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CONSERVATION CONNECTIVITY: FUTURE LEGAL PROSPECTS WITHIN SOUTH AFRICA AS SEEN THROUGH THE LENS OF THE BAVIAANSKLOOF MEGA RESERVE

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Student no: FRDNIC008 Name: Nicholas Fordyce

Date: 26 July 2013 Supervisor: Alexander Paterson

Abstract

South Africa's incredibly rich biological diversity is increasingly being lost or threatened as a consequence of development induced habitat degradation and urban sprawl, fragmentation of natural landscapes and the influence of global climate change. For the past four decades scientists have called for the creation of broad 'ecological networks' in which natural areas, which have varying degrees of legal protection, are functionally linked through a range of corridors, sustainable use zones and buffer zones. More recently, governments across the world have embraced the notion of 'connectivity conservation' and have given the concept significant recognition through various international instruments such as the Convention on Biological Diversity, the Convention on Migratory Species, the Ramsar Convention and the World Heritage Convention. Whilst South African environmental law does not call for the implementation of connectivity initiatives directly, it does, nonetheless, have a number of indirect tools within its environmental legal framework which can be used to promote connectivity conservation. This dissertation analyses which tools (for implementing connectivity initiatives) are available and used, which are available and unused and which are missing. This will achieved by assessing how the National Biodiversity Strategy and Action Plan, the National Biodiversity Framework and the National Spatial Biodiversity Assessment, as well as the relevant sustainable use, conservation, biodiversity, land-use and coastal management legislation is applied in the case of the Baviaanskloof Mega-Reserve (BMR), a connectivity initiative within the Eastern Cape Province of South Africa. The dissertation reveals how, despite surprisingly few of these tools being used for the BMR, those that have, have proven sufficient in promoting connectivity conservation.

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List of Abbreviations

BMR	Baviaanskloof Mega-Reserve
BMRP	Baviaanskloof Mega-Reserve Project
BNR	Baviaanskloof Nature Reserve
BSC	Baviaanskloof Steering Committee
BCI	Biodiversity Citrus Initiative
CAPE	Cape Action for People and the Environment
CARA	Conservation of Agricultural Resources Act
CBD	Convention on Biological Diversity
CFR	Cape Floristic Region
CMS	Convention on Migratory Species
COP	Conference of Parties
DEAET	Department of Economic Affairs, Environment and Tourism
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
ECPB	Eastern Cape Parks Board
ECPTA	Eastern Cape Parks and Tourism Agency
EIA	Environmental Impact Assessment
IDP	Intergrated Development Plan
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
GEF	Global Environment Facility
NBF	National Biodiversity Framework
NBSAP	National Biodiversity Strategy and Action Plan
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEMPAA	National Environmental Management Protected Areas Act
NPAES	National Protected Areas Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
PMU	Project Management Unit
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SDF	Spatial Development Framework
SO	Strategic Objective
SKEP	Succulent Karoo Ecosystems Programme
STEP	Subtropical Thicket Ecosystem Planning
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCC	World Conservation Congress
WHS	World Heritage Site
WPC	World Parks Congress

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Chapter 1: Introduction

1.1 Context

South Africa, despite occupying only two per cent of the world's surface area,[1] is the third most biologically diverse country in the world.[2] It is one of the 17 members that make up the 'Megadiverse Countries'[3] which, together, comprise more than two thirds of the world's biodiversity.[4] This diversity is a consequence of the incredibly diverse landscapes found within the country. Indeed, South Africa comprises an astonishing array of biomes which include Mediterranean-type, arid, alpine and tropical environments.[5] Three internationally recognized biodiversity hotspots[6] are found in South Africa: the Cape Florist Region (the fynbos biome), the Succulent Karoo[7] and the Maputaland-Pondoland-Albany centre of endemism.[8] South Africa has around seven per cent of the world's vertebrate species with 247 mammal species and 842 bird species.[9] It has in excess of 23 000 angiosperms (flowering plants – of which more than eighty percent are endemic)[10], and 5.5 per cent of the world's known insect species.[11] Marine biological diversity is also high. There are over 11 000

[1] Giri, CP, Shrestha, s, Foresman, TW and Singh, A (2000) Global Biodiversity Data and Information. PDF Available at: http://www.unescap.org/stat/envstat/stwes-26.pdf. Accessed 09/03/2013

[2] Sandwith, T. 2002. Introduction. In: Pierce, S.M., Cowling, R.M., Sandwith, T. and Mackinnon, K. (eds.), Mainstreaming Biodiversity in Development: Case Studies from South Africa. Washington, D.C., The World Bank, pp.1-4. At page 1.

[3] On 18th February 2002, these countries set up a group of 'Like-Minded Megadiverse Countries' as a mechanism for consultation and cooperation with interests pertaining to the preservation and sustainable use of biological diversity. Full list of megadiverse countries available at http://www.conservation.org/documentaries/Pages/megadiversity.aspx. Accessed 10/03/2013.

[4] The term 'biodiversity' was first used by Thomas E. Lovejoy (1980) and later by Norse and McManus (1980) as a means of describing a concept which incorporated both biological and genetic diversity. It is no widely used in both the scientific and legal literature. The CBD defines biodiversity as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.' See Hamilton AJ. Species diversity or biodiversity? *Journal of Environmental Management* 75 (2005) 89–92.

[5] Sandwith, 2002. Page 1.

[6] A biodiversity hotspot is a bio-geographic region with a significant reservoir of biodiversity that is under threat from humans. The concept was created by Norman Myers in an article in 'The Environmentalist' in 1988. See Myers, N. The Environmentalist 8 187-208 (1988).

[7] The Succulent Karoo is one of two desert biodiversity hotspots in the world. The other desert hotspot is the Horn of Africa.

[8] See http://www.cbd.int/countries/profile/?country=za#status. Accessed 07/03/2013.

[9] South African National Biodiversity Institute (SANBI). 2013. Life: the state of South Africa's biodiversity 2012. South African National Biodiversity Institute, Pretoria.

[10] Paine, J.R., 1997. *Status, trends and future scenarios for forest conservation including protected areas in the Asia-pacific Region*. Asia-Pacific Forestry Sector Outlook Study Working Paper Seris No. 4, FAO, Rome.

[11] Giri et al. 2000.

species found in South African waters, which accounts for about fifteen per cent of global species, with more than 25 per cent of these marine species (or 3 496 species) being endemic to South Africa.[12] In short, South Africa is a veritable 'overlord' when it comes to biological wealth.

Nonetheless, South Africa is losing this biodiversity at an increasingly rapid rate as the country's wilderness areas become increasing fragmented and marginalised. The most recent assessment of the nation's biological resources highlights that 40 per cent of terrestrial ecosystems,[13] 57 per cent of river ecosystems, 65 per cent of wetland ecosystems,[14] 43 per cent of estuary ecosystems[15] and 58 per cent of coastal and inshore ecosystem types are threatened.[16] A great challenge lies ahead in protecting this biodiversity from the numerous threats to its long term (and in some cases short term) survival. James Leape, Director General for WWF International, recently highlighted the plight facing the world and its biodiversity:

> '...the unprecedented drive for wealth and well-being of the past 40 years is putting unsustainable pressures on our planet. The Ecological Footprint[17] shows a doubling of our demands on the natural

[12] SANBI, 2013.

[13] Jonas, Z., Daniels, F., Driver, A., Malatji, K.N., Dlamini, M., Malebu, T., April, V. & Holness, S. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 1: Terrestrial Component. South African National Biodiversity Institute, Pretoria.

[14] Nel J.L. and Driver A. 2012. South African National Biodiversity Assessment 2011: Technical Report. Volume 2: Freshwater Component. CSIR Report Number CSIR/NRE/ECO/IR/2012/0022/A, Council for Scientific and Industrial Research, Stellenbosch. Page 8.

[15] Van Niekerk, L. and Turpie, J.K. (eds) 2012. South African National Biodiversity Assessment 2011: Technical Report. Volume 3: Estuary Component. CSIR Report Number CSIR/NRE/ECOS/ER/2011/0045/B. Council for Scientific and Industrial Research, Stellenbosch

[16] Sink K, Holness S, Harris L, Majiedt P, Atkinson L, Robinson T, Kirkman S, Hutchings L, Leslie R, Lamberth S, Kerwath S, von der Heyden S, Lombard A, Attwood C, Branch G, Fairweather T, Taljaard S, Weerts S, Cowley P, Awad A, Halpern B, Grantham H, Wolf T. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute, Pretoria. Pp 325. Page 5.

[17] The ecological footprint is a measure of human demand on the Earth's ecosystems. It represents the amount of biologically productive land and sea area necessary to supply the resources a human population consumes, and to assimilate the associated waste.

> world since the 1960s, while the Living Planet Index[18] tracks a fall of 30 per cent[19] in the health of species that are the foundation of the ecosystem services on which we all depend.'[20]

Within the South African context, the challenge of protecting our natural capital is compounded by the legacy of South Africa's transition to a constitutional democracy. Environmental issues have been pushed to one side to accommodate political and budgetary priorities accorded to socio-economic development imperatives, the need to promote rural development amongst impoverished communities, large scale rural land tenure reform and land redistribution, and the creation of a highly fragmented governance regime particularly evident in the environmental sector.[21] Conservation efforts within the country have to incorporate these issues in order to have any chance of being successful.

Worldwide, protected areas remain the key strategy for the conservation of biodiversity in all aspects, including the diversity of genes, species, and ecosystems.[22] Countries, particularly developing ones, have made significant efforts to expand their protected area systems since the 1960s.[23] In most cases some form of legal protection has been afforded to these protected areas.[24] According to the latest global data on protected areas, by 2010 there were some 200,000 protected areas with legal recognition covering 12.7 per cent of the world's land area; this compared with about 1.5 per cent coverage in the 1960s.[25]

[18] The Living Planet Index (LPI) is an indicator of the state of global biological diversity, based on trends in vertebrate populations of species from around the world. The LPI provides the general public, scientists and policy-makers with information on trends in the abundance of the world's vertebrates and offers insights into which habitats or ecosystems have species that are declining most rapidly. This information can be used to define the impact humans are having on the planet and for guiding actions to address biodiversity loss.

[19] The index shows a decline of around 30 per cent from 1970 to 2007, based on 9014 populations of 2688 mammal, bird, reptile, amphibian and fish species – many more than in previous editions of the Living Planet Report (WWF, 2006; 2008; 2010). See WWF 2012. The Living Planet Report: Biodiversity, biocapacity and development. WWF-International, Gland, Switzerland. Page 18.

[20] Leape, J. Focussing on the Future. In WWF 2010. The Living Planet Report: Biodiversity, biocapacity and development. WWF-International, Gland, Switzerland. Page 4.

[21] Paterson AR. 'Connectivity Conservation through the eyes of the Greater Cederberg Biodiversity Corridor' in Lausche, Barbara. (2012). *The Legal Aspects of Connectivity Conservation. Volume 2 – Case Studies, DRAFT 12.11.2012*, IUCN, Gland, Switzerland. 78 pp. Page 51.

[22] Lausche, Barbara ' The Legal Aspects of Connectivity Conservation. Volume 1 – A Concept Paper, DRAFT' (2012) IUCN, Gland, Switzerland. Page 21.

[23] Worboys, G, L. 2008. *Large scale connectivity conservation in mountains: a critical response to climate change.* A paper presented to the international workshop on protected area management and biodiversity conservation, East Asia. Taipei, Taiwan. 12pp. Page 1

[24] West, Igoe and Brockington (2006).

[25] UN Millennium Development Goals Report 2011. Available at: http://www.un.org/millenniumgoals/11_MDG%20Report_EN.pdf. Accessed 3 January 2013.

Despite this legal protection and the increase in the number of protected areas across the world, scientific studies continue to show that biodiversity is being lost at significant rates.[26] The principle factors for this decline are decades of development-induced habitat degradation and landscape fragmentation, over exploitation of natural resources and anthropogenic induced climate change.[27] The combined result of these factors is that protected areas are often just small 'islands' in an otherwise disturbed and developed matrix. Moreover, genes, species and populations are increasingly being isolated with little chance of dispersal and mixing. Climate change poses arguably the greatest contemporary challenge to biodiversity conservation and protected areas, in isolation, are proving an insufficient solution to the escalating crisis. Animals and plants are changing their distribution and dispersal patterns in response to climatic changes and often move beyond protected areas. Worst of all is that the bulk of the earth's biodiversity falls outside of protected areas. A broader, more holistic approach in needed to adequately conserve biodiversity. The past four decades has seen significant scientific and theoretical development in how we approach biodiversity conservation and resulted in a relatively new approach to conservation in the form of connectivity conservation.[28]

> 'To ensure the survival, health and resilience of all species, including humans, we need to look at how we can rehabilitate and "reconnect" islands of vegetation on a large scale, so a mosaic of ecosystems can exist across the landscape which can function more effectively.'[29]

Connectivity conservation primarily helps in maintaining ecological processes which provide important goods and services for nature and people. It works by linking landscapes and creating continuity between protected areas and natural habitat.[30] In so doing, it tackles issues of fragmentation (consequently enhancing dispersal and genetic mixing), 'edge effects'[31] and

[26] Lausche, 2012.
[27] WWF 2012. Page 16.
[28] The concept of 'connectivity' first emerged in the early 1970s in response to the issues that were raised in E. O. Wilson and Robert MacArthur's 'Theory of Island Biogeography' paper which was published in 1967. It is only in the last two decades that connectivity has really taken off and garnered significant international recognition. For further reading see MacArthur, R. H. and Wilson, E. O. 1967. The Theory of Island Biogeography. Princeton, N.J.: Princeton University Press
[29] See The Great Eastern Ranges – Fact Sheet. Available online at: http://www.greateasternranges.org.au/images/stories/downloads/connectivity-conservation.pdf. Accessed 12/02/2013.
[30] Worboys, 2008. Page 2.
[31] The 'edge effect' refers to the changes in the population or community structure that occur at the point where two habitat types or landscapes meet (in this instance protected areas and the adjacent, unprotected, 'matrix' landscape). The smaller the habitat fragment the more pronounced the edge effect.

habitat degradation, whilst also helping to alleviate the negative effects of climate change.[32] In its infancy, connectivity conservation was limited to a simplistic design of a strip of land, or linear linkage, which joined two or more conservation areas. More recently, the scientific emphasis has shifted from its simplistic and narrow origins towards a wider variety of spatial arrangements, all of which are useful to link habitats and to protect ecosystem processes across fragmented landscapes and seascapes.[33]

Whilst the past four decades has seen the scientific community make important strides in understanding and applying connectivity conservation across a range of scales and functions, the role of law in connectivity conservation is still very much in the early stages of development.[34] This dissertation looks at the growing recognition for connectivity conservation and seeks to analyse what legal tools are available within South Africa's environmental legal framework that can be used to facilitate connectivity conservation initiatives within the country. The dissertation will make use of a case study, the Baviaanskloof Mega-Reserve in the Eastern Cape Province of South Africa, to assess what legal tools are available, the extent to which they are being used and what additional tools could be introduced to further promote connectivity conservation in the future.

1.2 Relevance

The majority of the Earth's surface is not formally protected, meaning that the future of most of the Earth's biodiversity, and its ability to adapt to climate change,[35] depends on how 'matrix areas'[36] are managed.[37] Climate change also presents a serious threat to human welfare[38] and sustainable development.[39] Connectivity conservation offers a potential

[32] Worbots, 2008. Page 2.
[33] Lausche, 2012. Page 21.
[34] Lausche, 2012. Page 21.
[35] Aune, K., P. Beier, J. Hilty, and F. Shilling. 2011. Assessment & Planning for Ecological Connectivity: A Practical Guide. Bozeman, MT., USA: Wildlife Conservation Society.
[36] The term 'matrix' is often used to describe the physical and biotic dimensions of human modified and unprotected connecting landscapes in an ecological network. Consequently, matrix habitats form the largest portion of critical connecting habitat and their management is important for maintaining biological diversity. See Lindenmayer, D. B. and J. F. Franklin. 2002. Conserving forest biodiversity: A comprehensive multi-scaled approach. Island Press. Washington D.C. 351pp.
[37] Franklin and Lindenmayer. 2009.
[38] Chambwera, M. and Stage, J. 2010. Climate change adaptation in developing countries: issues and perspectives for economic analysis. International Institute for Environment and Development (IIED), London. Pp 39.

solution and has recently gained international attention as a consequence of its growing relevance to biodiversity conservation, socio-economic development and climate change mitigation and adaptation.[40]

1.2.1 Biodiversity

The most significant impact that humans have on biodiversity is the reduction of natural connectivity of landscapes.[41] Since 1945, more land has been converted to cropland than in the eighteenth and nineteenth centuries combined.[42] Without connectivity, species become genetically isolated and unable to disperse.[43] Connectivity is important because it helps to maintain important ecological processes which are critical for the survival of the plants and animals that make ecosystems whole.[44]

> 'The most important insight that followed from these theories [connectivity conservation] was that habitat fragmentation increases the vulnerability of species populations by reducing the area of habitat available to local populations.'[45]

Despite some sceptics[46] scientists at Utah State University reviewed 78 experiments from 36 studies between 1988 and 2008.[47] They found that corridors increased movement between habitat patches by approximately fifty per cent compared to isolated patches, showing that connectivity is hugely beneficial to a wide range of animal and plant forms.

[39] World Bank. 2008. Biodiversity, Climate Change and Adaptation: Nature-based solutions from the World Bank Portfolio. World Bank: Washington DC. Page 1.
[40] Lausche, 2012.
[41] Worboys, 2008. Page 1.
[42] Millennium Ecosystem Assessment report 2005. Page 18. Cultivated systems now cover one quarter of Earth's terrestrial surface.
[43] Lindenmayer, D.B., and J. Fischer. 2006. *Habitat Fragmentation and Landscape Change: An Ecological and Conservation Synthesis.* Washington, DC: Island Press.
[44] Bennett, A.F. (2003). *Linkages in the landscape. The role of corridors and connectivity in wildlife conservation.* IUCN. Gland.
[45] Bennett, G. Green Infrastructure In-Depth Case Analysis Theme 1: Ecological Networks ENV.B.2./SER/2010/0059. Page 1.
[46] Simberloff, D., J. A. Farr, J. Cox, and D. W. Mehlman. 1992. Movement corridors: conservation bargains or poor investments? *Conservation Biology* 6:493-504. For further reading on this topic see Simberloff, D., and J. Cox. 1987. Consequences and costs of conservation corridors. *Conservation Biology* 1:63-71. And Hobbs, R. J. 1992. The role of corridors in conservation: solution or bandwagon? *Trends in Ecology and Evolution* 7:389-392.
[47] Gilbert-Norton, L., R. Wilson, J. R. Stevens, K. H., Beard. 2010. Corridors increase movement: a meta-analytical review. *Conservation Biology* 24: 660-668. Page 660.

> 'It just makes sense to keep natural bushland that has always been interconnected in an unfragmented state, particularly when it has been this way for geological epochs.'[48]

In light of the global threats facing biodiversity and ecosystems, the ecological benefits continue to represent connectivity conservation's most compelling case.[49]

1.2.2 Climate Change

Climate change[50] presents one of the greatest long-term threats to protected areas and biodiversity conservation.[51] Protected areas already face significant development pressures and external threats and climate change will only serve to exacerbate these problems.[52] Climate modelling, completed by the Intergovernmental Panel on Climate Change (IPCC) in 2007, identified many anticipated climatic changes including increased temperatures worldwide and marked seasonal drying for Southern Africa.[53]

Despite these predictions, there remains substantial uncertainty regarding how climate change will affect species and communities and how they will adapt to the changes.[54] Because of this uncertainty, scientists agree that retaining as much high quality natural and semi-natural habitat as possible should remain a key focus for conservation.[55] Based on the precautionary principle, it is important that large scale areas be conserved, since they maintain opportunities for many species to survive and move and for ecosystem processes to persist.[56] The opposite, habitat destruction and fragmentation, leads to extinctions.[57] Unfortunately many human-

[48] Worboys, 2008. Page 2.
[49] Lausche, 2012. Page 47.
[50] Climate Change is defined as 'a statistically significant variation in the mean state of the climate or its variability, which persists for an extended period (typically decades or longer).' Climate change may be caused by natural internal processes or external forces or by persistent anthropogenic changes in the composition of the atmosphere or land use. Further reading available at http://www.ipcc.ch/index.htm. Accessed 13/03/2013.
[51] Worboys, 2008.Page 3.
[52] Lausche, 2012. Page 49.
[53] IPCC. 2007. For the first time in human history atmospheric carbon dioxide levels in the atmosphere have risen above 400ppm. See http://www.guardian.co.uk/environment/2013/may/14/record-400ppm-co2-carbon-emissions. Accessed 15/05/2013.
[54] Heller, N.E. and Zavaleta, E.S. (2009). Biodiversity management in the face of climate change: A review of 22 years of recommendations. Biological Conservation, 142: 14-32. Page 23.
[55] Hodgson, J.A., C. D. Thomas, B. A. Wintle, and A. Moilanen. 2009. Climate change, connectivity and conservation decision making: back to basics. Journal of Applied Ecology, 46 (5): 964–969. At 968.
[56] Bennett, A.F., Crooks, K.R. and Sanjayan (2006). The future of connectivity conservation. In (Eds). Crooks, K.R. and Sanjayan, M. *Connectivity conservation*. Cambridge University Press. Cambridge.
[57] IUCN (2004). *2004 IUCN Red List of threatened species. A global species assessment.* IUCN Species Survival Commission. Gland.

focussed climate change adaptation strategies conflict with conservation efforts.[58] Protecting ecosystems from climate change will require both prospective (mitigation approaches) and retrospective action (adaptation to change).[59] In this regard connectivity conservation can be expected as a global and adaptive response to climate change,[60] since it can be used as both a 'prospective tool' and a 'retrospective remedy'.[61]

1.2.3 Social and Economic Relevance

The world's population continues to grow rapidly and doubled from three billion to six billion between 1960 and 2000 whilst the global economy increased more than six-fold.[62] Consequently, the value and demand for a multitude of ecosystem services[63] has increased.[64] The future of human communities, their livelihoods, and their socio-economic systems hinges on the resilience of the ecosystems on which they depend.[65] Promoting connectivity provides social, economic, and environmental benefits both directly, through more sustainable management of biological resources, and indirectly, through protection of ecosystem services.[66]

Isolated protected areas frequently exist at the expense of local communities (through decreased access to resources, crop damage from wild animals, or the opportunity cost of using that habitat for another purpose).[67] There is consensus on the need to give a human context to conservation since protected areas must function in a human context as well as a natural one. Socio-economic factors have a significant role in deciding which conservation

[58] Hulme, P. E. 2005. Adapting to climate change: is there scope for ecological management in the face of a global threat? Journal of Applied Ecology 42: 784–794. Page 784.
[59] Omann, I., Stocker, A. and Jager, J. 2009. Climate change as a threat to biodiversity: An application of the DPSIR approach. Ecological Economics 69 (1): 24-31. Page 24.
[60] Aune et al, 2011. Page 6.
[61] Aune et al, 2011. Page 6.
[62] See http://www.un.org/esa/population/publications/sixbillion/sixbilpart1.pdf. Accessed 11/03/2013.
[63] Examples of ecological goods or services include clean air, fresh water, nutrient cycling, food, disease management, climate regulation, spiritual fulfilment, recreation, maintenance of biodiversity, decomposition of wastes, soil and vegetation generation and renewal, pollination of crops and natural vegetation, groundwater recharge, seed dispersal, greenhouse gas mitigation through carbon storage and aesthetic enjoyment. See Mackey, B.G., Watson, J.E.M. and Hope, G. (2008). Climate change, biodiversity conservation, and the role of protected areas: an Australian perspective. *Biodiversity*. 9(3&4): 11-18.
[64] Millennium Ecosystem Assessment report 2005. Page 17.
[65] Lausche, 2012. Page 47.
[66] World Bank. 2008.
[67] Jeffrey A. McNecly in: Lewis, C. (1996). *Managing Conflicts in Protected Areas.* IUCN, Gland, Switzerland, Cambridge, UK. xii + 100 pp. At page xii.

priorities are economically or politically feasible.[68] The mosaic of land-use types characteristic of connectivity initiatives provides opportunities to conserve natural landscapes whilst simultaneously providing local communities with invaluable ecosystem services and land-derived economic opportunities.

