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Environmental Management / Environmental Economics

**An Evaluation of the Feasibility of Obtaining Payment for
Ecosystem Services for the Baviaanskloof Nature Reserve**

A dissertation submitted in part fulfilment for the degree of

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ABSTRACT

Cities must go further and further away to find new, more costly sources of water for human consumption while industries and agriculture continue to compete for increasingly scarce water resources. This may already be seen occurring within the Nelson Mandela Bay Metro where the severe drought being experienced during the past 18 months has severely depleted water supply dams.

One of the main supply dams to the Nelson Mandela Bay Municipality is situated within the Baviaanskloof Nature Reserve and World Heritage Site. The potential of funding the Baviaanskloof Nature Reserve and World Heritage Site with payments for ecosystem services (water) obtained for water services supplied to the Nelson Mandela Bay Municipalities and agriculture in the Gamtoos River Valley will ensure financial sustainable for the Baviaanskloof Nature Reserve and World Heritage Site in the long term. This ability to become financially independent and generate its own income will place the Baviaanskloof Nature Reserve and World Heritage Site in a unique position within the conservation community in South Africa as only a very few protected areas are self sustaining through payment for an ecosystem service.

EXECUTIVE SUMMARY

Terrestrial ecosystems provide a number of vital services for people and society, such as biodiversity, food, fibre, water resources, carbon sequestration, and recreation. The future capability of ecosystems to provide these services is determined by changes in socio-economic characteristics, land use, biodiversity, atmospheric composition and climate (Metzger *et al.* 2005). In order to understand ecosystem services and payment for those services, ecosystem services need to be defined. There are a number of definitions of ecosystem services. Cowling *et al.* (2007) defined ecosystem services as the end products of nature that benefit humans — provided by natural and semi-natural habitats (wild nature). This definition excludes agricultural products and is limited to wild nature. Payment for ecosystem services may therefore be defined as the determination of value of these services and benefits to human beings.

Effective management of protected areas ensures the ongoing, sustainable provision of these important ecosystem services; it ensures the production of clean water, assists in the moderation of floods and forms a buffer against the extreme weather conditions resulting from global warming; it is vital to the prevention of erosion; it ensures carbon storage, clean air and provides aesthetic landscapes, which in turn attract a growing tourism industry. Murphree (2004) did a broad investigation into the role of parks in transitional societies in southern Africa. His findings note that it is important to distinguish between the uses and values generated by protected areas. In economic terms, this means that protected areas cannot simply be valued according to the uses which a protected area can capitalise on to generate economic activities, but also the intangible values of the protected area for sustaining the local, provincial and national economy (Review of Institutional Arrangements for Management of Protected Areas 2010).

Savey & Turpie (2004) maintained that Payment for Ecosystem Services (PES) has been defined as a method of internalising the positive externalities associated with a specific land use option (Pagiola *et al.* 2004). An externality can be defined as a benefit or cost which is not included in the overall consideration of costs and benefits related to a particular activity. This means using new or existing markets to capture at least some of the value of beneficial environmental services which are provided to society at large, such as the storage of carbon or conservation of biodiversity (i.e. positive externalities).

Such benefits are rarely considered in local land use decision making because they are not represented in the system of economic costs and benefits which largely inform this process (Pagiola & Platais 2002). The benefit of PES lies in increasing the economic returns to conservation-friendly land uses by providing real compensation for these benefits to those who provide them. The main principle of PES thus lies in making those who benefit from these services liable for the costs of their provision (Pagiola & Platais 2002).

Provincial protected areas in the Eastern Cape were established under a number of pre-1994 laws, namely the CapeNature and Environmental Conservation Ordinance, 19 of 1974, the Transkei's Decree 9 (Environmental Conservation) of 1992 and the Ciskei Nature Conservation Act, 1987. Since 1994 the provincial government has enacted the Provincial Parks Board Act, Act 12 of 2003 and recently the Eastern Cape Parks and Tourism Agency Act 2 of 2010. This has laid the basis for the Eastern Cape Parks and Tourism Agency (ECPTA) managing protected areas in the province. The incorporation of protected areas previously managed by former homeland legislation and agencies has created some legal complications for the ECPTA. In particular, dealing with the effects of different land tenure regimes on ownership histories of protected areas located within the former Transkei; dealing with protected areas that have never been legally established and trying to resolve land claims involving protected areas present the agency with some complicated legal challenges.

ECPTA has received the following grants from the Eastern Cape Provincial Government during the past three financial years: R 145 566 094 for 2008 / 2009; R 129 500 000 for 2009 / 2010 and R 116 650 001 for 2010 / 20100. This grant is received in order for the ECPTA to carry out its mandate of biodiversity conservation within protected areas under its control and to promote tourism across the entire Eastern Cape. The grant received for managing (including staffing) the protected areas and tourism in the Eastern Cape must be differentiated from any potential revenue that may be received from payment for ecosystem service. The grant received by ECPTA to manage and maintain the protected areas and promote tourism is therefore not a form of ecosystem service payment as defined by Cowling *et al.* (2007).

The grants show a decrease of 21% in the funding levels over the past three financial years. In 2009, ECPTA spent R124 million Rand that included a human resources bill that totalled 61% of expenditure, with normal operating costs accounting for the remaining 39% of the budget (2009/2010 financial report). While total funding has grown year-on-year, this has not kept pace with escalating costs and the 2009 financial year left ECPTA with a operational deficit of R11 million. Expenditure in 2007 and 2008 produced operational surpluses of R7 million and R2.4 million respectively (2007/ 2008 & 2008 / 2009 financial report). The expenditure of ECPTA is lower than the average provincial management authority expenditure of R167 million and is in fact the lowest received by any other provincial conservation agency (Review of Institutional Arrangements for Management of Protected Areas 2010).

The shortfall in funding has undermined ECPTA's necessary capital expenditure program and has necessitated operational expenditure reprioritisation; a concerted effort to maximise all forms of revenue; and the development of a business case to put forward an effective motivation for additional funds for protected areas management and to increase transparency in terms of adequate financial controls and management effectiveness reviews. ECPTA initiated a commercialisation drive including the sale of surplus game which raised R1.7 million in 2009 and R 9 Million in 2010; various eco-tourism projects which raised R12.1 million in 2009; raising tourism income to R4.6 million for 2009 and a R 1.7 million for a Public Private Partnership project in the Baviaanskloof Nature Reserve and World Heritage Site that will pave the way for a concessionaire to run and operate a private lodge development within the Baviaanskloof Nature Reserve and World Heritage Site. A Public Private Partnership is a mechanism that is recognised and supported by National Treasury to encourage investment and development in Protected Areas by private entrepreneurs and companies of tourist facilities and infrastructure and will contribute to tourism income generation opportunities. ECPTA also launched a number of institutional reorganisation initiatives in 2009 / 2010 aimed at avoiding cost duplication resulting from the merger and rationalising protected area management by clustering reserves. Despite these efforts, 2009 financial statements indicate a continued reliance on government funding (94% of revenue).

No fewer than seven of the country's eight biomes – the highest level of ecosystem recognized by ecologists - are represented in the broader Baviaanskloof area – these are the Fynbos, Subtropical Thicket, Nama-karoo, Succulent Karoo, Grassland, Savannah and Forest biomes. This exceptional diversity is testament to the great physical and climatic diversity in this area of transition. The Cluster includes two internationally recognised —Biodiversity Hotspots” the Fynbos (Cape Floristic Region) and the subtropical thicket (Maputaland-Pondoland Region). The Baviaanskloof Nature Reserve and World Heritage Site alone houses over 1100 species of plant, 20 of which are known to be endemic, 52 species are categorised as Red Data Book species. Expanding the list to Groendal and Formosa Nature Reserves could add as many as 100 species (Baviaanskloof Nature Reserve and World Heritage Site cluster SMP 2007).

The Nelson Mandela Bay Metro has identified a lack of water as being a critical issue for its development and has also embarked on a Strategic Environmental Assessment and an Environmental Management Framework that will address environmental issues and their remedies, water being one of the issues. There are currently 300 000 metered households within the Nelson Mandela Bay Metro which under normal conditions and consumption utilise 275 million litres per day. This figure includes industry and commerce which utilises approximately 35% of the daily usage.

An analysis of the budgetary requirements for the Baviaanskloof Nature Reserve and World Heritage Site has shown that the current budget is 53.72% below the actual funding level that should be received to enable the Baviaanskloof Nature Reserve and World Heritage Site to meet its objectives and mandate. It should be noted that a conservative approach has been taken when compiling the zero based budget and this therefore represents that minimum budget requirements for the Baviaanskloof Nature Reserve and World Heritage Site. The current budget trend is indicating that the available budget to the Baviaanskloof Nature Reserve and World Heritage Site will only decrease over time making it imperative that an additional source of funding be found that will meet the needs and requirements of the Baviaanskloof Nature Reserve and World Heritage Site and ensure a sustainable funding source.

The single source of sustainable funding for the Baviaanskloof Nature Reserve and World Heritage Site will be Payment for Ecosystem Services. This will take the form of an ecosystem levy that is added to water that is currently captured within the Baviaanskloof Nature Reserve and World Heritage Site catchment and provided to the Nelson Mandela Bay Metro, Gamtoos Valley citrus industry and the surrounding towns of Patensie and Hankey from the Kouga Dam via the Gamtoos Irrigation Board. The revenue generated through the levying of this ecosystem service (water) will be utilised by Baviaanskloof Nature Reserve and World Heritage Site management to ensure that the long term biodiversity management objectives of the Baviaanskloof Nature Reserve and World Heritage Site are met and that long term water security is provided to both the Nelson Mandela Bay Metro, communities and agriculture in Hankey and Patensie.

Analysis of the research conducted through a willingness to pay questionnaire has shown that there is awareness within the Nelson Mandela Bay Municipality that their water supply is under threat and needs to be protected to ensure long term sustainability of the Nelson Mandela Metro. The current water crisis that is being experienced with the Nelson Mandela Metro and surrounding catchments has contributed to raising this awareness. Analysis of the willingness to pay questionnaires have further shown that all respondents interviewed are in favour of some form of payment for the water services and are willing to pay to ensure that the catchments is protected. The majority of the respondents, 88.8% were in favour of a fee or levy greater than 0.20 cents per kiloliter for the water service. The research results obtained from the willingness to pay questionnaire that was undertaken has further shown that that the Nelson Mandela Bay Municipality would be willing to pay between 0.20 and 0.25 cents per kilo litre (1000 L) of water to Baviaanskloof Nature Reserve and World Heritage Site (ECPTA) for the continued management of the catchment under its management control in order to secure sustainable long term water security for the Nelson Mandela Bay Municipality.

It is recommended that the initial levy charged for payment of the water service from Baviaanskloof Nature Reserve and World Heritage Site to the Nelson Mandela Bay Municipality and Gamtoos Valley start at a between 15 – 20 cents per kilolitre and that an escalation be built into the agreement. It is further recommended that the fee is levied by the Gamtoos Irrigation Board to all water users and that the Gamtoos Irrigation Board then pays the fee to the Eastern Cape Parks and Tourism Agency for the water services

generated by the Baviaanskloof Nature Reserve and World Heritage Site. The funds generated are to be utilised to fund continued biodiversity, operational and catchment management in the Baviaanskloof Nature Reserve and World Heritage Site.; this funding will ensure that the Baviaanskloof Nature Reserve and World Heritage Site will become financial self sustainable in the long term. The ability to be self funding will greatly contribute to ensuring that the natural biological systems in the Baviaanskloof Nature Reserve and World Heritage Site continue to be conserved and that its World Heritage Status obtained for its biodiversity will be maintained. The ability to become financially independent and generate its own income will place Baviaanskloof Nature Reserve and World Heritage Site in a unique position within the conservation community in South Africa as only a very few protected areas are self sustaining.

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Declaration

I certify that this dissertation has not been submitted for a degree in any other university and that it is my original work

Wayne Erlank

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LIST OF ACRONYMS

ASGI: Accelerated Growth Initiative

BMR: Baviaanskloof Mega Reserve

BNR: Baviaanskloof Nature Reserve and World Heritage Site

BMRPMU: Baviaanskloof Mega Reserve Project Management Unit

C.A.P.E: Cape Action for People and the Environment

CapeNature: Western Cape Nature Conservation Board

DWAF: department of Water Affairs and Forestry

DWEA: Department of Water and Environmental Affairs

DEDEA: Department of economic Development and Environmental Affairs (Eastern Cape)

ECPB: Eastern Cape Parks Board (April 2004 – 1 July 2010)

ECPTA: Eastern Cape parks and Tourism Agency (1 July 2010)

EKZNW: Ezemvelo KwaZulu Natal Wildlife

GIB: Gamtoos Irrigation Board

GNR: Groendal Nature Reserve

FNR: Formosa Nature Reserve

IUCN: International Union for the Conservation of Nature

NMBM: Nelson Mandela Bay Municipality

NPAES: National Protected Areas Expansion Strategy

PES: Payment for Ecosystem Services

PGDP: Provincial Growth and Development Program

SANBI: South African National Biodiversity Institute

SANParks: South African National Parks Board

WFW: Working for Water program

WHS: World Heritage Site

Chapter 1: Introduction to the Research

This chapter introduces the research problem, including the research area, presents a summary of the results of the research and explains the organisation of the thesis.

1. INTRODUCTION

Terrestrial ecosystems provide a number of vital services for people and society, such as biodiversity, food, fibre, water resources, carbon sequestration, and recreation. The future capability of ecosystems to provide these services is determined by changes in socio-economic characteristics, land use, biodiversity, atmospheric composition and climate (Metzger *et al.* 2005). In order to understand ecosystem services and payment for those services, ecosystem services need to be defined. There are a number of definitions of ecosystem services. Cowling *et al.* (2007) defined ecosystem services as the end products of nature that benefit humans — provided by natural and semi-natural habitats (wild nature). This definition excludes agricultural products and is limited to wild nature. Payment for ecosystem services may therefore be defined as the determination of value of these services and benefits to human beings.

Ecosystem services are the goods or services provided by the ecosystem to society, and provide the basis for the valuation of the ecosystem. The supply of ecosystem services will often be variable over time, and, where relevant, both actual and potential future supplies of services have to be included in the valuation (Drepper and Mainsson, 1993; Barbier, 2000; Mailer, 2000 Hein *et al.* 2006). The values that are attributed to ecosystem services depend upon the stakeholders benefiting from these services. The classic definition of a stakeholder is any group or individual who can affect or is affected by the achievement of the organization's objective (Freeman, 1984).

For ecosystem valuation, this definition may be modified into any group or individual who can affect or is affected by the ecosystem's services. The value of ecosystem services depends upon the views and needs of stakeholders (Vermeulen and Koziell, 2002), and there is a mutual and dynamic relationship between ecosystem services and stakeholders. The services supplied by an ecosystem determine the relevant stakeholders and the stakeholders determine relevant ecosystem services. Four value types that stakeholders can attribute to ecosystem services are: (i) Direct use values arising from human direct utilization of ecosystems (Pearce & Turner, 1990), for example, through the sale or consumption of a piece of fruit that is assumed to have been harvested from the wild as per the earlier definition of ecosystem services. All production services and some cultural services (such as recreation) have direct use value; (ii).

Indirect use values stem from the indirect utilization of ecosystems, in particular that ecosystems provide pollination and water services amongst others (Munasinghe and Schwab, 1993). This reflects the type of benefits that are provide to society; (iii) Option values are when people are unsure about their future demand for a service, and are then are willing to pay to keep open the option of using a resource in the future (Weisbrod, 1964; Pearce & Turner, 1990). Option values may be attributed to all services supplied by an ecosystem. Various authors also distinguish quasi option value (e.g., Hanley and Spash, 1993), which represents the value of avoiding irreversible decisions until new information reveals whether certain ecosystems have values we are not currently aware of. Although theoretically correct, the quasi-option value is in practice very difficult to assess (Turner *et al.* 2000). (iv) Non- use values are derived from attributes inherent to the ecosystem itself such as pollination services and basal flow rates of water (Cummings & Harrison, 1995; Van Koppen, 2000).

Hargrove (1989) has pointed out that non-use values can be anthropocentric, as in the case of natural beauty, as well as ecocentric, (e.g., related to the notion that animal and plant species may have a certain right to exist). Kolstad (2000) distinguishes three types of non-use value: existence value (based on utility derived from knowing that something exists), altruistic value (based on utility derived from knowing that somebody else benefits) and bequest value (based on utility gained from future improvements in the well-being of one's descendants). The different categories of non-use value are often difficult to separate, both conceptually (Weikard, 2002) and empirically (Kolstad, 2000). Nevertheless, it is important to recognize that there are different motives to attach non-use value to an ecosystem service, and that these motives depend upon the moral, aesthetic and other cultural perspectives of the stakeholders involved. (Hein *et al.*, 2006)

Ecosystem services may thus be defined as the conditions and processes through which natural ecosystems and the species that make them up, sustain and fulfil human life (Daily, 1997). The concept of ecosystem services encompasses the delivery, provision, production, protection or maintenance of a set of goods and services that people perceive to be important (Chee 2004). Cowling *et al.* (2007) maintain that ecosystem services need to be mainstreamed (internalised into routine protocols) if they are to be realised sustainably. Based on South African experience, there are four elements of a framework for achieving the mainstreaming ecosystem services (i) prerequisite, elements

without which mainstreaming cannot happen; (ii) stimuli (or windows of opportunity), elements external and internal to the sector that catalyze awareness of the need for mainstreaming; (iii) mechanisms, the actual activities that seek to effect mainstreaming; and (iv) outcomes, the measurable indicators of mainstreaming effectiveness. Mainstreaming is achieved primarily through behaviour change and it requires that the safeguarding of ecosystem services is institutionalized in land use planning policies and is reflected in the day-to-day activities of this sector (Cowling *et al.* 2007).

1.1 RESEARCH CONTEXT

Ecosystem services are those often unseen but essential actions which we require from the environment and which are essential for us to sustain life on earth. We need a constant supply of fresh, clean water, which in a water scarce country like South Africa, is a critical requirement. We need clean air with abundant supplies of oxygen to maintain good health. The urgent pressure on our environment as a result of our excessive reliance on fossil fuels has led to a pressing need to mitigate the effects of climate change and to contribute towards the reduction of carbon emissions. Without healthy topsoil we cannot grow food and without the pollinating insects and animals we cannot maintain our biodiversity, food security and environmental health. Healthy environments affect us in a myriad of unseen ways from our psychological and spiritual well being to our social well being, including our relationship with our fellow human beings. Humans benefit from wild nature in many ways: aesthetically and culturally; via provisions for ecosystem services such as climate regulation, soil formation and nutrient cycling and from direct harvesting of wild species for food, fuel, fibres and pharmaceuticals (Benford *et al.* 2002). Balmford *et al.* (2002) stated that landscapes can yield substantial but different flows of goods and services after as well as before conversion by humans. Hooper *et al.* (2005) agreed with this by stating that human activities have been and are continuing to change the environment on local and global scales. Many of these alterations are leading to domestic changes in the biotic structure and composition of ecological communities. Many aspects of the planet are changing rapidly due to human activities and these are expected to accelerate during the next decade (IPCC, 2001a, b, c). Many of these changes will have an immediate and strong effect on agriculture, forestry, biodiversity, human health and well being (Metzger *et al.* 2006). The interaction between ecosystem services and human well being is well summarised in Figure 1.

Effective management of protected areas ensures the ongoing, sustainable provision of these important ecosystem services; it ensures the production of clean water, assists in the moderation of floods and forms a buffer against the extreme weather conditions resulting from global warming; it is vital to the prevention of erosion; it ensures carbon storage, clean air and provides aesthetic landscapes, which in turn attract a growing tourist industry. Murphree (2004) did a broad investigation into the role of parks in transitional societies in southern Africa. His findings note that it is important to distinguish between the uses and values generated by protected areas. In economic terms, this means that protected areas cannot simply be valued according to the uses which a protected area can capitalise on to generate economic activities, but also the intangible values of the protected area for sustaining the local, provincial and national economy (Review of Institutional Arrangements for Management of Protected Areas 2010).

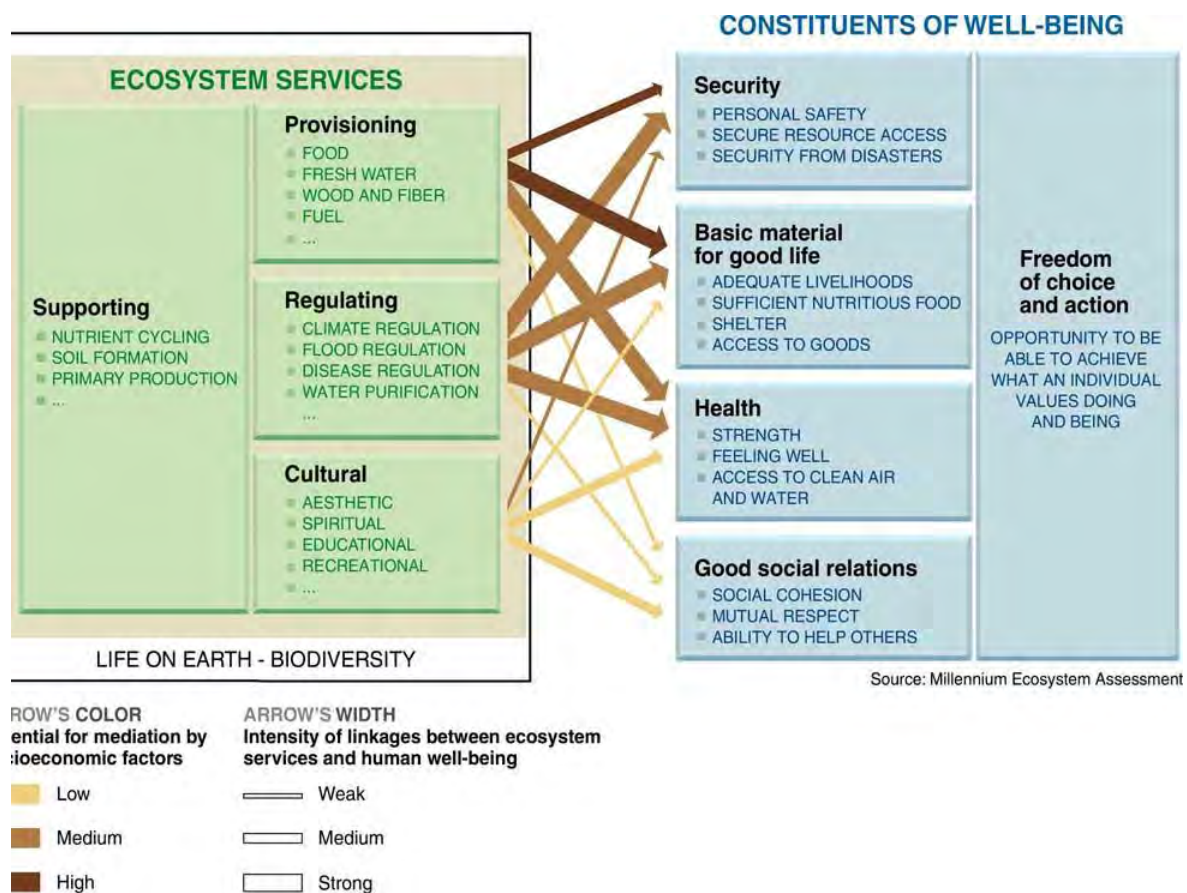


Figure 1: Ecosystem Services and Human Well Being (from Millennium Ecosystem Assessment) Source: Review of Institutional Arrangements for Management of Protected Areas 2010

Savey & Turpie (2004) maintained that Payment for Ecosystem Services (PES) has been defined as a method of internalising the positive externalities associated with a specific land use option (Pagiola *et al.* 2004). An externality can be defined as a benefit or cost which is not included in the overall consideration of costs and benefits related to a particular activity. This means using new or existing markets to capture at least some of the value of beneficial environmental services which are provided to society at large, such as the storage of carbon or conservation of biodiversity (i.e. positive externalities). Such benefits are rarely considered in local land use decision making because they are not represented in the system of economic costs and benefits which largely inform this process (Pagiola & Platais 2002). The benefit of PES lies in increasing the economic returns to conservation-friendly land uses by providing real compensation for these benefits to those who provide them. The main principle of PES thus lies in making those

who benefit from these services liable for the costs of their provision (Pagiola & Platais 2002).

The Nelson Mandela Bay Metro has identified a lack of water as being a critical issue for its development and has also embarked on a Strategic Environmental Assessment and an Environmental Management Framework that will address environmental issues and their remedies, water being one of the issues.

1.2 STATEMENT OF THE PROBLEM

The goal of this research is to determine the feasibility of obtaining payments for ecosystem services (water delivery for consumption) derived from the biodiversity functions of the Baviaanskloof Nature Reserve and World Heritage Site.

1.3 STATEMENT OF THE SUB PROBLEMS

- Will the end users in the Nelson Mandela Bay Metro be willing to pay for ecosystem services (water consumption)?
- Determine whether the Nelson Mandela Metro will be willing to support the concept of “end user pays” to ensure sustainable water supply and if so what monetary value would be paid to secure the water?
- Determine the percentage that the Baviaanskloof Nature Reserve and World Heritage Site catchment contributes to the total catchment for Kouga Dam
- Determine the long term benefits that Eastern Cape Parks and Tourism Agency could obtain from obtaining payment for ecosystem services in the form of a water levy from end users.

1.4 RESEARCH METHODOLOGY

The research has focused primarily on the potential ecosystem value that the Baviaanskloof Nature Reserve and World Heritage Site provide to the Nelson Mandela Bay Municipality. The citrus industry within the Gamtoos valley has been excluded from the research at this time as there are difficulties in determining the actual allocations of water and uses of water to the citrus industry, communities living on farm land and the town of Patensie and Hankey. There is no clear differentiation between water usage for

irrigation, household use, industry and staff usage on the farms. Further research will need to be undertaken with individual landowners and through local municipalities to determine whether water usage can be differentiated. There was insufficient time to undertake this additional research and include it as part of this study.