1.2.4 Aichi Targets

Governments around the world have recently given connectivity conservation increased international recognition with parties at the Convention on Biological Diversity – Conference of Parties (CBD COP) 10 adopting the 'Strategic Plan for Biodiversity 2011-2020'.[69] The plan consists of 5 strategic goals and 20 biodiversity targets called the Aichi Biodiversity Targets.[70] While all the Targets have relevance for connectivity conservation, Target 11 is most explicit. It states:

> 'By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.'

The Targets, specifically Target 11, are the most recent and significant indication that connectivity conservation has arrived and will be at the forefront of conservation efforts in the future.

1.3 Nature, Scope and Purpose

In light of a number of aforementioned threats[71] to biodiversity conservation facing South Africa, this dissertation investigates what legal tools, both international and domestic, are available for encouraging and implementing connectivity conservation initiatives within South Africa. This will be done by identifying the theoretical tools entrenched in international agreements, to which South Africa is a ratified member, and in domestic legislation, which is

[68] Crooks, K. R., and M. Sanjayan, eds. 2006. *Connectivity Conservation.* United Kingdom: Cambridge University Press. Page 37.
[69] COP Decision X/2, 2010.
[70] Convention on Biological Diversity (CBD). 2012. Report of the Global Workshop on National Experiences in implementing the Strategic Plan for Biodiversity 2011-2020. Brasillia, Brazil. Available online at: https://www.cbd.int/sp/global-workshop/ Page 3.
[71] Landscape fragmentation, habitat degradation, development and climate change.

of relevance to connectivity conservation. Connectivity conservation initiatives vary in their geographic scales, from international scale,[72] to regional[73] and finally, national scale.[74] The scope of this paper is limited to a national scale as it deals with a case study which is confined to the South-East of South Africa.

At the national, provincial and local levels, the legal tools that may be available for connectivity conservation range from direct regulation requiring implementation to incentives and other economic instruments promoting implementation through voluntary action. The IUCN's 'Guidelines on Protected Areas Legislation'[75] identify several elements important to address in connectivity conservation initiatives. These elements include system planning and design, management planning for specific sites, buffer zones, and achieving specific biodiversity objectives where integration in the broader landscape and seascape; and, in some cases, the formation of ecological networks (for example, for migratory species).[76] These serve as themes against which this dissertation will seek to analyse South Africa's legal framework and assess whether South Africa possesses the right tools to enable these elements.

There are also legal aspects which are external to protected areas systems and networks. These aspects include conservation laws, sustainable resource use laws, land use planning laws and development control laws. Connectivity conservation outside protected areas mostly involves non-state owned or non-state controlled lands and resources. In many cases a wide range of land tenure systems and rights holders, which include local communities and indigenous peoples, NGOs, private individuals and corporations, have controlling interests in how lands identified for connectivity conservation are managed. The larger the landscape/seascape under consideration, the more likely there will be a combination of

[72] International level -- relevant treaties and programmes that may set out global obligations, commitments, or guidance, including under CBD and UNFCCC mechanisms, for countries to support connectivity conservation in the context of their protected area systems and networks.
[73] Regional level – continent-wide, multi-country and transnational level initiatives, including European Union directives and Pan-European initiatives, and lessons being learned with regional agreements and programmes requiring or promoting connectivity conservation;
[74] National/sub-national level – legal instruments and related tools useful to help achieve connectivity conservation at a country level and at provincial, state, and local levels to the extent to which conservation authority exists. See Lausche, 2012. Pages 22 and 23.
[75] Lausche, Barbara. (2011). Guidelines for Protected Areas Legislation. IUCN, Gland, Switzerland. xxvi + 370 pp. Page 24
[76] Lausche, 2012. Page 25.

interests. The extent to which this is true will be assessed using the case study of the Baviaanskloof Mega-Reserve (BMR).

1.4 Structure

This chapter has briefly introduced connectivity conservation and highlighted its relevance to, and usefulness in improving conservation efforts (of both ecosystems and species), adapting to anticipated climate shifts, mitigating other climate threats and providing opportunities for social development and economic benefits for local communities.

With connectivity's relevance to a number of contemporary environmental challenges established, chapter two analyses, in more detail, the history, science and rationale behind connectivity conservation and introduces a range of connectivity 'types'. It moves on to reveal how increased international recognition for connectivity conservation has seen it emerge as a major future conservation strategy moving forward. The chapter looks at the international legal framework which is of relevance to connectivity conservation and, in particular, at conventions and treaties which South Africa has ratified. These include the Convention on Biological Diversity – Conference of Parties[77] (CBD COP), the Convention on Wetlands of International Importance especially as Waterfowl Habitat[78] (Ramsar Convention) and the Convention on Migratory Species[79] (CMS).

With that in mind, chapter three introduces the case study, the BMR, providing an overview of the area's biological importance, its potential as a connectivity initiative with a mosaic of land-uses all with varying degrees of legal protection and a multitude of local community projects. The chapter will begin by briefly summarising important milestones in the initiative's history whilst simultaneously identifying and describing the roles of the various stakeholders involved in the initiative such as Cape Action for People and the Environment (CAPE), the Wilderness Foundation and The Eastern Cape Parks Board (ECPB). Important milestones and key developments in the formation of the BMR will be highlighted.

[77] Convention on Biological Diversity, Jun. 5, 1992, 1760 U.N.T.S. 79, 31 I.L.M. 818.
[78] Convention on Wetlands of International Importance especially as Waterfowl Habitat, Feb. 2, 1971, 11 l.LM. 969 (1972).
[79] Convention on the Conservation of Migratory Species of Wild Animals, June 3, 1979, 19 I.L.M. 15.

Chapter four looks at South Africa's legal framework of relevance to connectivity with a particular emphasis placed on how it is applied, practically, in the case of the BMR. In particular the laws and policies within South Africa's environmental legal framework including conservation, biodiversity, land-use planning, coastal management, sustainable-use and fiscal legislation will be analysed in relation to their practical influence and role in the BMR. Using the case study the dissertation explores how each of these laws and legal tools are applied in the context of the BMR and will highlight the opportunities provided by, and constraints associated with, the use of these legal tools in promoting connectivity conservation.

Chapter five concludes the dissertation by highlighting the important lessons learnt from the BMR case study. The chapter will summarise what legal tools are important in facilitating connectivity initiatives, what legal tools have proven less useful and what tools are missing from the current legal framework that might assist future domestic connectivity initiatives.

Chapter 2: Understanding the Science, Rationale and Growing Recognition for Connectivity Conservation

2.1 A Brief History of Conservation

Conservation as we know it, first took root on 1 March 1872, when Ulysses S. Grant signed *The Act of Dedication*;[80] the law that gave rise to Yellowstone National Park.[81] Yellowstone became the world's first legally recognised protected area and thus provided a model which was subsequently mimicked by many other nations seeking to protect wilderness areas. In South Africa, the Hluhluwe Game Reserve and the Kruger National Park were proclaimed in 1895[82] and 1926 respectively, with the latter being idealised as the 'Yellowstone of the Transvaal'.[83]

The proclamation of Yellowstone National Park coincided with, and was largely driven by, the Wilderness Movement in the United States. George Perkins Marsh,[84] an early advocate of the 'Wilderness Conservation' theory,[85] encapsulated the rationale central to the theory by stressing the importance of pristine nature without the disturbance of humans:[86] "Where [man] plants his foot, the harmonies of nature are turned to discords [sic]."[87]

Today, the conservation ideology which governs the way we conserve and protect biodiversity and ecosystems is significantly different from that which gave rise to Wilderness Conservation theory. Kalamandeen and Gillson describe a sequence of conservation

[80] The Act of Dedication provided the first substantiation of conservation theory. "An Act to set apart a certain tract of land lying near the headwaters of the Yellowstone River as a public park [...] and all persons who shall locate, or settle upon, or occupy the same or any part thereof, except as hereinafter provided, shall be considered trespassers and removed there from [...]"

[81] U.S. Department of the Interior. *Yellowstone: A Brief History of the Park*. Archived from the original on April 14, 2008.Accessed via: http://web.archive.org/web/20080414040117/http://www.nps.gov/yell/planyourvisit/upload/Yell257.pdf
See also: Nash, R. 1970. The American Invention of National Parks. *American Quarterly* 22(2): 725-735.

[82] See http://hluhluwegamereserve.com/hluhluwe-game-reserve-history.

[83] WCPA (2005) World database on Protected Areas. Accessed via: http://www.sea.unep-wcmc.org/wdbpa/ See also Dennis and Scholes (1995)

[84] George Perkins Marsh was an American diplomat who is widely regarded as the first environmentalist or conservationist. See http://www.uh.edu/engines/epi595.htm.

[85] Early conservation theory was based on a wilderness and preservationist mentality. Humans were seen as a destructive force that needed to be kept separate from wilderness areas. For further reading see Kalamandeen, M. and Gillson, L. 2007. Demything "wilderness": implications for protected area designation and management. *Biodiversity Conservation* 16(1): 165-182.

[86] Kalamandeen, M. and Gillson, L. 2007. Demything "wilderness": implications for protected area designation and management. *Biodiversity Conservation* 16(1): 165-182. At 168.

[87] George Perkins Marsh 1864, p. 36

approaches, each of which has risen to prominence only to be replaced by a newer and more 'progressive' approach.[88] These approaches are (1) Wilderness conservation and the Yellowstone Model; (2) Wise-use and the Game Reserve Model;[89] (3) Wildlife and Biodiversity conservation; and (4) Ecosystem Management.[90] Central to these changes has been a paradigm shift in the ideology of conservation. Historically, conservation sought to keep ecosystems unaltered because their 'present state' was perceived to be in a state of 'equilibrium' and highly fragile.[91] Over time there have been conceptual and theoretical shifts in conservation ecology with ideas of variability, flux and resilience gradually replacing the older ideas of equilibrium, fragility and balance that were characteristic of the Wilderness Conservation and Wise-Use models.[92]

In spite of these changes, protected areas remain the cornerstone of global biodiversity conservation and the IUCN's[93] major focal point since its origin in 1948.[94] Since the 1960s, countries have made important strides in expanding their protected area systems (figure 1.1). This is especially true in developing countries (figure 1.1B) where, in most cases, some form of legal protection has been afforded to these protected areas.[95] During the 1960s, protected areas accounted for about 1.5 per cent of the earth's surface.[96] Today, 12.7 per cent of the

[88] Kalamandeen and Gillson, 2007. At page 165.
[89] The Organic Act, passed in the USA in 1897, encapsulated the principle of ''Wise Use'' and became the foundation for later conservation policy based on the management and use of natural resources. The act contained a congressional rider that allowed for the selective harvesting of individual older trees. Key to the 'Wise-Use' approach was the strict control of, or even the prohibition of, access and use of natural resources in these areas.
[90] The 'Wildlife and Biodiversity' and 'Ecosystem Management' Models have resulted in the conservation rationale for protected area designation and management shifting from aesthetic and natural resources, to preservation of wildlife and biodiversity. This resulted from an interest in protecting animals for their own sakes, and for preserving species for science and for the potential and actual benefits they offer in terms of genetic resources and ecosystem services.
[91] This mentality underpinned the Wilderness Conservation and Wise-Use models. Despite the philosophical division that marked the origins of the Wilderness Conservation and Wise Use movements, the goals of these two contrasting approaches to conservation converged. Humans were regarded as a threat because ecosystems were viewed as fragile,and in a state of equilibrium with an intricate, easily disturbed balance. Thus, aesthetic and economic concerns resulted in the same practical conservation outcome; that of establishing protected areas, free from human inhabitation, where consumptive uses of natural resources was forbidden or strictly controlled. Ladle, R., J. and Gillson, L. 2009. The (im)balance of nature: a public perception time-lag? Public Understand. Sci. 18: 229–242.
[92] Gillson and Willis (2004).
[93] The International Union for Conservation of Nature (IUCN) is an international organization dedicated to finding "pragmatic solutions to our most pressing environment and development challenges". Retrieved from iucn.org on 12 October 2012.
[94] Wilkinson, Z. 2011. Preparing for the 6th IUCN World Parks Congress 2014: A Draft Background Discussion Paper. 34 pp. Page 2.
[95] West, Igoe and Brockington (2006).
[96] Source from the United Nations Millennium Development Goals Report 2012. Available at: http://www.un.org/en/development/desa/publications/mdg-report-2012.html. Accessed 10/01/2013. Page 51.

earth's surface had been formally protected in roughly 200,000 protected areas[97] with an additional 1.6 per cent of the global ocean area now protected.[98]

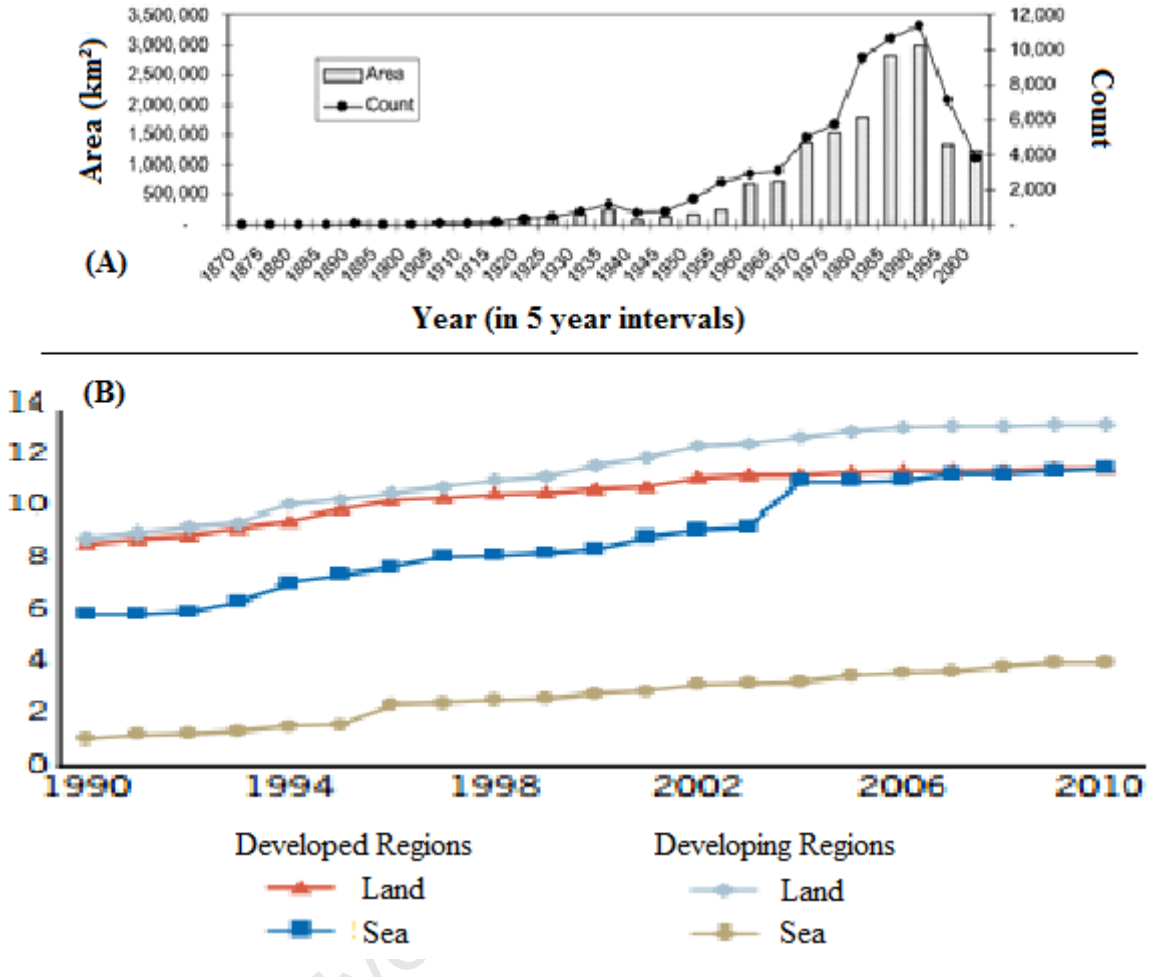

Figure 1.1: (A) The global growth of protected areas since the first protected area, Yellowstone National Park, was proclaimed in 1872.[99] (B) The proportion of terrestrial areas and coastal waters protected from 1990 – 2010 (Percentage).[100]

Despite the increase in the number of protected areas, biodiversity continues to be lost as ecosystems are fragmented and degraded.[101] Protected areas are proving ineffective in controlling the pressures that stem from urbanisation, development and climate change. They

[97] UN Millennium Development Goals. Page 51.
[98] Bastian Bertzky, Colleen Corrigan, James Kemsey, Siobhan Kenney, Corinna Ravilious, Charles Besançon and Neil Burgess (2012) Protected Planet Report 2012: Tracking progress towards global targets for protected areas. IUCN, Gland, Switzerland and UNEP-WCMC, Cambridge, UK.
[99] Figure taken from West, Igoe and Brockington, 2006.
[100] Source from the United Nations Millennium Development Goals Report 2011. Available at: http://www.un.org/millenniumgoals/11_MDG%20Report_EN.pdf Accessed 10/01/2013.
[101] Lausche, 2012 Page 21.

are commonly impacted and dependent upon the ecological processes of the larger ecosystems of which they are a part.[102] Within larger ecosystems, lands and resources outside the boundaries of designated protected areas may have intensive uses such as agriculture, settlements, manufacturing, mining etc and many of these have potentially negative effects on the protected area, both directly or in surrounding areas that impact the area.[103]

In response to this, two major management approaches are being used; (l) an ecosystem-based approach to protected areas design and management and (2) shifting the emphasis from individual protected areas to protected area systems and networks. [104] These approaches enter the realm of connectivity conservation.

2.2 Connectivity Conservation

The concept of 'connectivity' first emerged as a consequence of the ground breaking theory of 'Island Biogeography' by Robert MacArthur and E. O. Wilson in 1967.[105] MacArthur and Wilson's theoretical work looked at the influence that 'island size' and 'proximity to other islands' had on a species' ability to colonise and survive on that island. They proposed that the number of species found on an island could be determined by a balance between the immigration rate (or the movement of species onto the island from other islands) and the extinction rate (Figure 1.2A). The theory also proposed that immigration and extinction rates are affected by the size of the island (Figure 1.2B) and its distance from another source (another island) of immigrant species (Figure 1.2C). Hence, a larger island that has close neighbouring islands has higher species diversity for two reasons: it is a larger target giving it a greater probability of becoming the home to immigrants, and it has a larger supply of resources necessary to prevent extinctions.

[102] These ecosystems can range from small scale (wetlands, forests etc.) to large scale (hydrological catchments, a particular species' home range etc.). An example of an ecological process which
[103] Hansen, A. J. & DeFries, R. 2007. Ecological Mechanisms Linking Protected Areas To Surrounding Lands. *Ecological Applications* 17 (4): 974–988.
[104] *Ibid.*
[105] See MacArthur, R. H. and Wilson, E. O. 1967. The Theory of Island Biogeography. Princeton, N.J.: Princeton University Press.

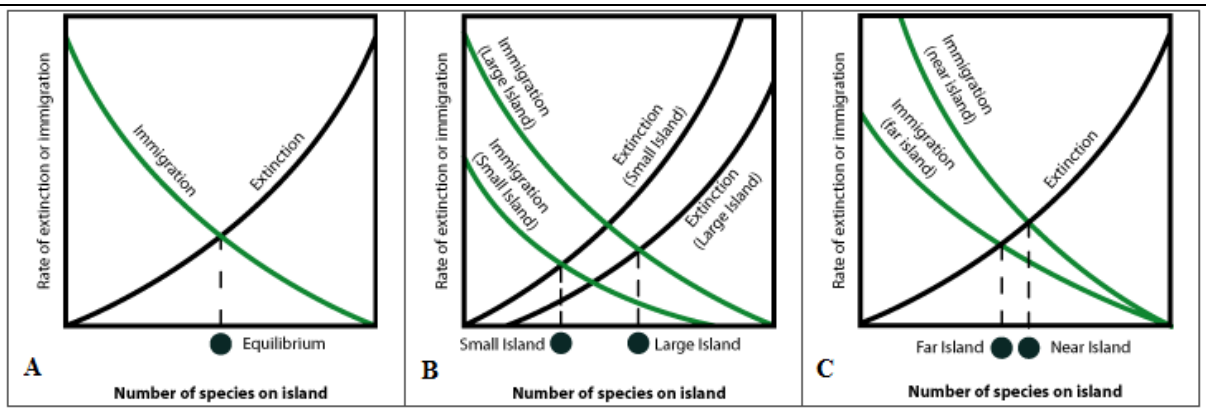

Figure 1.2: Theoretical relationships between immigration and extinction (A) on and between small and large islands (C), and the number of species these islands can support (B).[106]

However, it was only in the 1970s that the full extent of Island Biogeography was realised and biologists generalized the theory to isolated patches of terrestrial habitat (for example, mountains surrounded by deserts and protected areas surrounded by converted landscapes).[107] This led to research on fragmentation which generated more theories and concepts.[108] Conservationists realised that the models could be applied to theoretical 'islands' which had profound implications for protected area management. Protected areas and/or isolated habitats surrounded by a matrix of human-altered landscapes could also be considered islands and the broad principles outlined in the Theory of Island Biogeography could be applied to their management. Connectivity, as a response to increasing fragmentation and development of landscapes, provided a solution to the problem.

Wildlife corridors, habitat patches, stepping stones, and other spatial linkages (see figure 1.3 below) became tools for restoring natural linkages, connecting important habitats, facilitating species movement,[109] and sustaining ecosystem functions in highly fragmented areas.[110] Today, connectivity conservation is a widely accepted field of science, but this is a relatively new development.[111] It was defined during the 2006 Papallacta Conference as follows:

> 'The maintenance and restoration of ecosystem integrity requires landscape-scale areas functionally linked and buffered in ways that maintain ecosystem processes and allow species to survive and move,

[106] Graphs from http://www.algebralab.org/practice/practice.aspx?file=Reading_IslandBiogeography.xml. Accessed on 14 January 2013. For further reading see MacArthur, R. H. and Wilson, E. O. 1967. The Theory of Island Biogeography. Princeton, N.J.: Princeton University Press.
[107] Lindenmayer and Fischer, 2006. Page 32
[108] Worboys et al, 2010
[109] Shadie, and Moore, 2008.
[110] Lausche, 2012.
[111] Chester, C.C. and J.A. Hilty. (2010).