River flow data for the past 15 years has been obtained from the Department of Water Affairs and Forestry who have a monitoring weir located in the Kouga River. This weir is the only weir that monitors water flow in the Kouga River above the boundary of the Baviaanskloof Nature Reserve and World Heritage Site; there are no other water flow monitoring points in the Kouga River. This data has provided an indication of the amount of water entering Kouga Dam from the Kouga River catchment outside the Baviaanskloof Nature Reserve and World Heritage Site. Outflow data for the Kouga Dam as well as evaporation values has also been utilised as part of the data obtained from the Department of Water Affairs and Forestry.

A structured questionnaire was submitted to the selected heads of departments at the Nelson Mandela Metro as well as a cross section of councillors and has been completed in one – on -one interview with the selected heads. The following persons were interviewed: the managers for Environmental Services; Bulk Water and Infrastructure, Legal Services, Finance and the Municipal Manager. Interviews were also conducted with random consumers to obtain their views on water supply and their feelings on paying for protection of water supplies. The questions focused on the cost of current water tariffs, likelihood of payment for water as ecosystem services (water consumption) and potential value of PES (water consumption). An explanation of what comprises ecosystem services are and how they would apply was provided to enable those being interviewed to understand the context of the research and the end result.

The data obtained from the willingness to pay questionnaire was used in determining whether the feasibility of obtaining payments for ecosystem services (water consumption) derived from the biodiversity functions of the Baviaanskloof Nature Reserve and World Heritage Site from the Nelson Mandela Metro was possible or not.

1.5 SUMMARY OF RESULTS

The initial results of the questionnaire showed that awareness had been created of the vulnerability of the water supply to the Nelson Mandela Bay Municipality by the decision makers at the NMB Municipality. This came across in the interview process as did a willingness to pay for the long term protection of the water supply for the Municipality. It also became clear from the questionnaires that the members of the public interviewed were as concerned with long term protection of the water supply as the municipal officials and are prepared to pay for this long term supply protection.

The current drought that is being experienced throughout the Eastern Cape has raised awareness in officials and users of the importance of securing long term water supply protection. Awareness was also shown with regard to the potential effects that climate change may have on the future water supplies of the Nelson Mandela Bay Municipality.

1.6 THESIS ORGANISATION

This thesis is organised into seven (7) chapters.

Chapter 1: Introduction to the Research

The research area and the specific problem under investigation are introduced by providing contextual background information and the rationale for conducting the research. A statement of the research problem and its sub-problems are presented. The scope of the research, the research methodology, a summary of the results of the research and the organisation of the thesis are detailed.

Chapter 2: Eastern Cape Parks and Tourism Agency and Protected Area funding

This chapter describes corporate governance, sustainable development, sustainability reporting and the environment in which the Eastern Cape Parks and Tourism Agency finds itself. Funding for Eastern Cape Parks and Tourism Agency is explored together with funding sources for protected areas. An overview is provided of the Baviaanskloof Nature Reserve and World Heritage Site encompassing its location, World Heritage Status, climate and geology.

Chapter 3: Ecosystem services and the potential for obtaining sustainable funding for protected areas

This chapter reviews the threats and challenges to biodiversity in the Eastern Cape and considers ecosystem services in cities and economic values. A greater understanding of ecosystem services and payments for ecosystem services is required in order to achieve sustainable and long term funding for protected areas and specifically for the Baviaanskloof Nature Reserve and World Heritage Site where funding is concerned. Stewardship is discussed as a means to secure ecosystem resilience and additional ecosystem services.

Chapter 4: Assessment Tool

This chapter reviews the sustainability of Eastern Cape Parks and Tourism Agency through an assessment of the triple bottom line, economic impact and willingness to pay for ecosystem services (water) from the Baviaanskloof Nature Reserve and World Heritage Site. The tool is based on a willingness to pay questionnaire and interviews.

Chapter 5: Research Methodology

This chapter describes the research methodology inclusive of the research approach, sources of data, treatment of the data and presentation of the results.

Chapter 6: Results

This chapter describes the population and sample, and presents the results of the assessment. The assessment of the willingness to pay by the Nelson Mandela Bay Municipality indicates a willingness to pay to ensure sustainable and long term water security. This will result in sustainable biodiversity conservation of the Baviaanskloof Nature Reserve and World Heritage Site.

Chapter 7: Discussion and Conclusions

This chapter reviews results and draws a conclusion on the feasibility of obtaining payment for ecosystem services for the Baviaanskloof Nature Reserve and World Heritage Site. The chapter also considers methods of obtaining and implementing payments for ecosystem services and considering areas of further research.

Appendix A

This Appendix contains the financial model used to obtain costs of operations for Baviaanskloof Nature Reserve and World Heritage Site including human resources and capita costs.

Appendix B

This Appendix contains the risk assessments matrix that was conducted using the three pillars of environment, social and economics.

Appendix C

This Appendix contains the strategic objectives for ECPTA that include its vision, mission and visual representation of objectives.

Appendix D

This Appendix contains the assessment Tool questionnaire for environmental sustainability reporting and a glossary of terms used in the assessment questionnaire.

Appendix E

This appendix depicts the land claims within the Eastern Cape, the claimants, area, land claimed and status of the claims.

Appendix F

This appendix depicts statistical data.

Chapter 2: Eastern Cape Parks and Tourism Agency and Protected Area funding

This chapter describes corporate governance, sustainable development, sustainability reporting and the environment of the Eastern Cape Parks and Tourism Agency. Funding for Eastern Cape Parks and Tourism Agency is explored together with funding sources for protected areas. An overview is provided of the Baviaanskloof Nature Reserve and World Heritage Site which looks at its location, World Heritage Status, climate and geology.

2. INTRODUCTION

The Eastern Cape Parks and Tourism Agency (ECPTA) is an amalgamation of the Eastern Cape Parks Board and the Eastern Cape Tourism Board and falls under the Department of Economic Development and Environmental Affairs (DEDEA). ECPTA is responsible for biodiversity conservation management in all provincial protected areas and includes all tourism function within the Eastern Cape. The organisation is new (established 1 July 2010) and, with limited capacity, has to catch-up and ensures alignment of its programmes with existing initiatives. Many challenges are faced by the organisation: these included delays in the registration of the entity, the transfer of assets and staff from the two previous organisations and the development of policies and systems (ECPB 2008 Strategic Plan; Revised ECPTA Strategic Plan 2010 - 2011).

The Eastern Cape Parks and Tourism Agency has faced a number of challenges since its inception in 2004 as the Eastern Cape Parks Board; chief amongst these has been the lack of staff capacity and the transfers of staff from Eastern Cape Tourism Board and Department of Economic Development and Environmental Affairs that were only finalised in November 2006. Since 1 July 2010, the functions of the Eastern Cape Tourism Board have been merged with Eastern Cape Parks Board to form a single Agency responsible for conservation and tourism in the Eastern Cape, The Eastern Cape Parks and Tourism Board. The resource capacity within the finance department has been a challenge with the organisation having difficulties with implementation of effective financial controls and reporting being the chief problem areas and these resulted in qualified audits being received from the Auditor General during the 2004 / 2005 and 2005 / 2006 financial years. The organisation has since made progress by filling some critical vacancies, developing key performance indicators, policies and procedures, identifying additional positions within the finance department and has received an unqualified audit for the all the financial years since up to the current 2009 / 2010 financial year. The key performance indicators have been drawn from the organisational goals; these goals have been reduced to five for 2008 – 2010 (ECPB 2008 Strategic Plan; Revised ECPTA Strategic Plan 2010 - 2011).

Eastern Cape Parks and Tourism Agency has biodiversity and Tourism as its core business units but it has also place significant emphasis on its People and Parks

Programme. This programme is aimed at involving communities that surround the various reserves in the operations of the reserves and strives to create benefits for the communities that will uplift the communities and contribute to the economic development of the regions around the reserves and to the Province as a whole. The vision, mission and organisational values have also been revised to accommodate the growth of the organisation and to better define its way forward with regard to biodiversity and people and parks. The organisation is not required to make a profit; , however, is has acknowledged that the annual grant received is insufficient to fund the organisations activities and it has now embarked on a programme through the commercialisation department to attract investors to the protected areas to manage commercial developments such as upmarket lodges and other activities.

2.1 STRATEGIC MANAGEMENT

ECPTA's mandate is biodiversity conservation within Provincial Parks and tourism throughout the Eastern Cape, thereby ensuring persistence of all species, biomes and ecosystems in the Province whilst ensuring the financial sustainability of the institution. This mandate should be informed by International (International Union for the Conservation of Nature, World Heritage Convention Act); national (National Environmental Management Acts, Bioregional strategy, National Biodiversity Action Plan) and Provincial Biodiversity Conservation strategies and should be in line with National and Provincial legislative framework. The importance of alignment with provincial priorities, such as the Provincial Growth & Development Plan (PGDP) and Accelerated Growth Strategic Initiative for South Africa (ASGI – SA) cannot be overemphasized. The common thread underpinning all of ECPTA's strategic goals is its transform into a sustainable organisation with a sharpened focus on strategic stakeholders that will enable delivery on its mandate. This implies a paradigm shift by in operational thinking and conduct by all ECPTA employees (ECPB Strategic Plan 2008 – 2010, Revised ECPTA Strategic Plan 2010 - 2011).

The objective of strategic management is to achieve above average returns over a period time; such returns need to be sustainable. A successful organisation should employ the following four management practices in order to outperform their competitors: (i) strategy, (ii) execution, (iii) culture and (iv) structure (Review of Institutional

Arrangements for Management of Protected Areas 2010). These four practices should be supplemented by any two of the four secondary management practices: (v) talent, (vi) innovation, (vii) leadership and (viii) mergers and partnerships (Harvard Business Review, July 2003).

The review and analysis of ECPTA's strategic management plan will be done using the following steps:

- Strategic intent – vision and mission
- Analysis of the external environment – opportunities (attractors) and threats
- Analysis of the internal environment – strengths and weaknesses
- Cross – impact analysis
- Strategic objectives
- GAP analysis
- Value innovation
- Corporate level strategy
- Business level strategy.

2.2 RISK ASSESSMENT

The ECPTA has assessed its risks and appointed KPMG to facilitate a strategic risk assessment workshop with a view to guiding senior management's efforts towards identifying the highest risks to which the Board is exposed. The strategic risk workshop was facilitated by KPMG on 24 April 2009. The main purpose of this workshop was to involve and assist senior managers in assessing and prioritising the risks that need to be managed in order to achieve the vision, mission and strategic goals of ECPTA. The workshop was also designed to assist management in the establishment of the risk management process as required by the Public Finance Management Act (PFMA) and best practice corporate governance (King III), as well as provide guidance to the internal

audit function in the development of a risk based internal audit strategy and annual internal audit plan for ECPTA.

The Strategic Risk Assessment Report prepared by KPMG in May 2009 highlighted the utmost importance to the ECPTA of the ability to provide quality service given the current emphasis on service delivery and the quality of the service. The report further identified the following key issues in relation to the entity's risk:

- Inherent exposure to the risk of not being able to deliver quality service to the stakeholders;
- Contributing factors to the realisation of this risk might include insufficient funding, land ownership, poor infrastructure, inadequate human resource capacity and the effect of poor ICT connectivity to all sites; and
- Negative consequences associated with this risk might include financial losses, stakeholder dissatisfaction, reputational damage as well as unfavourable political reaction.

Table 1: KPMG report summarizing the risk description for each of the identified strategic risks

Risk number	Risk description	Risk number	Risk description
1	Inadequate funding	10	Inadequate social service and local economic development support
2	Non compliance with legislation	11	Inconsistent communication of the ECPB strategies.
3	Threats to Biodiversity	12	Incompleteness of the base-line information on biodiversity
4	Change in land ownership	13	Misunderstanding of the role of biodiversity versus commercialization
5	Poor Infrastructure	14	Political uncertainty
6	Inadequate human resource capacity	15	Inconsistent culture
7	Fraud risk and other illegal activities	16	Lack of focus on conservation (core function)
8	Loss of information	17	Misunderstanding in terms of co-management agreements
9	Poor ICT connectivity to all sites		

The Strategic Risk Assessment Report includes the following high level recommendations relating to the management of the ECPTA's risks:

A stern commitment to robust Enterprise Risk Management by top management is needed to ensure that ECPTA is proactive in identifying and managing the risks to which it is exposed. This would also assist management in having foresight to identify emerging risks. Management might consider a 'turnaround strategy' to assist ECPTA to direct

resources and effort effectively and efficiently, to ensure that possible crises are averted. Ultimately successful Enterprise Risk Management increases the probability of achieving objectives and positions management to identify and proactively realise opportunities.

2.3 PROTECTED AREA & ECPTA FUNDING

The existing global network of Protected Areas totals some 13, 2 million square kilometres which includes an estimated 1.3 million square kilometres of marine reserves (Green and Paine 1997, IUCN 1998). This means that the 7, 9 % of the earth's land surface (149 811 204 square kilometres) is under some form of formal protection by Governments (IUCN 1998). In more than half of these, those that fall under IUCN categories I – III, direct human intervention and modification of the environment has been ~~inited~~”; in the rest, IUCN categories IV – VI, significant greater intervention and modification will be found (IUCN 1994, p. 10).

Annual expenditure of Protected Areas includes national governments funding for recurrent management expenditure and capital outlays as well as foreign and nongovernmental assistance. A World Conservation Monitoring Centre (WCMC) survey provided Protected Area budgets in 108 countries that manage 3, 7 million square kilometres of Protected Areas or more than 28 % of the global protected area system (James *et al.* 1999).

Based on figures from the mid 1990's, an estimated annual total of \$ 6, 0 billion is spent on management of the global protected area network. Expenditure varies widely across the globe, especially in developed versus non developed countries and regions. The four developed regions account for 88, 3 % (\$ 5, 27 billion) of the total global protected area spending or an average of \$ 929.00 per square kilometre that is protected. By comparison, the 6 developing regions spend an estimated \$ 695 million annually on protected areas or \$ 93 per square kilometres (James *et al.* 1999).

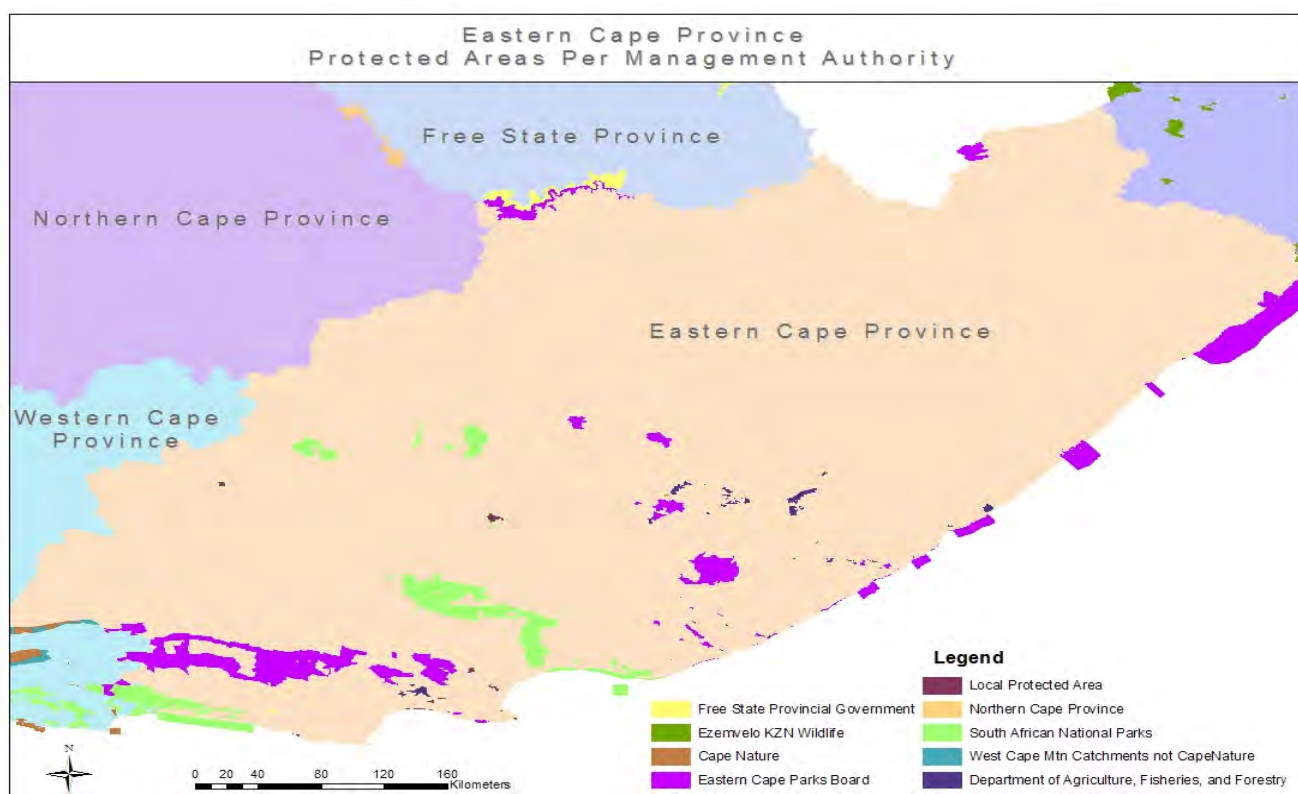
An IUCN norm for land protection is that 10 % of a countries land area should be preserved or under some form of formal protection. This protection can be either through government agencies or private owners. Governments do not have the necessary finances to continue to fund Protected Areas. Ecosystem services and the payment thereof represent a new and sustainable way of funding the protected area network.

EKZNW and CapeNature are the only other provincial conservation organisations that are responsible for equally important centres of endemism, making the protected areas managed by ECPTA of high biological significance (Review of Institutional Arrangements for Management of Protected Areas 2010). This does not imply that there are no other important centres of endemism within the country under the management of other provincial conservation organisation. The three organisations (ECPTA, EKZNW, and CapeNature) are however recognised as managing what is considered to be the most important centres of endemism in the country. ECPTA is responsible for the conservation of the total protected area for 13 (25%) of these different centres of endemism as well as tourism across the province.

Figure 3 illustrates the protected areas in the province, and highlights ECPTA and SANParks as the two major management agencies in the province. The proportion of the area managed by ECPTA that contains endangered, critically endangered, threatened or vulnerable ecosystems only amounts to a total of 2% of the land under their management. However, the Eastern Cape, particularly the Pondoland centre of endemism, is very under researched, and these figures suggest lack of data rather than lack of threat (Review of Institutional Arrangements for Management of Protected Areas 2010).

Table 2: Eastern Cape Parks & Tourism Agency Biodiversity Statistics (Source: Review of Institutional Arrangements for Management of Protected Areas 2010)

% of total protected area estate	No. of ecosystems where agency manages at least 95% of ecosystem area	% of estate consisting of threatened ecosystems	% of estate important for climate change resilience	% of estate important for ecosystem services	% of estate consisting of under protected ecosystems
6.9	13	1	55	40	28



Map 1: Eastern Cape Protected Areas Per Management Authority (Source: Review of Institutional Arrangements for Management of Protected Areas 2010)

28% of ECPTA's protected areas contain ecosystems considered to be under-protected - 5% of the area contains poorly protected ecosystems, 7% very poorly protected ecosystems and 15% partially protected ecosystems (Review of Institutional Arrangements for Management of Protected Areas 2010). These figures indicate the important role that ECPTA plays in contributing to the overall representivity of under-protected ecosystems. 55% of the protected areas managed by ECPTA are considered important for climate change resilience in the province, and a further 40% are considered important for provision of selected ecosystem services. Considering the importance of the centres of endemism found in the Eastern Cape there is clearly a high biological significance of the areas managed by ECPTA (Review of Institutional Arrangements for Management of Protected Areas 2010).

Provincial protected areas in the Eastern Cape were established under a number of pre-1994 laws, namely the CapeNature and Environmental Conservation Ordinance, 19 of 1974, the Transkei's Decree 9 (Environmental Conservation) of 1992 and the Ciskei

Nature Conservation Act, 1987. Since 1994 the provincial government has enacted the Provincial Parks Board Act, Act 12 of 2003 and recently the Eastern Cape Parks and Tourism Agency Act 2 of 2010. This has laid the basis for ECPTA's managing protected areas in the province. The incorporation of protected areas previously managed by former homeland legislation and agencies has created some legal complications for the ECPTA. In particular, dealing with the effects of different land tenure regimes on ownership histories of protected areas located within the former Transkei; dealing with protected areas that have never been legally established and trying to resolve land claims involving protected areas present the agency with some complicated legal challenges.

ECPTA has received the following grants from the Eastern Cape Provincial Government during the past three financial years: R 145 566 094 for 2008 / 2009; R 129 500 000 for 2009 / 2010 and R 116 650 001 for 2010 / 20100. This grant is received in order for the ECPTA to carry out its mandate of biodiversity conservation within protected areas under its control and to promote tourism across the entire Eastern Cape. The grant received for managing (including staffing) the protected areas and tourism in the Eastern Cape must be differentiated from any potential revenue that may be received from payment for ecosystem service. In the Review of Institutional Arrangements for Management of Protected Areas 2010, it was stated that ecosystem services and the payment thereof represent a new and sustainable way of funding the protected area network. The grant received by ECPTA to manage and maintain the protected areas and promote tourism is therefore not a form of ecosystem service payment.

The grants show a decrease of 21% in the funding levels over the past three financial years. In 2009, ECPTA spent R124 million Rand that included a human resources bill that totalled 61% of expenditure, with normal operating costs accounting for the remaining 39% of the budget (2009/2010 financial report). While total funding has grown year-on-year, this has not kept pace with escalating costs and the 2009 financial year left ECPTA with a operational deficit of R11 million. Expenditure in 2007 and 2008 produced operational surpluses of R7 million and R2.4 million respectively (2007/ 2008 & 2008 / 2009 financial report). The expenditure of ECPTA is lower than the average provincial management authority expenditure of R167 million and is in fact the lowest received by

any other provincial conservation agency (Review of Institutional Arrangements for Management of Protected Areas 2010).

The shortfall in funding has undermined ECPTA's necessary capital expenditure program and has necessitated operational expenditure reprioritisation; a concerted effort to maximise all forms of revenue; and the development of a business case to put forward an effective motivation for additional funds for protected areas management and to increase transparency in terms of adequate financial controls and management effectiveness reviews. ECPTA initiated a commercialisation drive including the sale of surplus game which raised R1.7 million in 2009 and R 9 Million in 2010; various eco-tourism projects which raised R12.1 million in 2009; raising tourism income to R4.6 million for 2009 and a R 1.7 million for a Public Private Partnership project in the Baviaanskloof Nature Reserve and World Heritage Site that will pave the way for a concessionaire to run and operate a private lodge development within the Baviaanskloof Nature Reserve and World Heritage Site. A Public Private Partnership is a mechanism that is recognised and supported by National Treasury to encourage investment and development in Protected Areas by private entrepreneurs and companies of tourist facilities and infrastructure and will contribute to tourism income generation opportunities. ECPTA also launched a number of institutional reorganisation initiatives in 2009 / 2010 aimed at avoiding cost duplication resulting from the merger and rationalising protected area management by clustering reserves.

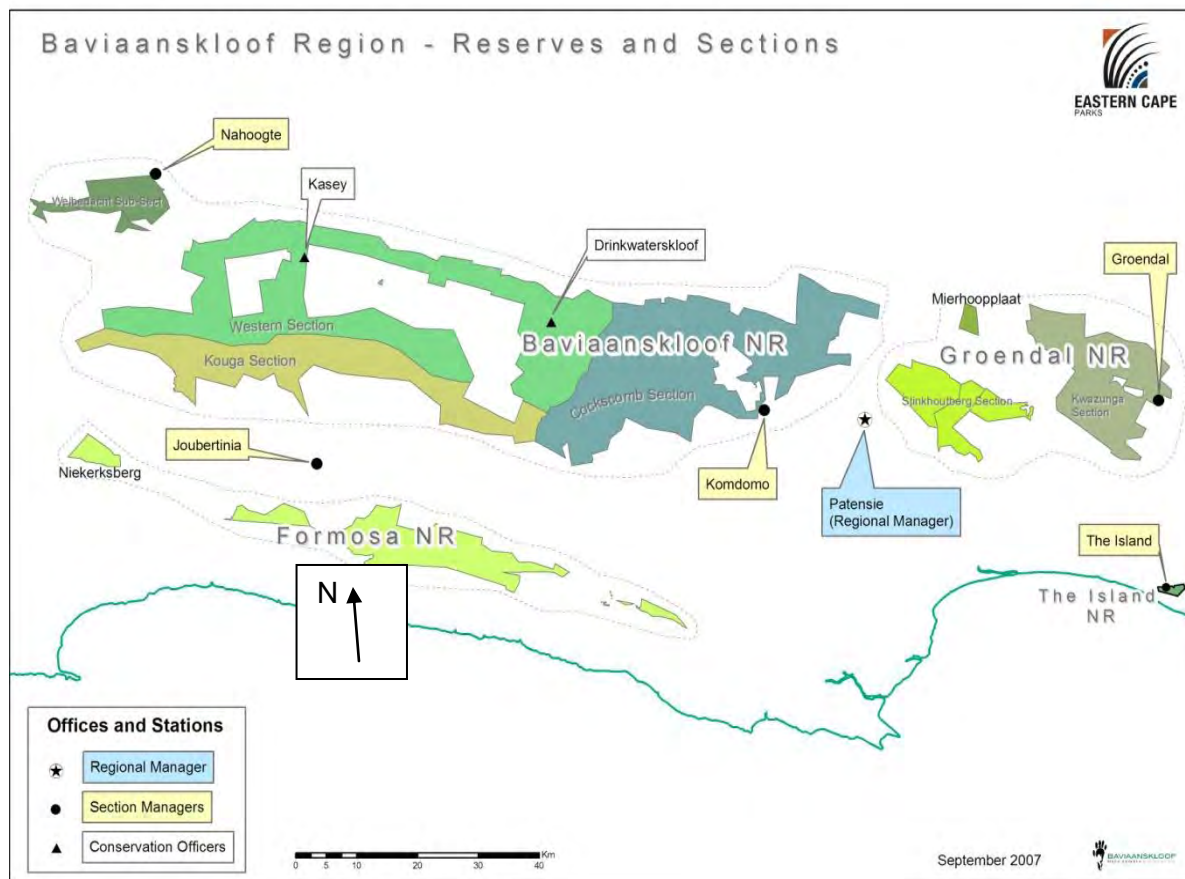
Despite these efforts, 2009 financial statements indicate a continued reliance on government funding (94% of revenue). The ECPTA received an unqualified audit from the Auditor General. Attention was drawn to the inadequate nature of information systems within the agency; inadequate financial control processes and procedures; inadequate financial statements; the inability of the accounting authority to ensure effective, efficient and transparent accounting systems; and the need for attention to be paid to internal performance management controls (2009 financial report).