> thus ensuring that populations are viable and that ecosystems and people are able to adapt to land transformation and climate change. We call this proactive, holistic, and long-term approach connectivity conservation.'[112]

More recently, Lausche defines connectivity conservation as:

> '... a conservation measure in environments modified and fragmented by human impacts and development that aims to link habitats for wildlife conservation and to maintain ecological processes for the goods and services they provide.'[113]

The 'connectivity' aspect of connectivity conservation relates to those spatial arrangements and elements within a landscape/seascape that allow and promote natural movement of species across their habitats, and protect essential ecological processes and ecosystem services. The term 'landscape' (as used in this context) is broadly defined as:

> 'An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.'[114]

A landscape may be perceived differently by different species and so the level of connectivity needs may vary between species and species communities. This can vary from local small-scale areas for smaller sedentary animals to large-scale landscapes for wide-ranging birds or large mammals. [115] Finally, for the purposes of clarity, the terms 'Ecological Network' or 'Reserve Network', which come up in the literature and are used interchangeably, refer to:

> '... a coherent network of core areas and connectivity zones that facilitate dispersal, migration and genetic exchange between local species populations. The network may be further complemented with buffer zones and sustainable-use areas.'[116]

2.3 Connectivity Types

Landscape ecology gave rise to new terms and concepts which remain in use today in the connectivity literature.[117] Among these were four terms from which connectivity conservation science has evolved: 'patch', 'corridor', 'matrix', and 'mosaic' (sometimes referred to as the patch-corridor-matrix model).[118] They are defined accordingly below:

[112] Papallacta Declaration (2006)
[113] Lausche, 2012. Page 21.
[114] European Landscape Convention (2004)
[115] Lausche, 2012. Page 27.
[116] Bennett, 2010.
[117] Lindenmayer and Fischer. 2006.
[118] Lausche, 2012.

> Patch: 'a relatively homogeneous area that differs from its surroundings and is considered the basic unit of the landscape'.[119]

A patch has a definite shape and can be described by natural or other features. A particular biome will often be made up of a series of patches. In a savannah, for example, there are patches of tree-less grassed areas, patches of trees that could constitute a woodland habitat and patches that comprise an even density of trees and grasses. A related term, a 'stepping stone' (Figure 1.4), is one or more separate patches of habitat in the space between core protected areas.[120] These patches of habitat can be used during movement/migrations, for shelter, for feeding or for resting within a landscape in which other activities (such as agriculture) are taking place. Studies, like those by Bennett on the silver spotted skipper butterfly, have shown that stepping stones are extremely effective in providing a network of habitat refuges which the butterflies have used in order to re-colonise core areas that were previously inaccessible to them.[121] In this way, a group stepping stones can also be considered a form of corridor for aerial species.

> Corridor: 'a strip of land or water which links two or more isolated core areas and which differs from the adjacent land on both sides of it.'

A corridor can have several important functions which include conveyance, acting as a barrier, and providing habitat.[122] Corridors are one of the earliest practical recommendations arising from studies of habitat fragmentation.[123] There are two types of corridors; landscape corridors and linear corridors. Landscape corridors are a mosaic (patchwork) of contiguous natural cover that allows movement between habitat patches or protected areas (figure1.3). The Mesoamerican Biological Corridor, for example, one of the earliest corridor initiatives, contains landscape corridors that link clusters of protected areas. The land use in many of the Mesoamerican corridors includes not only natural or restored areas, but also areas under human use, especially agriculture. Nonetheless species are able to move between core areas by moving through agricultural areas.

[119] Forman, R.T.T. 1995. *Land Mosaics: The Ecology of Landscapes and Regions.* New York: Cambridge University Press.
[120] Bennett, 2003. Page 10.
[121] Bennett 2004
[122] Forman, 1995
[123] Bennett, 2003. Page 4.

Linear corridors comprise strips of natural habitat which are 'embedded' in an otherwise dissimilar matrix (see definition below). They connect two or more larger blocks of habitat and serve to enhance or maintain the viability of specific wildlife populations within the habitat blocks.[124] They provide connectivity between habitat fragments for target species. Examples of linear corridors include narrow corridors of natural vegetation connecting forest plantations and "ecoducts" (land bridges planted with grass and hedgerows) that enable animals to cross a motorway that cuts through a landscape. They can be very narrow (e.g., 40-80 meters wide) yet still perform a valuable linking function.

> Matrix: '*the background ecosystem or land-use type in which patches, corridors and other linkages are located*.'

Many of these 'matrix' areas are semi-natural lands that may be managed primarily for farming, timber, recreation or other human uses, but provide extensive cover and high connectivity.[125] They are often incorporated into the aforementioned landscape corridors. Matrix lands can vary from providing high levels of connectivity through to providing little or no connectivity based on how degraded and exploited they are. In conservation management, the goal is for matrix areas to provide some connectivity benefits overall and also to support the patches and linkages within the area.

The concepts of patches, corridors and the matrix are often discussed in scientific literature within the context of the broader landscape 'mosaic'.[126]

> Mosaic: The combination of these patches, corridors and matrix make up the landscape mosaic,[127] much like different pieces of fabric make up the mosaic of a quilted blanket. Natural features of a landscape include such elements as the dominant vegetation, soils, topography, microclimate, natural disturbance activities such as flooding, fire, wind, insect or animal infestations. These features also contribute to the pattern or 'mosaic' of a landscape.[128]

Other connectivity types such as core areas, buffer zones and sustainable use areas are also described within the connectivity literature.[129] Core areas are generally the main protected

[124] Beier, P. & Noss, R, F. 1998. Do Habitat Corridors Provide Connectivity? Conservation Biology. 12(6):1241-1252.
[125] Forman, 1995.
[126] Forman, 1995.
[127] Gillson, 2009.
[128] Lausche, 2012.
[129] IUCN (2007) Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors, IUCN Regional Protected Areas Programme, Asia, Bangkok.

area/s around which a connectivity initiative is planned and implemented. Buffer zones are geographic areas surrounding the main protected area. Generally they are a transition area between the protected area and the land-use practices occurring outside of the protected area[130] and serve to mitigate edge effects. Sustainable use areas are zones designated for human settlement and use.[131] These zones can occur within buffer and corridor zones and as such they retain at least a partial 'natural' element to them. Figure 1.3 below provides a conceptual representation of all the connectivity types described above.

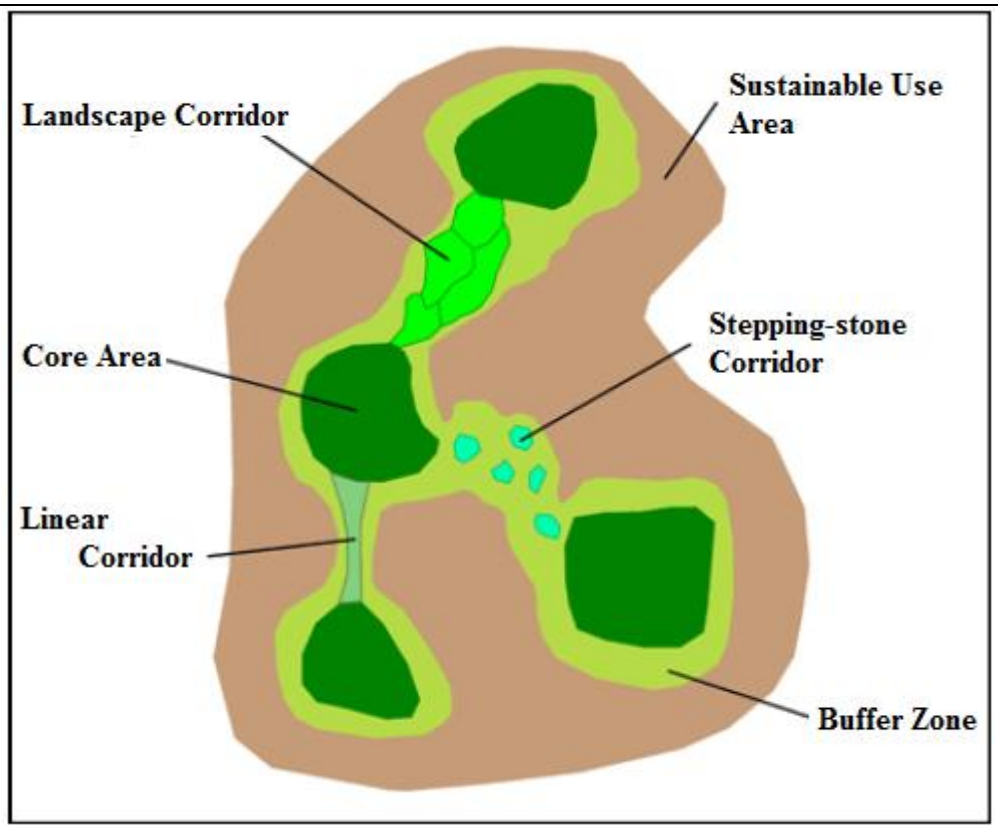

Figure 1.3: A reserve or ecological network comprising various types of connectivity linkages.[132]

Science has made important strides in understanding and applying connectivity conservation across a range of scales and functions. In contrast, the role of law in connectivity conservation is still in the very early stages of development. The rest of this chapter highlights the recent rise to prominence of connectivity conservation within the realm of environmental law.

[130] IUCN, 2007.
[131] IUCN, 2007.
[132] Taken from Biodiversity Conservation Corridor Initiative. http://www.adb.org/Projects/core-environment-program/why.asp.

2.4 International Recognition

Prior to 2000, there were only five countries with laws that enabled biodiversity corridors or some form of connectivity, and the earliest of these laws originated in 1993. Since then, at least nine countries have enacted legislation enabling biodiversity corridors at national or sub-national level (see table 1 below).[133]

[133] IUCN (2007) Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors, IUCN Regional Protected Areas Programme, Asia, Bangkok. At page 3.

Table 1: International legal instruments enabling conservation connectivity.[134]

Country	Law	Date	Notes
Bhutan	Royal Government of Bhutan Decree	November, 1999	A specific legal instrument enabling the Bhutan Biological Conservation Complex
Brazil	Law 9.985	18 July 2000	Protected area law establishing three National System of Nature Conservation Units
Bulgaria	Biological Diversity Act	Amended 2005	Biodiversity Law
Canada	Muska Kechika Management Area Act	1998	Legal instrument creating a specific corridor
Denmark	Consolidated Planning Act No. 883	Amended 18 August 2004	Spatial Planning Law
Germany	Federal Nature conservation Act	2002	Nature Conservation Protection Law
Hungary	Act LIII of 1996 on Nature Conservation	1996	Nature Conservation Protection Law
	Act No. XXVL of 2003 on the National Spatial Plan	2003	Spatial Planning Law
India	Indian Wildlife Protection Act	1972 (2002)	Wildlife law amended in 2002
Lithuania	Law on Protected Areas	1993 (1995)	Amended in 1995
Poland	Act on Nature Protection	16 April 2004	Nature Conservation Protection Law
South Korea	Act on the Protection of Baedku Daegan Mountain System	2003	Legal instrument creating a specific corridor
Slovakia	Law No. 543/2003 on Nature and Landscape Protection	2003	Nature Conservation Protection Law
Ukraine	Law on the Ecological Network 2004	2004	A distinct connectivity Law
Venezuela	Biological Diversity Law	24 May 2000	
Bolivia	Supreme Decree No. 24453	12 July 1996	Approving the General Regulation of the Forestry Law, No. 1700
Argentina	Law 7107 Salta Provincial Protected areas System	8th November 2000	Protected area Law in Salt Province
Equador	Ordinances issued by each municipality	Multiple dates for the differet ordinances	Specific legal instruments enabling corridors in the Banos, Mera and Palora Municipalities

To confirm the growing international recognition for, and relevance of, connectivity conservation, an increasing number of international agreements and targets now call for the adoption of landscape and seascape-level conservation efforts to provide a more

[134] Table adapted from IUCN (2007). Pages 11-13. Original source Moore and Shadie, 2007.

comprehensive strategy for biodiversity conservation to underpin development.[135] Others even now call for connectivity either explicitly or, in other cases, implicitly.

2.4.1 Convention on Biological Diversity

The Convention on Biological Diversity[136] (CBD) is an internationally legally binding treaty to which South Africa is a ratified member. It has three primary goals; conservation of biological diversity, sustainable use of its components and the fair and equitable sharing of the benefits derived from genetic diversity.[137] Whilst connectivity conservation is not addressed specifically within the CBD text, there are, nevertheless, several provisions of relevance to the topic, particularly the following paragraphs of Article 8 on *in-situ* conservation:

> 'Each Contracting Party shall, as far as possible and as appropriate:
>
> (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
>
> (b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;
>
> (c) Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;
>
> (d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
>
> (e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas;
>
> (f) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies'

The significance of Article 8 is that it refers to a 'system' of protected areas and other 'areas where special measures need to be taken to conserve biological diversity' and in so doing promotes and calls for connectivity conservation initiatives.

[135] IUCN, 2007. Page 3.
[136] Convention on Biological Diversity, Jun. 5, 1992, 1760 U.N.T.S. 79, 31 I.L.M. 818. South Africa became a ratified member of the CBD in 1995.
[137] Article 1 of the CBD Text.

In addition, parties to the CBD are required to develop a national biodiversity strategy or plan[138] and ensure that this NBSAP is mainstreamed into the planning and activities of all those sectors whose activities can have an impact on biodiversity.[139] Lausche notes that '(t)he latter obligation must be deemed to apply, for example, to infrastructural and agricultural policies, which evidently have far-reaching implications for connectivity conservation.'[140]

A growing set of non-binding commitments and guidelines adopted by the CBD Conference of Parties (COP) accompany and inform the Convention provisions. A number of these are linked to connectivity conservation by references to climate change adaptation[141] and protected areas networks. This reveals that CBD Parties attach considerable significance to connectivity in the implementation of Convention obligations. Whilst the CBD COP commitments which follow this section below are non-binding, Lausche emphasises that:

> "(It is significant)....that, both generally speaking and particularly as a consequence of climate change, effective conservation can hardly be achieved without maintenance or restoration of adequate connectivity [...] COP decisions regarding connectivity, although themselves non-binding, may influence the interpretation of binding treaty obligations. It should also be kept in mind that treaty obligations may not only have effect within the sphere of public international law (as obligations of states in relation to other states) but also within the sphere of domestic legal systems."[142]

2.4.1.1 Aichi Biodiversity Targets

At CBD COP 10 held in Nagoya (Japan) in October 2010, Parties adopted the 'Strategic Plan for Biodiversity 2011-2020'.[143] This was following the decision by the United Nations General Assembly to declare the period 2011-2020 the 'United Nations Decade on Biodiversity'.[144] The plan consists of 5 strategic goals and 20 biodiversity targets called the

[138] Decision X/2, 2010. National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at the national level. To date, 177 (92 per cent) Parties (including South Africa) have developed NBSAPs in line with Article 6.
[139] Article 6 of the CBD Text calls on parties to develop national strategies, plans or programmes or adapt [...] existing strategies, plans or programmes for the conservation and sustainable use of biological diversity. Parties are also called on to "integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies."
[140] Lausche, 2012. Page 72.
[141] For which connectivity conservation has already been shown to be a useful management strategy.
[142] Lausche, 2012. Page 71.
[143] COP Decision X/2, 2010, Annex
[144] Resolution 65/161.

Aichi Biodiversity Targets.[145] While all the Targets have relevance for connectivity conservation, Target 11 is most explicit. It states:

> 'By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.'

In addition, the fifth Aichi Target determines that by 2020 the rate of loss of natural habitats should be 'at least halved and, where feasible, brought close to zero, and degradation *and* fragmentation [should be] significantly reduced.'[146] NBSAPs are considered a key part of delivering the 2020 global goal since most action on biodiversity takes place at the national and sub-national levels and NBSAPs provide a focal point for leadership, engagement and resource mobilisation to deliver national goals and targets.[147]

2.4.1.2 CBD COP

A number of decisions taken at various CBD COP meetings have incorporated connectivity in some form or another. CBD COP 7, held in Kuala Lumpur in 2004, called on Parties to 'take measures to manage ecosystems so as to maintain their resilience to extreme climate events and to help mitigate and adapt to climate change';[148] and to 'integrate climate change adaptation measures in protected area planning, management strategies, and in the design of protected area systems'.[149] CBD COP 8, held in Curitiba in 2006,called on Parties to 'cooperate regionally in activities aimed at enhancing habitat connectivity across ecological gradients, with the aim of enhancing ecosystem resilience and to facilitate the migration and dispersal of species with limited tolerance to altered climatic conditions'.[150]

[145] Convention on Biological Diversity (CBD). 2012. Report of the Global Workshop on National Experiences in implementing the Strategic Plan for Biodiversity 2011-2020. Brasillia, Brazil. Available online at: https://www.cbd.int/sp/global-workshop/ Page 3.
[146] http://www.cbd.int/sp/targets/
[147] Report of the Global Workshop on National Experiences in implementing the Strategic Plan for Biodiversity 2011-2020. Accessed online via: http://www.cbd.int/doc/meetings/sp/wsspne-01/official/wsspne-01-report-en.pdf Accessed on 09/03/2013. Page 4.
[148] Decision VII/15, 2004, paragraph 12.
[149] Decision VII/28, 2004, paragraph 1(4)(5).
[150] Decision VIII/30, 2006, paragraph 4.

During CBD COP 10 a decision on protected areas[151] called on Parties to '(e)nhance the coverage and quality, representativeness and, if appropriate, connectivity of protected areas' as a contribution to the establishment of 'representative systems of protected areas and coherent ecological networks'.[152] In the context of climate change, the same decision calls for 'concerted efforts to integrate protected areas into wider landscapes and seascapes and sectors, including through the use of connectivity measures such as the development of ecological networks and ecological corridors, and the restoration of degraded habitats and landscapes in order to address climate-change impacts and increase resilience to climate change'.[153] Also in connection with ecosystem restoration, Decision X/31 urges Parties to employ 'connectivity tools such as ecological corridors and/or conservation measures in and between protected areas and adjacent landscapes and seascapes'.[154]

In addition, a CBD COP 10 decision on biodiversity and climate change[155] (aimed at helping species and ecosystems adapt to climate change) summons CBD Parties to strengthen protected areas networks 'including through the use of connectivity measures such as the development of ecological networks and ecological corridors and the restoration of degraded habitats and landscapes',[156] and to integrate biodiversity 'into wider seascape and landscape management'.[157]

At CBD COP 11 in Hyderabad, India and the CBD Executive Secretary made strong calls to parties, partners and other stakeholders to take urgent action towards achieving the Aichi Biodiversity Targets.[158] The CBD COP 11 also reaffirmed the importance of connectivity as part of forest activities for climate change mitigation.[159] Parties were called upon to 'consider conservation of biodiversity and ecosystem services through, for example…[s]trategically locating afforestation activities within the landscape to enhance connectivity and increase the provision of ecosystem services within forest areas.'[160]

[151] Decision X/31, 2010.
[152] Decision X/31, 2010, paragraph 1(a).
[153] Decision X/31, 2010, paragraph 14(a).
[154] Decision X/31, 2010, paragraph 26(a).
[155] Decision X/33, 2010.
[156] Decision X/33, 2010, paragraph 8(d)(iii).
[157] Decision X/33, 2010, paragraph 8(d)(iv).
[158] Joint letter from the CBD Executive Secretary, Dr. Braulio Ferreira de Souza Dias, and the Indian Minister for Environment and Forests and COP 11 president, Jayanthi Natarajan. Available at http://www.cbd.int/doc/champions/bc-letter-cbd-in-81008-2013-02-01-en.pdf. Accessed 28/06/2013.
[159] Lausche, 2012. Page 73.
[160] CBD COP 2012, Annex, paragraph 17(d)(v).

2.4.1.3 Programme of Work on Protected Areas

Aichi Biodiversity Target 11 builds on the CBD Programme of Work on Protected Areas (PoWPA),[161] adopted at CBD COP 7 in 2004. The PoWPA enshrines development of participatory, ecologically representative and effectively managed national and regional systems of protected areas, where necessary stretching across national boundaries.[162] It is a framework for cooperation between Governments, donors, NGOs and local communities and includes 16 goals which are divided across four programme elements.[163] Programme element 1, 'Direct Actions for Planning, Selecting, Establishing, Strengthening, and Managing, Protected Area Systems and Sites', calls for the establishment and management of 'ecological networks, ecological corridors and/or buffer zones, where appropriate, to maintain ecological processes and also taking into account the needs of migratory species'[164] The PoWPA goes further by setting a target for broad integration of all protected areas into their wider landscape and seascape, as follows:

> 'By 2015, all protected areas and protected area systems are integrated into the wider land- and seascape, and relevant sectors, by applying the ecosystem approach[165] and taking into account ecological connectivity and the concept, where appropriate, of ecological networks'.[166]

The PoWPA can be considered as a defining framework or "blueprint" for protected areas for the coming decades.[167]

[161] COP Decision VIII/28, 2004, Annex.
[162] http://www.cbd.int/protected/overview/. Accessed 12/01/2013.
[163] http://www.cbd.int/protected/pow/learnmore/intro/. Accessed 27/09/2012.
[164] CBD COP 2004 VII/28, programme element 1, Goal 1.1. Paragraph 1.2.3. Also see paragraphs. 1.2.1, 1.2.4 and 1.2.5.
[165] The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the CBD. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.
[166] CBD COP 2004 VII/28, programme element 1. Goal 1.2. Target. http://www.cbd.int/protected/overview/. Goal 1.3 is also of relevance to connectivity. Goal 1.3: 'To establish and strengthen transboundary protected areas (TBPAs) and collaboration between neighbouring protected areas across national boundaries'.
[167] http://www.cbd.int/protected/overview/

2.4.2 World Conservation Congress

Connectivity conservation has gained increasing recognition at each of the IUCN World Conservation Congresses (WCC). At the 1st IUCN WCC IUCN members were encouraged to 'further the development of ecological networks at national, regional and intercontinental levels as a means of strengthening the integrity and resilience of the world's biological diversity'.[168]

As previously mentioned, the PoWPA calls on countries to 'integrate protected areas into broader land- and seascapes and sectors so as to maintain ecological structure and function',[169] and this is being done by applying the ecosystem approach and taking into account ecological connectivity and the concept, where appropriate, of ecological networks.[170] The 3rd IUCN WCC in Bangkok, in 2004, reaffirmed this commitment, calling upon IUCN members, national and regional governments and civil society 'to develop innovative governance systems and strategic programmes fostering the integration of protected areas in their landscapes/seascapes'.[171]

Finally, at the 4th IUCN WCC (Barcelona, 2008) and the 5th IUCN WCC (Jeju, 2012) and building on the work of the previous WCCs and the Vth IUCN-WPC, countries were called on to establish 'enhanced ecological networks and connectivity conservation areas to strengthen the protection of biodiversity, which include, as appropriate, biological corridors and buffer zones around protected areas',[172] and to continue to 'strengthen the integration of biodiversity and ecological connectivity in terrestrial and marine planning, including conservation planning and especially actions on climate change mitigation and adaptation.'[173] Resolution 056 also noted that '[E]ffectively managed protected areas, when linked to critical migration corridors, can serve to anchor the conservation goals and biodiversity integrity of

[168] IUCN World Conservation Congress (WCC). 1996. Recommendation 1.38: Ecological Networks and Corridors of Natural and Semi-Natural Areas. First IUCN World Conservation Congress, Montreal, Canada, 13–23 October 1996. Gland, Switzerland and Cambridge, UK: IUCN
[169] The PoWPA Goal 1.2.
[170] Target for Goal 1.2
[171] WCC 3.065, Nov. 2004
[172] IUCN World Conservation Congress (WCC). 2009. Resolution 4.062: Enhancing ecological networks and connectivity conservation areas. IUCN Fourth World Conservation Congress, Barcelona, 5–14 October 2008. Also see IUCN WCC 2012. Res 056.
[173] IUCN World Conservation Congress (WCC). 2012. Resolution 056: Enhancing connectivity conservation through international networking of best practice management. IUCN Fifth World Conservation Congress, Barcelona, 6–15 September 2012. Also see Lausche, B. 2011. At page 77.

larger landscapes counted towards Target 11 goals'. So the trend is self evident, and connectivity conservation is gaining recognition not only within the IUCN WCC but also with the IUCN's World Parks Congresses.