Eastern Cape Parks employs 565 staff on conservation activities. This translates into a comparatively low staff distribution ratio of 0.1 staff per square kilometre, and 19 staff per protected area. The ECPTA has an annual expenditure of R219 522 per staff member.

The Baviaanskloof Nature Reserve and World Heritage Site Cluster is made up 3 nature reserves situated in the western region of the Eastern Cape Province, extending from Uitenhage near Port Elizabeth to Willowmore on the Western Cape Boundary (see Map 2). The Cluster covers most of the Kouga and Baviaanskloof Ranges, part of the Tsitsikamma Mountains in the South, and part of the Grootwinterhoek and Elandsrivier Mountains to the East. The Cluster is situated between the arid Steytlerville Karoo and the mesic southern Cape coast. The bulk of the Cluster falls within the eastern part of the Cape Floristic Region (Fynbos biome). The northern areas of the Cluster fall within the Nama-karoo biome while the eastern areas mostly fall within the Subtropical Thicket biome. The Forest biome is represented in the narrow river valleys and the Grassland biome is represented on the plateaus of the Old African Land Surface in the Kouga and Baviaanskloof Nature Reserve and World Heritage Site Ranges (Strategic Management Plan 2007: Baviaanskloof Nature Reserve and World Heritage Site Cluster).

The Cluster is made up of three nature reserves (currently in the process of being formally proclaimed as provincial nature reserves). These nature reserves comprise a number of management sections and sub-sections as shown in Table 3 as follows:

- The Baviaanskloof Nature Reserve and World Heritage Site consists of three contiguous sections; namely the Western Section, Cockscomb Section and Kouga Section. The Western Section includes the dis-contiguous Welbedacht sub-section.
- Groendal Nature Reserve consists of two sections; namely the main Kwa-Zunga Section in the Grootwinterhoek Mountains and the separate Stinkhoutberg Section situated north of Patensie. The Kwa-Zunga Sections includes a small separate sub-section, Mierhoopplaas.
- Formosa Nature Reserve is not divided into Sections but has a small sub-section, Niekerksbergs, which lies 14 Kilometres to the west of the Cluster. The management of Formosa Nature Reserve is also responsible for management of the Kouga Section of the Baviaanskloof Nature Reserve and World Heritage Site Nature Reserve.



Map 2: Baviaanskloof Nature Reserve and World Heritage Site cluster of reserve. (Source: Baviaanskloof Nature Reserve and World Heritage Site Cluster strategic management plan 2007)

Table 3: Baviaanskloof Cluster Nature Reserves and their constituent Sections and Sub-Sections that make up the Baviaanskloof Nature Reserve and World Heritage Site Cluster. (Source: Baviaanskloof Nature Reserve Cluster SMP 2007)

Nature Reserve	Section	Sub-Section	Area (ha)
1.Baviaanskloof Nature Reserve and World Heritage Site (BNR)	Cockscomb Section		72,617
	Kouga Section		45,113
	Western Section		84,274
		Welbedacht sub-Section	9,473
	TOTAL BNR		211,476
2.Groendal Nature Reserve (GNR)	KwaZunga Section		27,998
		Mierhoopplaar sub-Section	1,063
	Stinkhoutberg Section		16,367
TOTAL GNR			45,428
3.Formosa Nature Reserve (FNR)			42,873
		Niekerksberg sub-Section	2,300
TOTAL FNR			45,173
TOTAL BAVIAANSKLOOF NATURE RESERVE AND WORLD HERITAGE SITE CLUSTER			299,078

No fewer than seven of the country's eight biomes – the highest level of ecosystem recognized by ecologists - are represented in the broader Baviaanskloof area – these are the Fynbos, Subtropical Thicket, Nama-karoo, Succulent Karoo, Grassland, Savannah and Forest biomes. This exceptional diversity is testament to the great physical and climatic diversity in this area of transition. The Cluster includes two internationally recognised —Biodiversity Hotspots” the Fynbos (Cape Floristic Region) and the subtropical thicket (Maputaland-Pondoland Region). The Baviaanskloof Nature Reserve

and World Heritage Site alone houses over 1100 species of plant, 20 of which are known to be endemic. 52 species are categorised as Red Data Book species. Expanding the list to Groendal and Formosa Nature Reserves could add as many as 100 species (Baviaanskloof Nature Reserve cluster SMP 2007).

The majority of game found in the Baviaanskloof Nature Reserve and World Heritage Site has been re-introduced and includes Black Rhino, Cape Mountain Zebra, Red Hartebeest, Cape Buffalo, Eland, Kudu, Mountain Reedbuck, Duiker, Grysbok and Grey Rhebok. Also common are Aardvark, Aardwolf, Cape Clawless Otter, Honey Badger, Bushbuck, bush pig, leopard, Bat-eared Fox and Caracal as well as Chacma Baboon and Vervet Monkeys. A summary of the game introductions and removals between 1996 and 2004 is presented in the State of Knowledge Report (Baviaanskloof Nature Reserve cluster SMP 2007).

2.5 WORLD HERITAGE SITE STATUS

The Baviaanskloof Nature Reserve was declared a World Heritage Site (WHS) as part of the Cape Floristic Region (CFR) Serial Nomination in June 2004. The basis of the WHS status is the outstanding floristic diversity and endemism of the Cape Floristic Region. The WHS status places the Baviaanskloof Nature Reserve in a special category in terms of the Protected Areas Act, and the implications for management are being investigated by the Eastern Cape Parks and Tourism Agency, Cape Nature, SA National Parks and the Department of Environmental Affairs (Strategic Management Plan 2007: Baviaanskloof Nature Reserve Cluster). A memorandum of agreement has recently been concluded that establishes a Joint Management Committee consisting of the three conservation agencies of ECPTA, SANParks and CapeNature with the secretariat function being provided by the Department of Environmental Affairs.

2.6 HISTORY

The Baviaanskloof area has been managed by the Department of Forestry since the early 1920's. The policy then was that of "mountain protection", which was applied in management by the forester stationed at Prince Albert. The first forester in the Baviaanskloof Nature Reserve was appointed circa 1930 at Studtis. The Langkloof (Formosa) forestry station was only established in December 1964. The Cockscomb

station was established still later in 1974. The main tasks of Forestry in those years were the creation of firebreaks and control of mountain fires. A number of fences were also erected. More intensive management has taken place since 1985 with an increased budget and the appointment of more staff for the area. Livestock transgressions were finally curbed by 1990 and the exotic plant problem was tackled with great success through the Working for Water programme that is administered by Gamtoos Irrigation Board.

Large parts of the high-lying areas of the Kouga and Baviaanskloof mountains have always been classified as State land (Crown land) and have never been privately owned. Large areas of mountain land were bought by the State in the early seventies as part of the government's mountain catchment protection policy. With the building of the Paul Sauer Dam, now known as the Kouga Dam, large areas of land on both sides of the Kouga River were bought out and transferred to the Department of Forestry in 1977 to be managed by them. Since 1986 a further 35 000 ha has been acquired (with the aid of private and government funds) in order to consolidate the core section of the area.

On 1 April 1987 the management of the area was transferred from Environment Affairs (Department of Forestry) to Cape Nature Conservation as part of the devolution policy of the government. The area has been managed according to the principles of a wilderness area since the early 1980's, even though it was not declared as such (Strategic Management Plan 2007: Baviaanskloof Nature Reserve Cluster).

The area was transferred to Eastern Cape Province (Department of Economic Development and Environmental Affairs – DEDEA) for management during 1994. In 2004 the Eastern Cape Parks Board (ECPB) was formed and was charged with managing protected areas across the Eastern Cape. In July 2010, the EC Tourism Board and EC Parks Board are merged to form the Eastern Cape Parks and Tourism Agency which continues to manage the protected areas.

2.7 CLIMATE

The annual average rainfall is more or less equally distributed over the year, with a tendency to reach a maximum in March and November (Tyson, 1971). The proportion of summer rainfall in the area increases gradually towards the east. The rain is mostly

cyclonic and orographic in nature with frequent thunderstorms (10 to 20 per annum) in the summer months (Bond, 1981). Snow occurs annually on the high mountain peaks (Strategic Management Plan 2007: Baviaanskloof Nature Reserve Cluster).

Table 4: Average annual rainfall figures (mm) (Source Baviaanskloof SMP, 2007)

Mountain Range	Area Average	Southern Slope	Northern Slope
Tsitsikamma	869	1021	695
Kouga	547	651	448
Baviaanskloof	451	461	435
Nature Reserve and World Heritage Site	575	723	425
Groot Winterhoek			

High daily and seasonal temperature fluctuations occur in the area. Temperatures of 44°C occurring as a result of warm winds from the high plateau are not uncommon. Night temperatures can be relatively cold with differences of up to 28°C between day and night temperatures. The average daily maximum temperature in the low-lying areas is about 32°C in January and 18°C in July. The average daily minimum temperature is about 15°C in January and 5°C in July, with extremes varying between 5°C and -3°C. Frost occurs from the beginning of June to the end of August. In summer the prevailing wind direction is south to southeast, and in winter the prevailing wind direction is northwest. Dry hot berg winds are experienced during autumn and particularly winter (BWA Management Plan 2001).

2.8 CONCLUSIONS

Eastern Cape Parks and Tourism Agency is reliant on the funding grant that it received from the Eastern Cape Provincial Government (DEDEA) in order to continue to carry out its mandated biodiversity conservation and tourism functions. It is clear from the

discussion in 2.4, Funding, that the Agency's grant is insufficient to fund all its operational and capital requirements in a sustainable manner and that the grant funding has steadily decreased over the past three years as the economic climate plays a greater role in the availability of funds to be dispersed to provincial departments and other agencies. Conservation and biodiversity, while important in itself, are not priorities of the provincial Government that is focused on service delivery, health and education.

Despite efforts of the Agency to increase its revenue through the sale of surplus game animals and eco tourism ventures it still recorded a loss of R 11 Million in 2009. The financial results for the 2009 / 2010 financial year have not yet been released due to the merger. The ECPTA has inherited an infrastructure backlog of over three hundred million Rand that must be financed in order for the Agency to begin generating significant revenue from eco tourism ventures and concessions through Private Public Partnerships (PPP's). These costs are additional to the costs of meeting legislative requirements and ensuring that fire and alien management are being carried out.

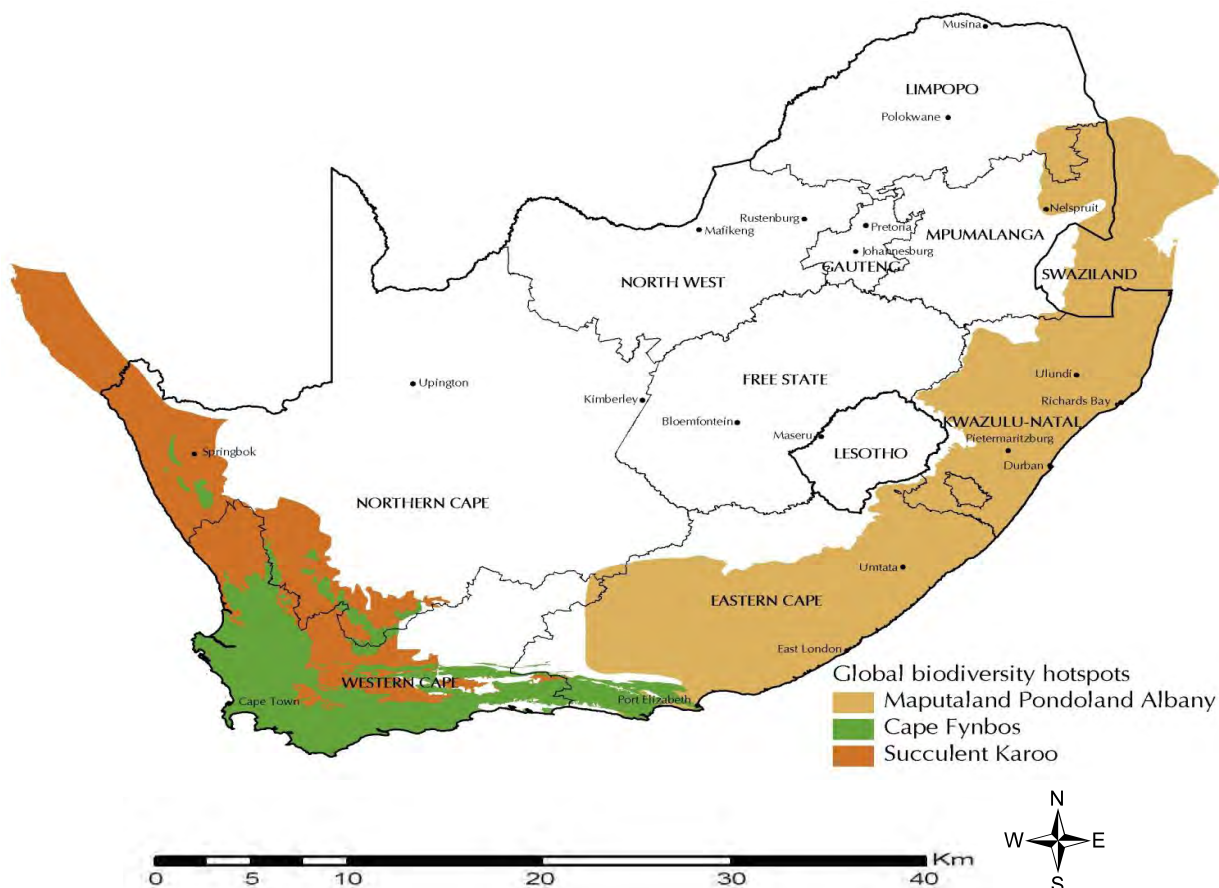
Chapter 3: Ecosystem services and the potential for obtaining sustainable funding for protected areas

This chapter reviews the threats and challenges to biodiversity in the Eastern Cape and considers the economic value of ecosystem services downstream stakeholders. A greater understanding of ecosystem services and payments for ecosystem services is required in order to achieve sustainable and long term funding for protected areas and specifically for the Baviaanskloof Nature Reserve and World Heritage Site where funding is concerned. Stewardship is discussed as a means to secure ecosystem resilience and additional ecosystem services.

3. INTRODUCTION

The Eastern Cape Province is internationally recognized for its exceptionally rich biodiversity and shows the highest biome diversity of any of the provinces in the country with seven biomes and three global biodiversity hotspots. The seven biomes are: Forest (2% of total area); Fynbos (6% of total area); Grassland (39% of total area); Nama Karoo (26% of total area); Savannah (10% of total area); Succulent Karoo (0.01% of total area) and Thicket (17% of total area) (ref). The three global hotspots are the Maputaland-Pondoland-Albany hotspot which overlaps most extensively with the Eastern Cape and covers more than half of the Province; a small part of the Succulent Karoo hotspot which overlaps with two municipal districts in the South West of the Province; and the Cape Floristic Region which covers about 6% in the South West of the Province (Strategic Management Plan 2007: Baviaanskloof Nature Reserve Cluster; Review of Institutional Arrangements for Management of Protected Areas 2010).

The economic and social importance of biodiversity may not always be fully appreciated; this leads to its value being discounted against short-term economic gain and at the expense of long-term human wellbeing. Biodiversity underpins all ecosystem goods and services that are important for human wellbeing and includes clean water, air, and soil, provision of foods, medicinal plants and building materials.



Map 3: Map of SA Global biodiversity hotspots (Source: Review of Institutional Arrangements for Management of Protected Areas 2010).

3.1 KEY CHALLENGES AND THREATS TO BIDOVERSITY IN THE EASTERN CAPE

One of the major challenges facing the ECPTA is meeting conservation targets for the province. South Africa's protected area network currently falls short of sustaining biodiversity and ecological processes (National Protected Areas Expansion Strategy 2008). An analysis of land-based protected area targets by province highlights that the current protected area network also does not protect the full range of ecosystems. The same trend is evident in the Eastern Cape: Of its 20 Year protected area target of 12%, only 4.1% of the Province is currently a protected area. In order to achieve the 20 Year target an expansion of a further 9.3% is required which means that within the next 5 years the protected area network needs to be expanded by 2.3% (National Protected Areas expansion Strategy 2008).

In order to meet the 20 Year protected area targets the National Protected Area Expansion Strategy for South Africa (NPAES) has identified 42 focus areas for land-based protected area expansion. These are large, intact and unfragmented areas of high importance that are suitable for the expansion or creation of large protected area. Seven of these focus areas fall within the Eastern Cape, namely the Baviaanskloof - Addo, Bisho Kei, Amatole Tarkastad, Camdeboo Escarpment, Karoo Escarpment Grassland, Southern Berg Griqualand and Pondoland (National Protected Areas Expansion Strategy 2008).

The Eastern Cape is subject to increasing development pressure from both government and the private sector, partly in an attempt to alleviate high unemployment and poverty rates, and partly because the potential of the area has been recognized on a national scale. Concomitantly, the natural environment is under constant pressure as urban edge boundaries shift in response to the growing demand for urban and industrial developments. Unsustainable land use planning has led to the demise of many ecological process areas and key biodiversity components, the effects of which are only noted when a disaster has occurred: For example, when metropolitan water supply is under threat because of pollution and/or quantity restrictions; when infrastructural components such as roads and bridges collapse in yearly floods; when foundations of coastal homes are eroded by wave action; and when fisheries resources collapse because of over-utilisation and alteration of the conditions of the supporting environment. Increasing development pressure has led to a range of land use activities that pose varying degrees of threat to biodiversity in the Province. These include rural, urban and coastal development; mining; commercial and communal agriculture (crop production and livestock farming); and afforestation.

In addition, there are numerous other threats to biodiversity in the Eastern Cape, including alien vegetation invasion; inefficient management of municipal infrastructural and engineering services (mostly related to waste management, sanitation and water supply); unemployment, poverty, unsustainable population growth and development; poor control/regulation of polluting industries (leading to air, freshwater, coastal and marine pollution); poor farming practices and expansion of agricultural lands; fragmentation of habitats; unsustainable harvesting of natural resources; subsistence

resource harvesting (for medicinal plants, fire wood, building materials etc); and climate change (Review of Institutional Arrangements for Management of Protected Areas 2010).

The South African Country Study on Climate Change predicted that the area considered climatically suitable for South Africa's seven existing terrestrial biomes could shrink by 40% by 2050. Nationally, suitable habitat could shift in line with climate change, leading to an increased probability of extinction as movement and available intact habitat is today greatly restricted. While there is considerable uncertainty about the timing and magnitude of climate change impacts, it is certain that temperatures will increase, rainfall regimes will become more unpredictable and atmospheric carbon dioxide will increase. These changes are likely to have the following impacts on biodiversity:

- Decline in grassland biome and increase in savannah and thicket biome;
- Change in the distribution of many species and species with narrow distribution ranges and without access to altitudinal corridors will be particularly vulnerable to extinction;
- Sea level rise will impact heavily on all coastal vegetation;
- Increased threat from woody alien species, bush encroachment into productive grasslands; and
- Increased crop failures, particularly in marginal areas, which will in turn lead to increased population pressure on natural resources for subsistence.

This highlights the extreme importance of the incorporation of ecological process areas into protected area expansion strategies and provincial and local land use planning documents and decisions, and allowing for connectivity between protected areas (both formally and informally through the proclamation of new protected areas and stewardship initiatives).

The high percentage of provincial parks in the Eastern Cape under land claims pose another challenge and may change the traditional management of these areas in the future. The table attached as annexure E shows the current land claims registered

against provincial parks, the status of the claims and what the key challenges are in settling the claims (Regional Land Claims Commission August 2009).

3.2 ECONOMIC VALUES

Economic theory recognizes four kinds of capital – human, financial, manufactured and natural. It is, however, worth noting that natural capital, while being recognised as economic theory is not recognised by mainstream theory. Ecosystem services are the equivalent of ‘natural capital’, renewable and non renewable goods and services provided by the ecosystem (Constanza and Daly 1992, Constanza *et al.* 2007). Developed economies have focused primarily on using the first three (which were considered limiting factors to development) to transform natural capital (which was considered ‘free’ and abundant) into consumer products and services (Hawken *et al.* 1999, Chee 2004).

The interconnectivity and interdependencies of ecosystem services may also confound the valuation process because of the likelihood of double-counting (Barbier, 1994; Constanza and Folke, 1997). For instance, Barbier (1994) noted that the nutrient retention function of tropical wetlands might be integral to the maintenance of biodiversity. Therefore, if both ecosystem services were to be valued separately and then aggregated, this would ‘double count’ the nutrient retention function which is already ‘captured’ in the biodiversity value. The formidable challenges of understanding and modelling the spectrum of interdependent ecological functions, uses and values across varying states of ecological disturbance, may account for the preponderance of single function valuation studies in the literature on environmental valuation of ecosystem services (Turner *et al.*, 2003). The fact that this method is partially dependent on the demand for a marketed service also means that market forces exert considerable influence on the monetary value of ecosystem services (Sagoff, 1998). It is questionable how useful it is to measure the value of an ecosystem service based on prices for services observed in real markets that do not value those services sufficiently anyway (Norgaard, 2000; Chee, 2004).

Water is clearly more important to human society than diamonds, yet diamonds trade in the market at prices far in excess of those fetched by water. Why? Alfred Marshall's answer to this question faced by 18th and 19th century economists was simple and is by

now part of common knowledge: price is set by supply and demand (Heal 2000). The market price is the price at which the amount supplied is also the amount demanded. In the case of water, the supply (at least in Marshall's time) was so large as to exceed the amount that could possibly be demanded at any price. Consequently the price was zero; water was free. Now, of course, the demand for water has increased greatly as a result of population growth and rising prosperity, while the supply has remained roughly constant, so that water is no longer free. If there are market prices for the services provided by natural ecosystems, then these prices provide an obvious basis for valuing them. Carbon sequestration services of forests or the water purification services of watersheds can be valued by using market prices for these; value may also be placed on their biodiversity support roles by valuing ecosystem services at the market prices of ecotourism and of bio- prospecting. From these numbers, it should be possible to compute values for the forest as a whole or for the watershed as a whole. Typically the asset value is that value that provides a flow of services at the present discounted value of the flow of services that it will provide in the future (Heal 2000).

3.3 STEWARDSHIP, CLIMATE CHANGE & ECOSYSTEM SERVICES

Stewardship plays a crucial role in the National Protected Area Expansion Strategy (NPAES) as many of the most threatened ecosystems are situated on private or communally owned land, and are often under great pressure from development and unsustainable land use. It is neither desirable nor financially feasible for government to purchase all the land identified as priority areas for meeting protected area targets. Thus biodiversity stewardship programs play an increasingly important role in protected areas expansion and conservation of our most threatened ecosystems. The draft biodiversity stewardship policy document sets out South Africa's approach to biodiversity stewardship on a national level. It includes the legal framework, principles, links with other national policies and programs, and key roles in responsibilities of the main organisations involved it is closely linked to the biodiversity stewardship guideline document and should be read together with this document. The principles identified are the following: biodiversity outcomes are critical, focus on biodiversity priority areas, site security, voluntary commitment, ensure ongoing land owner/user support and co-operative governance and partnerships. The policy document provides for four hierarchical categories of biodiversity stewardship agreements namely:

- Nature reserves
- Protected environments
- Biodiversity management agreements
- Conservation areas.

The policy also highlights that a range of statutory and non-statutory incentives should be made available to support land owners/uses that enter into biodiversity stewardship agreements. The policy highlights the following roles that SANParks and provincial conservation agencies can play to contribute towards biodiversity stewardship programs (National Protected Areas Expansion Strategy for SA 2008).

Table 5: National Protected Areas Expansion Strategy for National and Provincial Reserves (Source Protected Areas Expansion Strategy for SA 2008)

SANParks	• Identify priority areas where biodiversity stewardship can contribute to the strengthening of buffer zones. • Secure and manage biodiversity stewardship agreements. • Ensure biodiversity stewardship programme is sufficiently staffed and supported • Develop partnerships with NGOs and landowners.
Provincial conservation agencies	• Establish biodiversity stewardship programmes. • Secure and manage biodiversity stewardship agreements. • Streamline approval process for agreements and declarations. • Ensure biodiversity stewardship programme is sufficiently staffed and supported. • Co-operate with other directorates to ensure sufficient suitably skilled extension staff. • Look for partnerships with NGOs and landowners.

3.4 ECPTA STEWARDSHIP

Of increasing concern are the impacts that the projected future climate changes will have on biodiversity and ecosystem services. Protected area planning for future biodiversity persistence will need to incorporate the shifts in species distributions predicted to manifest within the next 30 to 50 years. The primary goal of biodiversity stewardship is to secure biodiversity assets of both immediate and long-term value through voluntary agreements with private and communal landowners/users. The Eastern Cape Parks and Tourism Agency Act 2 of 2010 makes provision for:

12 (4) (b) *the development of stewardship programmes and to,*

12 (4) (c) *participate in relevant public participation programmes to increase the protected area system throughout the province and facilitate the co-management in the areas adjacent to, and beyond the boundaries of the protected areas.*

Biodiversity stewardship recognizes landowners / users as custodians of their land, including biodiversity and natural resources and is a mechanism that promotes and supports wise use and management of natural resources, biodiversity and ecosystem services. As part of ECP's responsibilities for the implementation of the Baviaanskloof Mega Reserve Landscape Initiative, the Board of Directors approved the exit strategy and takeover of the Baviaanskloof Mega Reserve Project Management Unit. The Baviaanskloof Mega Reserve Project Management Unit (BMRPMU) was started in 2002 by to implement the Baviaanskloof Mega Reserve Landscape Initiative by the Department of Economic Development and Environmental Affairs (DEDEA); its responsibilities included initiating stakeholder support for the Mega Reserve through a Proud Partner program, stakeholder engagement, engagements with local and district municipalities and the establishment of a Biodiversity and Citrus Initiative. With the establishment of ECPB and later ECPTA, the functions of the Baviaanskloof PMU have been entirely taken over by regional and reserve management. ECPTA has also received funding from South African National Biodiversity Institute (SANBI) and Cape Action For people and the Environment (CA.P.E) to employ a coordinator for the Baviaanskloof Mega Reserve Landscape Initiative to implement biodiversity stewardship; as part of the funding agreement, ECPTA has contracted the coordinator with a view of permanently embedding a stewardship unit in the organisation.

In order to achieve the objectives of the stewardship program and to take the Proud Partner and other programs to the next level, a Biodiversity Stewardship strategy document and implementation plan has been approved by Board that provides a framework for ECPTA to engage with stakeholders and implement stewardship and also includes a generic assessment criteria and management plan format.

Various pieces of legislation provide the framework for implementation of biodiversity stewardship programs. Environmental rights are provided for in Section 24 of the Bill of Rights within the Constitution of the Republic of South Africa (Act 108 of 1996). Section 24 affords all citizens the right to an environment that is not harmful to their wellbeing, and that is protected for —the benefit of present and future generations...” The National Environmental Management Act (Act 107 of 1998) (NEMA) was created to provide the legal framework that aims to ensure that all people within South Africans have their constitutional environmental rights realized. NEMA, together with the Constitution, prepared the way for a suite of environmental legislation including the National Environmental Management: Protected Areas Act (Act 57 of 2003) and the National Environmental Management: Biodiversity Act (Act 10 of 2004), which are key to biodiversity stewardship programs.

The importance of biodiversity stewardship is recognised in the National Biodiversity Framework, recently adopted by the Department of environmental Affairs (DEA), which identifies the establishment and strengthening of provincial biodiversity stewardship programs as one of 33 priority actions for biodiversity conservation in South Africa over the period 2008 to 2013.

The key advantages of biodiversity stewardship are:

- It provides a cost effective conservation mechanism for expanding protection over important biodiversity areas in production landscapes, in many cases without taking land out of agricultural production;
- It contributes to national targets for protecting threatened ecosystems, expanding protected areas, maintaining the diversity and integrity of natural systems and landscapes, and the provision of vital ecosystem goods and services;

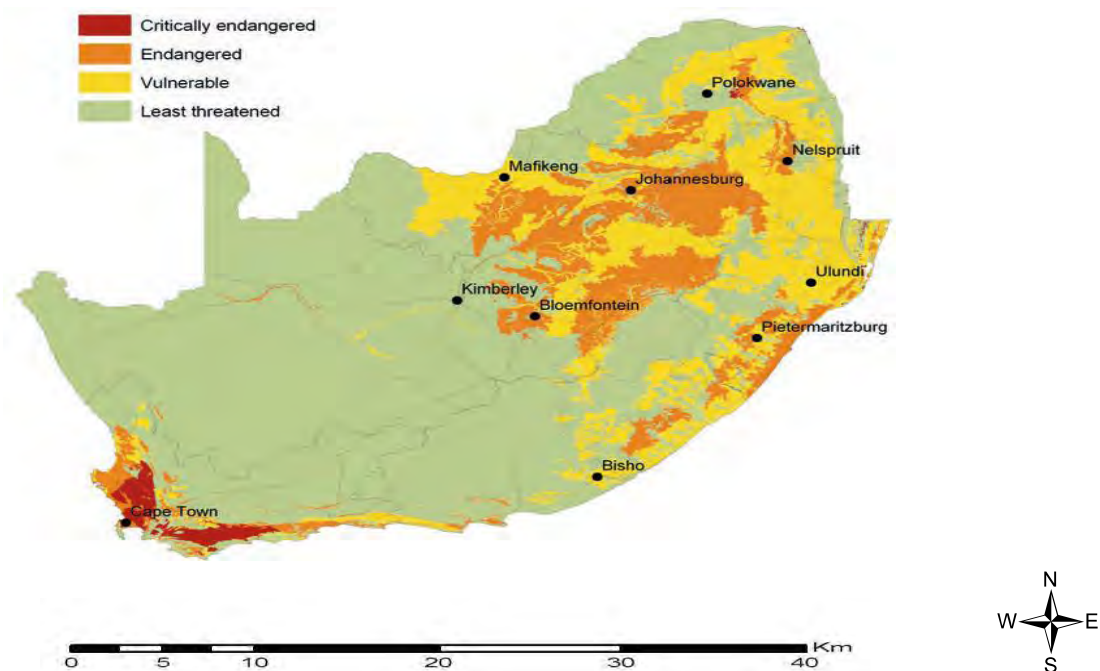
- It provides political, social, economic and environmental benefits, particularly in light of recent developments within the Department of Rural Development and Land Reform.

Protected area targets are action targets that indicate how much of each ecosystem needs to be included in protected areas, and help to focus protected area expansion on the least protected ecosystems. Where possible, the NPAES uses biodiversity thresholds as a basis for setting protected area targets, so that protected area targets have underlying science-based conservation logic. The move away from looking simply at the number of hectares included in the protected area network, towards considering how those hectares are distributed across different ecosystems, is a key feature of this NPAES. It means that meeting protected area targets is not just about numbers of hectares, and that some hectares contribute more to meeting protected area targets than others.

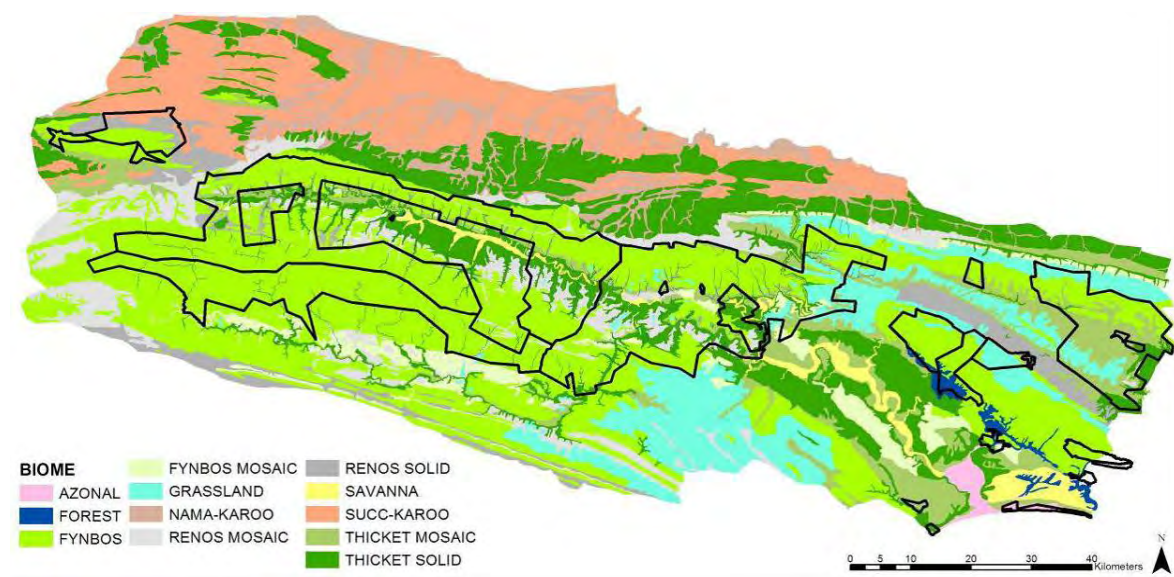
South Africa's current protected area network falls far short of sustaining biodiversity and ecological processes. In the next five years, in order to move a quarter of the way to meeting our twenty-year protected area targets, we need to add 2.7 million hectares to the land-based protected area network, 88km to the inshore marine protected area network, 52 500 km² to the offshore marine protected area network in South Africa's mainland Exclusive Economic Zone (EEZ). The Minister of Water Affairs and Environment has signed a Performance Agreement with the Presidency, of which one of the targets is to secure 400 000 ha of biodiversity assets through Stewardship Contracts by 2014.

Table 6: Land-based protected area targets summarised by province (National Protected Area Expansion Strategy)

Land-based protected area targets summarized by Province	Province area (000ha)	20-year PA target (%)	Current protected areas		Still required to meet 20-year veg type targets		Required in the next 5 years	
			000ha	%	000ha	%	000ha	%
Eastern Cape	16 893	12	687	4.1	1 570	9.3	393	2.3
Free State	12 983	13	167	1.3	1 581	12.2	395	3.0
Gauteng	1 655	13	84	5.1	152	9.2	38	2.3
KwaZulu-Natal	9 333	13	731	7.8	842	9.0	211	2.3
Limpopo	12 575	11	1 489	11.8	687	5.5	172	1.4
Mpumalanga	7 649	13	1 168	15.3	632	8.3	158	2.1
North West	10 651	11	199	1.9	991	9.3	248	2.3
Northern Cape	37 289	11	1 582	4.2	3 333	8.9	833	2.2
Western Cape	12 945	13	1 632	12.6	1 004	7.8	251	1.9



Map 4: Status of terrestrial ecosystems (NSBA Report Driver *et al.* 2005)



Map 5: Map showing the Biome level diversity of the Baviaanskloof Mega Reserve (Source: BMR Conservation plan Skowno 2006)

3.5 CITIES AND ECOSYSTEM SERVICES

Cities are important nodes of human activities. It is projected that as much as 60% of the global human population will live in an urban setting in 2030 (UN, 1997). City inhabitants depend on ecosystems to produce food, water and other renewable resources. The role of natural capital in this context is seldom perceived (Jansson *et al.* 1994). Most of these services are hidden because they have no price in the economy, and people and policy seldom recognize them, but nevertheless they are real (Daily, 1997; de Groot, 1992; Odum, 1989; Jansson and Nohrstedt 2001)

The suite of terrestrial, aquatic, aerial, and subterranean interacting ecosystems throughout the world provide the basic support required for human life. Humans place value on ecosystem functions because they are essential for our continued existence and value values are also placed on ecosystems for cultural and emotional needs. From an ecological perspective, the concept of value has a different connotation because ecosystems do not have systems of value. *Ecosystem service* is a term coined to make apparent that the structure and function of ecosystems provide value (some of it measurable with money, some of it not) to humans (Daily, 1997). By recognizing ecosystem services and the value provided to humans as one of perhaps 30 million species on the planet, ecological economists must develop indicators of value which can be used in decision-making. But in order to do so, they must also understand and appreciate the inherent complexities of ecological and economic systems, particularly as the dynamics of the latter increasingly affect those of the former. (Limburg *et al.* 2002.)

Whittington (2003) stated that the urban water supply situation in South Asia is deteriorating and the urban population continually adjusts to the worsening situation. Cities must go further and further away to find new, more costly sources of water while industries and agriculture compete for increasingly scarce water resources. This may already be seen occurring within the Nelson Mandela Bay Metro where the severe drought being experienced during the past 18 months has severely depleted water supply dam to the point where household water quotas have been introduced and users are being charged exponentially higher tariffs when quotas are being exceeded (pers comm. B. Martin, 2010). There are currently 300 000 metered households within the Nelson Mandela Bay Metro which under normal conditions and consumption utilise 275

million litres per day. This figure includes industry and commerce which utilises approximately 35% of the daily usage.

Whittington (2003) further states that a water tariff is an important management tool that can be used to assist with the reform of the municipal water and sanitation sector and that the pricing of these water services is controversial. Whittington (2003) suggests that a balance needs to be found between four main objectives of municipal water tariffs:

- Revenue Sufficiency: the purpose of water tariff is often cost recovery where revenue received from water users should be sufficient to pay for operational and maintenance costs of the water provision to consumers (including capital costs, expansion projects and cash reserves).
- Economic efficiency: this requires that prices be set to ensure that consumers face the avoidable costs of their decisions and means that there are implications of their water use practices to society as a whole. A tariff should create incentives that ensure that users obtain the largest possible aggregate benefits.
- Equity: the water tariff should treat similar customers equally and that consumers in different situations are not treated the same. This would entail that users pay monthly water bills that are proportionate to the costs they impose on the water services by their water use.
- Poverty alleviation: it is generally felt that water services are a basic right and should be provided to peoples regardless of whether they can pay and that water services be provided free to the poor. This view however conflicts with the objectives of cost recovery and efficient water use.

The Nelson Mandela Bay Metro receives 67 Million Litres per day under normal conditions from the Kouga Dam which is situated within the Baviaanskloof Nature Reserve and World Heritage Site and represents 24,36 % of the Nelson Mandela Bay Metro's total daily water consumption (pers comm. B.Martin,2010). The basic water tariff for both domestic and industrial usage in the Nelson Mandela Bay Metro is R 5.28 per kiloliter exclusive of 14% VAT with a monthly quota of 30 kilolitres per month with the NMB Metro providing 6 kiloliters per month of water free to indigent households.

3.6 BAVIAANSKLOOF NATURE RESERVE AND WORLD HERITAGE SITE BUDGETS & EXPENDITURE

Current funding for the Baviaanskloof Nature Reserve and World Heritage Site are only about 15% above the 1990's levels and in real term means that the Baviaanskloof Nature Reserve and World Heritage Site has experienced negative budget growth when compared to inflation levels. The current operational budget for the Baviaanskloof Nature Reserve and World Heritage Site and human resources for the two sections of Baviaanskloof Nature Reserve and World Heritage Site are shown in Table 7. The operational budgets shown exclude capital budgets for the reserve; capital budgeting for the Baviaanskloof Nature Reserve and World Heritage Site over the past three years has totalled less than R 1.5 Million.

Table 7: Baviaanskloof Nature Reserve and World Heritage Site– three year summary of operational costs (Source ECPTA 2010).

Reserve Section	Operational Budget (R)			HR Budget (R)		
	2008/09	2009/10	2010/11	2008/09	2009/10	2010/11
Financial year						
Western	792,831	614,500	734,744	1,560,999	2,825,303	3,071,120
Cockscomb	877,690	1,048,000	967,222	1,092,329	2,196,217	2,953,611

An analysis of table 6 shows an overall decrease in operational expenditure for the two management sections (Western and Cockscomb) that comprise the Baviaanskloof Nature Reserve and World Heritage Site. Operational expenditure for Cockscomb has shown an increase in allocation due to this section managing and maintaining all the tourist facilities for the reserve. This does not indicate an increase in allocated expenditure to the Baviaanskloof but is rather the result of the reallocation of budget from the three other reserves in the Western Region to the Baviaanskloof due to its status as

a World Heritage Site and its conservation priorities. The human resources budget shows a continued increase based on cost of living increases. These increases are eroding the available operational budget despite additional allocations from the three other reserves which has been done to their detriment and reduced operational effectiveness.

Utilising an excel costing program developed by Richard Davies and attached as annexure A, the staffing costs of the Baviaanskloof Nature Reserve and World Heritage Site together with conservation development, equipment, operational estimates, overheads and tourism costs have been worked out and utilised as means of developing a -zero based" budget for the Baviaanskloof Nature Reserve and World Heritage Site. The budget obtained from the -zero based" costing exercise has been compared to the current operational and human resources expenditure for the reserve and has been utilised as the basis for establishing a payment for ecosystem services (water) for the Baviaanskloof Nature Reserve and World Heritage Site. This costing system enables a comprehensive budget estimation to be obtained of all reserve operations, staffing costs, capital purchases and maintenance of all infrastructures for both conservation and tourism functions. Table's 8 and 9 with figure 2 represent accommodation and revenue incomes for the reserve over the past two financial years in Rand (Table 8) while Table 9 shows income generation from day visitor fees in Rand for the period 2007 - 2010. The revenue generation from accommodation and fees are graphically shown in Figure 2 to allow comparison.

Both table and graphs indicate a negative trend for both accommodation and revenue which is in line with the economic downturn experienced in South African from late 2009 as a result of the global economic meltdown in the banking and investment sectors in the USA and UK. The graph in figure 2 shows that the economic downturn only started to affect the reserve income from June 2010, the first 6 months of 2010 show increased revenue over 2008 and 2009 but a marked increase from July 2010 to date as a result of improved access control procedures in the Baviaanskloof Nature Reserve and World Heritage Site. The increase in day visitor fees will have a positive effect though minimal effect on revenue generation when viewed against operational and human resource expenses.

Table 8: Income in Rand: Accommodation Baviaanskloof Nature Reserve (Source: ECPTA 2010)

Baviaanskloof Nature Reserve and World Heritage Site			
	Year08/09	Year 09/10	% Change
Accommodation	R 100075	R 111304	11%
Entrance Fee	R 9767	R 3322	-66%
	Year09/10	Year10/11	% Change
Accommodation	R 111304	R 67427	-39%
Entrance Fee	R 3322	R 21770	555%

Table 9: Monthly Revenue Comparison in Rand: Baviaanskloof Nature Reserve Day Visitors 2007 - 2010 (Source: ECPTA 2010).

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
2008				4,089	1,320	1,260	908	1,456	2,100	2,705	2,988	16,707
2009	2,856	2,292	6,677	2,365	4,708	2,838	4,986	3,111	1,224	3,812	2,129	7,400
2010	8,692	2,526	1,638	1,723	1,217	1,400	3,616	2,564	3,664	5,287	3,094	18,870
2010	20,809	5,473	10,406	20,279	13,057	9,617	12,050	15,430	19,720	14,065	19,170	90,255

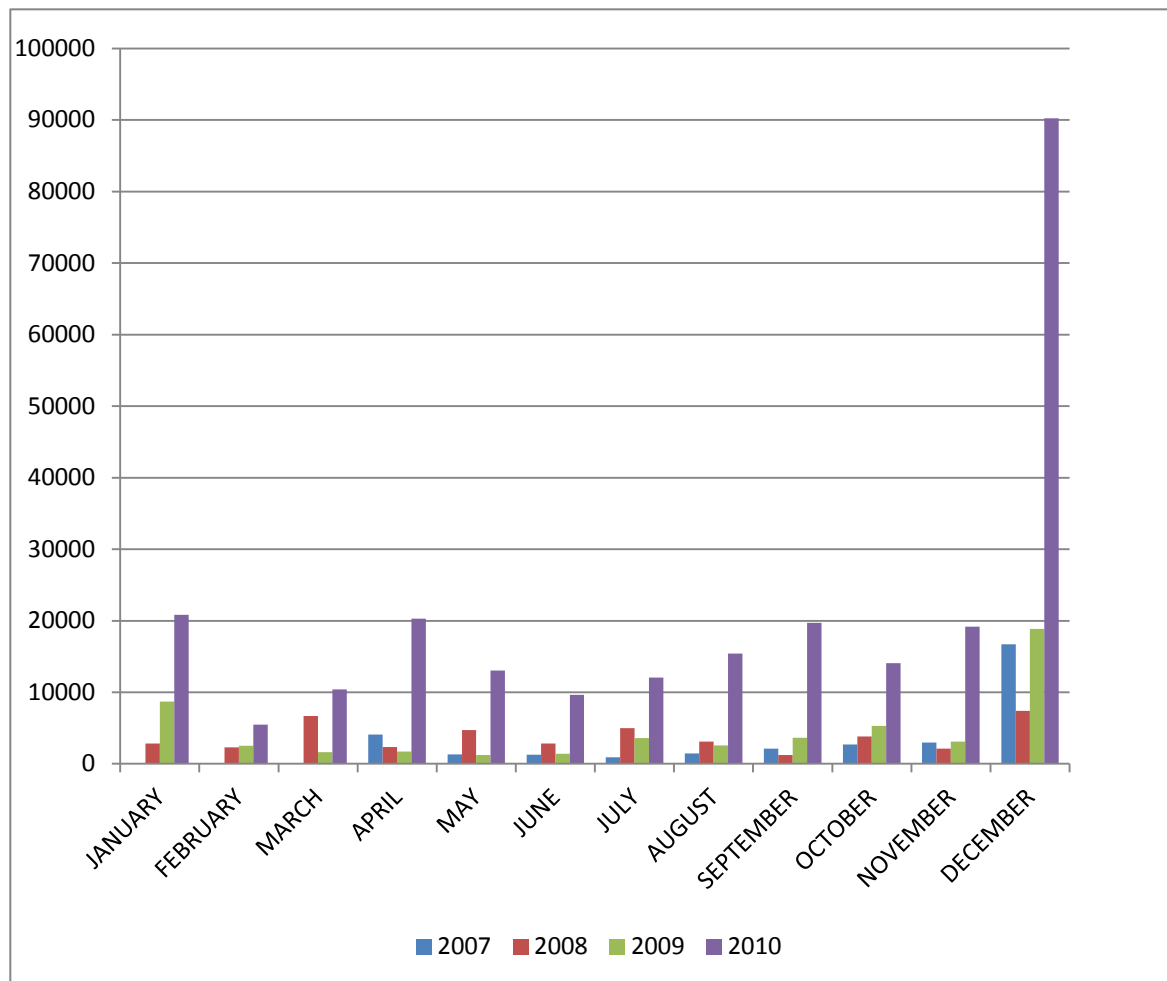
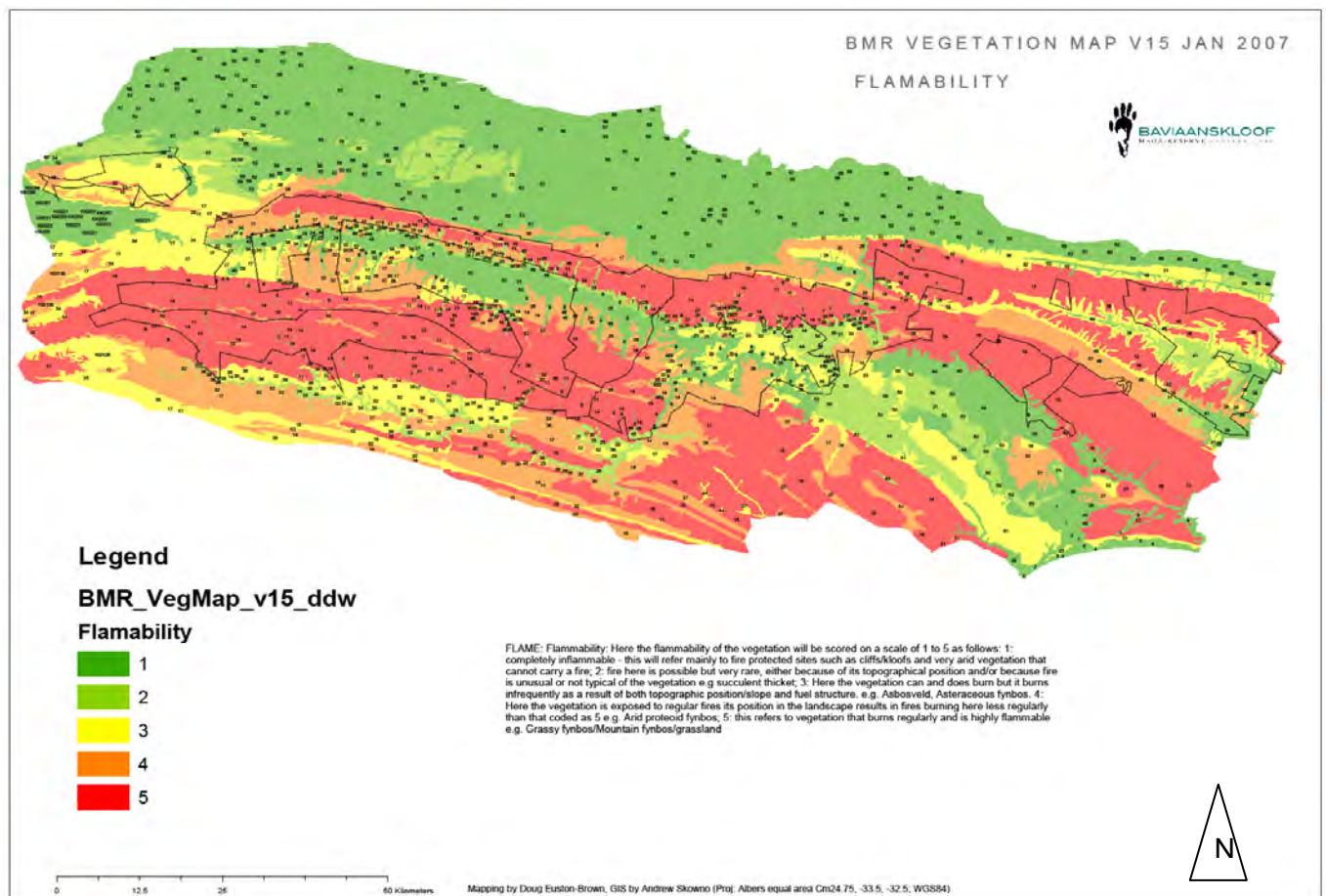


Figure 2: Monthly Revenue Graph in Rand: Baviaanskloof Nature Reserve (Source ECPTA 2010)

Reserve expenditure for the past three years has been in line with available budgets where reserves utilised their entire allocated budget to conduct operations and meet reserve objectives. These budgets however do not include expenditure of alien clearing and very limited expenditure on fire management. Fire management has been limited to acquiring tools and protective clothing for staff and in providing fire training for staff. The cash flow summary for the Baviaanskloof Nature Reserve and World Heritage Site shows that the reserve has an existing conservation capital asset value of R 152 107 500.00 and still requires a further investment of R 21 100 000.00 while existing tourism capital is R 11 188 500.00 and requires a further R 18 183 500.00 investment. The cash flow analysis shows that the required annual budgetary requirements for the Baviaanskloof Nature Reserve and World Heritage Site is R 14 380 616.00. When this is compared to actual budgets and expenditure of R 7 726 697.00, a shortfall of R 6 653

919.00 is currently being experienced and represents a 53.72 % budgetary shortfall that is only going to get worse over time due to inflationary costs and continued fiscal constraints.