2.4.2.1 World Parks Congress

The IUCN World Parks Congress (WPC) is a global forum of protected areas experts who set the global agenda for protected areas aimed at achieving three priority objectives relating to parks,[174] people[175] and the planet.[176] While decisions of the IUCN-WPC are taken by the participating experts rather than by IUCN members, the forum provides policy and technical guidance on protected areas planning and management and helps define new concepts for the future of protected areas. Key recommendations made by the participants of each IUCN-WPC are normally submitted for consideration by IUCN members at a subsequent IUCN-WCC for endorsement.[177] Five congresses have been held to date, with the latest in Durban, South Africa in 2003. Each congress has been a milestone in the development of the global protected area movement.[178]

The theme of the Vth IUCN World Parks Congress (WPC) held in 2003 was 'Benefits beyond Boundaries' to emphasize the vital role protected and surrounding areas play in sustainable development and the critical importance of incorporating local communities in conservation efforts.[179] The adoption of the ecosystem approach for protected area management and governance was in following with recommendations made by the CBD.[180] Based on the ecosystem approach, the Vth IUCN-WPC stressed in the Durban Action Plan the to set protected areas within a wider matrix of ecosystem-based, environmentally sensitive land and water management, supported by mainstreaming environmental considerations into various areas of public policy.[181] This was in conjunction with the target

[174] 'Valuing and conserving nature'.
[175] 'Effective and equitable governance of nature's use'.
[176] 'Deploying nature-based solutions to global challenges'. The three objectives are based on the three foundations of the current IUCN Programme.
[177] Lausche, 2011. Page 6.
[178] Wilkinson, 2011. Page 2.
[179] Lausche, 2011. Page 16.
[180] 'Protected areas should be in keeping with the Ecosystem Approach' (IUCN-WPC 2003 V.9; IUCN-WPC 2003 V.16).
[181] IUCN-WPC, 2003, main target 4.

to have a system of protected areas representing all the world's ecosystems by the next WPC in 2014.

> 'Few protected areas will ever be large enough to include entire ecosystems, and all protected areas—however big—will be affected by developments beyond their borders. […] Yet many protected areas are cut off from the surrounding environment, where land uses and economic activities are planned without regard to the effect on the protected area, ignoring the movement of species, nutrients and other environmental flows across boundaries. To address this, an ecosystem or landscape-scale approach to protected areas planning is needed. This requires a conceptual move from protected areas as 'islands' to protected areas as parts of 'networks'.'[182]

In 2003, to advance fulfilment of this target, the Durban Action Plan called on protected areas authorities to develop an overall plan for their protected areas within a framework based on biogeographical regions.[183] The PoWPA subsequently provided concrete targets for shifting to a system approach with the aforementioned programme element 1.[184]

Participants of the Vth IUCN-WPC have also called upon governments to 'adopt design principles for protected areas which emphasize linkages to surrounding ecosystems and ensure that the surrounding landscapes are managed for biodiversity conservation'.[185] Finally, the Vth IUCN-WPC emphasised the need to develop more trans-boundary protected areas (TBPAs). It promoted the establishment of TBPAs in all continents and oceans, and for international action to promote regional agreements and governance structures to support TBPAs.[186] The WPC also called for establishing new or strengthened agreements for trans-boundary cooperation[187] to couple the goal of linking protected areas with wider ecological and environmental systems.[188]

In preparation for the VIth IUCN WPC 2014 delegates cast votes for key topics which the congress will focus on. 'Connectivity Conservation' was one of six topics that received more than 60 per cent of the votes, whilst additional topics 'Landscape Connectivity/Beyond Boundaries' and 'Trans-boundary Conservation' were voted for by more than 20 per cent of

[182] IUCN-WPC, 2003, main target 4.
[183] IUCN-WPC, 2003, main target 5.
[184] CBD COP 2004 VII/28, programme element 1. Lausche, B. 2011. Page 20.
[185] IUCN-WPC 2003 V.9, paragraph 1(b). See Lausche, B. 2011. Page 24.
[186] Durban Action Plan, IUCN-WPC 2004, .242 pages.
[187] Especially with regard to regional seas, mountain chains, and shared watersheds and river basins (Durban Action Plan, IUCN-WPC 2004, p. 241).
[188] Lausche, 2011. Page 269.

the delegates.[189] Evidently connectivity conservation is now a theme well entrenched in international conservation efforts and mentality.

2.4.3 UNESCO

The United Nations Educational, Scientific and Cultural Organisation's (UNESCO) Man and the Biosphere Programme's World Network of Biosphere Reserves represents the framework within which national sites may be designated as biosphere reserves.[190] The Statutory Framework of the World Network of Biosphere Reserves[191] has been accepted by all UNESCO member states and functions as the legal framework to guide states with the development of biosphere reserves to be designated as part of the World Network.

Today there are over 500 biosphere reserves in more than 100 countries.[192] They are considered by IUCN and the world protected areas community as one of the key tools for linking protected areas to surrounding ecosystems and designing integrated landscape management to support protected areas.[193] Each biosphere reserve has its own system of governance to ensure it meets its functions and objectives, and establishment is voluntary.[194]

2.4.4 The Ramsar Convention

The Convention on Wetlands of International Importance especially as Waterfowl Habitat[195] (Ramsar Convention) was adopted to 'stem the progressive encroachment on and loss of wetlands now and in the future'.[196] The Ramsar Convention includes a list of wetlands which are of 'international importance'. Parties are required to 'formulate and implement their

[189] Wilkinson, 2011. Page 24.
[190] Biosphere reserves are areas of terrestrial and coastal ecosystems organized into three interrelated zones: a core area, a buffer zone and a transition zone.
[191] United Nations Educational, Scientific and Cultural Organisation (UNESCO). 1995. Biosphere Reserves: Seville Strategy for Biosphere Reserves and Statutory Framework of the World Network of Biosphere Reserves. Paris: UNESCO. Available at http://unesdoc.unesco.org/images/0010/001038/103849eb.pdf.
[192] UNESCO, 1995.
[193] IUCN-WPC 2003 V.9
[194] Lausche, 2011. Page 65.
[195] Convention on Wetlands of International Importance especially as Waterfowl Habitat, Feb. 2, 1971, 11 l.L.M. 969 (1972).
[196] Ramsar Convention (1971) preamble.

planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of (all) wetlands in their territory".[197]

Whilst wetlands on the Ramsar List are most likely to constitute actual core areas of protected areas networks, some wetlands, such as rivers, can provide connectivity and therefore the obligations under the Convention have the potential to contribute to connectivity conservation.[198] A resolution on wetlands and climate change adopted by the 10th COP in 2008 affirms that the 'conservation and wise use of wetlands enables organisms to adapt to climate change by providing connectivity, corridors and flyways along which they can move'.[199] In addition, Article 5 of the Convention calls on Parties to 'consult with each other concerning the implementation of the Convention, especially with respect to transboundary wetlands'.[200]

2.4.5 The World Heritage Convention

The Convention Concerning the Protection of the World Cultural and Natural Heritage[201] (World Heritage Convention) applies to the natural areas that have been entered into a World Heritage List authorized under the Convention.[202] Parties are resolved under Article 4 of the convention to doing everything within their power to ensure the 'identification, protection, conservation, presentation and transmission to future generations' of the natural heritage situated on their territories. According to the definition in Article 2,[203] a significant number of ecologically important sites around the globe qualify as 'natural heritage' and some of these are included in the World Heritage List.

[197] Article 3(1).
[198] Lausche, 2011. Page 76.
[199] Resolution X.24, 2008, paragraph 12
[200] Also, Article 4(1) sets out an obligation to 'promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands, whether they are included in the List or not.'
[201] The Convention Concerning the Protection of the World Cultural and Natural Heritage, November 16, 1972. 1037 U.N.T.S. 151, 27 U.S.T. 37, 11 I.L.M. 1358. South Africa became a ratified state party of the WHC on 07/10/1997. See http://whc.unesco.org/pg.cfm?cid=246
[202] Lausche, 2012. Page 77.
[203] For the purposes of this Convention, the following shall be considered as "natural heritage":
natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;
geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;
natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

Each Party 'shall endeavour, in so far as possible, and as appropriate for each country,' to 'integrate the protection of that heritage into comprehensive planning programmes' and to 'take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage.'[204] In addition, another type of connectivity is called for in the Operational Guidelines for the Implementation of the World Heritage Convention. The Guidelines instruct Parties to provide for an "adequate buffer zone" wherever this is "necessary for the proper conservation" of the site involved.[205]

As with Ramsar sites, World Heritage Sites are more likely to form the core area of a connectivity initiative, as the Baviaanskloof World Heritage Site does, but there are still examples of sites which occur along corridors.[206] Since the Baviaanskloof Mega-Reserve was declared a World Heritage Site in 2007 and is thus subject to the provisions mentioned above.

2.4.6 Convention of Migratory Species

The Bonn Convention on the Conservation of Migratory Species of Wild Animals[207] (CMS) (1979) aims for a "favourable conservation status" for migratory species. With regard to endangered migratory species,[208] CMS Parties are required, where 'feasible and appropriate', to 'conserve and, [...] restore those habitats of the species which are of importance in removing the species from danger of extinction',[209] 'prevent, remove, compensate for or minimize [...] the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species',[210] and 'to prevent, reduce or control factors that are endangering or are likely to further endanger the species [...].[211] It is evident that these requirements implicitly call for connectivity conservation and this manifests itself in a number of ancillary instruments.

[204] Article 5.
[205] WHC.08/01 Paragraph 103.
[206] An example is the great wildlife migration corridors of East Africa
[207] Convention on the Conservation of Migratory Species of Wild Animals, June 3, 1979, 19 I.L.M. 15.
[208] Listed in CMS Appendix I.
[209] CMS COP 2011, Appendix I, Article III(4)(a).
[210] Article III(4)(b).
[211] Article III(4)(c).

Migratory species with an unfavourable conservation status are listed in Appendix II. Appendix II species are to be the subject of focused ancillary instruments, which may be 'agreements'[212] or less formal 'agreements'.[213] Regarding formal agreements, the Convention states that these should, 'where appropriate and feasible', provide for the 'conservation and, [...] restoration of the habitats of importance in maintaining a favourable conservation status, and protection of such habitats from disturbances [...],'[214] the 'maintenance of a network of suitable habitats appropriately disposed in relation to the migration routes,'[215] the '[...] provision of new habitats favourable to the migratory species [...],'[216] and the 'elimination of, to the maximum extent possible, or compensation for activities and obstacles which hinder or impede migration.'[217]

The CMS COP has recognised the role that connectivity conservation must play in conserving migratory species. Resolution 10.3, devoted to critical sites and ecological networks in the context of CMS, acknowledges that 'habitat destruction and fragmentation are among the primary threats to migratory species, and that the identification and conservation of habitats, in particular the critical sites and connecting corridors, are thus of paramount importance for the conservation of these species'.[218] A number of points raised under Resolution 10.3 promote connectivity by calling on parties to: (1) promote the identification of the most relevant sites and corridors for migratory species, with an emphasis on those that are transboundary and would benefit from international cooperation; (2) enhance the coverage, quality and connectivity of protected areas as a contribution to the development of representative systems of protected areas and coherent ecological networks that include all taxonomic groups of migratory species; (3) undertake habitat restoration and management in protected areas to ensure habitat availability during the different stages of the life cycle of migratory species; (4) cooperate over transboundary protected areas, ensuring that barriers to migration are eliminated or mitigated and that migratory species are managed under commonly agreed criteria; (6) undertake concerted efforts to integrate protected areas

[212] Article IV(1)(3).
[213] Article IV(1)(4).
[214] Article V(1)(e).
[215] Article V(1)(f).
[216] Article V(1)(g).
[217] Article V(1)(h).
[218] Resolution 10.3, 2011, Preamble. The preamble also notes that 'ecological connectivity can have multiple advantages, such as maintenance of viable populations and migration pathways, reduced risk of a population becoming extinct and higher resilience to climate change', and that 'networks of critical sites are needed in order to achieve connectivity and to protect migratory species along their entire migration route'.

into wider landscapes, including through the use of connectivity measures such as biological corridors, to address the impacts of, and increase resilience to, climate change; (9) explore the applicability of ecological networks and corridors to marine migratory species that are under pressure from human activities such as oil and gas exploration, overexploitation, fishing and coastal development.

Finally, Parties are requested to 'ensure that migratory bird habitat requirements are integrated into land-use policies, including protected areas but also especially outside protected areas',[219] to review 'the coverage and protection status of current site networks',[220] to 'consider the resilience of sites to climate change, taking account of the potential for shifts in the range of species due to climate change, as well as other factors',[221] and to 'strengthen the physical and ecological connectivity between sites, permitting dispersal and colonization when species distributions shift'.[222]

It is evident from the range of international agreements which promote connectivity that it is at the forefront of the conservation movement. Chapter three will now introduce the case study of the Baviaanskloof Mega-Reserve, a South African connectivity initiative in the Eastern Cape Province of South Africa. The case study will then be used as a way of reflecting on South Africa's relevant legal framework and tools for promoting connectivity.

[219] Resolution 10.10, 2011, paragraph 4.
[220] Paragraph 6.
[221] Paragraph 6.
[222] Paragraph 8(b).

Chapter 3 – Case Study - The Baviaanskloof Mega-Reserve

The Baviaanskloof, an area of outstanding natural beauty also known as the 'Valley of Baboons', is a 75 km long valley which lies between the parallel east-west running Baviaanskloof and Kouga mountain ranges in the western region of South Africa's Eastern Cape Province.[223] The eastern-most point of the valley is 95 kms north-west of Port Elizabeth, and its most southerly point is 50 kms from the Indian Ocean.[224] Straddling these mountain ranges and part of the valley is the Baviaanskloof Nature Reserve (BNR (See figure 1.4)).[225] The BNR falls predominantly within the Eastern Cape (with a small segment extending into the Western Cape) between the towns of Uniondale in the west and Uitenhage in the east.[226] This region is arguably one of the most biologically diverse areas within southern Africa, as it is home to seven[227] of South Africa's nine biomes.[228] This includes the convergence of three of the world's 34 biodiversity hotspots[229] (the Cape Floristic Region, Maputaland-Pondoland-Albany[230] and Succulent Karoo).[231] Indeed the BNR has more than 1100 plant species, of which 20 are endemics and 52 are listed as red data listed species.[232] The area also supports a high diversity of animal species, including 58 mammal species, 293 bird species and 11 fish species, three of which are indigenous.[233] Several of these animal

[223] Boshoff, A. F. 2005. The Baviaanskloof Mega-Reserve: an environmentally, socially and economically sustainable conservation and development initiative. Terrestrial Ecology Research Unit Report No. 52, Nelson Mandela Metropolitan University, Port Elizabeth. Page 1.
[224] Boshoff, A. F. 2008. The Baviaanskloof Mega-Reserve: from concept to implementation. TERU report 58: 1-54. Page 1.
[225] Boshoff, A. F. Cowling, R.M. Kerley, G. I. H. 2000. The Baviaanskloof Conservation Area – a conservation and tourism development priority. Terrestrial Ecology Research Unit Report No. 27, Nelson Mandela Metropolitan University, Port Elizabeth. 52pp. Page 2.
[226] Powell, M. J. 2009. Restoration of degraded subtropical thickets in the Baviaanskloof Megareserve, South Africa: The role of carbon stocks and *Portulacaria afra* survivorship. Unpublished MSc. Thesis, Bangor House, Rhodes University, South Africa. 164pp. Page 28.
[227] These include the Fynbos, Subtropical Thicket (Maputaland-Pondoland-Albany), Nama-karroo, Succulent Karoo, Grassland, Savanna and Forest biomes.
[228] Mucina, L. & Rutherford, M.C. (eds). 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
[229] To qualify for hotspot status, a region must harbour a significant percentage of the world's biodiversity, as well as be under threat from habitat conversion and the concomitant biodiversity loss (Mittermeier et al. 2004).
[230] The recently updated list of international biodiversity hotspots (34) includes the Maputaland-Pondoland-Albany hotspot (Mittermeier et al. 2004). Van Wyk & Smith (2001) describe the botanical diversity and endemism for the Albany Centre, citing the incidence of 4 000 plant species, with levels of endemism at around 15 %.
[231] See http://www.capeaction.org.za/index.php/strategic-objectives/landscape-initiatives/baviaanskloof-mega-reserve. Accessed 15/05/2013.
[232] ECPB, 2007. Baviaanskloof Cluster Strategic Management Plan. Draft 1. Eastern Cape Parks Board, East London, South Africa.
[233] Joubert, A. Smith, B. and Neke, K. Preliminary Assessment of the Proposed Consolidation and Expansion of the Western Sector of the Baviaanskloof Wilderness Area (2000). University of Cape Town. 65pp. At page 7.

species are red data listed, including leopard (*Panthera pardus*), Cape mountain zebra (*Equus zebra zebra*), and grey rhebok (*Pelea capreolus*).[234] The area serves as a critically important water catchment which supplements the growing water needs of the agricultural sector (particularly for downstream irrigation for citrus and vegetable farming)[235] and urban growth in downstream areas to the east and south-east.[236] This includes the Kouga Dam, a critical water resource, which supplies the Patensie, Hankey and Nelson Mandela municipalities.[237] Finally it also contains a remarkable variety of pre-historical and historical sites and artefacts which add to its cultural value.[238]

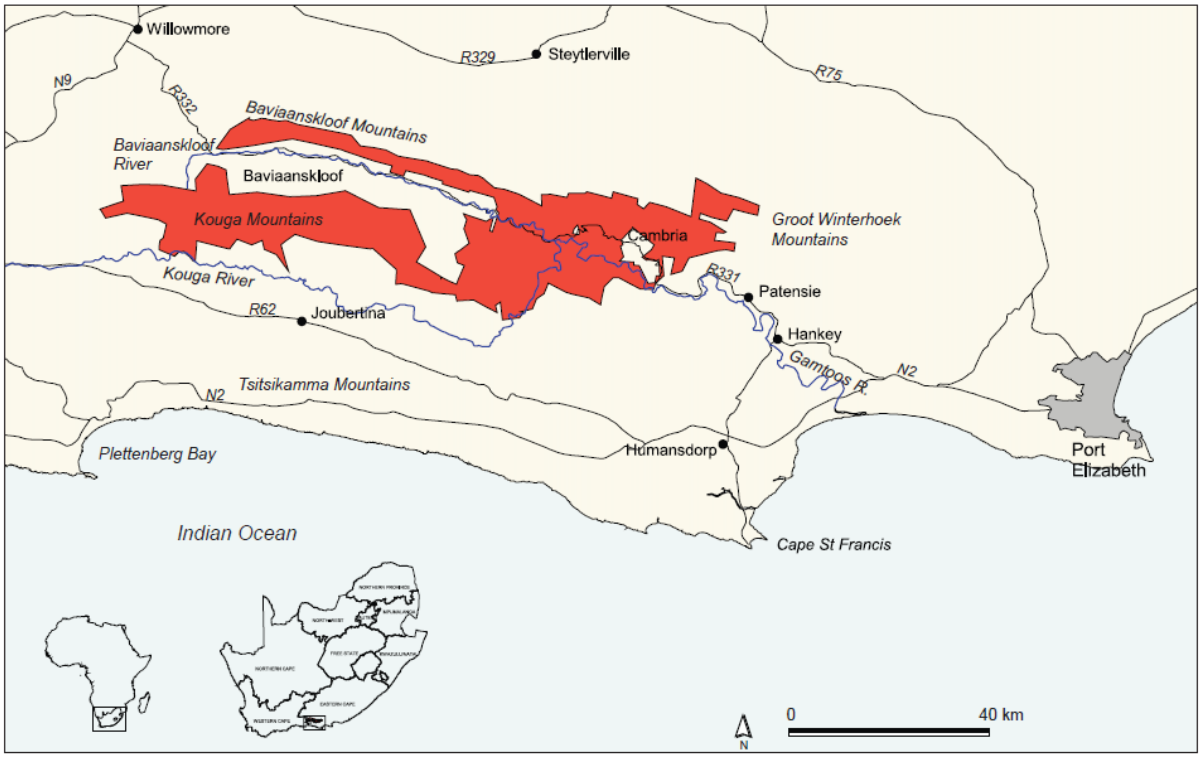

Figure 1.4: The location of the Baviaanskloof Nature Reserve (in red) and other key areas described in the text.[239]

[234] Clark, D., 1998. Greater Baviaanskoof wilderness area: a regional development proposal – rationalisation and consolidation of the western sector (Executive summary). Department of Economic AVairs, Environment and Tourism, Eastern Cape Province.
[235] Powell, 2009. Page 28.
[236] Crane, W. Biodiversity conservation and land rights in South Africa: Whither the farm dwellers?, Geoforum (2006), doi:10.1016/j.geoforum.2006.07.002. At page 4.
[237] Denny, 2010. Page 2.
[238] Boshoff, 2009. Page 1.
[239] Boshoff et al. 2000. Page 3.

3.1 History of the BNR and Origins of the Baviaanskloof Mega-Reserve

The BNR has a fairly long conservation history. Its earliest management, from the Department of Forestry, was as a mountain catchment area (this lasted from the 1920s through to the late 1970s).[240] It was only during the 1980s that the particular importance of the BNR for biodiversity conservation and for the provision of essential ecosystem services[241] became more widely recognised.[242] A policy change in 1987 saw the area revert from the national Forestry Department to the provincial government – Cape Nature Conservation.[243] With the advent of democracy in 1994 and the evolution of nine provinces, the management was transferred again to the newly formed Eastern Cape Government, and specifically the Department of Economic Affairs, Environment and Tourism (DEAET).[244] A final management transfer to the Eastern Cape Parks Board (ECPB)[245] took place in 2004.[246]

The process of turning the BNR into the Baviaanskloof Mega-Reserve (BMR) is distinguished by seven key milestones.[247] The first two of these milestones, a symposium, in 1989, at the University of Port Elizabeth, themed '*The Kouga-Baviaanskloof Complex - Conservation Status and Management Problems*'[248] and a visionary proposal to consolidate 'the Kloof'[249] developed by Reserve Manager Derek Clark in 1997[250] (see figure 1.5), provided the impetus for a third, and crucial milestone. This was the identification, by Cape Action for People and the Environment (CAPE),[251] of the BNR and adjacent areas as having

[240] Boshoff, 2005. Page 5. Much of the higher lying areas were always under State control or crown land.
[241] Especially water.
[242] Crane, 2006. Page 6.
[243] Boshoff, 2005. Page 5
[244] Powell, 2009. Page 44.
[245] In 2010 the ECPB became the Eastern Cape Parks and Tourism Agency (ECPTA).
[246] ECPB, 2007.
[247] Boshoff, 2008.
[248] Contributions dealt with geological, biological, ecological, agricultural, cultural and social aspects.
[249] 'The Kloof' is the western sector which is not part of the BNR but the privately owned land between the two 'arms' of the BNR. See Figure 1.5
[250] The long and convoluted boundary of the BNR made management of the conservation estate expensive. Due to its shape, the nature reserve was exceptionally vulnerable to the 'edge effect'. This led to Derek Clark creating a proposal motivating for the consolidation of the western sector of the reserve through compulsory acquisition of private land inside the Baviaanskloof 'kloof' The proposal motivated for the consolidation of the 56 000 ha western sector of the reserve, and for the establishment of a 20 000 ha sustainable game utilization-based zone on the plains area to the north of the Baviaanskloof. See figure 1.5
[251] CAPE is a multi-stakeholder partnership comprising 23 signatories from government, civil society and the private sector that focuses on research, planning and implementation initiatives to co-ordinate and maximize efforts to conserve the highly threatened 87 892 km² Cape Floristic Region (CFR) whilst simultaneously delivering significant benefits to local communities. It applies a landscape-level approach to biodiversity conservation, through 'landscape initiatives' that take various forms, including corridor initiatives, mega-

the potential to create a mega conservation area[252] that includes linkages to other conservation areas, both existing and proposed.[253] CAPE recognised that the BNR was one of only three protected areas within the CFR which was of sufficient area (199 986 hectares)[254] to warrant the status of a mega-reserve and thus created the planning domain for the BMR.[255] The BMR would (a) span the gradient from the arid Nama-Karoo to moist fynbos and forest, (b) include much of the Groot-Baviaanskloof-Kouga riverine corridor,[256] and (c) encompass habitats such as grassland and moist subtropical thicket that are restricted to the eastern sector of the Cape Floristic Region.[257]

reserves and biosphere reserves. These initiatives seek to overcome the growing deficiencies associated with traditional conservation and protected area management. Instead these initiatives rely on the 'sustainable management of a mosaic of land uses, where people live and work in harmony with nature and within the natural resource limits of the landscape - inherent in the notion of "living landscapes".