Fire management has been identified as one of the major risks that the Baviaanskloof Nature Reserve and World Heritage Site is facing and in light of climate change, this risk will continue to remain high. The high lying vegetation of the Baviaanskloof Nature Reserve and World Heritage Site is grassy Fynbos and is therefore severely fire prone with almost 90% of the area having a high flammability index. Map 6 shows the flammability map of the Baviaanskloof Nature Reserve and World Heritage Site, areas shown in red and yellow are extremely prone to fire and are the fynbos and grassy fynbos zones.



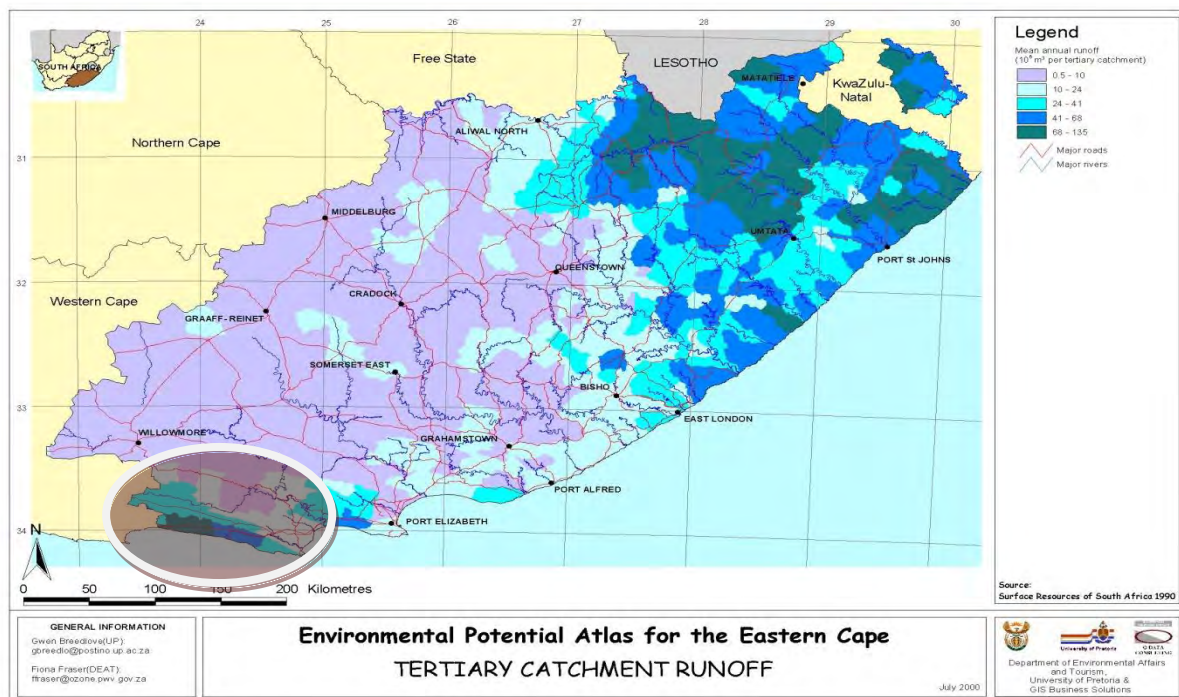
Map 6: Baviaanskloof Vegetation Flammability map (source: Euston Brown 2008, Baviaanskloof Fire Management plan 2008)

These are important functions that need to be undertaken in order to ensure proper biodiversity management of the Baviaanskloof Nature Reserve and World Heritage Site for alien control, water catchment and fire. Climate change is going to have an effect on these activities and the general indication is that climate change is moving towards hotter and longer summers with higher incidents of storm events which are going to have a strong effect of the ecological resilience of the Baviaanskloof Nature Reserve and World Heritage Site.

Alien control is currently been carried out as part of the Working for Water program and is being implemented by Gamtoos Irrigation Board who have been implementing alien clearing in the Baviaanskloof Nature Reserve and World Heritage Site over the past 10 years. The Working for Water (WFW) project, implemented by Gamtoos Irrigation Board, has cleared in excess of 115 000 ha in the Baviaanskloof Nature Reserve and World Heritage Site over the past 8 years. It may be inferred that this has resulted in greater water availability to the ecosystem and greater run off into the Baviaans and Kouga Rivers and ultimately into the Kouga Dam through the removal of alien species that utilise scarce ground water. The catchment size for the Baviaans River is an estimated 123 332 ha in extent and contributes an estimated 30% of the Kouga Dam catchment. The mean annual rainfall is 300 mm pa (188 mm pa in summer and 112 mm pa in winter). Total rainfall is estimated to be 369 million m³ per annum (Jansen 2008).

The catchment size for the Kouga River is an estimated 282,040 hectares in extent, with an annual rainfall in the region of 500 mm pa or 1.2 billion m³ per annum (Jansen 2008) of which an estimated 60% of the catchment falls within the Baviaanskloof Nature Reserve and World Heritage Site and contributes to inflow at the Kouga Dam; the remainder of the catchment is estimated to be a further 60 000 ha. The total catchment of the Baviaanskloof Nature Reserve and World Heritage Site is an estimated 324 352 ha of a total catchment of 505 372 ha and represents an estimated 64 % of the total catchment. The area is incredibly rugged and the vegetation exceedingly complex, with plant community structure and plant community composition changing substantially over short distances (Vlok 1989). The total surface area is therefore expected to be double the estimated catchment size due to the rugged terrain features. DWAF data on the quaternary catchments lists the Mean Annual Precipitation (MAP) to range from 450 mm pa to 685 mm pa. The area is renowned for the deciduous fruit it produces. Map 7 shows

runoff potential for the Eastern Cape, the Baviaanskloof Nature Reserve and World Heritage Site is highlighted by the white circle.

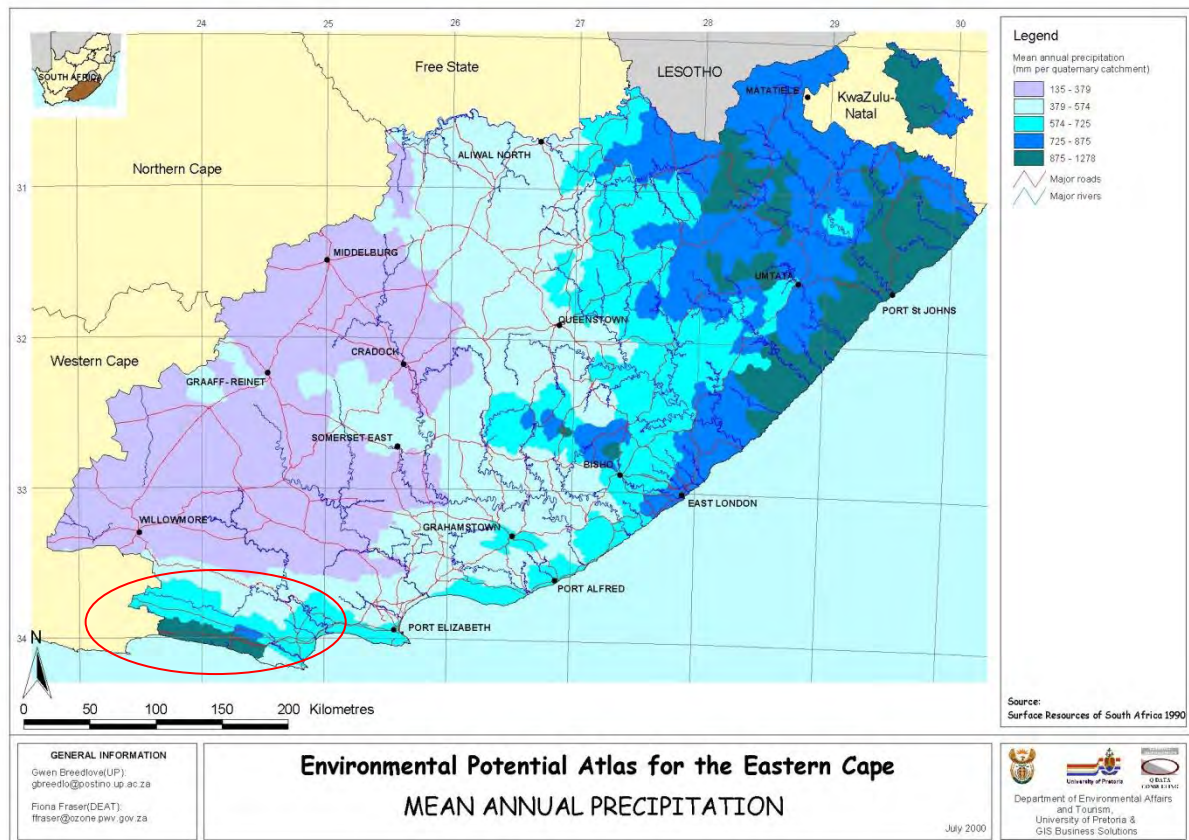


Map 7: Tertiary catchment runoff for Eastern Cape (Source Department of Environmental Affairs 2009)



Map 8: Baviaanskloof Nature Reserve and World Heritage Site catchment (Source Gamtoos Irrigation Board 2008)

Map 8 shows the total catchment area for the Baviaanskloof Nature Reserve and World Heritage Site, the area east and north of the Kouga River is estimated to be 60 000 ha in size while Map 9 shows mean average annual rainfall for South Africa with the Baviaanskloof Nature Reserve and World Heritage Site catchment areas highlighted in the red circle.



Map 9: Mean Annual Precipitation for Eastern Cape (Source Department of environmental Affairs 2009)

3.7 CONCLUSION

An analysis of the budgetary requirements for the Baviaanskloof Nature Reserve and World Heritage Site has shown that the current budget is 53.72 % below the actual funding level that the Baviaanskloof Nature Reserve and World Heritage Site should be receiving to be able to meet its objectives and mandate. It should be noted that a conservative approach has been taken when compiling the zero based budget and this therefore represents that minimum budget requirements for the Baviaanskloof Nature Reserve and World Heritage Site. The current budget trend is indicating that the

available budget to the Baviaanskloof Nature Reserve and World Heritage Site will only decrease over time making it imperative that an additional source of funding be found that will meet the needs and requirements of the Baviaanskloof Nature Reserve and World Heritage Site and ensure a sustainable funding source.

The single source of sustainable funding for the Baviaanskloof Nature Reserve and World Heritage Site will be Payment for Ecosystem Services. Water that is captured within the Baviaanskloof Nature Reserve and World Heritage Site catchment is currently provided to end users in the Nelson Mandela Bay Metro and surrounding areas of Patensie and Hankey including the Gamtoos Valley through the Gamtoos Irrigation Board. An ecosystem services levy can be added to all water users of the Kouga Dam based on a per kiloliter allotment; this additional levy can then be paid to Eastern Cape parks and Tourism Agency by Gamtoos Irrigation Board for utilisation by Baviaanskloof Nature Reserve and World Heritage Site. The revenue generated through the levying of the ecosystem service will be utilised by Baviaanskloof Nature Reserve and World Heritage Site management to put the required measures and practices in place to ensure that the long term management objectives of the Baviaanskloof Nature Reserve and World Heritage Site for both catchment and biodiversity are met and that long term water security is provided to both the Nelson Mandela Bay Metro, communities and agriculture in Hankey and Patensie.

Chapter 4: Assessment Tools

This chapter reviews the sustainability of Eastern Cape Parks and Tourism Agency through as assessment of the triple bottom line, economic impact and willingness to pay for ecosystem services (water) from the Baviaanskloof Nature Reserve and World Heritage Site. The tool is based on a willingness to pay questionnaire and interviews.

4. INTRODUCTION

The Eastern Cape Parks and Tourism Agency (ECPTA) does not define the concept of sustainability in its policy on natural resource use within provincial protected area; instead the policy defines sustainable use as the continued derivation of benefit from a resource with minimal negative effect on the ability of future generations to benefit from the resource and the ecosystem in which it occurs (Policy on Natural Resource Use in Provincial Protected Areas, 2008). The policy also defines —natural resources” which refers to the goods derived by people from the environment and includes animals, plants, minerals and water. Natural resources can be renewable or non-renewable. One category of natural resources is indigenous biological resources.

The most widely quoted definition on sustainable development as quoted in Weybrecht (2010) is —development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. It contains within it two key concepts: the concept of needs, in particular the essential needs of the world’s poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social Agency on the environment’s ability to meet present and future needs.”

There is a clear correlation between the accepted definition of sustainable development as quoted in Weybrecht (2010) and the ECPTA’s interpretation of sustainable use as contained within its policy on natural resource usage. The Eastern Cape Parks and Tourism Agency is committed to sustainability in natural resource usage by the broader communities as long such usage does not impact negatively on the ecosystems and future generations. The Agency has captured this view in its vision where biodiversity management and tourism development underpin sustainable development in the Province. In certain instances it may be possible to use resources within the protected areas without compromising the primary objective of conservation. Due to higher levels of protection, these areas may contain resources that have been depleted elsewhere and which are in demand by local communities.

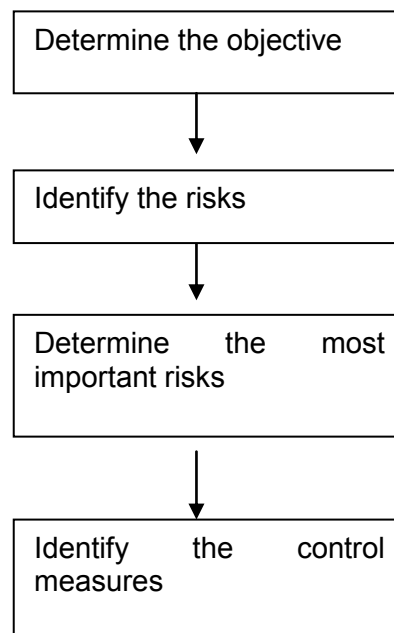
A key strategic objective of ECPTA is to include stakeholders as active partners in conservation and to manage protected areas in a way that contributes to the well being of neighbouring communities and is also a legal requirement. The National

Environmental Management Protected Areas Act 107 of 1998 has stated that one of the objectives of the act is —to promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas”. The needs of local communities and other stakeholders are as many and varied as the local communities that surround the protected areas and clear policies and guidelines are therefore needed in order to ensure that any consumptive use of natural resources from the reserves is sustainable and equitable.

4.1 SUSTAINABILITY RISK AND OPPORTUNITIES

Risk management is a cyclical approach that must be repeated regularly during the course of a project or assessment. Risk management begins with an analysis of the risks and with the aid of risk analysis, insights into the risks within a project or assessment can be gained systematically and the measures used to approach these risks can be evaluated. The risk process is not one off and therefore risks have to be monitored on a regular basis and controlled (Van Well – Stam *et al.* 2004). This cyclical nature is shown in figure 3.

Risk Analysis



RISK MANAGEMENT

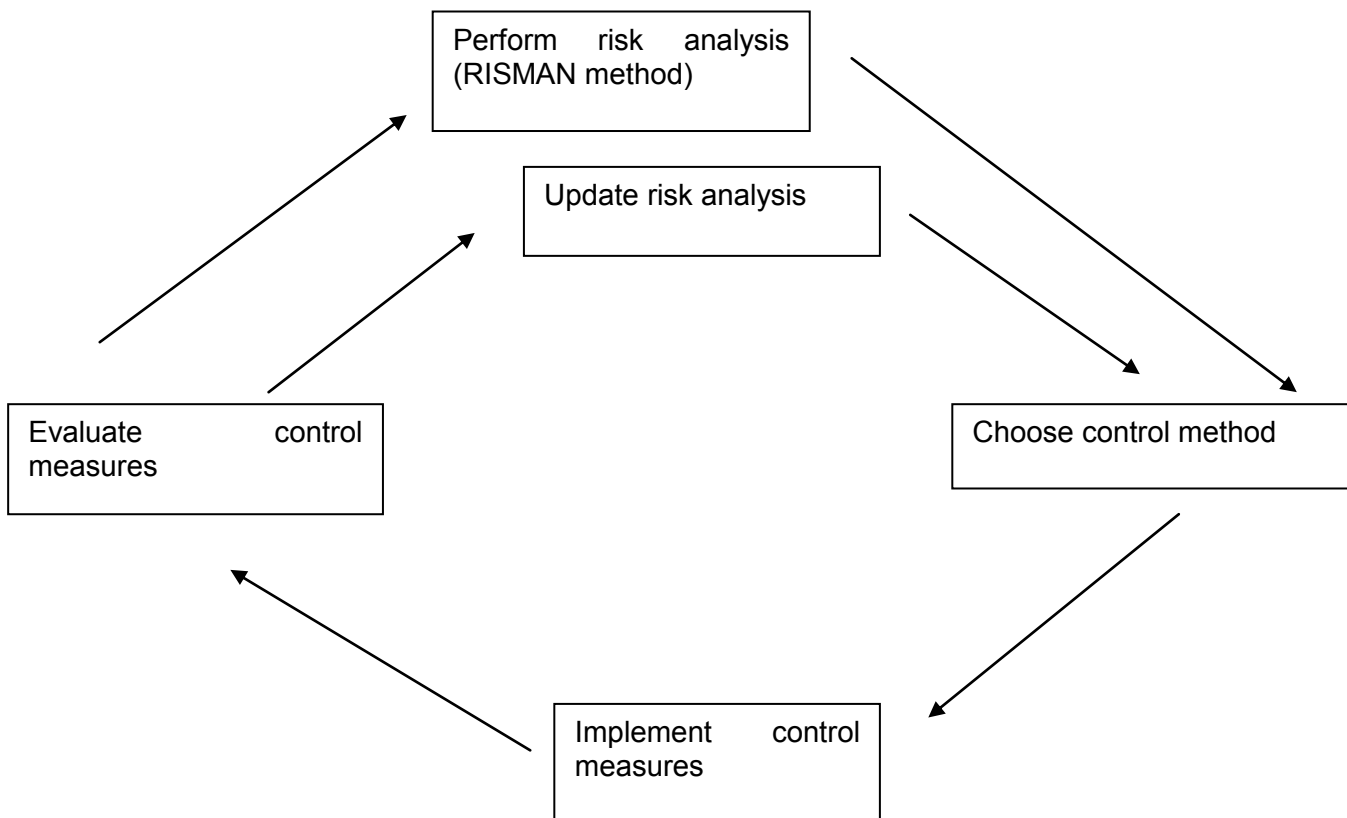


Figure 3: The cyclical nature of risk management (Source: Van Well – Stam *et al.*, 2004)

Risk is actually a measure of the amount of uncertainty that exists and it is directly tied to information. Risk relates primarily to the extent of the ability to predict a particular outcome with certainty and is shown in figure 4.

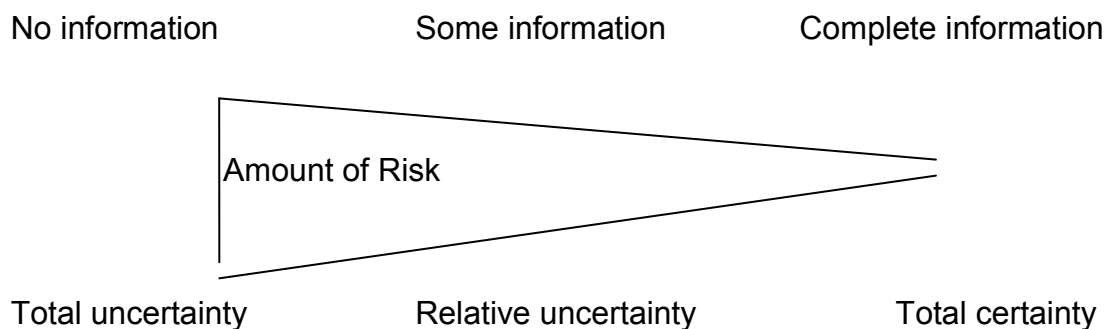


Figure 4: Risk relationship between information and uncertainty

It is important to recognise from the outset that identification and characterization of risks is an inherently subjective process that may be influenced by the personal beliefs, training and experience of the individual who makes judgements about the risks (Bowden *et al.*, 2001). Risk management is the systematic application of management policies, processes and procedures to the tasks of identifying, analysing, assessing, treating and monitoring risk. The aim of the risk management process is to reduce exposure to the consequences of risk events to levels that are considered acceptable to the business (Bowden *et al.*, 2001). Bowden *et al.* go on to state that the risk process allows risk treatment actions to be selected on the basis of the nature of the risk and its components, namely likelihood and consequence.

4.2 SUSTAINABILITY AND THE TRIPLE BOTTOM LINE

Stuart Hart stated in *Beyond Greening: Strategies for a Sustainable World* (Harvard Business Review, Jan – Feb 1997, pp67 – 76) that “the environmental revolution has been almost three years in the making and it has changed forever how companies do business. In the 1960’s and 1970’s, corporations were in a state of denial regarding their impact on the environment”. He further stated that in “beyond greening lie an enormous challenge and an enormous opportunity. The challenge is to develop a sustainable global economy; an economy that the planet is capable of supporting indefinitely.”

The notion of the triple bottom line has taken the two existing components of bottom line reporting, economic and environmental and has added a social component as well to get the triple bottom line reporting. Social reporting has introduced a new value to the traditional reporting and in South Africa; the JSE has recognised the importance of this by introducing the Social Responsibility Index (SRI) where companies are evaluated according to their social responsibilities. The King Report on Corporate Governance of South Africa 2001 (King II) recommended that a company should report on certain non – financial issues. This is the so called “triple bottom line” of a company, namely the sustainability of a company that has adopted a balanced and integrated economic, social and environmental performance. (A Company’s Duty to Report on “Non – Financial Matters”; JCE/HUT 3419.DOC/COM-GEN/113997, 20010829a).

There are three models of sustainability: the three legged stool model, weak sustainability and strong sustainability (ref). The three legged stool model is where all

three elements of the triple bottom line combine and overlap, where this happens is sustainability; this does not occur in reality. The weak sustainability model is where the economy is strong with society and the environment being smaller criteria; strong sustainability on the other hand is where the environment is strong with society playing a bigger role and economy being the last criteria. A new model of sustainable development has been developed and is as follows and is based on actual activities that are required in order to reach sustainable development.

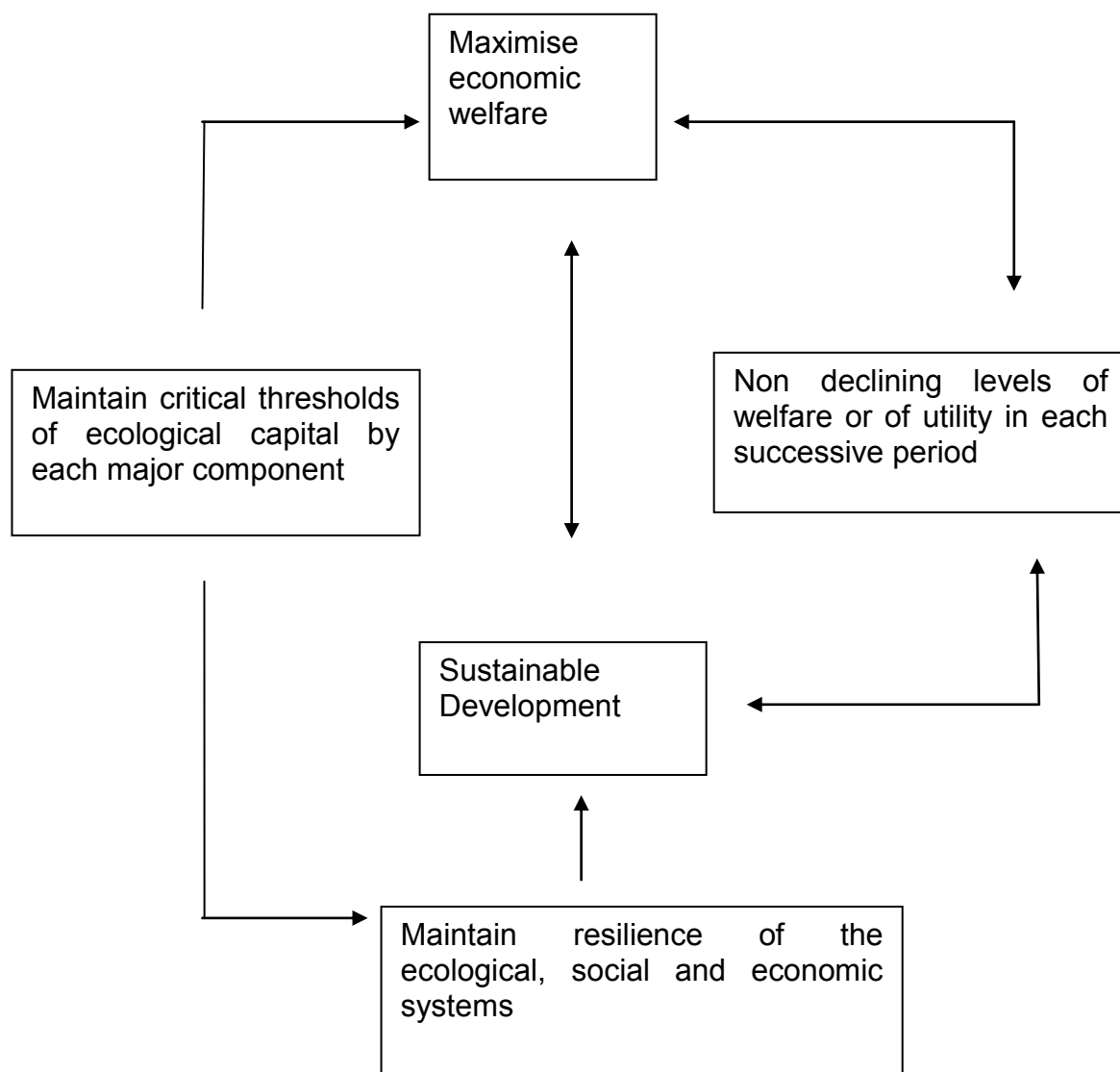


Figure 5: Model of sustainable development. Source: Rao (2000)

4.3 **METHODOLOGY TO ASSESS “TRIPPLE BOTTOM LINE”**

In determining the methodology to assess the “triple bottom line”, the JSE SRI Index, 2004, has been utilised. The four criteria that the JSI SRI index uses have been used for this assessment, namely:

- Environmental sustainability practices,
- Economic sustainability practices,
- Social sustainability practices,
- Corporate governance practices.