[252] Mega conservation areas comprise largely pristine habitat that are sufficiently large (250 000–1 000 000 ha) to support all of the ecological processes necessary to conserve biodiversity in the long term. Boshoff (2005, page 5) highlights some of these processes which include providing a variety of ecological gradients (e.g. upland-lowland linkages), and associated habitats, incorporating transition areas between biomes, providing major migratory corridors, enabling ongoing diversification of plant and animal lineages, supporting natural fire events, facilitate seasonal animal migrations and maintaining plant-herbivore, and predator-prey, relationships

[253] Boshoff, 2008. Page 6.

[254] Boshoff, 2008. Page 1.

[255] Boshoff, 2005. Page 5. Mega conservation areas comprise areas of largely pristine habitat that are sufficiently large (250 000–1 000 000 ha) to support all of the ecological processes necessary to conserve biodiversity in the long term.

[256] This corridor is essentially the land that runs between the Kouga River and Baviaanskloof . The BNR covers some of this area, but not all of it.

[257] Boshoff, 2005. Page 6.

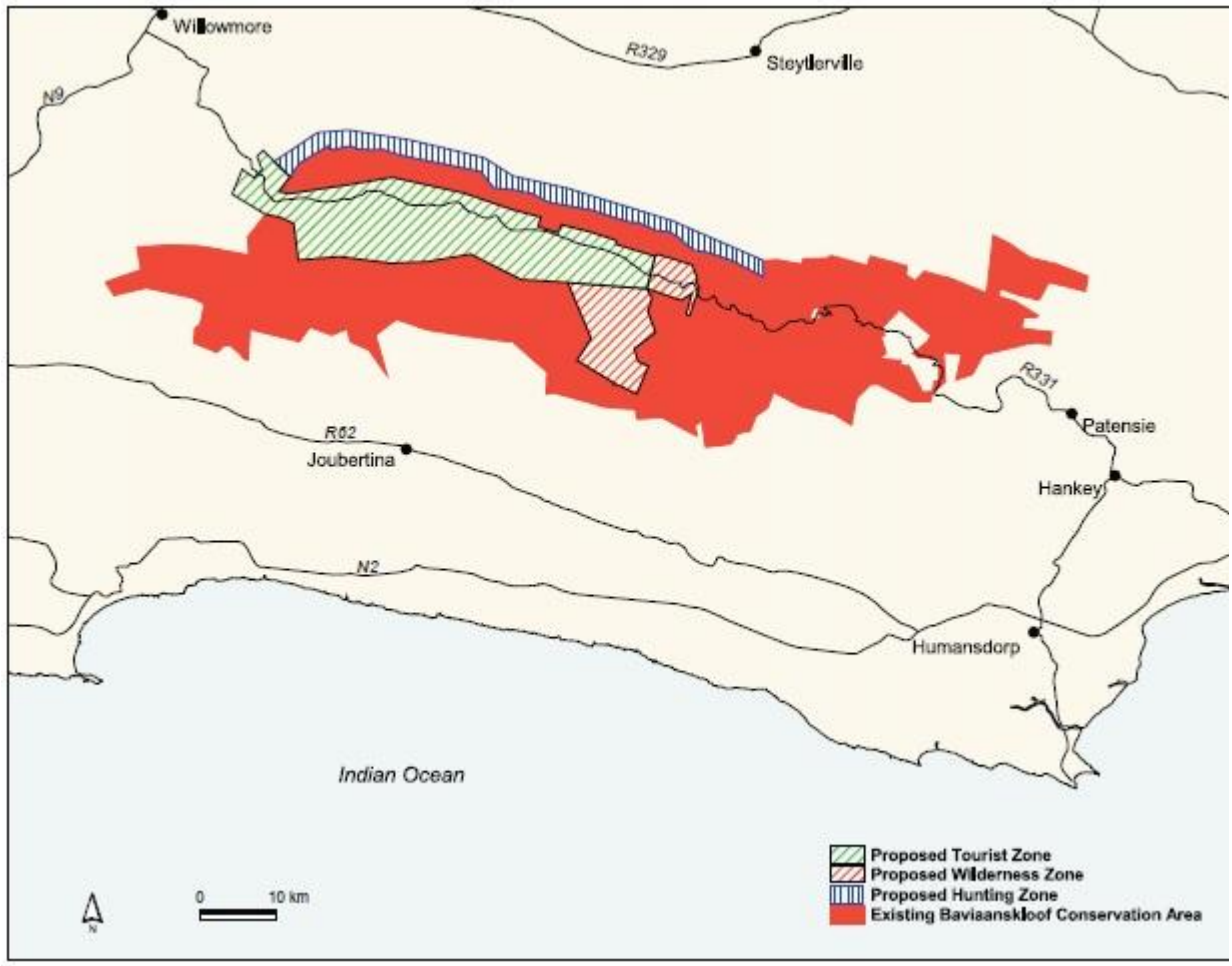

Figure 1.5: Derek Clark's proposal for the consolidation and expansion of the western sector (proposed tourist zone) of the existing Baviaanskloof Conservation Area. The proposal also included possible hunting and wilderness zones.[258]

The publication of the booklet '*The Baviaanskloof Conservation Area: A conservation and tourism development opportunity'* by the then University of Port Elizabeth's Terrestrial Ecology Research Unit in 2000 is identified by Boshoff[259] as the fourth key milestone in bringing about the BMR. The booklet highlighted the significance of the area for biodiversity conservation and evaluated the conservation and socio-economic development potential of the area based on the tourism industry. At the time the surrounding area was facing growing socio-economic pressures.[260] Historically the local economy was based almost entirely on agriculture, with commercial agriculture (involving a mix of pastoralism and irrigated crops)[261] operating near to/at capacity with limited opportunity for growth.[262] The overall

[258] Source Boshoff, 2005. Page 6.
[259] See Boshoff (2005) and Boshoff (2008).
[260] Powell, 2009. Page 54.
[261] These are mainly citrus and deciduous fruit, but there are also some cash and seed production crops
[262] Crane. 2006. Page 5.

decline in the regional economy has been accompanied by a general depopulation.[263] Thus the booklet advocated for conservation-based tourism as an alternative and sustainable form of land use with the potential to contribute to the local and regional economy.[264] Most importantly, the document provided a motivation for attracting the interest of national and international governmental and non-governmental conservation funding agencies.[265]

The booklet also paved the way for the fifth milestone, the identification by the Subtropical Thicket Ecosystem Planning project (STEP)[266] of the Baviaanskloof Mega-Conservancy Network,[267] which is centred round the BNR. Mega-conservancy networks represent a model of ecologically sustainable land management that offers landowners opportunities to work together to preserve landscapes. They comprise groups of adjacent properties of various tenures and land-uses, whose owners share a common vision and who participate voluntarily, manage their land in a co-ordinated, co-operative and integrated way, and are committed to halting the degradation and loss of indigenous plant and animal communities, and to improving their own livelihoods.'[268] Central to STEP's mega-conservancy networks is the mantra 'Keeping people on the land in living landscapes'. Like any mega-conservancy network, STEP envisaged that the BMR would consist of both formal protected areas and privately owned land. This fifth milestone, along with the four that preceded it, ultimately led to the sixth and critical milestone: The Baviaanskloof Mega-Reserve Project (BMRP).

3.2 Nature and Structure of the BMR

The core area of the BMR comprises seven separate protected areas with the BNR at the centre. The other protected areas which make up the cluster are Misgund (622 ha), Skilpadbeen (1108 ha) and Welbedacht (1816 ha) to the West and Stinkhoutberg (10 557 ha), Mierhoopplaat (1 062 ha) and Groendal (27 914 ha) to the East (see figure 1.6). Collectively,

[263] Crane. 2006. Page 5.
[264] Boshoff et al., 2000.
[265] Boshoff, 2005. Page 7.
[266] The project a) created an awareness of the unique biodiversity and significant economic value of the Subtropical Thicket Biome, b) conducted a conservation assessment to identify priority areas for ensuring the long term conservation of thicket plants, animals and ecological processes, and c) promoted the inclusion of the spatial conservation plan, derived from the assessment, into the policies and practices of public and private sector organizations responsible for land-use planning and the management of natural resources in this biome.
[267] Mega-conservancy networks, as identified by the STEP Project, are large corridors of land, the conservation of which is essential for the long-term conservation of biodiversity and ecological processes in subtropical thicket, and also for providing opportunities for sustainable nature-based economic development.
[268] Boshoff, 2005. Page 7.

these reserves are referred to as the Baviaanskloof Reserve Cluster (BRC). The farming communities within the BMR planning domain included the areas in and around Willowmore, Steytlerville, Baviaanskloof, Cockscomb, and Kareedouw.[269]

The conservation area is bordered predominantly by livestock farmers (northern border of the BNR and the Kareedouw area, south of the Cockscomb section) with other land-use types including irrigated crops (between the Cockscomb and Stinkhoutberg sections and south of the Kouga section), contracted conservancies[270] and private nature reserves (scattered throughout the planning domain with the latter two types being a present day consequence of the BMR).[271] The dominant land-use in these areas is small stock farming and to a lesser extent, cattle farming.[272]

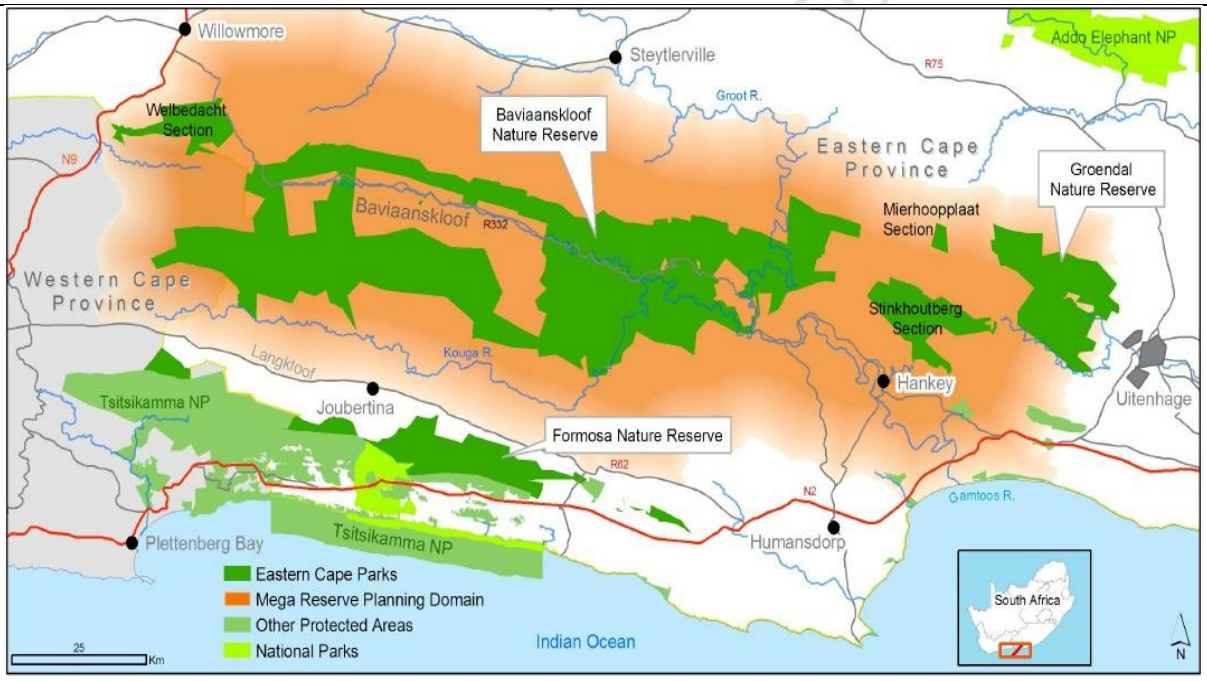

Figure 1.6: The location of the Baviaanskloof Mega-Reserve planning domain including the Baviaanskloof Nature Reserve, Groendal Nature Reserve, Formosa Nature Reserve, their individual sub-sections, and the planning domain in relation to the surrounding towns and South Africa.[273]

[269] Minnie, L. 2009. Socio-economic and ecological correlates of leopard-stock farmer interactions in the Baviaanskloof Mega-Reserve, Eastern Cape. MSc Thesis, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa. pp 86.
[270] One such example is the Baviaans Conservancy. It is discussed in chapter 4.
[271] Boshoff, 2008.
[272] Crane. 2006. Page 6.
[273] Source: http://www.capeaction.org.za/resources/landscape-initiatives

The vision for the BMR is a cluster of state-owned protected areas within a network of private and communal land that would eventually reach a size of around 500 000 ha.[274] The BMR is also envisaged as a biologically, economically and socially sustainable multi-owner/contractual reserve system that realises nature conservation and eco-tourism goals, while promoting ecologically sustainable land management in the surrounding agricultural area. Consequently, the strategy for implementation relies heavily on land owner and community participation.[275] Private landowners, who volunteered to become part of the mega-reserve, were and continue to be, encouraged to align their land-use activities with the principles and practices of biodiversity conservation. The BMR seeks to expand and consolidate the existing protected area and create a mega-reserve in which the conservation of the region's biodiversity and natural resources are aligned with rural and agricultural development needs.[276]

The BMRP has a long-term goal of conserving the biodiversity of the BMR with the delivery of benefits and the full support of local communities, endorsement by government and international recognition.[277] Specifically, it was conceived as a 20-year process to (a) conserve the spectacular biodiversity within the area, (b) protect its critically important role as a regional water provider, and (c) promote sustainable economic development opportunities and deliver economic benefits to surrounding communities by stimulating a 'biodiversity economy'[278] (by promoting alternative productive land uses – notably, though not exclusively, ecotourism).[279] Achieving these goals would be done by consolidating formal protected areas, establishing a multi-owner contractual reserve network,[280] managing the mega-reserve through a partnership between government the private sector and civil society and exposing people to sustainable ways of using the region's natural resources, incentivising this approach and improving livelihoods in rural parts of the region.[281]

[274] Recently Powell (2009, page 28) has highlighted that the BMR now includes nearly 762 000 hectares of private and communal land adjacent to the BNR.
[275] Kouga IDP Review. 2011. At page 114.
[276] Denny, C. 2010.Page 1.
[277] Wilderness Foundation - Final Project Completion Report. Available online http://www.cepf.net/Documents/Final.Baviaanskloof.Mega-Reserve.Project.pdf. Accessed 06/03/2013.
[278] The concept of a biodiversity economy is one where local economic development does not harm biodiversity, and where biodiversity resources are developed into economic opportunities.
[279] Global Environment Fund (GEF), 2004. C.A.P.E. Biodiversity Conservation and Sustainable Development Project Document.
[280] Around the core area in which different land-use patterns and forms of conservation status are reconciled
[281] Boshoff, 2005. Page 8.

Incorporating land into the BMR has and is being pursued through a number of different means which include land purchases, stewardship agreements, conservancies and incentives and donations.[282] In terms of land purchases, the ECPB have purchased, where possible, land which is of high conservation value within the BMR planning domain. The use of stewardship agreements, conservancies and incentives has involved a range of agreements and/or contracts including leases, fixed-term contracts, co-operation agreements between landowners and the ECPB.[283] Land acquired in this way forms the greater part of the BMR. One such example is the Baviaanskloof Conservancy initiative which consists of both financial and non-financial incentives[284] aimed at encouraging land-owners to incorporate their land into the BMR and to implement a range of good management practices.

3.3 Institutional Arrangements

The BMR covers an area of land that is administered by two district municipalities, four local municipalities (local government authorities) and both the Western and Eastern Cape Provincial Governments. A diverse array of laws, administered by a range of national, provincial and local authorities, regulate the BMR's natural resources and the activities that impact on them (See table 2).

In 2002 CAPE appointed the Eastern Cape provincial government's Department of Economic Affairs, Environment & Tourism (DEAET), as the Implementing Agent for the BMRP. Following their appointment, DEAET contracted the Wilderness Foundation[285] to conduct the planning and initial implementation of the BMRP.[286] By 2003 the Wilderness Foundation had set up a Baviaanskloof Project Management Unit (PMU) who took on the task of planning and implementing the BMRP. The PMU would report on a quarterly basis to the Baviaanskloof Steering Committee (BSC), made up of representatives from 30 stakeholder groups. The executive committee of the BSC, made up of the Wilderness Foundation CEO,

[282] Boshoff, 2005. Page 39.
[283] Chapter four will elaborate on this topic
[284] These include alien vegetation clearing, fire management, large mammal management and specialist and technical support, rates relief, funding grants or direct payments, joint commercial tourism ventures and tourism product marketing.
[285] The Wilderness Foundation is an Eastern Cape-based NGO and 'project-driven conservation and leadership organisation that encourages, plans and protects wild lands and wilderness, uplifts the knowledge and lives of citizens and stimulates an environmental ethos among current and future leaders.' The NGO envisages 'a world that has sufficient intact natural ecosystems and wilderness areas that are valued and effectively protected for the benefit of all species.' For further reading go to http://www.wildernessfoundation.co.za/.
[286] DEAET provided the initial seed funding (Boshoff, 2005)

the Chief Director of Environmental Affairs at DEAET and the CEO of the ECPB, oversee the project on a more regular basis.[287] Midway through 2009, following completion of the task, The PMU, and more specifically the Wilderness Foundation, handed over its functions to the ECPB and DEAET.[288] The ECPB became responsible for the nature conservation component of the BMR while the DEAET took on responsibility for the 'off-reserve' aspects of the BMR.

The BMRP received funding from the Global Environment Facility (GEF) through the World Bank between 2004 and 2009. It also received funding from DEAET, Critical Ecosystem Partnership Fund, WWF-SA, Global Conservation Fund and others.[289]Since 2010, a mega-reserve project management unit run by the Eastern Cape Parks and Tourism Agency (ECPTA (replacing the old ECPB) has coordinated the Baviaanskloof Liaison Forum. The forum includes stakeholders such as DEDEA (the Department of Economic Development and Environmental Affairs, Eastern Cape Province), community organisations, farmers' organisations, tourism operators and municipalities. The planning region straddles parts of the areas administered by two District Municipalities, in the extreme West the Eden District Municipality, and for most of the BMR planning domain, the Cacadu District Municipality.[290] It falls mostly under the local municipal authority of three Local Municipalities (Baviaans,[291] Kou-Kamma and Kouga), one District Municipal Area and one Metropolitan Municipality (see figure 1.7).[292] A full list of the stakeholders and relevant institutions are shown in table 2 below.

[287] Noirtin, E. 2008. At page 20. Also see BMR, (2006),*Baviaanskloof mega-reserve background document for the Strategic Management Plan.* Project Management unit.
[288] Part of the mandate of the PMU was to train and mentor staff from the ECPB and DEAET so that these organisations could adequately take over following the change or organisational control.
[289] ECPB, 2007 and Noirtin, 2008. Page vii.
[290] Powell, 2009. Page 28.
[291] 90 per cent of the mega reserve falls within the Baviaans municipal area. Baviaans Municipality Annual Report 2011-2012. 223 pp. Available online at: www.baviaans.gov.za
[292] Boshoff, 2005. Page 38.

Table 2: Spatial distribution of relevant BMR stakeholders

Spatial Distribution of Stakeholders	**Baviaanskloof Mega-Reserve Stakeholders**
Global and International	UNESCO World Bank "Future Generations"
National	DAFF DEA DWA SANParks SANBI SAHRA
Provincial	DEAET Department of Agriculture ECPB/ECPTA Cape Nature Wilderness Foundation PMU CAPE STEP SKEP[293] DEDEA Gamtoos Irrigation Board
District	Cacadu District Municipality Eden District Municipality (Western Cape)
Local	Baviaans Municipality Kou-Kamma Municipality Kouga Municipality Nelson Mandela Bay Metropolitan Municipality DMA Municipality (Western Cape) Working for Water Farmers Private Land-owners Local communities

[293] The western section of the planning area for the mega-reserve includes parts of the Succulent Karoo Biome. SKEP (Succulent Karoo Ecosystem Programme) was initiated in 2001 to identify and generate broad consensus around a shared vision and set of conservation goals for this threatened biome. Further reading available at www.skep.org.