The following assumptions are made: the scoring method will be number based, with zero (0) being the lowest with nothing in place to measure adoption or implementation and three (3) exceeding the objectives of adoption or implementation. The criteria for assessment will be set out in table format and scores will be attributed to each of the four criteria as stated. The assessment will be carried out on the operations department of the Eastern Cape Parks and Tourism Agency; this will include all operations of the Protected Areas as well as policies and procedures. The selection criteria and drivers as determined by the JSE SRI index for each of the four criteria will be used in the assessment. See triple bottom line assessment in annexure B.

4.4 **CONCLUSION**

The Agency has a number of challenges to overcome in order to meet the requirements of a sustainable organisation. The Eastern Cape Parks and Tourism Agency is reliant on a grant that is provided by the Provincial Government through the Department of Economic Development and Environmental Affairs and is based on a five year strategic plan and operational plan. The funding that is received has proven to be inadequate for the Agency to meet its stated objectives and mandate. The protected areas are underfunded and a legacy of poor infrastructure has been inherited from the previous departments. This has placed major strains on the Eastern Cape Parks and Tourism Agency to provide the required financial commitments to meet the biodiversity and people and parks mandate.

One major challenge that must be met is the carbon emissions and carbon footprint that the Agency has. This is starting to be addressed through a rehabilitation project that is currently being carried out in one of the protected areas where there has been a degradation of the thicket biome. There is great interest in entering the carbon market and to this end; a contract is in draft form to provide carbon credits to an overseas Agency through the planting of *Portulacaria afra* which has proven carbon sequestration abilities. Further options are being explored to enter the formal carbon market through the Clean Development Mechanism (CDM).

The Eastern Cape Parks and Tourism Agency needs to explore the issues of the carbon market further; this will strengthen the environmental pillar of the “triple bottom line” and will provide the Agency with much needed revenue in the medium to long term through offsetting carbon to developed countries. A second issue to be explored is the question of eco system services payments – the end user pays for the efforts of conserving the natural systems that provide clean water to persons downstream. Payment for ecosystem services will also strengthen the Agencies resource base and must be developed over the short to medium term as this has long term benefits to the Agency. These two initiatives will not only improve the environmental pillar but also the social and economic pillars of the Agency and will therefore improve the overall resilience of the Eastern Cape Parks and Tourism Agency.

Risk assessments have been conducted in the protected areas and the twenty top risks to the organisation have been identified. A revised business strategy has been developed and implemented by the organisation and its mission, vision and values have also been revised to meet the challenges of the organisation. Sustainable development is paramount to the organisation and must be achieved without compromising the organisations mandate of biodiversity. The precautionary principal should be applied to all processes that the organisation undertakes to ensure that as an organisation the correct decision are made to prevent a loss of biodiversity and ecological systems.

Chapter 5: Research Methodology

This chapter reviews the research methodology used when compiling the research information and includes determination of economic impact as a potential means of determining economic impact of the Baviaanskloof Nature Reserve and World Heritage Site and willingness to pay questionnaire.

5. INTRODUCTION

The research was conducted in the Baviaanskloof Nature Reserve and World Heritage Site; with the Baviaanskloof being inscribed as a World Heritage Site in 2004 as part of the Cape Floristic region (CFR) serial nomination that includes 7 World heritage Sites in the Western Cape. The Baviaanskloof Nature Reserve and World Heritage Site is situated in the western portion of the Eastern Cape and encompasses the Kouga, Baviaanskloof and Groot Winterhoek Mountain ranges extending westwards into the Western Cape (estimated 20 000ha).

As part of the Cape fold belt the area is characterised by relatively high mountains, including the highest peaks in the South Eastern Cape (Cockscomb 1 758 m and Smutsberg 1 757 m). The average height of the three parallel east south-east mountain ranges, the Baviaanskloof, Groot Winterhoek and Kouga mountains is more than 1 200 m above sea level.

From the peaks the slopes fall steeply to the north and south to end on a plateau level (the Mica land surface) of 650 to 900 m above sea level. Only a few ridges of this formation survive. The rest of this former land surface was carved away by deep ravines reaching a valley at an altitude of between 550 and 320 m above sea level. This valley includes the Kouga, Baviaanskloof and Groot River valleys.

The main drainage systems flow in the valleys, mainly in an easterly and southerly direction. Smaller streams flow northwards on the northern slopes of the Baviaanskloof Mountains and westwards from the watershed on the Uniondale side of the area. Five formations of the Table Mountain Group are found in the area, namely the Peninsula, Cedarberg, Goudini, Skurweberg and Baviaanskloof formations. Sediments of the Enon formation, consisting of conglomerate with rounded to angular alluvial stone in a sandy matrix are found in the valley in the middle of the area. In the valleys the extensive appearance of alluvial sand and gravel is due to deposition by rivers depositing sand and gravel from the mountains and ravines (Strategic Management Plan 2007: Baviaanskloof Cluster).

5.1 ECONOMIC FEASIBILITY

The next best alternative foregone would have been for agriculture in the form of cattle, goat and sheep farming to have continued on the land. A cost – benefits analysis would reveal what the costs and profits foregone for agriculture would have been. The loss of the productive land should be factored into calculations as well as what income would have been derived from the land currently under conservation assuming a number of factors such as suitability of land, veld type, agricultural carrying capacity, etc. An example of this is the Conservation Reserve Program (CRP) in the United States that sets out a process to select appropriate acreage to conserve. The CRP converts cropland into grasslands or forest lands which can enhance the natural environment in ways that people care about (Feather *et al.*, undated).

The conservation value of the Baviaanskloof Nature Reserve and World Heritage Site and its economic value would need to be determined before the opportunity costs can be measured and quantified. It is easier to measure and quantify the agricultural value lost or foregone through the establishment and continued expansion of the Baviaanskloof Nature Reserve and World Heritage Site than it is to measure the opportunity costs of conserving the Baviaanskloof Nature Reserve and World Heritage Site. Additional opportunity costs would be the costs of harvesting, capturing or selling wildlife species and the medicinal value of harvesting of plants by local communities.

5.2 DETERMINATION OF ECONOMIC IMPACT

Crompton (2006:68) in Snowball (2007) provides a useful diagram of the economic impact cycle of costs and benefits for conducting studies of cultural events or facilities that attract tourists from outside the impact region. The implications that may be drawn from this cycle are that both direct and indirect impacts of job creation and income on local residents should be taken into account. This diagram when used to determine the economic impacts of the Baviaanskloof Nature Reserve and World Heritage Site may be modified to reflect the monetary value of the direct, indirect and option value uses such as recreation, game viewing, etc. Crompton's economic impact cycle of costs and benefits may therefore be adapted to reflect the variances in the direct, indirect and option use values and is reflected in Figure 6.

This is reflected in Wells (1997) where he states that tourism's contribution to the economy can be very difficult to estimate because of the diverse type of businesses selling goods and services to tourists who do not constitute an easily separable economic sector.

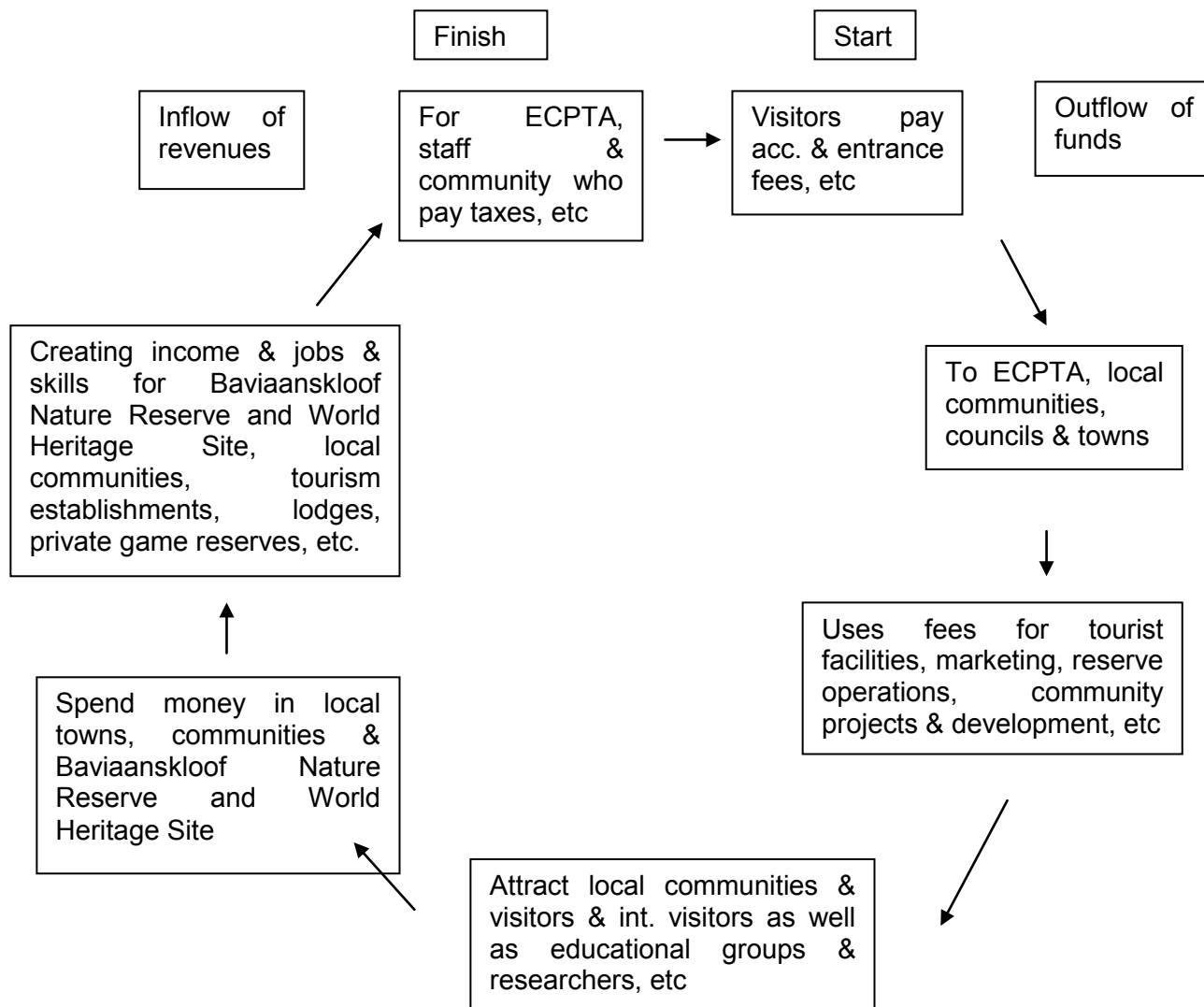


Figure 6: Adapted Economic Impact Cycle of Costs and benefits for Baviaanskloof Nature Reserve and World Heritage Site (Source: Adapted from Crompton 2006: 68 in Snowball 2007)

According to Wells (1997); the economic impact of tourism is usually measured in terms of tourists' overall spending on accommodation, food, travel, souvenirs and other expenditures.

To determine economic impact, the effects of multipliers and leakages must be taken into consideration. Wells (1997) found that there are three categories of multiplier effects: (1) **Direct** effects are economic impacts directly related to nature tourism; (2) **Indirect** effects are expenditures incurred by a business or other entity when it re spends its gross income on wages, operating expenses or capital items and (3) **Induced** effects arise from the re spending of wages earned in businesses that benefit from direct and indirect effects. There can only be multiplier effects if there are unemployed or under employed resources in an area (Ulph & Reynolds 1981 in Wells 1997).

Positive multiplier effects are limited by leakages which reduce the positive economic impacts of tourism. Leakage is often higher during start up or rapid growth phases of tourism when the local economy is generally unable to provide many of the goods and services demanded by visitors. Higher leakage rates for nature tourism are likely to persist in relatively undeveloped locations and at those sites providing more luxurious and expensive facilities (Wells 1997).

In order to determine the economic impact of the Baviaanskloof Nature Reserve and World Heritage Site, the following data would be needed:

- Visitor numbers,
- Nationality of visitors (local or international)
- Length of stay in Baviaanskloof Nature Reserve and World Heritage Site,
- Length of stay outside Baviaanskloof Nature Reserve and World Heritage Site,
- Spending within Baviaanskloof Nature Reserve and World Heritage Site (drives, accommodation, etc)
- Spending outside Baviaanskloof Nature Reserve and World Heritage Site (local communities, towns, fuel, etc)
- Total spending on holiday package (tour operator, travel agent, etc)
- Details of transport (self drive, fly, tour)

- Visitor preferences and reasons for visiting Baviaanskloof Nature Reserve and World Heritage Site

The total economic value of the Baviaanskloof Nature Reserve and World Heritage Site, both direct and indirect and non use values, would all be considered in determining the economic impact of the Baviaanskloof Nature Reserve and World Heritage Site on the economy of the Eastern Cape. Visitor's preferences and reasons for visiting the Baviaanskloof Nature Reserve and World Heritage Site would indicate whether the intrinsic value of Baviaanskloof Nature Reserve and World Heritage Site is what is attracting visitors or the ability to enjoy nature and view wildlife.

The data collection will be difficult; data would need to be captured from areas outside Baviaanskloof Nature Reserve and World Heritage Site and the reliability of data will need to be verified. The multiplier and leakage effects must be considered in the model as well. Determining the multipliers and leakages will require an in depth analysis of all data and even then estimations with a reasonable degree of accuracy would be difficult. This is a weakness of the model and according to Wells (1997), the multiplier analysis appears in general to have a fairly low credibility and estimates of total tourist expenditures do not take into account the costs of the inputs to the tourism industry; the benefits are therefore overstated. This method was therefore not utilised, the willingness to pay method was adopted for the purposes of obtaining research data.

5.3 WILLINGNESS TO PAY METHOD

In order to offset the weaknesses of the economic impact model, a second method has been used to value the reserve and provide a comparison. The method that may be used is the willingness to pay method. Wells (1997) states that the total economic benefit from tourism is represented by visitors' aggregate willingness to pay for their experience. The economic impact method represents the total package amount that a tourist will pay for the holiday experience to Baviaanskloof Nature Reserve and World Heritage Site and according to Wells (1997), would be less than the maximum that the individual would have been willing to pay. This difference between what an individual actually pays and the maximum that the individual would be prepared to pay is known as consumer surplus. Willingness to pay or total economic value includes both actual expenditure and consumer surplus (Wells 1997).

There are two approaches to valuing willingness to pay: (i) direct approaches through surveys and (ii) the contingent valuation method that asks people how much they are willing to pay. In order to determine willingness to pay in nature tourism, it is vital that a distinction is made between willingness to pay to visit a destination and their willingness to pay to conserve the destination (Wells 1997). Care also needs to be taken to ensure that “free riders” are eliminated through the type of questions asked and the context that the questions are being asked in to prevent bias being created through too little or too much information provided to the respondents. Carson and Mitchell (1993) in Palmer and Snowball (2009) concluded that it was the quality of the response to a willingness to pay question that would determine the accuracy of the study. List and Gallet (2001) in Palmer and Snowball (2009) found that although “free rider” bias has shown to exist, it is usually small and results in willingness to pay values of between 1.26 and 1.30 times more than the real market situation.

In order to determine a willingness to pay principal, the method used was to adapt the findings of Carson and Mitchell (1993) to conduct a survey of the departmental heads of the Nelson Mandela Bay Municipality as well as other respondents in order to determine a willingness to pay to conserve long term water sustainability for the Nelson Mandela Bay Municipality. The survey provided background information to the respondent so that the respondent would be able to answer the survey in the correct context; the background explained the purpose of the questionnaire. The current drought (2009 – 2010) that is being experienced in the Eastern Cape has raised awareness in members of the public and local government about the vulnerabilities of water supply and the need to secure and protect water catchments.

5.4 RESEARCH CONTEXT

Effective management of protected areas ensures the ongoing, sustainable provision of these important ecosystem services; it ensures the production of clean water, assists in the moderation of floods and forms a buffer against the extreme weather conditions resulting from global warming; it is vital to the prevention of erosion; it ensures carbon storage, clean air and provides aesthetic landscapes, which in turn attract a growing tourist industry. In 2004 Murphree (2004) did a broad investigation into the role of parks in transitional societies in southern Africa. His findings note that it is important to

distinguish between the uses and values generated by protected areas. In economic terms, this means that protected areas cannot simply be valued according to the uses which a protected area can capitalise on to generate economic activities, but also the intangible values of the protected area for sustaining the local, provincial and national economy (Review of Institutional Arrangements for Management of Protected Areas 2010).

5.5 **METHODOLOGY**

The research is primarily on the ecosystem services value that the Baviaanskloof Nature Reserve and World Heritage Site provides to end users in the Nelson Mandela Municipality. The citrus industry within the Gamtoos valley is excluded from this research at this time as there are difficulties in determining the actual allocations of water and uses of water to the citrus industry and in determining the population that benefits directly or indirectly from this water. This area should be the focus of further research in the future. There is no clear differentiation between water usage for irrigation, household use, industry and staff usage on the farms. Further research will need to be undertaken through local municipalities to determine whether water usage can be differentiated, there will be insufficient time to undertake this research and include it as part of this study.

A structured questionnaire has been completed with selected heads of departments at the Nelson Mandela Metro as well as a cross section of members of the public. These questionnaires were completed in one – on -one interview. The following persons were interviewed at the Nelson Mandela Bay Municipality: the managers for Environmental Services; Bulk Water and Infrastructure, Legal Services and Finance. The questions were focused on the cost of current water tariffs and how NMBM applies the tariffs to residents, cost of purification of Kouga water and water received from the Gariep Dam, percentage of users using Kouga water, likelihood of payment for water as ecosystem services (water consumption) and potential value of PES (water consumption) and knowledge of ecosystem services and catchments importance. An explanation of what ecosystem services are and its application was provided to all interviewee's to provide context.

This data has been used to determine the feasibility of obtaining payments for ecosystem services (water consumption) derived from the biodiversity functions of the Baviaanskloof Nature Reserve and World Heritage Site from the Nelson Mandela Municipality.

5.6 **CONCLUSION**

The research context has clearly expanded on the need for payment for ecosystem services and the need to secure sustainable funding for protected areas. The benefit of PES lies in increasing the economic returns to conservation-friendly land uses by providing real compensation for these benefits to those who provide them. The main principle of PES thus lies in making those who benefit from these services liable for the costs of their provision (Pagiola & Platais 2002).

The interviews that were conducted with the official of the NMB Municipality and selected members of the public have provided a good basis for payment of ecosystem services. The willingness to pay method has proven to be the better method to utilise to obtain the required information and to obtain an insight into the perceptions of local government and the public on the need to make payments for ecosystem services and to protect conservation and catchment areas.

Chapter 6: Results

This chapter reviews the results that have been obtained through the interview process and questionnaires. The chapter also considers the data obtained from the Department of Water Affairs on the inflow and outflow of the Kouga Dam.

6. INTRODUCTION

The results of the questionnaire (Annexure D) were analysed using the statistical program Statistica. The answers obtained from the one on one questions from both the municipal officials and non municipal officials were analysed and graphs were drawn from the analysed data.

Data on water flow into the Kouga Dam, outflow and evaporation from 1989 to 2009 were obtained from the former Department of Water Affairs. The water inflow data was derived from a measurement weir at Stuurmanskraal that is monitored by Gamtoos Irrigation Board and is located approximately 80 km from the Kouga Dam. Similarly, the outflow data from Kouga Dam was derived from measurements of water flow from the canal outlet below Kouga Dam and monitored by Gamtoos Irrigation Board.

6.1 WILLINGNESS TO PAY SAMPLE ANALYSIS

The sample size of the questionnaire was 31. This sample is considered large enough for the statistical information obtained from the questionnaires to be considered and for conclusions are drawn from the data that may be applied when answering the problem statements discussed in chapter 1 (MBA lecture notes Quantitative Decision Making, 2009). The persons interviewed included 5 senior managers at the Nelson Mandela Bay Municipality in environment, infrastructure, bulk water, legal services and finance; a senior consultant from SRK Consulting in Port Elisabeth was interviews with the bulk of the interviews (20) being a general cross section of the public and 4 international students at the PRESENCE learning village in Patensie. The four international students were surveyed in order to obtain an independent and non biased opinion on the willingness to pay principals. The student's views are important given that they interact with stakeholders on a regular basis and have gained an insight to the problems of ecosystem services from a stakeholder's perspective. The majority of respondents were randomly selected from the general public through a direct approach at various venues.

Section A of the Willingness to pay questionnaire established the basis for concern and established how the respondent identified with factors such as water as a basic right and whether there was an awareness of the water situation in the Nelson Mandela Bay

Municipality. This section also established the awareness of the respondent to the location and status of the supply dams to the Nelson Mandela Bay Municipality.

Section B of the questionnaire established whether there is a value placed on water and attempts to establish what the value each respondent places on the long term protection of the water supply. The section also attempts to establish what each respondent would consider to be a fair value to be paid per kiloliter of water conserved.

A separate questionnaire was conducted with the Director for Bulk Water Supply and Infrastructure for the Nelson Mandela Bay Municipality, Mr Barry Martin, to determine specific water usage and costs for residents of the Nelson Mandela Metro that relate to water from Kouga Dam in the Baviaanskloof Nature Reserve and World Heritage Site Nature Reserve. This questionnaire is included in annexure D.

Results obtained from the analysis of Section A of the questionnaires using Statistica may be summarised as follows:

- All respondents with the exception of two respondents felt that environmental concerns such as water provision and protection was very important even when compared to socio economic issues such as HIV / AIDS, crime, health and education.
- All respondents were aware that the Nelson Mandela Metro faces a water crisis with water supply to the metro under threat.
- Nineteen or 70.3% of respondents felt that water was important as a basic human right; four or 14.8% felt that it was important to socio economic growth and only three or 11.1 % felt that it was important to the development of the Nelson Mandela Metro with 3.8% not knowing. The same number of respondents felt that water was important to the Nelson Mandela Metro; there were no respondents who agreed to the statement that water was not important.
- Sixteen or 51.6% of the respondents knew where the main catchment areas were with fifteen or 48.4 % not knowing where the main catchments were with only eleven or 35.5% of the respondents could being able to name the catchments and nineteen or 61.3 % not knowing the names of the main catchment dams. Twenty

six or 83.9% knew where the NMBM obtained its water with four or 12.9% not knowing and 3.2 % having no idea where their water came from.

Analysis of section B shows that a majority of the respondents, twenty four or 77.4% do not know what their current water tariff is per kiloliter with only seven or 22.6 % knowing. All of the respondents agreed that long term protection of the catchment was required and with the majority agreeing that there should be a willingness to pay for this long term protection. Figure 7 is the statistical representation of the results of the willingness to pay questionnaire. Nineteen or 61.3% of the respondents were willing to pay between 0.20 and 0.25 cents per kiloliter to Baviaanskloof Nature Reserve and World Heritage Site in order to ensure long term protection of the catchments. Eleven or 35.5% were in favour of 0.25 cents per kiloliter as payment for the water service with eight or 25.8 % in favour of 0.20 cents per kiloliter and five or 16,1 % in favour of 0.15 cents per kiloliter. Four or 12.9 % were in favour of a tariff greater than 0.25 cents per kiloliter with the remainder in favour of a tariff less than 0.15 cents per kiloliter.

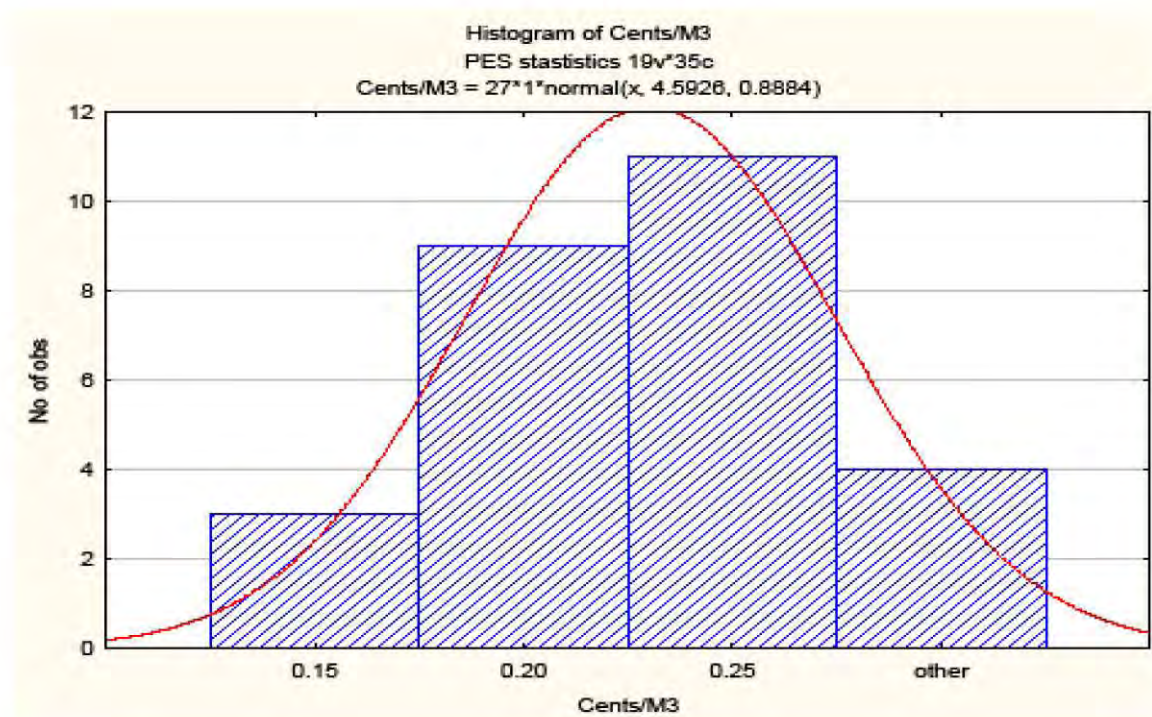


Figure 7: graphical representation of statistical data for Willingness to pay, cents per kilolitre

It is significant that the majority of the respondents do not know where the supply dams are or are even able to name the dams and catchments or know what they pay their water supplied by NMBM as shown in Figure 8.

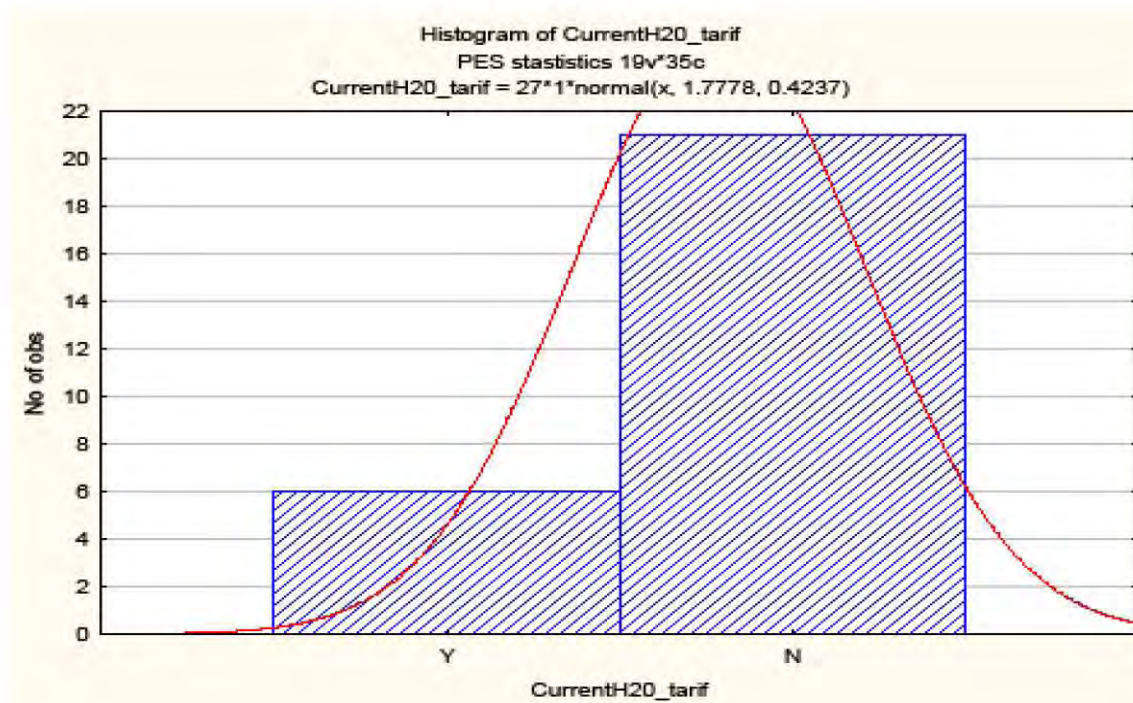
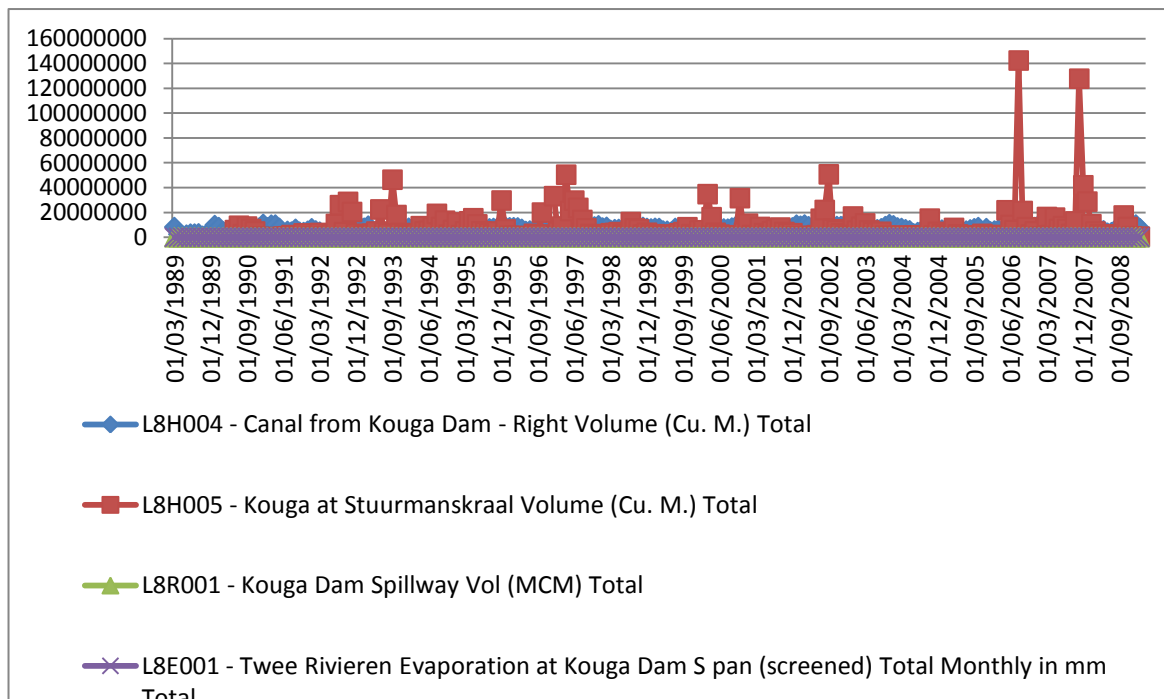


Figure 8: graphical representations of statistical results for water tariff data

6.2 WATER FLOW DATA ANALYSIS

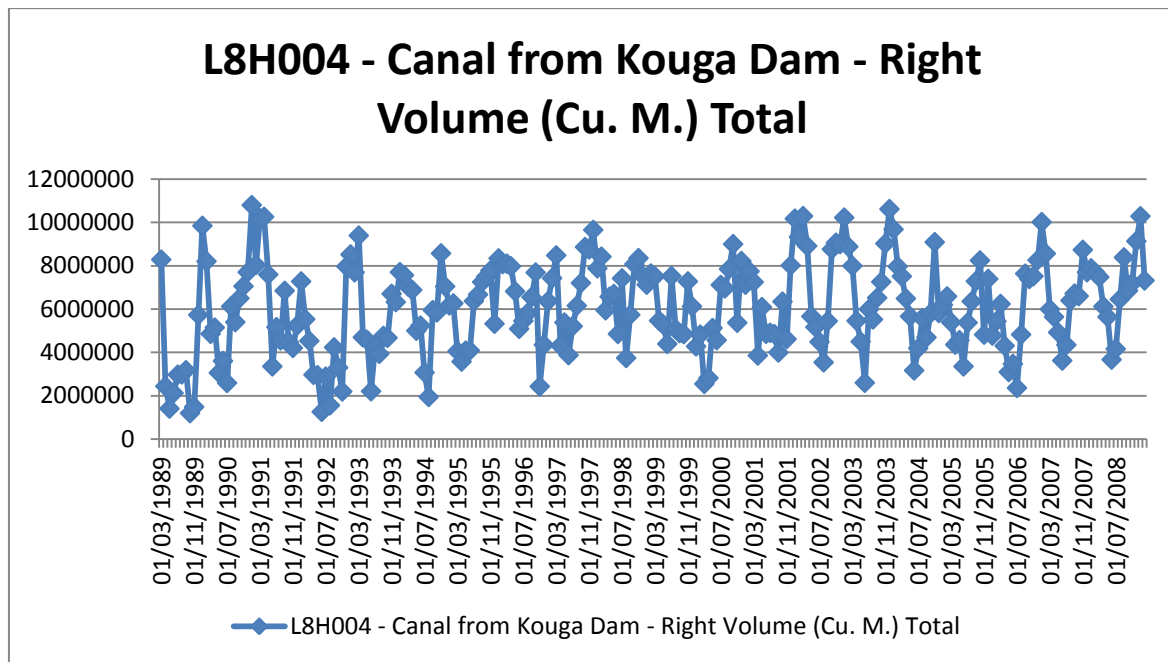
The water flow data that was received from the Department of Water affairs is depicted graphically in figure 13 where water inflow at Stuurmanskraal is recorded together with outflow recording through the canal outlet and over the spillway. The sharp spikes in the inflow data between June and October of 2006 and again between October 2007 and March 2008 are for periods of excessive rain and flooding. The inflow in 2006 and 2007 / 2008 periods are significantly higher than those preceding 2006, inflow remains consistent and below 60 Million cubic litres.

Figures 9 – 13 are a breakdown of the data into separate data sets that allow for better interpretation of the inflow and outflows associated with the water inflow and outflow.



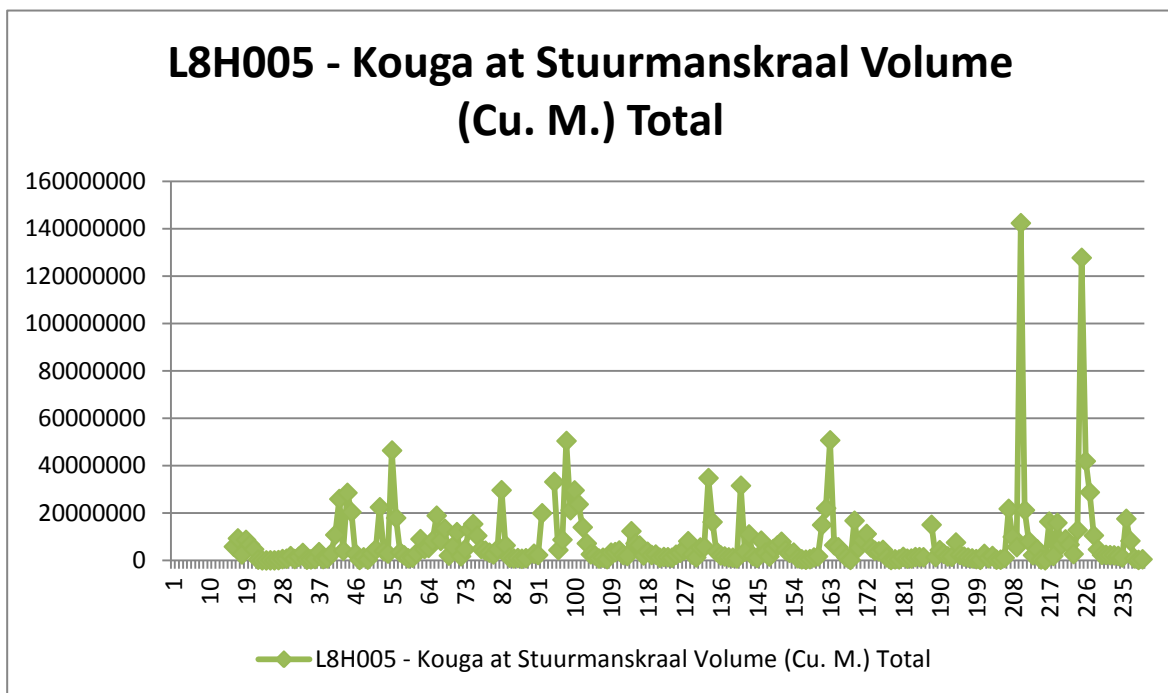
(Source DWAF 2009)

Figure 9: Graph showing water inflow and outflow data for period 1989 – 2009 in cubic meters.



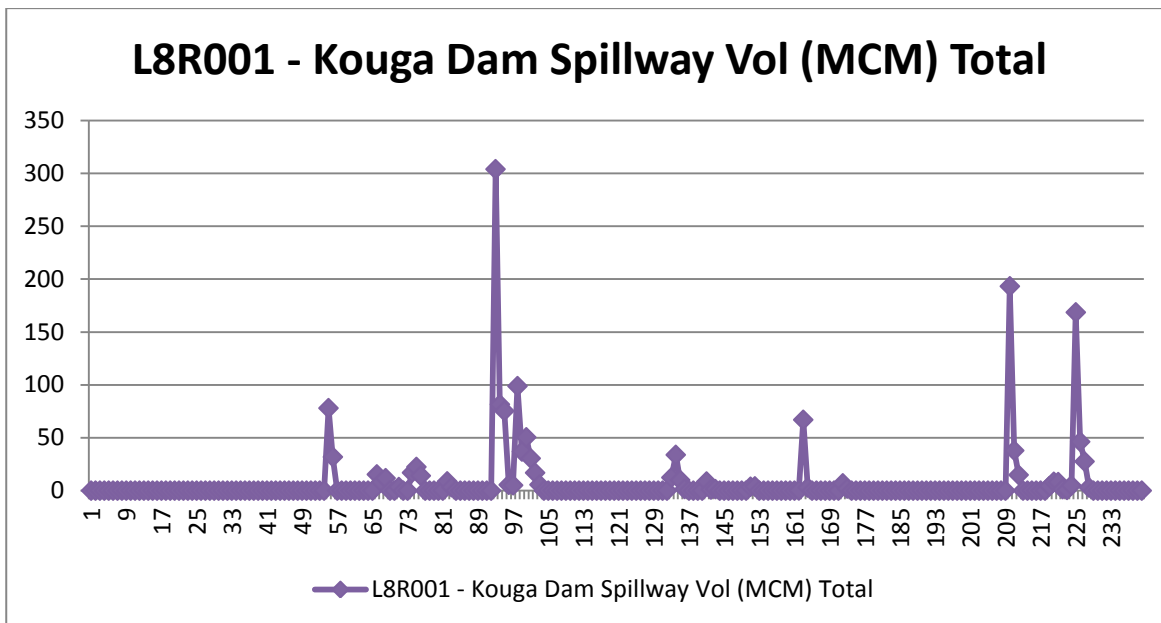
(Source DWAF 2009)

Figure 10: Graph showing water outflow data for the Kouga Dam Canal for period 1989 – 2009 in cubic meters



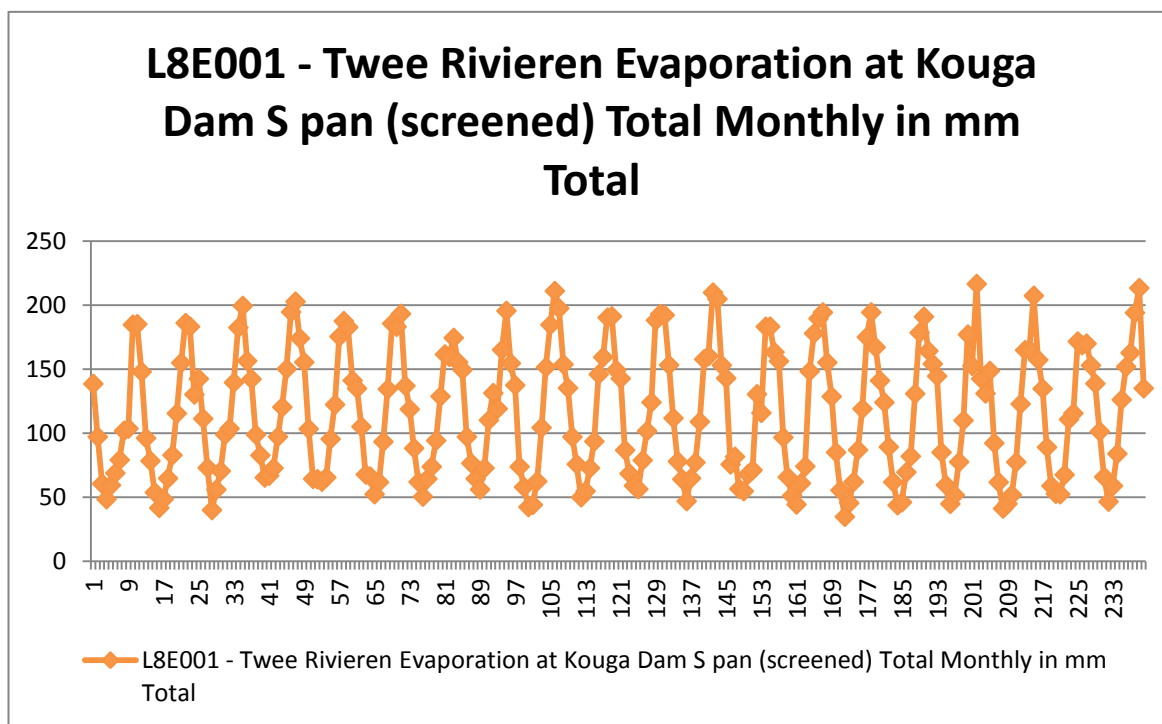
(Source DWAF 2009)

Figure 11: Graph showing water inflow to Kouga Dam at Stuurmanskraal for period 1989 – 2009 in cubic meters



(Source DWAF 2009)

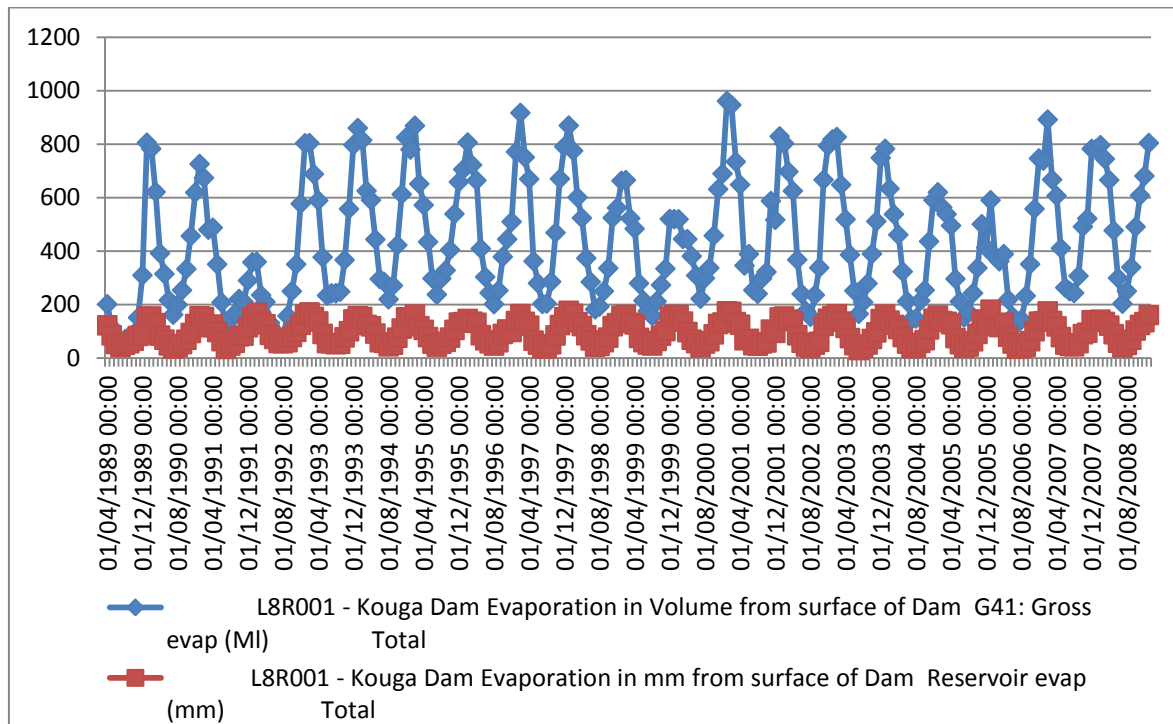
Figure 12: Graph showing water outflow data at the Kouga Dam spillway for period 1989 – 2009 in cubic meters



(Source DWAF 2009)

Figure 13: Graph showing Twee RivierenEavporation data for Kouga Dam S pan (screened) for period 1989 – 2009 in cubic meters

Evaporation levels remain within fixed levels during the entire period between 1989 and 2008 with levels only exceeding 800 ML on 8 occasions as shown in figure 14. This can be attributed to the narrow canyon within which the Kouga River flows, direct sunlight is only achieved for a limited period each year during the heights of the summer months. This therefore limits the levels of evaporation that and ensures that this remains a constant over time.



(Source DWAF 2009)

Figure 14: Evaporation in ML and mm for the period 1989 – 2008

6.3 CONCLUSION

The statistical analysis has shown that there is awareness within the Nelson Mandela Bay Municipality that their water supply is under threat and needs to be protected to ensure long term sustainability of the Nelson Mandela Municipality. The current water crisis that is being experienced with the Nelson Mandela Municipality and surrounding catchment has contributed to raising this awareness. Analysis has also shown that all respondents are in favour of some form of payment for the water services and are willing to pay to ensure that the catchments is protected. The majority of the respondents,

88.8% were in favour of a fee or levy greater than 0.20 cents per kiloliter for the water service.

The inflow of water to the Kouga Dam as measured at Stuurmanskraal Weir varies greatly and averages less than outflow from the canal except for seasonal peaks that are experienced between March to May and September to November at irregular intervals. These seasonal peaks coincide with rainfall peaks that are normally experienced during these times. Evaporation does not have a significant impact on the level of the Kouga dam; evaporation remains consistent over the period with higher evaporation coinciding with summer and the correspondingly higher temperatures that are experienced during summer.

The difference between outflow and inflow suggests that the unrecorded runoff contribution of the Baviaanskloof Nature Reserve and World Heritage Site is the factor that ensures that there is sufficient water in the Kouga Dam to ensure a regular outflow of an estimated 93 million cubic litres (P. Joubert pers comm. 2010) of water annually for agricultural, industrial and domestic use. It may therefore be stated with a degree of certainty that the unrecorded water runoff below Stuurmanskraal from the Kouga Mountains and the Baviaanskloof Mountains, including the Baviaans River, is the difference between inflow and outflow at the Kouga Dam canal. This unrecorded flow is a large part of the contribution that the Baviaanskloof Nature Reserve and World Heritage Site makes towards the Kouga Dam.

Chapter 7: Discussion and Conclusion

This chapter reviews results and draws a conclusion on the feasibility of obtaining payment for ecosystem services for the Baviaanskloof Nature Reserve and World Heritage Site. The chapter also considers methods of obtaining and implementing payments for ecosystem services and considering areas of further research.

7. INTRODUCTION

Eastern Cape Parks and Tourism Agency has made it a priority to generate its own revenue from tourism and ventures such as the Public Private Partnerships and concession out activities on protected areas to private operators. It is anticipated that this revenue generation will, in the long term, serve to make ECPTA less dependent of the current Government grant that is insufficient to ensure that ECPTA meets its mandates of conservation and tourism.

The potential of obtaining payment for ecosystem services for water services from the Nelson Mandela Bay Municipality for the Baviaanskloof Nature Reserve and World Heritage Site has been shown to be feasible through the research conducted. The fee or levy received from the Nelson Mandela Bay Municipality will be the first of its kind and will pave the way for ECPTA to achieve its goal.

7.1 DISCUSSION

The results obtained from the willingness to pay questionnaire have shown that there is a clear willingness to pay for water services as a form of ecosystem services payments from the Baviaanskloof Nature Reserve and World Heritage Site. The willingness to pay principle is further reinforced by the current drought that has reduced levels of supply dams to the Nelson Mandela Municipality to the lowest levels in recent years and has underpinned the need to secure a long term sustainable water supply for the Nelson Mandela Municipality.

When considering the sub problem statements in chapter one, it is found that:

- the statement has been answered in favour of obtaining payments for ecosystem services (water consumption).
- The results show that the Nelson Mandela Bay Municipality is willing to support the concept of the “user pays” principle to ensure that their water supply is secured in the long term. Confirmation has also been obtained that the Nelson Mandela Bay Municipality is willing to attach a value to the water from the Baviaanskloof Nature Reserve and World Heritage Site.

- The research has determined that the greater Baviaanskloof Nature Reserve and World Heritage Site catchment has been shown to contribute an estimated 324 352 ha of a total catchment of 505 372 ha which represents an estimated 64 % of the catchment of Kouga Dam.
- The long term benefits that Eastern Cape and Tourism Agency could obtain for the payment of ecosystem services in the long term is immense. The feasibility of obtaining payment for the water services from the Nelson Mandela Bay Municipality will allow ECPTA to further obtain payment from the Kouga Municipality as well as from the citrus industry for water secured within the Baviaanskloof Nature Reserve and World Heritage Site.

Research has shown that the Baviaanskloof Nature Reserve and World Heritage Site is currently, at a minimum, 53.72% underfunded when taking a conservative approach in financial model utilised in annexure A. The financial model has shown that revenue generation through activities such as ecotourism and entrance fees will not generate sufficient funds to make the Baviaanskloof Nature Reserve and World Heritage Site self sufficient and independent of government funding.