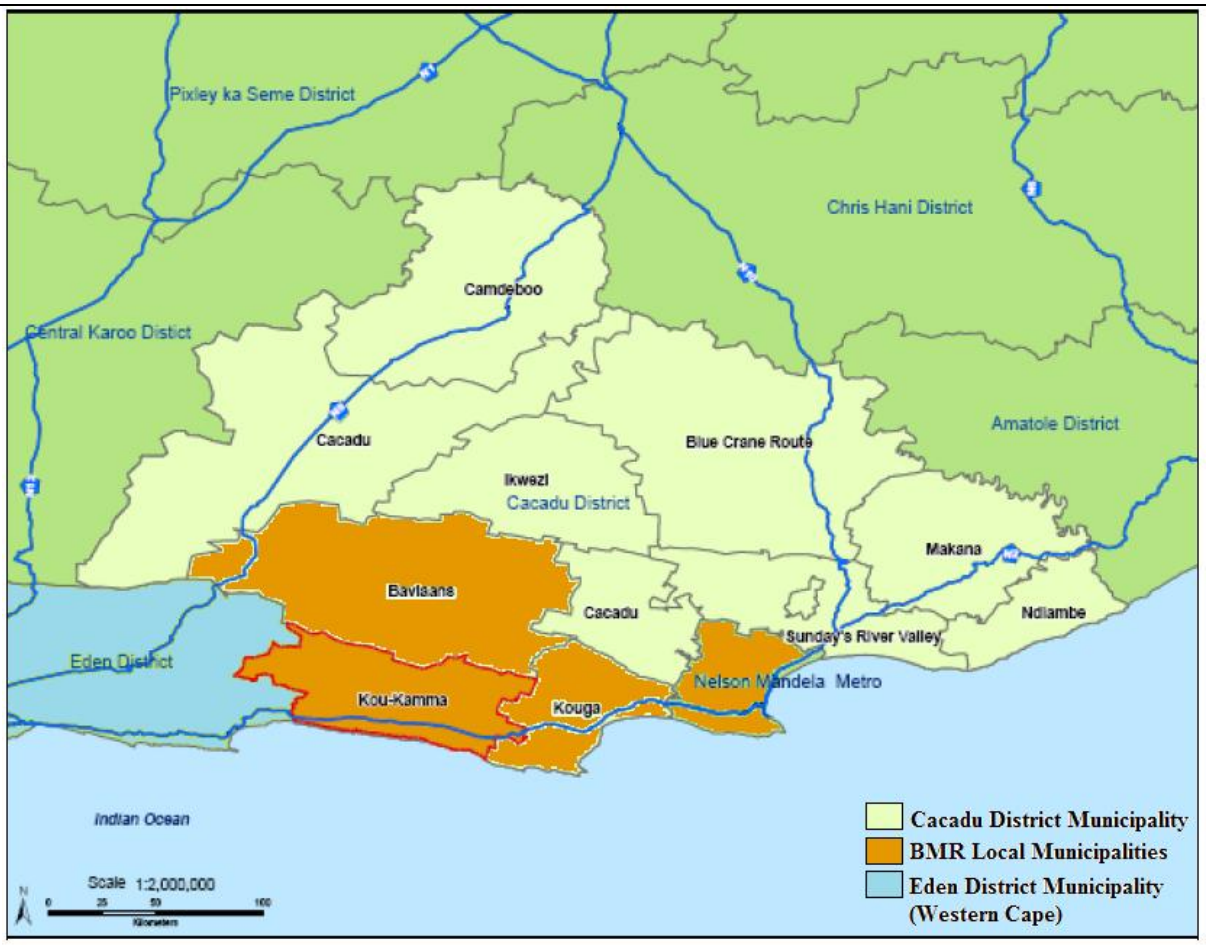

Figure 1.7: The BMR straddles two district municipalities, Eden District Municipality (Western Cape) and Cacadu District Municipality (Eastern Cape), four local munipalities, Eden, Baviaans, Kou-Kamma and Kouga Local Munipalities and one Metropolitan Municipality, NMBM Municipality.[294]

3.4 BMR Projects and Programmes

A number of projects, managed by ECPTA, have been created as part of the BMRP with the intention of creating a 'biodiversity economy'[295] and increasing corridors within the planning domain. These include projects like the Biodiversity and Citrus Initiative (BCI), community beekeeping, small business training and decision-maker wilderness trail projects. The BMR is also involved with the development of a pilot Biodiversity Stewardship Programme, focusing on the expansion and consolidation of the conservation estate. [296]

[294] Figure adapted from original in Kou-Kamma Municipality IDP: 2012-2017. 121pp.
[295] By 2005, the 'biodiversity economy' created by the BMR had brought R35.6 million to the area and facilitated the employment of at least 200 people.
[296] See http://www.capeaction.org.za/index.php/strategic-objectives/landscape-initiatives/baviaanskloof-mega-reserve. Accessed 13/10/2012.

The BCI, which involves a partnership between citrus farmers and the BMR in the Patensie area of the Gamtoos River Valley, aims to promote the conservation of habitats that are critical for the conservation of biodiversity.[297] The expansion of the citrus industry, already the second largest earner of foreign exchange through agricultural exports in South Africa,[298] poses a significant threat to biodiversity in the Baviaanskloof. Thus the BCI has developed biodiversity guidelines, which aim to enhance citrus production without compromising the region's valuable biodiversity. The guidelines include a checklist for producers which the project managers will ensure are incorporated the citrus industry's day-to-day operations thus enhancing existing Euregap[299] requirements. The specific aim of the BCI is to develop viable biodiversity-based land corridors that address social and economic development needs in the region. This will be achieved by working with 'champions' amongst the citrus farmers, who will support the piloting of certain activities on their properties.[300] Activities will include the development of conservation management plans for individual farms and the creation of physical corridors through co-operation between landowners.[301] The development of corridors is being aligned with, and supported by, Biodiversity Stewardship initiatives.[302] Considering the industry's strong export focus and changing global demand for environmentally-responsible goods, the BCI will provide producers with a considerable competitive edge.[303]

Biodiversity stewardship initiatives involve the use of a range of agreements and/or contracts (e.g. leases, fixed-term contracts, cooperation agreements) between landowners and the ECPB. Currently there are five registered conservancies in the mega-reserve, encompassing approximately 76 000 ha, and approximately 160 000 ha is owned by members of the Proud Partner Programme.[304] A package of financial and non-financial incentives is being developed to facilitate agreement by landowners to incorporate their land into the mega-reserve. The next chapter will look into this topic in more detail.

[297] Boshoff, 2008. Page 47.
[298] The industry generates R3 billion per annum and exports 54% of total production, making it the third largest exporter in the world after Spain and the USA. It is currently growing at a rate of 7% per year.
[299] EurepGAP is a common standard for farm management practice created in the late 1990s by several European supermarket chains and their major suppliers. GAP is an acronym for Good Agricultural Practices.
[300] Boshoff, 2005. Page 47.
[301] Boshoff, 2005. Page 47.
[302] http://www.wildernessfoundation.co.za/index.php?option=com_projects&view=project&id=5&Itemid=3
[303] http://www.capeaction.org.za/index.php/strategic-objectives/production-landscapes/citrus
[304] Boshoff, 2008. Page 41.

Finally, the BMR forms part of an even bigger connectivity project called 'Eden to Addo'. Eden to Addo is a project which seeks to link three mega-reserves, the Garden Route National Park with the BMR and the BMR with Addo Elephant National Park.[305] This will be done by creating corridors between the reserves.

Figure 1.8: The planning domain for the 'Eden to Addo' corridor initiative. The BMR is at the centre of this larger initiative and will play a key role in its success. Source: http://www.edentoaddo.co.za/maps

The success of the BMRP is ultimately best represented by the momentous and final milestone (of the aforementioned seven) which was reached when the BNR was proclaimed, along with seven other reserves in the CFR, as a World Heritage Site (WHS).[306] The reserves were nominated under two criteria – 'significant ecological processes',[307] and 'biodiversity and threatened species'.[308] The BNR's exceptional natural beauty and its culturally important sites and artefacts were used to support the successful nomination. The declaration of the BNR as a WHS has been a critical development in helping the BMR to gain international recognition and credibility. It has also installed a sense of pride for the BMR, especially amongst those closely associated with it.[309] This can only bode well for the future of the BMR.

[305] For further reading see http://www.edentoaddo.co.za/.
[306] World Heritage Sites are special places on earth that are considered to be of outstanding universal significance to humanity. They are sites of exceptional beauty, contain the most important habitats, represent major stages of the earth's history, or contain significant ongoing ecological processes.
[307] These processes have been enhance and protected by the creation of the BMR.
[308] To see all the criteria go to http://whc.unesco.org/en/criteria/.
[309] Boshoff, 2008. Page 9.

Chapter 4: Reflecting on South Africa's Legal Framework of Relevance to Connectivity

South Africa does not have dedicated legislation promoting connectivity conservation but several domestic laws do possess legal tools for realising the concept. These tools are found inherent in laws permeating many distinct legal sectors, namely: conservation and biodiversity legislation; sustainable use legislation (regulating specific natural resources such as fresh water, natural forests, soil, heritage and marine living resources); land-use planning legislation (governing future spatial planning, zoning and subdivision); development control legislation (providing for environmental impact assessment, strategic environmental assessment and environmental management frameworks); integrated coastal management legislation (regulating planning and development in the coastal zone) and fiscal legislation (governing an array of conservation incentives). The administration of these laws is distributed across national, provincial and local spheres of government. This legislative scheme is further complemented by several non-statutory schemes that seek to promote connectivity conservation through the use of voluntary contractual arrangements. All of these tools are discussed and analysed below.

4.1 Conservation and Biodiversity Legislation

South Africa's contemporary conservation and biodiversity legislation provides numerous tools for promoting connectivity conservation. These tools include the opportunity to create of a network of protected areas, biodiversity planning, the listing of important and valuable ecosystems and species and the creation of critical biodiversity areas. How these tools have been utilised within the context of the BMR is analysed below.

4.1.1 Establishing a network of Protected Areas

South Africa's environmental legislative body provides for an incredibly diverse array of protected areas which are managed by numerous management authorities across all tiers of government and within civil society. These protected areas differ in the extent to which they are regulated. Consequently the extent to which the resources within them can be accessed and used also varies. They include both statutory and non-statutory forms and provide provisions for the creation of buffer zones and corridors which provides opportunities for

promoting connectivity conservation. These aspects of the protected areas regime and their utility within the context of the BMR are analysed below.

South Africa provides for the designation of over twenty five statutory protected areas. These protected areas are provided for in eleven main national laws[310] and eighteen main provincial laws[311] with the principle Act being the National Environmental Management: Protected Areas Act[312] (NEMPAA). The BMR planning domain incorporates a range of protected area types which all differ in the extent to which they are regulated. These protected areas range from national parks, provincial and municipal nature reserves, publicly-owned land which has been declared as reserves (MTO Forestry (see figure 1.10)), and privately owned land which is managed for conservation (as conservancies).

The objectives of NEMPAA include providing a national framework for the declaration and management of protected areas; entrenching cooperative governance; integrating protected areas within broader national planning instruments; providing for a representative network of protected areas on state, private and communal land; promoting the sustainable utilization of protected areas for the benefit of the people; and promoting local community participation in the management of protected areas.[313] It provides for the proclamation of protected areas to facilitate the conservation of both biological resources (focusing on the conservation of species, habitats and ecosystems and the conservation of specific site values) and cultural values.[314]

[310] Relevant national laws include: the National Environmental Management: Protected Areas Act 57 of 2003; National Environmental Management: Biodiversity Act 10 of 2004; World Heritage Convention Act 49 of 1999; National Heritage Resources Act 25 of 1999; National Environmental Management Act 107 of 1998; National Forests Act 84 of 1998; Marine Living Resources Act 18 of 1998; Environment Conservation Act 73 of 1989; Forest Act 122 of 1984; Mountain Catchment Areas Act 63 of 1970, and Sea Birds and Seals Protection Act 46 of 1973.

[311] Relevant provincial laws include: Nature Conservation Ordinance (Transvaal) 12 of 1983; Nature Conservation Ordinance (Cape) 19 of 1974; Nature Conservation Ordinance (Natal) 15 of 1974; Nature Conservation Ordinance (OFS) 8 of 1969; Transkei Environmental Conservation Decree 9 of 1992; Nature Conservation Act (Ciskei) 10 of 1987; Protected Areas Act (Bophuthatswana) 24 of 1987; Bophuthatswana Nature Conservation Act 3 of 1973; Provincial Parks Board Act (Eastern Cape) 12 of 2003; Limpopo Environmental Management Act 7 of 2003; Limpopo Tourism and Parks Board Act 8 of 2001; Mpumalanga Nature Conservation Act 10 of 1998; Mpumalanga Tourism and Parks Agency Act 5 of 2005; Kwazulu-Natal Nature Conservation Act 29 of 1992; Kwazulu-Natal Nature Conservation Management Act 9 of 1997; Northern Cape Nature Conservation Act 9 of 2009; Eastern Cape Parks and Tourism Act 2 of 2010; and Western Cape Biosphere Reserves Act 16 of 2011.

[312] 57 of 2003.

[313] S 2.

[314] Paterson, 2011. Page 11.

NEMPAA's ambit is exceptionally broad regarding the forms of land that can be incorporated within protected areas. It specifically recognizes that its objectives can only be achieved if it is implemented in partnership with the people,[315] an essential element in the South African context where 84 per cent of land is privately owned.[316] In an effort to ensure the practical realisation of this partnership, NEMPAA specifically provides for the incorporation of private, communal and state owned land within all forms of protected areas prescribed under the Act.[317] It thereby effectively provides for a broad array of governance options including state-owned protected areas, privately owned protected areas and community-owned protected areas. These governance options are further diversified as NEMPAA provides for a range of management categories and management options for protected areas.

Strictly regulated protected areas within the BMR include national parks, provincial nature reserves, local authority reserves, wilderness areas[318] and marine protected areas (see figure 1.10). Whilst the statutory objectives for establishing these areas do not specifically refer to connectivity, they are broad enough to promote the conservation of the core areas within the BMR which are of high conservation value. Laws[319] for these protected area types provide for the appointment of management authorities, the preparation of management plans and the strict regulation of activities within them. The majority of these protected areas are protected and managed by government conservation authorities (such as SANParks) in perpetuity.

Other forms of protected areas such as: private nature reserves, national heritage sites and mountain catchment areas are also represented within the BMR. They are less strictly regulated since management of these protected areas often falls to private landowners and greater provision is made for regulated access and use. Nonetheless, they are also regulated by statute and the rationale for their creation is diverse and includes biodiversity conservation, heritage protection and fresh water management. Within the context of the BMR, private nature reserves and mountain catchment areas have been created and/or consolidated within the mega-reserve.

[315] S 3(b).
[316] Paterson, 2011. Page 12.
[317] S 18(3) (special nature reserves); S 20(3) (national parks); S 23(3) (nature reserves); and S 28(3) (protected environments).
[318] Small pockets within the BMR are contracted as 'wilderness areas' under the National Forest Act 84 of 1998.
[319] See footnote 310 and 311.

As previously mentioned, NEMPAA provides for the incorporation of private, communal and state owned land within all forms of protected areas prescribed under the Act.[320] In order to facilitate their practical uptake by private and communal landowners; the national and provincial conservation authorities have implemented various stewardship programmes. Stewardship programmes are geared towards safeguarding valuable biodiversity which is represented on private land. Landowners undertake to protect and manage their properties or parts of their properties according to sound conservation management principles and Provincial institutions undertake to support this management by providing advice, management plans and assistance in planning alien invasive species clearing and fire management schedules. These agreements may take the form of one of three categories with differing levels of obligation (see figure 1.9 below).

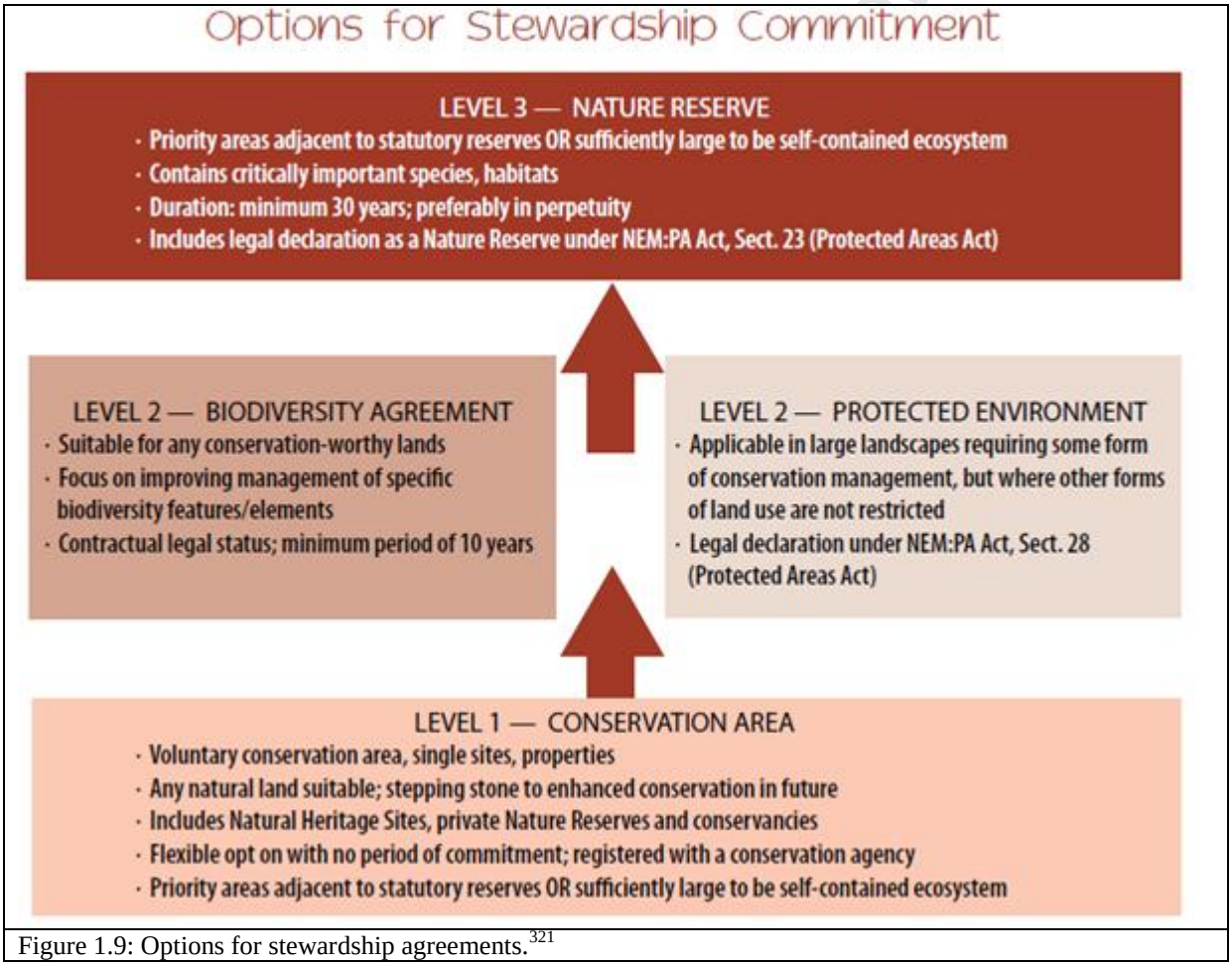

Figure 1.9: Options for stewardship agreements.[321]

[320] S 18(3) (special nature reserves); S 20(3) (national parks); S 23(3) (nature reserves); and S 28(3) (protected environments).
[321] Source Cape Nature Brochure: Conservation in Landowners' Hands. http://www.capenature.co.za/docs/1451/stewardship.pdf

The Wilderness Foundation promoted a broad natural landscape vision for the BMR that included strictly protected land under public management and private lands under conservation stewardship contracts brought together under the umbrella of common management planning and land use zoning standards. [322] CAPE has facilitated the Biodiversity Stewardship Programme as part of the BMRP. [323]

Conservancies, which do not have statutory standing and are widely present within the BMR, are areas subject to voluntary stewardship agreements concluded between private landowners and provincial conservation authorities, in this instance ECPTA. The Baviaans Conservancy[324] was borne out of a desire by stock farmers in an area to the immediate north of the BNR (see figure 1.10) to investigate possible alternatives to farming with domestic small-stock. It is characterized by a variety of land forms, biomes and vegetation types and incorporates a number of cultural and historical sites, including caves, rock paintings and old homesteads.[325] The Conservancy comprises 23 individual farms (representing 18 landowners) and covers some 57 000 ha. At present the Conservancy is managed for domestic stock farming, with limited wildlife utilization, and with small areas set aside for biodiversity conservation.[326]

[322] Kayser, D., Ledec, G., Mackinnon, K. and Sobrevila, C. (World Bank) 2011. Partnership for Biodiversity and Sustainable development. 26pp. Page 17.
[323] The CAPE Stewardship Programme aims to create innovative and alternative mechanisms for incorporating private and communally owned land for biodiversity conservation. The objectives of the programme are: to ensure that private and community owned areas with high biodiversity value receive secure conservation status and are linked to a network of other conservation areas in the landscape.; to ensure that landowners and communities who commit their property to a stewardship option enjoy tangible benefits for their conservation actions; and to expand biodiversity conservation by encouraging commitment to, and the implementation of, good biodiversity management practices on private and community owned land in such a way that landowners become empowered decision makers.
[324] Established in 1997.
[325] Boshoff, 2005. Page 39.
[326] Boshoff, 2005. Page 39.

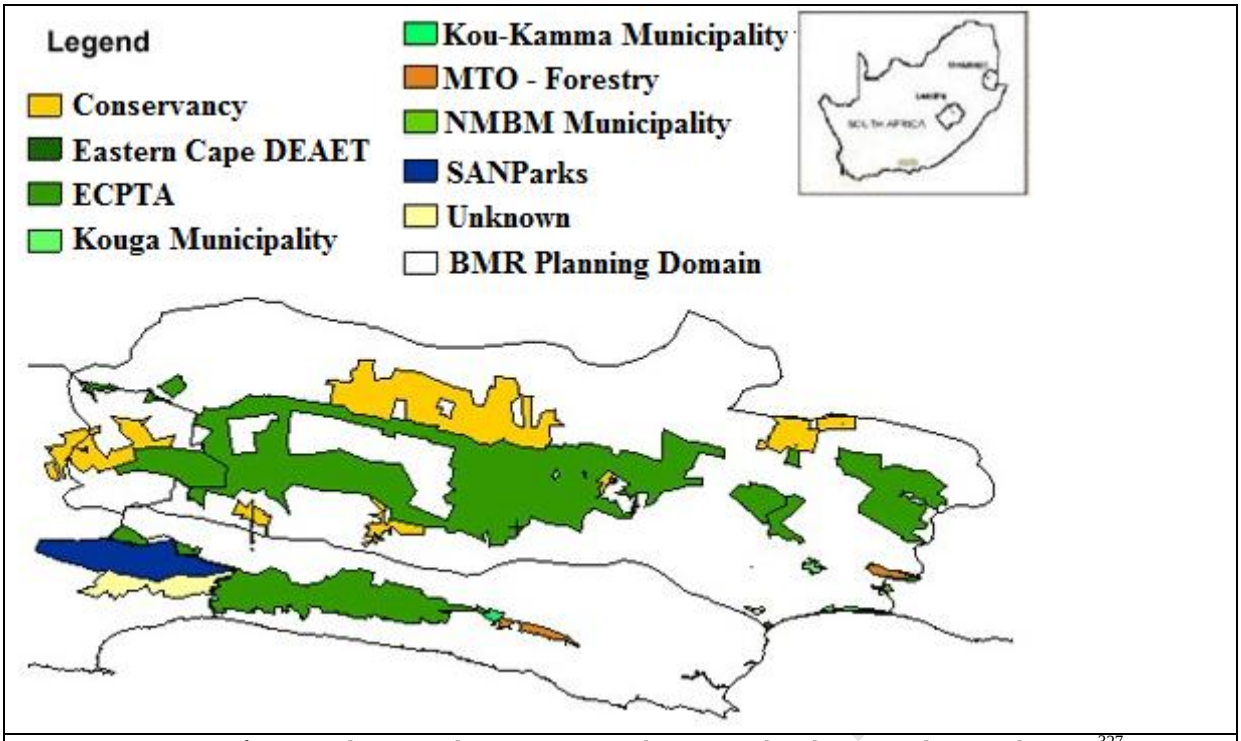

Figure 1.10: Types of protected areas and management authorities within the BMR planning domain.[327]

Finally, the NEMPAA also provides for the declaration, with notice in the government gazette, of any area as a 'protected environment'[328] or 'as part of an existing protected environment'.[329] Importantly, the purposes for which protected environments can be declared include creating a buffer zone for, or a link between, special nature reserves, national parks or nature reserves declared under the Act.[330] In addition, co-management agreements concluded under NEMPAA[331] include provisions for cooperatively regulating the development of economic opportunities adjacent to protected areas.[332] This forms a central aspect of CAPE, STEP and the PMU's strategy for the BMR, which has the motto 'Keeping people on the land in living landscapes'.

The diverse array of protected areas and stewardship options described above has afforded conservation authorities and landowners a wide range of conservation solutions for achieving specific objectives including promoting connectivity conservation despite the fact that

[327] Figure adapted from the original at: http://development.ioisa.org.za/BGIS/new/baviaanskloof/protectedAreas.asp. Accessed 12/10/2012.
[328] NEMPAA S 28(1)(a)(i).
[329] S 28(1)(a)(ii).
[330] S 28(2)(a).
[331] 42. (1) *(a)* 'The management authority may enter into an agreement with another organ of state, a local community, an individual or other party for-
(i) the co-management of the area by the parties
[332] S 42(2)(f).

connectivity conservation is not explicitly called for.[333] Nonetheless, very recent national protected area strategies, such as the *National Protected Areas Expansion Strategy* (2009) and the *Strategy on Buffer Zones for National Parks* (2012) recognise the value of protected areas in promoting connectivity, and consequently maintaining ecological processes and fostering resilience to climate change.

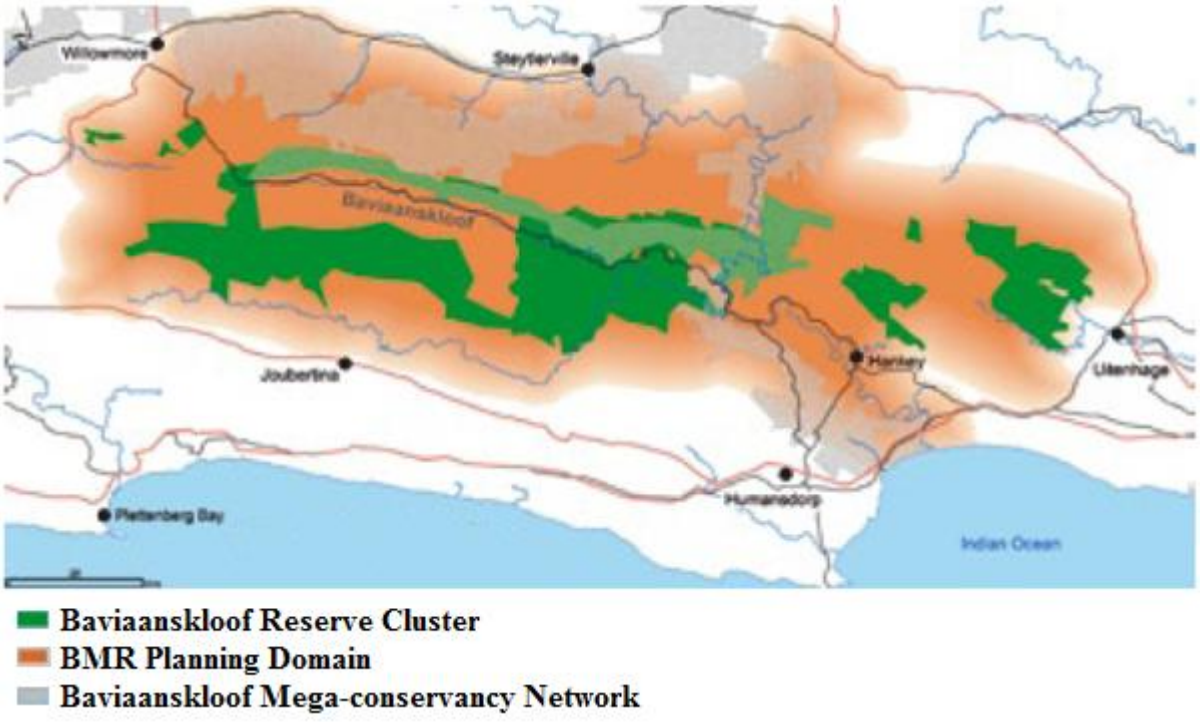

Figure 1.11: The BMR planning domain in relation to the BRC and the Baviaanskloof Mega-conservancy Network (as determined by the STEP project). Note the linkage between the interior and the coast. [334]

4.1.2 Biodiversity Planning

Several national[335] and provincial laws[336] provide the planning framework for informing priority conservation action (including the designation of formal and less formal protected

[333] Paterson, 2012. Page 56.
[334] Figure adapted from the original in Boshoff, 2005. Page 37.
[335] Relevant national laws include: the National Environmental Management: Protected Areas Act 57 of 2003; National Environmental Management: Biodiversity Act 10 of 2004; World Heritage Convention Act 49 of 1999; National Heritage Resources Act 25 of 1999; National Environmental Management Act 107 of 1998; National Forests Act 84 of 1998; Marine Living Resources Act 18 of 1998; Environment Conservation Act 73 of 1989; Forest Act 122 of 1984; Mountain Catchment Areas Act 63 of 1970 and National Environmental Management: Integrated Coastal Management Act 24 of 2008.
[336] Relevant provincial laws include: Nature Conservation Ordinance (Transvaal) 12 of 1983; Nature Conservation Ordinance (Cape) 19 of 1974; Nature Conservation Ordinance (Natal) 15 of 1974; Nature Conservation Ordinance (OFS) 8 of 1969; Transkei Environmental Conservation Decree 9 of 1992; Nature Conservation Act (Ciskei) 10 of 1987; Protected Areas Act (Bophuthatswana) 24 of 1987; Bophuthatswana Nature Conservation Act 3 of 1973; Provincial Parks Board Act (Eastern Cape) 12 of 2003; Limpopo

areas) and an array of tools for promoting the realisation of this planning regime. The most important of these laws, the National Environmental Management: Biodiversity Act[337] (NEMBA) provides important tools for promoting connectivity conservation including the *National Biodiversity Framework* (NBF).[338]

The NBF[339] must identify priority areas for conservation action and the establishment of protected areas, provide for regional cooperation and may determine norms and standards for provincial and municipal environmental conservation plans.[340] The NBF, complemented by a *National Spatial Biodiversity Assessment*[341] (NSBA) and the *National Biodiversity Strategy and Action Plan*[342] (NBSAP), identifies thirty-three priority actions to be undertaken in the next five years in order to give effect to the strategic objectives highlighted in the NBSAP.[343] The NBF draws out immediate priorities for the next five years within each of the SOs of the NBSAP. The NBF's Priority Actions are organised according to the five NBSAP [344]

Despite no explicit references to connectivity conservation, several of the priority actions focus on promoting objectives and activities associated with connectivity.[345] It thus provides an important planning framework to promote, inform and co-ordinate the short-term efforts of the many organisations and individuals involved in conserving and managing South Africa's biodiversity. In the context of the BMR, this includes CAPE, STEP and the

Environmental Management Act 7 of 2003; Limpopo Tourism and Parks Board Act 8 of 2001; Mpumalanga Nature Conservation Act 10 of 1998; Mpumalanga Tourism and Parks Agency Act 5 of 2005; Kwazulu-Natal Nature Conservation Act 29 of 1992; Kwazulu-Natal Nature Conservation Management Act 9 of 1997; Northern Cape Nature Conservation Act 9 of 2009; Eastern Cape Parks and Tourism Act 2 of 2010; and Western Cape Biosphere Reserves Act 16 of 2011

[337] 10 of 2004.

[338] S 38(1)(a) calls on the minister to prepare a national biodiversity framework which, according to s 39(1)(a), must provide an 'integrated, coordinated and uniform approach to biodiversity management' and (S 39(1)(c)) identify 'priority areas for conservation action and the establishment of protected areas'.

[339] GN 813 *GG* No. 32474 dated 3 August 2009

[340] S 39.

[341] DEA-SANBI 2012. *National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report.* South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria. The NSBA commissioned by DEA and the South African National Biodiversity Institute (SANBI) and published in 2005, provides a spatial picture of the location of South Africa's threatened and under-protected ecosystems, and focuses attention on geographic priority areas for biodiversity conservation.

[342] Department of Environmental Affairs and Tourism *South Africa's National Biodiversity Strategy and Action Plan* (2005). The NBSAP, which was commissioned by the former Department of Environmental Affairs and Tourism, sets out a comprehensive long-term strategy for the conservation and sustainable use of South Africa's biodiversity and the equitable sharing of benefits derived from this use.

[343] GN 813 *GG* No. 32474 dated 3 August 2009. Page 11.

[344] GN 813 *GG* No. 32474 dated 3 August 2009. Page 13.

[345] Paterson, 2012. Page 57.

Succulent Karoo Ecosystems Programme (SKEP)[346] that further guide and coordinate priority conservation action.

In a similar manner, national and provincial environmental Ministers may determine a geographic region as a bioregion and publish a bioregional plan to manage the biodiversity found within it.[347] The content of a bioregional plan is set out in S 41 of the NEMBA and must contain measures for the effective management of biodiversity in the region.[348] *Guidelines Regarding the Determination of Bioregions and the Preparation of and Publication of Bioregional Plans*[349] have been declared by the national Minister and these *Guidelines* contain detailed information on how to determine the boundaries of bioregions, the content to be included in a bioregional plan, the process to be followed in determining a bioregion and publishing a bioregional plan, and who shall use the plan.[350]

Of particular relevance to connectivity conservation is the fact that the 'Guidelines' specifically refer to 'representation' and 'persistence' as key characteristics of a systematic biodiversity plan. In addition, the plan must identify critical biodiversity areas that meet biodiversity and ecological process targets and that these areas should include 'spatially explicit ecological corridors that need to be managed to ensure connectivity of natural habitat in the landscape'.[351]

Bioregional plans have not been used within the context of the BMR but they nonetheless provide an opportunity for promoting and informing connectivity conservation initiatives within the BMR and South Africa, especially given their broadly framed nature.

The NEMBA also provides for the creation of a biodiversity management plan. These plans, which can be created for listed or non-listed indigenous species and ecosystems that require

[346] Like CAPE and STEP, SKEP is a partnership of government and civil society, aimed at implementing a 20-year strategy to conserve the sensitive Succulent Karoo Ecosystem. It focuses on the following four strategic areas: increasing local, national and international awareness of the unique inherent biodiversity of the Succulent Karoo; expanding protected areas and improving conservation management; supporting the creation of a matrix of harmonious land uses; and improving institutional coordination. Further reading available at: www.skep.org.
[347] S 40(1) and (2).
[348] S 41.
[349] GN 291 *GG* No. 32006 dated 16 March 2009.
[350] GN 291 *GG* No. 32006 dated 16 March 2009.
[351] Paterson, 2012. Page 58.

special conservation attention,[352] can be prepared by 'any person, organisation or organ of state desiring to contribute to biodiversity management'.[353] These plans are approved by the Minister provided that a suitable 'person, organisation or organ of state' willing to be responsible for implementing the plan has been found[354] and that the plan is consistent with a number of broader planning instruments including the NBF, applicable bioregional plans and relevant integrated development plans (IDPs) prepared by municipalities.[355] They must be aimed at the long-term survival in nature of the species or ecosystem to which the plan relates.[356]

The Minister may also enter into a 'biodiversity management agreement' with any party identified in terms of section 43(2), or any other 'suitable person, organisation or organ of state', 'regarding the implementation of a biodiversity management plan, or any aspect of it'.[357] Theoretically, this could include government authorities, organisations and private landowners. Recently various income tax benefits and incentives have been introduced in order to encourage persons to enter into such agreements. These are discussed a later on in the chapter.

In 2012 the national Minister promulgated the *Norms and Standards for Biodiversity Management Plans for Ecosystems*.[358] This followed the promulgation of the *National Norms and Standards for Biodiversity Management Plans for Species* in 2009.[359] These Norms and Standards set out the scope, format, approval and implementation process for the biodiversity management plans. Of particular relevance to connectivity conservation is the recognition of the following forms of ecosystems[360] as warranting inclusion in any such management plan: ecosystems in buffers or corridors linked to protected areas; ecosystems that play an important role in the provision of ecosystem services; and ecosystems likely to be important for ecosystem-based adaptation to climate change. Paterson notes that '[t]he management objective to be included in these biodiversity management plans could...be to maintain or

[352] S 43.
[353] S 43(1).
[354] S 43(2)
[355] S 45(b) and (c).
[356] S 45(a)
[357] S 44.
[358] GN 532 *GG* No. 35486 dated 2 July 2012.
[359] GN 214 *GG* No. 31968 dated 2 March 2009.
[360] As described in the *Norms and Standards for Biodiversity Management Plans for Ecosystems*.

restore connectivity, or to address under-representation of a particular ecosystem or species in the protected areas system'.[361]

At present there are only 5 biodiversity management plans (three final[362]and two draft plans[363]) None of these plans promote connectivity within the context of the BMR. In addition, no biodiversity management plans for ecosystems and no biodiversity management agreements have been formalised. Thus they represent connectivity tools which, within the context of both the BMR and the country at large, are yet to be used. Similarly, no biodiversity management agreements pertaining to the five management plans have been concluded. Nonetheless, given that they relate, and can be implemented by a range of stakeholders, and that they can promote objectives both within and beyond protected areas, they remain a potentially useful and unused tool for promoting connectivity.

In approving any of the aforementioned plans, authorities are obliged to follow a consultative process.[364] Furthermore, any of the aforementioned plans cannot be in conflict with other planning tools prescribed in other environmental and land-use planning laws.[365] This includes environmental implementation plans (EIPs) or environmental management plans (EMPs) prescribed in terms of the NEMA,[366] IDPs[367] and spatial development frameworks[368] (SDFs) prescribed in terms of the Local Government: Municipal Systems Act,[369] and other relevant national or provincial plans.[370] This will hopefully provide opportunity for connectivity conservation management plans to be incorporated in a range of planning tools.

4.1.3 Listed Ecosystems and Species

Several national[371] and provincial conservation laws[372] provide for the protection of threatened and protected ecosystems and species.[373] Protecting these ecosystems and species

[361] Paterson, 2012. Page 58.
[362] Albany Cycads (Encephalartos latifrons), Black Rhinoceros (Diceros bicornis) and Kalerbossie (Pelargonium sidoides)
[363] African Penguin (Spheniscus demersus) and Bearded Vulture (Gypaetus barbatus).
[364] NEMBA S 99 and S 100.
[365] S 48.
[366] S 11.
[367] S 25
[368] S 26(e)
[369] 32 of 200.
[370] S 48.
[371] These include NEMBA and National Forests Act.

involves listing them and then placing a range of restrictions on activities which may impact on them.

One such example is the NEMBA which enables the national or relevant provincial environmental Minister to publish a national or provincial list of ecosystems that are threatened and in need of protection.[374] Ecosystems may be listed as either 'critically endangered', 'endangered', 'vulnerable' or 'protected' ecosystems.[375] Once listed, the authorities may publish a list of processes or activities, called threatening processes, which put ecosystems at risk.[376] Threatening processes are activities which require an environmental authorisation, preceded by an environmental impact assessment (EIA).[377] In addition, the situation of listed ecosystems must be taken into account by several organs of state in preparing various environmental and land-use plans, including IDPs adopted by municipalities.[378]

A National List of Threatened Ecosystems, containing 225 terrestrial ecosystems[379] situated across South Africa, has been published.[380] It sets out the rationale and criteria[381] for identifying threatened ecosystems and the implications of listing them. While the primary rationale for listing ecosystems is to reduce the rate of ecosystem and species extinction, ensuring the persistence of landscape-scale processes may be indirectly assured as a consequence of listing threatened ecosystems and species.[382]

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[372] See footnote 311.
[373]This limit's of this dissertation are such that the focus will be on those species and ecosystems listed under the NEMBA since they are of greatest relevance to the BMR.
[374] S 52(1). The Minister may, in addition, publish lists of species that are threatened and in need of protection (S 56).
[375] S 52(2) and (3). They are listed with their location and must be reviewed every five years (S 52(4)).
[376] S 53(1). These 'threatening process' are yet to be listed.
[377] S 53(2). The EIA process is regulated under the National Environmental Management Act (107 of 1998) (S 24) read together with the *Environmental Impact Assessment Regulations* (GNR 543-546 *GG* No. 33306 dated 18 June 2010). These threatening processes are expressly listed as identified activities requiring basic assessment under these regulations (identified activity No. 25 in GNR 544).
[378] S 54.
[379] These include 53 critically endangered, 64 endangered and 108 vulnerable ecosystems.
[380] GN 1002 *GG* No. 34809 dated 8 December 2011.
[381] These criteria are: irreversible loss of natural habitat; ecosystem degradation and loss of integrity; rate of loss of natural habitat; limited extent and imminent threat; threatened plant species associations; threatened animal species associations; fragmentation; priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan.
[382] Paterson, 2012. Page 60.

Several listed ecosystems are located within the BMR[383] and thus provide a legal tool for promoting connectivity conservation within and between these listed ecosystems. Ultimately this is done by factoring their existence into relevant planning frameworks and regulating activities which may negatively impact on them. This process can be used to promote connectivity conservation and is at play with the BMR.

In a similar manner to threatened ecosystems, the NEMBA empowers the Minister to publish a List[384] of Critically Endangered, Endangered, Vulnerable and Protected Species.[385] Once listed, no person may carry out a restricted activity[386] involving a specimen of such a species without a permit[387] and the Threatened and Protected Species Regulations[388] (TOPS Regulations) regulates this permitting process. The Minister also has the power to prohibit the carrying out of any activity that may negatively impact on the survival of a listed threatened or protected species by notice in the Government Gazette.[389]

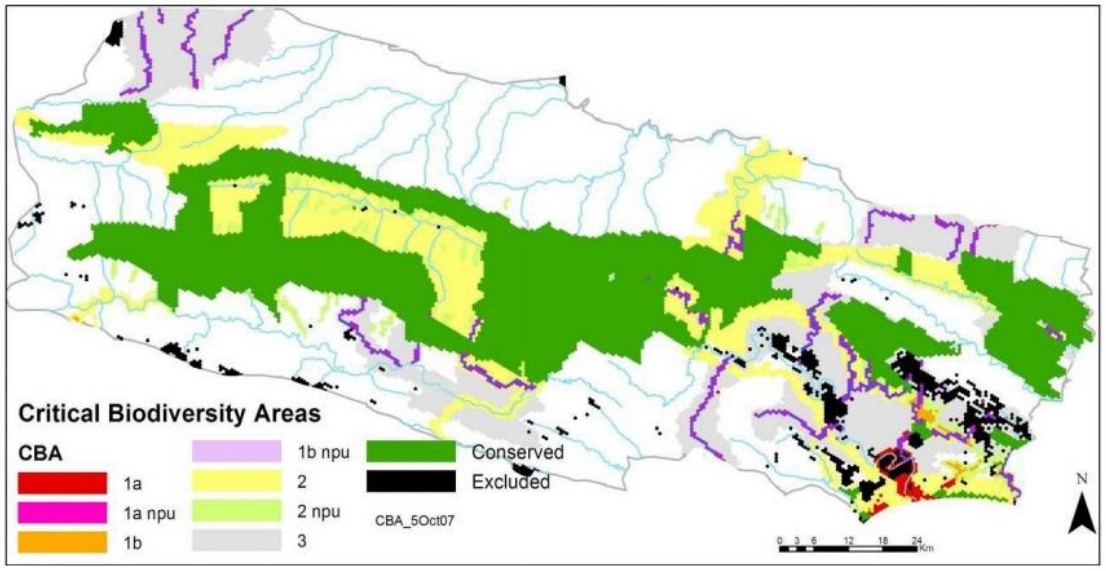
Several listed species occur within the BMR including the black rhinoceros, *Diceros bicornis*, which was reintroduced into the BNR in June 2007.[390] In providing for the uniform regulation of activities impacting on species across an entire landscape, it may indirectly promote connectivity conservation.[391]

4.1.4 Critical Biodiversity Areas

Very recently, provincial conservation authorities have identified and begun drawing up fine-scale biodiversity plans for critical biodiversity areas. These plans map the critical biodiversity areas (terrestrial and aquatic) and associated critical ecological support areas and buffers. Their status is still unclear 'with some arguing they have no binding status and others that they constitute either a form of bioregional plan or an environmental management

[383] These include: Garden Route Shale Fynbos, Algoa Sandstone Fynbos, Eastern Coastal Shale Band Vegetation, Humansdorp Shale Renosterveld, Langkloof Shale Renosterveld and Albany Alluvial Vegetation.
[384] S 56(1).
[385] GNR 152 *GG* No. 29657 dated 23 February 2007, as amended.
[386] The term 'restricted activity' is defined incredibly widely in the Act to include almost all activities relating to living specimens or derivatives of listed species (S 1).
[387] S 57(1)
[388] GNR 151 *GG* No. 29657 dated 23 February 2007, as amended.
[389] S 57(2). In this regard, the Minister has imposed a national moratorium on the trade of individual rhinoceros horns and products and derivatives thereof (GN 148 *GG* No. 31899 dated 13 February 2009).
[390] See http://www.focusonpictures.com/zuidafrika/landschappen/bavkloof/bavkloof15.htm
[391] Paterson, A., R. 2012. At page 60.

framework'.[392] Regardless, they provide an important tool for informing decision making[393] and for promoting connectivity conservation. They have been incorporated as a tool for promoting connectivity within the BMR conservation plan (see figure 1.12).



CBA1a 100% irreplaceable habitats; restricted RDB plant species; all remaining Critically Endangered habitats; selected river reaches;
CBA1b Best design site (meeting balance of pattern targets); RDB plant species; restricted animal habitats;
CBA2 All remaining Endangered habitats; all remaining forest and wetland habitats; remaining coastal corridor; river reaches supporting selected river reaches; Landscape Linkages (selected corridor areas)
CBA3* Sub-quaternary catchments of selected river reaches.
CBA = Critical Biodiversity Area * CBA3 = Key Biodiversity Support Area, Important Natural Area.

Figure 1.12: Critical biodiversity areas categories used in the BMR conservation plan.[394]

4.2 Land-use Planning Legislation

South Africa's land-use planning regime provides two main opportunities for promoting connectivity conservation. The first is the manner in which municipalities are compelled to align their future spatial planning with the aforementioned relevant biodiversity planning frameworks. The second is the manner in which specific land-use management tools, zoning schemes, environmental overlays and subdivision, may be used. Given that the relevant biodiversity planning frameworks are still in their infancy, these land-use planning tools have not been used for promoting connectivity conservation within the BMR. Nonetheless they still have the potential to be used in future initiatives and as such are discussed below.

[392] Paterson, 2012. Page 64.
[393] They can be used when considering applications for environmental authorizations, rezoning approvals, subdivision approvals and land clearing permits.
[394] Source: www.capeaction.org.za

4.2.1 Future Spatial Planning

Future spatial planning is a key component of South Africa's land-use planning regime and is entrenched in several national[395] and provincial laws.[396] These laws compel municipalities to prepare several overlapping plans, including IDPs, spatial development frameworks (SDFs) and structure plans, to guide future land-use in their municipal area.

South Africa's Local Government: Municipal Systems Act[397] legislates for the preparation of an IDP by municipalities in order to promote integrated development and management of their municipal area.[398] The content of an IDP must be taken into account by municipalities in their land-use and development decision-making.[399] In addition, the IDP must be 'compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation'.[400] Thus IDPs must be aligned with a broad array of biodiversity plans prepared by conservation authorities, such as the National Biodiversity Framework, and the aforementioned bioregional plans and biodiversity management plans.

Municipalities must also take listed ecosystems within their jurisdiction into account and align their IDPs accordingly. The IDPs must contain a spatial development framework (SDF), which provides guidelines for current and future land-use management in the municipality's jurisdiction.[401] The content of these SDFs must similarly be aligned with the abovementioned biodiversity planning tools and inform relevant land-use and development decisions.[402] A final planning tool and a remnant from South Africa's 'old' planning regime which contributes to future spatial planning are structure plans.[403] Structure plans have the same statutory status as IDPs and SDFs.

[395] Local Government Municipal Systems Act 32 of 2000; Physical Planning Act 125 of 1991 and Development Facilitation Act 67 of 1995.
[396] Kwazulu-Natal Planning and Development Act 5 of 1998; Northern Cape Planning and Development Act 7 of 1998; Land Use Planning Ordinance (Cape (LUPO)) 15 of 1985; Town Planning Ordinance (Natal) 27 of 1949; Town Planning and Townships Ordinance (Transvaal) 25 of 1965; and Townships Ordinance (Free State) 9 of 1969.
[397] 32 of 2000.
[398] S 25 and S 26.
[399] S 35. These decisions would include township, rezoning and subdivision approvals.
[400] S 25 (1)(e).
[401] S 26(e).
[402] Paterson, 2012. Page 61.
[403] The preparation, status and amendment of structure plans is predominantly regulated under the Physical Planning Act 125 of 1991 (S 4(2)) and the provincial planning legislation (S 4(1) and S 4(2) of LUPO (see note 2 above)).

Unfortunately, none of the municipalities which the BMR traverses have yet developed IDPs, SDFs or structure plans that make any reference to connectivity conservation.[404] There are two reasons for this. First, connectivity conservation will only permeate future spatial planning tools when it is incorporated into relevant biodiversity plans. Since these plans are still in their legislative infancy and very few have even been prepared, it will take some time before connectivity conservation is incorporated into future spatial planning tools. Second, many rural municipalities do not currently have the capacity or resources to align their plans accordingly. These challenges will hopefully be overcome in the future.

4.2.2 Zoning, Subdivision and Environmental Overlays

Several additional legal tools within the land-use planning legislation (zoning, environmental overlays and subdivisions) have the potential to promote connectivity conservation by regulating land-use rights. Municipalities are required to give all the land within their jurisdiction a particular zoning. These zones include open space, agriculture, rural, residential or industrial and each zone type is subject to certain land-use/development rights and restrictions. These strictly regulate the types and scale of development that can be undertaken and are contained in zoning scheme regulations prepared by municipalities under provincial planning legislation.[405] A zoning scheme is a legal document that identifies development rights and obligations, and is used together with other legislation, such as environmental laws, to manage land use and development in the city.[406] A landowner may apply to the relevant municipality to rezone the land[407] or obtain a formal departure in order to undertake a different land-use or alter the rights and restrictions attached to the current zoning.

Since rezoning or departure decisions are informed by future spatial planning, connectivity conservation will only be promoted by these tools when it has filtered down from biodiversity planning frameworks and into future spatial planning.

[404] See Baviaans Municipality Annual Report 2011-2012. 223 pp. (www.baviaans.gov.za), Kouga IDP Review. 2011 (www.kouga.gov.za), Kou-Kamma Municipality IDP: 2012-2017. 121pp. (http://www.ecsecc.org/files/library/documents/Koukammal_idp_2017.pdf), Nelson Mandela Bay Municipality IDP 2011-2016. 12th Edition 2013-2014. 429pp. (www.nelsonmandelabay.gov.za).
[405] Zoning is regulated under the aforementioned provincial laws.
[406] Van Wyk J Planning Law (Cape Town Juta 1999)
[407] S 17(1) LUPO 15 of 1985.

Subdivision is a second land-use planning tool that can be used to promote connectivity conservation. As with zoning, subdivision is informed predominantly by the relevant IDPs or SDFs. Approval from the relevant municipality is needed in order to subdivide land and it is the provincial laws that enable this within its jurisdiction.[408] The only exception relates to rural land, and it is regulated by national agricultural authorities.[409] Although subdivision has yet to be used extensively as a tool for promoting connectivity conservation, it has the potential to do so by precluding the fragmentation of consolidated compartments of land of high conservation value or of importance to promoting connectivity conservation.

Environmental overlays, a third land-use planning tool, enable municipalities to give effect to the goals of a particular SDF or relevant planning tool and they are seen as a mechanism to link policy proposals with the regulatory provisions of a zoning scheme.[410] Overlay zones, containing a set of restrictions, incentives and/or requirements, are applied in conjunction with a particular area's zoning restrictions. The contemporary nature of this land-use planning tool means it has yet to contribute to connectivity conservation initiatives, but it has the potential to do so in the future.

4.3 Integrated Coastal Management Legislation

Several provisions legislated for by the National Environmental Management Integrated Coastal Management Act[411] (NEMICMA), are of relevance to connectivity conservation. These provisions include coastal management planning; coastal management committees; estuarine management; and regulatory and enforcement mechanisms (for governing activities in the coastal zone). The BMR, although predominantly inland, does contain a corridor which links the BNR to the coast in the south-east (see figure 1.10). As such the provisions described above must be assessed. Given that NEMICMA is one of South Africa's most recently approved environmental laws, many of its provisions are yet to have been fully developed and integrated into conservation plans. Nonetheless it offers great potential for future initiatives.

[408] The provincial laws listed above regulate Subdivision.
[409] Subdivision in the agricultural context is regulated under the Subdivision of Agricultural Land Act 70 of 1970. The old law requires landowners seeking to subdivide agricultural land to obtain approval from the Minister of Agriculture, Forestry and Fisheries to do so.
[410] CoCT, 2007. Page 5.
[411] 24 of 2008.

4.3.1 Coastal Management Programmes

NEMICMA informs the integrated management of the coastal zone by providing for three tiers of coastal management programmes (national,[412] provincial[413] and municipal).[414] Each of these programmes is prepared by the relevant authority and contains their coastal management vision, objectives and policies. They must be consistent with the tier above, reviewed every five years and aligned with other relevant plans such as IDPs, SDFs, the NBF and the National Estuary Management Protocol.[415]

Whilst these programmes are still being developed and are yet to be used extensively, their broad scope and status as statutory policy mean they provide a key, and presently unused opportunity for promoting connectivity in the coastal environment.

4.3.2 Coastal Management Committees

NEMICMA also provides for three tiers of coastal management committees (national,[416] provincial[417] and municipal).[418] These committees are fairly cosmopolitan with representatives from government (from a diverse array of environmental sectors), local communities and members of the scientific community. Their functions are very similar to coastal management programmes and include promoting integrated coastal management,[419] providing advice on coastal management issues to the relevant decision makers and facilitating the development of coastal management programmes. The committees are also responsible for promoting and facilitating the integration of coastal management concerns and objectives into relevant plans such as IDPs, SDFs, and policies and plans of organs of state whose activities may adversely impact on the coastal environment.

As with the coastal management programmes, these committees are still fairly novel and being established. It is hoped that once established, they will promote the realisation of the

[412] NEMICMA, Chapter 6, Part 1.
[413] Chapter 6, Part 2.
[414] Chapter 6, Part 3.
[415] Chapter 4, S 33.
[416] Chapter 5, Part 1.
[417] Chapter 5, Part 3.
[418] Chapter 5, Part 4.
[419] Within and between relevant spheres of government.

objectives outlined in the different coastal management programmes. This would include promoting connectivity if it has permeated into the objectives of coastal management programmes.

4.3.3 Estuarine Management

NEMICMA also provides for the preparation of the National Estuarine Management Protocol[420] to govern wetlands.[421] The Protocol,[422] promulgated in May 2013, contains a guiding principle to 'maintain and/or restore the ecological integrity of South African estuaries by ensuring that the ecological interactions between adjacent estuaries, between estuaries and their catchments, and between estuaries and other ecosystems, are maintained'.[423] Given that the Protocol is still in its infancy it has yet to be utilised as a mechanism from promoting connectivity within the BMR. Nonetheless it has tremendous potential for promoting hydrologic connectivity in the coastal environment and will hopefully do so in the future.

4.3.3 Regulatory and Enforcement Mechanisms

NEMICMA also contains a broad array of legal mechanisms for regulating activities which may negatively impact on the coastal zone, and by default, the natural connectivity within the coastal zone. Presently, none of these regulatory mechanisms are in operation, but they will offer additional tools for promoting connectivity conservation which include: the designation of special management areas,[424] the prescription of coastal set-back lines,[425] coastal zoning schemes[426] and coastal leases and concessions.[427]

[420] Chapter 4, Section 33. The Protocol contains: a strategic vision and objectives (S 33(3)(a); management standards (S 33(3)(b)); procedures or guidelines as to how to manage estuaries and which authorities should undertake such management (S 33(3)(c)); and details regarding estuarine management plans which it is anticipated provincial and local government authorities will be required to prepare for estuaries situated in their jurisdiction (S 33(3)(d) and (e)).
[421] Preparation by the national environmental Minister.
[422] GN 341 *GG* No. 36432 dated 10 May 2013.
[423] Paterson, 2012. Page 66.
[424] S 23-24. Activities within these special management areas will be strictly regulated which provides a useful tool for conserving potentially valuable, connected coastal zone habitat.
[425] S 25. Development on the seaward boundary is prohibited and/or strictly regulated
[426] S 56-57. Coastal zoning schemes trump municipal zoning schemes.
[427] S 65-67. Coastal leases or concessions are granted to people seeking to develop or extract resources in certain parts of the coastal zone.

There are a broad array of enforcement mechanisms that can be used by environmental authorities (across all three tiers of government) to deal with people who do not comply with the regulations mentioned above and who's activities impact negatively on the coastal environment. These include repair and removal notices[428] and coastal protection notices.[429] Administrative and criminal remedies are available if the relevant person/s fails to comply with the notice.

4.4 Sustainable-Use Legislation

Several of South Africa's sectoral resource laws,[430] specifically those that regulate the use of agricultural resources,[431] fresh water resources,[432] forests[433] and marine living resources,[434] have the potential to promote connectivity conservation. Given that they haven't been utilised in the context of the BMR, and that the tools inherent in them are extremely diverse, they will only be mentioned briefly here. These tools include: Permitting Schemes,[435] National and Regional Planning Frameworks, Directives and Control Measures,[436] CARA Subsidy Schemes[437] and Voluntary Resource Management Associations and Committees[438]

As with a number of the aforementioned tools, none of the tools listed above (or the laws that provide for them) directly refer to connectivity. Nonetheless they certainly have the potential to indirectly promote the concept. A number of them provide for integrated and multi-level planning to inform national and regional priority action and many of the laws directly regulate several activities that may undermine connectivity.[439] Voluntary associations or

[428] S 60. Repair and removal notices are issued to persons who have constructed illegal structures within the coastal zone.
[429] S 59. Coastal protection notices are issued to persons whose activities are having/are likely to have an adverse effect on the coastal environment.
[430] Given their diversity, these laws are administered by several different government agencies.
[431] Conservation of Agricultural Resources Act 43 of 1993 (CARA). The CARA is administered by the Department of Agriculture, Forestry and Fisheries.
[432] National Water Act 36 of 1998 (NWA). The NWA is administered by the Department of Water Affairs.
[433] National Forest Act 84 of 1998 and National Veld and Forest Fire Act 101 of 1998. These are administered by the Department of Agriculture, Forestry and Fisheries.
[434] Marine Living Resources Act 18 of 1998 (administered by the Department of Agriculture, Forestry and Fisheries).
[435] Permitting schemes for using water, clearing land, catching marine living resources and harvesting natural forests
[436] These are used to control alien invasive species, prevent soil erosion, protect wetlands, regulate grazing capacity and prevent wild fires.
[437] These schemes are in place to assist resource poor farmers with irrigated agricultural development.
[438] These include water user associations, soil conservation committees and fire protection associations.
[439] Paterson, 2012. Page 60.

committees offer an additional opportunity for landowners to integrate connectivity conservation into management plans.

4.5 Development Control Legislation

Development control legislation provides for the strict regulation of activities which may negatively impact on the environment. This legislation provides several legal tools of potential relevance to promoting connectivity conservation in the BMR. These include provision for environmental impact assessment (EIA); strategic environmental assessment (SEA); environmental management frameworks and the designation of critical biodiversity areas.

4.5.1 Environmental Impact Assessment

South Africa has developed a comprehensive environmental impact assessment (EIA) framework[440] to regulate certain types of activities which may cause harm to the environment. These activities, identified by national and provincial environmental Ministers and listed accordingly, trigger the need for an environmental authorisation, preceded by some form of EIA. They can be listed nationally or in respect of certain areas or provinces only. The size of the activity, the degree of risk and the likelihood of that risk occurring are used as factors to determine whether developers need to undertake a full EIA or another form of basic EIA. The mandate to consider the EIA and grant the environmental authorisation usually rests with the provincial environmental authority.

While EIAs make no express reference to connectivity, the EIA scheme may promote it as many of the listed activities, such as housing developments; industrial activities; agricultural activities; forestry activities; activities that transform undeveloped land; road construction; activities which may impact on threatened/protected species/ecosystems; and developments near watercourses, estuaries or the coast, have the potential to undermine connectivity. In addition, several listed activities specifically refer to a broad range of developments undertaken in areas actively seeking to promote, or of key importance to, connectivity conservation. These areas include protected areas; critical biodiversity areas; ecosystems

[440] National Environmental Management Act 107 of 1998 (section 24) read together with the *Environmental Impact Assessment Regulations* (GNR 543-546 *GG* No. 33306 dated 18 June 2010).

service areas identified within relevant spatial planning frameworks; areas targeted for protected areas expansion; world heritage sites; biosphere reserves; and buffers around these areas and a number of these type of areas make up the BMR Therefore the EIA scheme provides a tangible legal mechanism to regulate activities that may undermine connectivity within the BMR.

4.5.2 Strategic Environmental Assessment

South Africa's contemporary EIA regime[441] expressly enables national and provincial environmental Ministers to promulgate SEA regulations.[442] These regulations are yet to be promulgated and as such have not been used within the context of the BMR, but once they are they may become of relevance if they recognise and promote connectivity as a mandatory element to be considered in SEAs undertaken for a particular area, project or activity.

4.5.3 Environmental Management Frameworks

One specific legal tool inherent the country's contemporary EIA regime aimed at promoting SEA are environmental management frameworks (EMFs).[443] The nature of these EMFs is incredibly broad and they vary significantly in the form they take. They range from information documents and/or a map: specifying an area's environmental attributes (sensitivity, extent, significance, interrelationship); detailing the conservation status of the area; stating environmental management priorities for the area; identifying potentially harmful or undesirable activities; and indicating areas of socio-cultural value. Both national and provincial environmental Ministers are enabled to prepare and approve an EMF, and once so approved, all authorities must take the content of the EMF into account in their administrative decisions impacting on the area in question. These decisions could forseeably include the grant of land development approvals, rezoning approvals, subdivision approvals, permits to use and extract natural resources, land clearing permits and decisions about where to establish protected areas. Given the broad nature of these EMFs, they could be tailored towards promoting connectivity conservation. However, no such EMF has been adopted in respect of land incorporated within the BMR..

[441] National Environmental Management Act 107 of 1998 (section 24) read together with the *Environmental Impact Assessment Regulations* (GNR 543-546 *GG* No. 33306 dated 18 June 2010).
[442] S 24(5)(bA)(ii).
[443] GNR 547 *GG* No. 33306 dated 18 June 2010 (Reg 69-72).

4.6 Fiscal Legislation

One of the most significant reforms affected in South Africa's environmental regime during the course of the last decade is the shift towards an incentive-based approach to regulation.[444] Incentive-based instruments seek to encourage compliance with state objectives and standards through motivation and reward, as opposed to direct regulation.[445] Nowhere is this incentive-based approach more evident than in the biodiversity sector, where several incentives have been recently implemented to encourage private and communal landowners to voluntarily assume conservation activities and practices on their land.[446] This has been an extremely important development for biodiversity conservation especially given the unlikelihood of increased government budgetary allocations to the conservation sector. Thus the government has had to create alternative mechanisms and incentives to encourage land incorporation within protected areas and to share management costs with willing conservation organizations, local communities and individuals.[447]

4.6.1 Property Rates Incentives

Under the Local Government: Municipal Property Rates Act,[448] no property tax can be levied on 'those parts of a special nature reserve, national park or nature reserve within the meaning of the Protected Areas Act […] which are not developed or used for commercial, business, agricultural or residential purposes'.[449] This, theoretically, should encourage landowners to contract land of high conservation value into these forms of protected areas in order to avoid high property tax liabilities. The Act also makes provision for the retrospective recouping of taxes in the event that the landowner withdraws from the contractual agreement[450] and in so doing, prevents these type of contracts being exploited for financial gain with no real commitment to conservation efforts.

[444] Paterson, 2011. Page 35.
[445] Paterson AR 'Chapter 12: Incentive-Based Measures' in Paterson AR & Kotze LJ (eds) *Environmental Compliance and Enforcement in South Africa: Critical Legal Perspectives* (2009) Juta 296-335. Page 299. The philosophy underlying these instruments is that it may be more efficient and effective to reward positive behaviour as opposed to sanctioning negative behaviour.
[446] Paterson, 2011. Page 35.
[447] National Treasury. 2006. A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa. Draft Policy Paper. Government Printers.
[448] 6 of 2004.
[449] S 17(1)(e)
[450] S 17(2).

Whilst many of South Africa's 284 municipalities are still formulating their municipal property tax policies (including those municipalities which straddle the BMR), the property tax benefits within them will offer a significant opportunity to facilitate the inclusion of key private land within the protected area's estate thereby promoting connectivity conservation.

4.6.2 Income Tax Incentives

Landowners who relinquish development opportunities on their land in order to promote biodiversity conservation will receive income tax benefits. These benefits, prescribed under the Income Tax Act[451] and formally implemented in 2009, are differentiated according to the degree to which a landowner is willing to voluntarily assume restrictions on his/her land-use rights, the duration of such limitations, and any costs incurred in managing his/her land in the interests of biodiversity conservation.[452] Landowners can contract their land into a national park or nature reserve, for 99 years (or longer) and annually deduct ten per cent of the market value of their land for tax purposes.[453] Alternatively, landowners can contract their land into a national park, nature reserve or protected environment for 30 years (or more) and deduct the costs associated with implementing the management plan for the protected areas from their annual taxes.[454] The final option for landowners is to deduct the expenses (from their tax) associated with implementation of the terms of a biodiversity management agreement (which must be in place for 5 years or more).[455]

The first two options described above clearly provide a tool for increasing the protected area network and as such contribute to connectivity conservation. Paterson notes that land this is contracted under a biodiversity management agreement, whilst not a formal protected area, is still of value to connectivity conservation because it can be used as a buffer zone around, or a corridor between, formally proclaimed protected areas.[456]

[451] 58 of 1962
[452] Paterson, 2012. Page 67. For further reading see Paterson A, 'Considering Recent Developments in Environmental Fiscal Reform in South Africa' (2009) 16(1) *South African Journal of Environmental Law and Policy* 29-34 and Paterson AR 'Chapter 12: Incentive-Based Measures' in Paterson AR & Kotze LJ (eds) *Environmental Compliance and Enforcement in South Africa: Critical Legal Perspectives* (2009) Juta 296-335.
[453] S 37C(5)-(7). Costs incurred for implementing the management plan of the protected area can also be dudcted.
[454] S 37C(4).
[455] S 37C(1)-(3).
[456] Paterson, 2012. Page 67.

Chapter 5: Conclusions

South Africa's progressive environmental governance regime and long conservation history position it amongst the world leaders in terms of biodiversity conservation. Notwithstanding this notable achievement, environmental authorities still face many challenges and obstacles which threaten to undermine all the work which has led to where we find ourselves today. Presently, our protected area network, like much of the rest of the world, is failing to suppress pressures from climate changes and socio-economic development. The global response to this has been to create a connected landscape of protected areas which differ in the extent to which they are regulated so that conservation can be married with, rather than antagonistic to, development.

Thus, the global trend in biodiversity conservation, as indicated by numerous international conventions and decisions emanating from their COP and other key international conservation forums, is to make efforts to expand protected area networks, link fragmented habitats and incorporate local communities in conservation initiatives. It is unfortunate that South Africa lacks an environmental law which explicitly calls for connectivity conservation, but this dissertation argues that the country's domestic legal framework still has numerous tools which can be used to promote connectivity conservation initiatives. These tools are spread throughout many legislative sectors such as conservation and biodiversity, land-use planning, integrated coastal management, sustainable-use, development control and fiscal legislation.

The dissertation has illustrated how a number of the country's conservation strategies, which provide the content which informs the implementation of legislation, are promoting connectivity. Many of the NBF's priority actions, for example, call for the mainstreaming of biodiversity. This essentially means that biodiversity considerations must be integrated into the policies, strategies and day-to-day operations of a range of sectors whose core business is not biodiversity conservation. Mainstreaming biodiversity is essential for ensuring sustainable development and, consequently, overcoming the "conservation vs. development" mind set.[457]

[457] NBF, Page 42.

The dissertation moved on to show how conservation legislation provides for a multitude of protected area types which can be created by environmental authorities across all three tiers of government. These protected areas all vary in the extent to which they are regulated and are thus an extremely useful and important tool for creating a protected area 'mosaic'. This became evident when examining the protected area make up of the case study, the BMR. Biodiversity legislation also provides numerous planning tools such as the NBF, bioregional plans, biodiversity management plans and biodiversity management agreements which can be used to promote a connectivity conservation agenda. However these biodiversity plans are yet to be used to promote connectivity primarily because of their relative novelty. Biodiversity tools which, in the context of the BMR, are being used to promote connectivity are the national lists for threatened ecosystems and species.

The dissertation also showed how land-use planning, integrated coastal management and sustainable-use legislation all possess tools which at present are not being used, but which could be used in the future to promote connectivity initiatives. Once again, these tools have not been used primarily because insufficient time has passed for the relevant government institutions to implement them. However, prescribing a comprehensive regime to regulate protected areas is worthless unless adequate resources are set aside to implement it. This is perhaps one of the greatest challenges facing South Africa's protected areas regime.

With that in mind the dissertation unveiled the tools inherent in fiscal legislation which present one of the most promising avenues through which to pursue future connectivity initiatives. Indeed, in a country where so little of the State's budget is allocated to conservation and where a high percentage of the land is privately owned, fiscal incentives provide an incredibly useful tool for incorporating this increasing the protected areas network. Finally, stewardship initiatives, organised by NGO's like CAPE, STEP and the Wilderness Foundation, were critical in getting local community 'buy in' to the BMR. These initiatives are a critical component of any connectivity initiative and must be incorporated into future projects. They also serve as a tool with which to battle one final obstacle in the way of connectivity conservation, land reform.

Scope exists for protected area expansion to work in partnership with land reform for mutual benefit, for example through contract agreements which establish nature reserves or other forms of biodiversity stewardship agreement on land that remains in the hands of its owners

rather than being transferred to a protected area agency. The opportunity exists for local communities, as potentially major landholders through the land reform process, to have full access to the economic opportunities associated with ecotourism.[458]

In concluding, international experience with conservation corridors and the laws that enable them provide a number of lessons for our environmental regulatory framework.[459] Analysing the BMR has revealed that the majority of these factors are in place. The legal framework relating to connectivity should be based on policy that outlines a clear national vision and strategy for connectivity conservation. Planning and management of connectivity conservation should be linked to the national protected areas system and included in local, sub-national and national land use planning and plans. It also needs to empower government institutions, community groups and individuals, research institutions and NGOs to initiate and participate in connectivity conservation initiatives. Harmonizing sectoral legal instruments that govern aspects of connectivity conservation is critical in helping to eliminate conflicts that would create obstacles for creating and managing corridors.[460] The use of incentives, a mechanism which has proven hugely successful in the case of the BMR, must be enabled for all stakeholders (the public and private sectors, communities and individuals). Finally, the effectiveness of connectivity initiatives, specifically their contribution to local livelihoods and biodiversity conservation at national, sub-national and local levels, must be monitored and evaluated in order to ensure their continued success.

The lessons above included an additional lesson which is one that South Africa's environmental framework is yet to learn. This is that in order to successfully promote connectivity conservation it is necessary to possess a law which explicitly legislates for it. This dissertation, and in particular the case study, has revealed that this is not necessarily the case and, in so doing, it provides an example and inspiration for future initiatives.

[458] NPAES, 2008. Page 2.
[459] Moore, P. Regulating Biodiversity Corridors: Lessons and Issues. Head, IUCN Regional Environmental Law Programme, Asia. 2008. 2pp. Page 2.
[460] Moore, 2008. Page 2.

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