Figure 15 is extracted from the financial model and shows that income for the Baviaanskloof Nature Reserve and World Heritage Site will rise from its current estimate of R 734 000.00 to R 1 730 734.00 over a 10 year period when a 10% escalation is applied. The application of a 10% escalation is taken as the general increase that has been applied over the past 5 years to tourism facilities in ECPTA. This is in direct contrast to operational and conservation development expenditure that will rise substantially over the same 10 year period. All expenditure has had a 10% escalation applied to the figures for the entire financial model.

Figure 16 depicts the conservation expenses over a period of 6 years against tourism and other income over the same period. The graphs clearly illustrates that the conservation expenses cannot be covered by the current tourism income that is generated from entrance fees, accommodation and activities.

Figure 17 shows a pie chart of the breakdown in operational expenditure, staffing costs are shown at 61% which is slightly higher than the average of 60%. The staffing costs

have included the costs of the regional manager position as well as optimal staffing for positions such as nature conservators and field rangers to ensure biodiversity and law enforcement compliance in the long term.

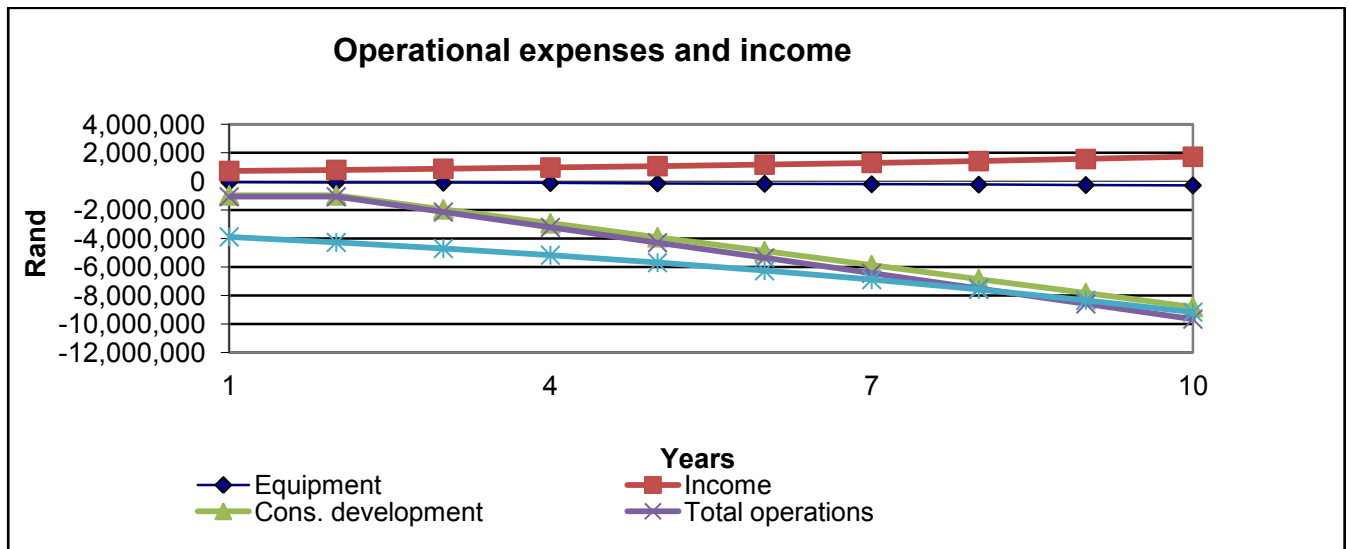


Figure 15: Operational expenses v income for Baviaanskloof over a 10 year period

Income depicted as red line; equipment depicted as dark blue line; conservation development depicted as olive green line; total operations depicted in purple and overheads depicted in blue.

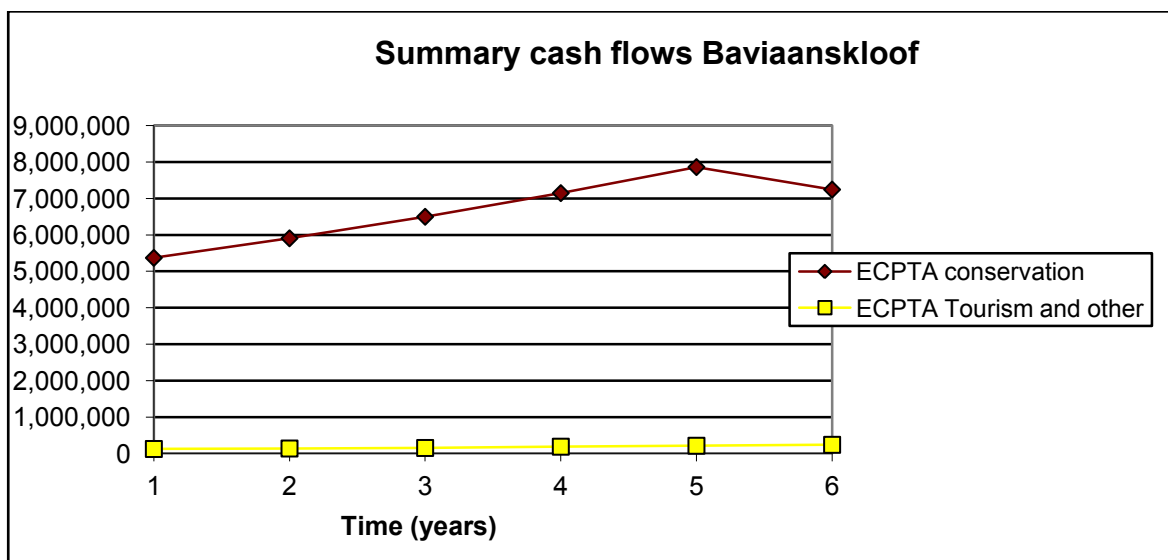


Figure 16: Cash flow summary for 6 year period showing conservation expenses v tourism and other income

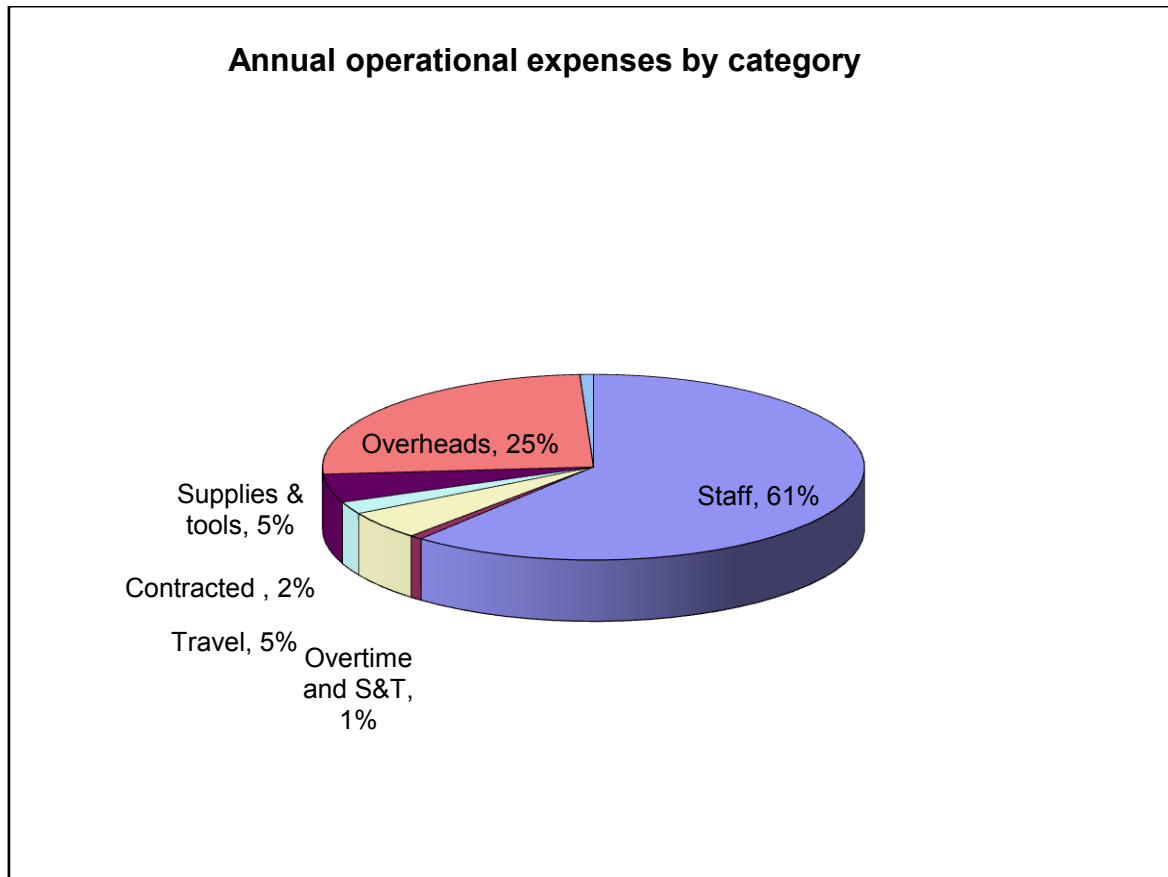


Figure 17: Annual operational expenditure by category

Figure 18 shows the relative asset values of expenditure per category for the Baviaanskloof Nature Reserve and World Heritage Site based on optimal expenditure on maintenance of assets, conservation and tourism infrastructures as well as staff and administrative infrastructure.

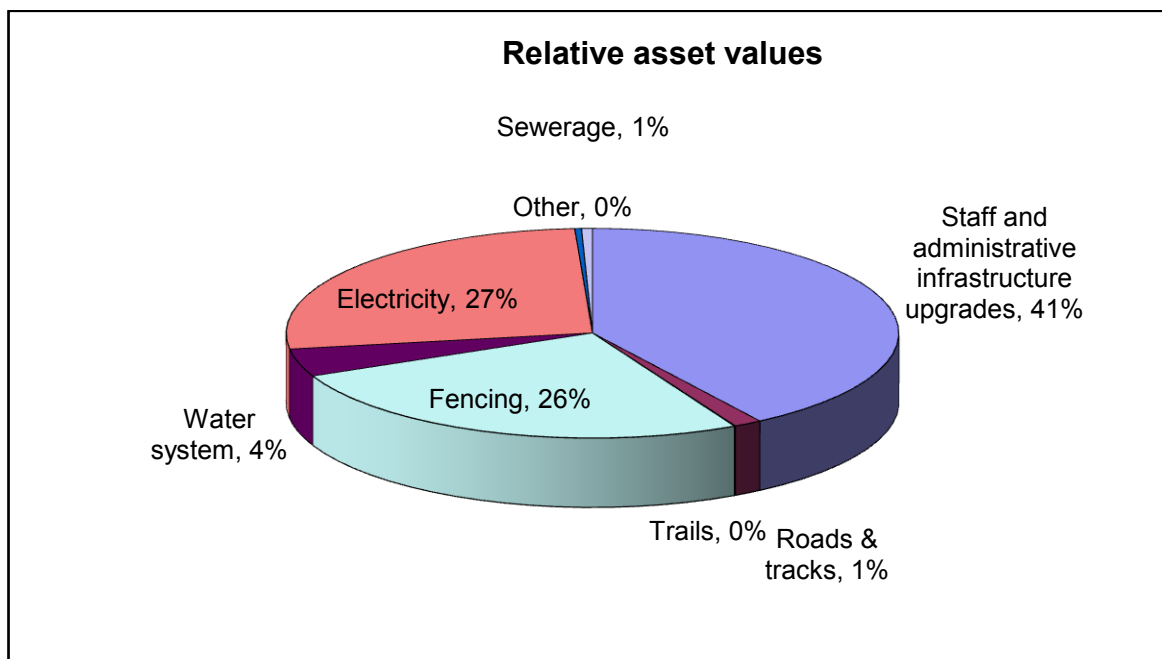


Figure 18: Relative asset value breakdown for the Baviaanskloof Nature Reserve and World Heritage Site

7.2 QUANTIFIED PAYMENT FOR ECOSYSTEM SERVICES

The Kouga Dam releases an estimated 93 million cubic litres of water (Pers comm. P. Joubert 2010) on an annual basis of which 67 million cubic litres of water goes to the Nelson Mandela Bay Municipality and the remaining water to the Citrus industry in the Gamtoos Valley and the towns of Loerie, Hankey and Patensie. The release of water from the Kouga Dam and management of the canals and dam wall is through the Gamtoos Irrigation Board in Patensie.

Research results have shown that that the Nelson Mandela Bay Municipality would be willing to pay between 0.20 and 0.25 cents per kilo litre (1000 L) of water to Baviaanskloof Nature Reserve and World Heritage Site (ECPTA) for the continued management of the catchments under its management control in order to secure sustainable water services for the Nelson Mandela Bay Municipality.

It is estimated that this would amount to between R 13 400 000.00 at a levy of 0.20 cents per kiloliter to R 16 750 000.00 at a levy of 0.25 cents per kilolitre for the 67 million cubic litres that are released to Nelson Mandela Bay Municipality from Kouga Dam. The remaining 26 million cubic litres are released to the Gamtoos valley for agricultural,

domestic and industrial use for the towns of Loerie, Hankey and Patensie. This remaining 26 million cubic litres would generate between R 5 200 000.00 at 0.20 cents per kilolitre and R 6 500 000.00 at a rate of 0.25 cents per kilolitre.

7.3 IMPLEMENTATION OF PAYMENT FOR ECOSYSTEM SERVICES

In order to implement payment for ecosystem services for Eastern Cape Parks and Tourism Agency in the Baviaanskloof Nature Reserve and World Heritage Site, an agreement will need to be put in place with Gamtoos Irrigation Board as the agency that controls the release of water from Kouga Dam. Permission must be obtained from the Minister of Water Affairs to have the additional ecosystem service levy that is to be paid by Nelson Mandela Bay Municipality and Gamtoos Valley (Kouga Municipality and citrus industry) included on the National Water Tariff document. This will be implemented after the Chief Executive Officer of the Eastern Cape Parks and Tourism Agency concludes a meeting with the Minister of water Affairs in early 2011. Water release data from the Kouga Dam will continue to be monitored by Gamtoos Irrigation Board as will the effects of higher or lower than average precipitation on dam water levels and inflow. The effects of water restriction that may be implemented from time to time may have a negative effect on payments for water services that will be levied and received. These effects may need to be quantified by further research.

It is recommended that the initial levy charged for payment of the water service from Baviaanskloof Nature Reserve and World Heritage Site to the Nelson Mandela Bay Municipality and Gamtoos Valley (Kouga Municipality and citrus industry) be at a lower tariff than the tariff that the Nelson Mandela Bay Municipality is willing to pay and that an escalation is built into the agreement. It is further recommended that the fee is levied by the Gamtoos Irrigation Board to all water users and that the Gamtoos Irrigation Board then pays the fee to the Eastern Cape Parks and Tourism Agency. The funds generated are to be utilised to fund continued biodiversity, operational and catchment management in the Baviaanskloof Nature Reserve and World Heritage Site.

The recommended starting fee should not be lower than 0.15 cents per kilolitre, this will then provide a minimum revenue stream of R 10 050 000.00 from the Nelson Mandela Bay Municipality and R 3 900 000.00 from the Gamtoos Valley (Kouga Municipality and

citrus industry). This will then provide an initial total funding stream of R 13 950 000.00 for the Baviaanskloof Nature Reserve and World Heritage Site.

7.4 FUTURE RESEARCH

Future research into payment for ecosystem services should be on further implementation measures and onto developing an institutional model that can be rolled out to other agencies and organisations. The role that private landowners can play will need to be researched to determine the potential payments that can be made to private landowners who conserve catchments on their land. Payment for ecosystem services for water has only just been explored, there is further potential to explore other services such as pollination services and the impact that these services have to the agricultural industry and conservation areas.

7.5 IN CONCLUSION, THE FUTURE

As a means of reducing species loss due to Climate Change, the creation of corridors of intact vegetation across landscapes to facilitate species migration is seen to be critically important. As climates change, species need to be able migrate across linear habitats to stay within their climatic range. Payment for ecosystem services may well provide the Baviaanskloof Nature Reserve and World Heritage Site with the means of securing expansion of the reserve through ECPTA's biodiversity stewardship program which in turn may secure those catchments that are currently outside the current protected area and may go further to securing long term water protection for the Nelson Mandela Bay Municipality and Gamtoos Valley.

The potential of funding the Baviaanskloof Nature Reserve and World Heritage Site with payments for ecosystem services obtained for water services will ensure that the Baviaanskloof Nature Reserve and World Heritage Site will become financial self sustainable in the long term. The ability to be self funding will greatly contribute to ensuring that the natural biological systems in the Baviaanskloof Nature Reserve and World Heritage Site continue to be conserved and that its World Heritage Status obtained for its biodiversity will be maintained. The ability to become financially independent and generate its own income will place Baviaanskloof Nature Reserve and

World Heritage Site in a unique position within the conservation community in South Africa as only a very few protected areas are self sustaining.

Lessons in how payments for ecosystem services may be implemented can be found in Latin America where the ability to be able to generate funding from water services is being implemented in Mexico's Sierra Gorda's. The hydrological importance of the area has been identified as an important generator of ecosystem services (Ecosystem Marketplace 2006). Twelve sites in the Sierra Gorda's now measure precipitation, filtration and flow rates in the different ecosystems in order to collect data to convince businesses to pay to conserve the watersheds. A further example of implementing ecosystem services comes out of Ecuador where a fund, the Water Conservation Fund, was established in 2000 to make an explicit link between the use of water and the conservation of watersheds (Ecosystem Marketplace 2006). By 2004 the fund had close to \$1.7 million that was made up of payments received from Quito's water agency for annual water sales, Quito's electrical utility (from water for hydropower) and from a local brewery (Ecosystem Marketplace 2006).

There are many other examples in Latin America that can act as fund models and are testimony to the fact that payment for water services is possible and is being implemented. The Baviaanskloof Nature Reserve and World Heritage Site is the first area in South Africa where payment for ecosystem services can become a reality and can provide conservation with a sustainable funding base independent of Government grants.

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ANNEXURE A: BAVIAANKLOOF NATURE RESERVE AND WORLD HERITAGE SITE BUSINESS CASE (EXCEL SPREADSHEET)

This computer model is designed to assist with budgeting and costing activities related to management plans. It must be viewed as a park planning tool and used with caution. The numbers which need to be input must be carefully considered to ensure that the full and realistic estimates are made of the actual costs of any item. Although in some areas guidelines have been supplied to help estimate costs these are very general and those using them must do so with an understanding as to what the actual cost elements are. If expert assistance can be obtained then a more realistic estimate can be made of the actual costs and better predictions made.

The model is divided into several discrete areas, these include the following:

A list of operational activities which are required, usually annually, in order to achieve specific outputs.

The above table is linked to a salary or wages sheet. Here the salaries of the various staff required to achieve the functions in the park are listed and the midpoint of their cost of employment entered.

Many functions required to undertake proper management are often of a short duration, either a few weeks or years, these interventions are entered separately and must then be rolled out according to an agreed development schedule with the necessary budgets. Functions be done with staff from the institution or the function/s can be outsourced.

Once the activities have been listed and a cost estimate obtained, it may be necessary to refine the activities to ensure that sufficient budget is available so that a work plan can be determined.

The activities also require basic equipment including vehicles, machinery and other moveable assets, there must be sufficient of these to ensure the outputs of the work plan are achievable

The infrastructure must also meet the needs of the activities, for example there must be provision for sufficient housing, office, workshops, and entrance facilities etc to fulfil all the actions.

The equipment and fixed improvements also require a provision for maintenance or replacement, this must be considered in the costing exercise. Note the model does not reflect depreciation, which is an accounting concept, rather this is dealt with via replacement and/or maintenance to ensure assets are maintained to a workable standard.

The conservation related activities and associated infrastructure and equipment should be accounted for separately from tourism assets so that the relative contribution or subsidy of tourism can be quantified, specifically in relation to its cost and benefits in the wider context of the park or reserve.

The tourism assessment is a very broad scale analysis and is not designed to measure the overall profitability of the tourism operations, but merely provide an indication of the direct park associated costs.

The tourism information must similarly assess the incremental costs to the conservation budget of doing tourism, if this entails a road to a higher spec this must be allocated to tourism. Environmental management to mitigate tourism impact must be allocated to tourism. Try and capture the Additional costs tourism brings to the park or reserve. Only capture reserve costs and not Additional costs not within reserve budget.

For any comments or assistance with this spreadsheet contact Richard Davies @ 072 926 9966 or rdavies@iafrica.com

Conservation infrastructure costs

Staff and administrative infrastructure upgrades								Year
Existing Facility	Description	Existing Number	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
Cockscomb: Komdomo	Administrative centre	3	2000000	R 6,000,000.00	2%	R 120,000.00	R 732,612.00	120000
Bosdorp: Cockscomb	Staff housing	30	750,000	R 22,500,000.00	2%	R 450,000.00	R 2,747,295.00	450000
	Reserve manager accommodation	1	1,000,000	R 1,000,000.00	2%	R 20,000.00	R 122,102.00	20000
	Workshop and store	1	2,000,000	R 2,000,000.00	2%	R 40,000.00	R 244,204.00	40000
Bosdorp: Studits	Staff housing	19	750,000	R 14,250,000.00	2%	R 285,000.00	R 1,739,953.50	285000
Drinkwaterskloof	Field rangers accommodation and offices	1	900,000	R 900,000.00	2%	R 18,000.00	R 109,891.80	18000
De Doorns	Field ranger accommodation	1	500,000	R 500,000.00	2%	R 10,000.00	R 61,051.00	10000
Riverside	Field Ranger accommodation	3	500,000	R 1,500,000.00	2%	R 10,000.00	R 61,051.00	10000
Doornkraal	Inspection quarters	1	650,000	R 650,000.00	2%	R 13,000.00	R 79,366.30	13000
Coleske	staff accommodation	1	900,000	R 900,000.00	5%	R 45,000.00	R 274,729.50	45000
Bosrug: Studits	staff accommodation	5	650,000	R 3,250,000.00	5%	R 32,500.00	R 198,415.75	32500
Kasey	staff accommodation & store	2	750,000	R 1,500,000.00	2%	R 15,000.00	R 91,576.50	15000
Nahoogte	Reserve manager accommodation, offices and stores	3	1,000,000	R 3,000,000.00	2%	R 20,000.00	R 122,102.00	20000
Land se Kloof	nature conservator house	1	1,000,000	R	2%	R	R	20000

				1,000,000.00		20,000.00	122,102.00	
Total		72		R 58,950,000.00		R 1,098,500.00	R 6,706,452.35	R 1,098,500.00
New Facilities required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
Reserve manager house	new house: Komdomo	1	1,000,000	R 1,000,000.00	2%	R 20,000.00	R 122,102.00	20000
Upgrade drinkwaterskloof	field ranger house & office	1	750,000	R 750,000.00	2%	R 15,000.00	R 91,576.50	15000
Kasey upgrade	senior supervisor house, stores	2	500,000	R 1,000,000.00	2%	R 10,000.00	R 61,051.00	10000
De Doorns	field ranger outpost	1	500,000	R 500,000.00	2%	R 10,000.00	R 61,051.00	10000
Riverside	field ranger outpost	3	500,000	R 1,500,000.00	5%	R 75,000.00	R 457,882.50	75000
Staff housing: Cockscomb	Staff housing	5	750,000	R 3,750,000.00	5%	R 187,500.00	R 1,144,706.25	187500
Staff housing: Studits	Staff housing	2	750,000	R 1,500,000.00	2%	R 15,000.00	R 91,576.50	15000
Upgrade Doornkraal	Inspection quarters	1	750,000	R 750,000.00	2%	R 15,000.00	R 91,576.50	15000
Upgrade: Coleske	office	1	500,000	R 500,000.00	2%	R 10,000.00	R 61,051.00	10000
Land se kloof upgrade	conservator house	1	500,000	R 500,000.00	4%	R 20,000.00	R 122,102.00	20000
Sub total		18		R 11,750,000.00		R 377,500.00	R 2,304,675.25	R 377,500.00
TOTAL		90		R 70,700,000.00		R 1,476,000.00	R 9,011,127.60	R 1,476,000.00

Roads & tracks								
Existing Road	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
Goedehoop	4x4 route, gravel	15	40000	R 600,000.00	2%	R 12,000.00	R 73,261.20	12000
Rooilagte	4x4 route, gravel	21	50,000	R 1,050,000.00	2%	R 21,000.00	R 128,207.10	21000
Elandsvlak	4x4 route, gravel	13	50,000	R 650,000.00	2%	R 13,000.00	R 79,366.30	13000
Enkeldoorn	access route	5	50,000	R 250,000.00	2%	R 5,000.00	R 30,525.50	5000
Total		54		R 2,550,000.00		R 51,000.00	R 311,360.10	R 51,000.00
New roads and tracks required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
				R -	2%	R -	R -	R -
Sub total		0		R -		R -	R -	R -
TOTAL		54		R 2,550,000.00		R 51,000.00	R 311,360.10	R 51,000.00

Trails								
Existing trail	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
Bergplaas	basic level, unguided	8	10000	R 80,000.00	2%	R 1,600.00	R 9,768.16	1600
Komdomo	basic level, unguided	3	7,500	R 22,500.00	2%	R 450.00	R 2,747.30	450

Total		11		R 102,500.00		R 2,050.00	R 12,515.46	R 2,050.00
New trails required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
				R -	2%	R -	R -	0
Sub total		0		R -		R -		0
TOTAL		11		R 102,500.00		R 2,050.00	R 12,515.46	R 2,050.00
Fencing								
Existing fencing	Description (type)	No	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
boundary fencing	5 strand	750	50000	R 37,500,000.00	2%	R 750,000.00	R 4,578,825.00	750000
Game fencing	Bonox	20	70,000	R 1,400,000.00	2%	R 28,000.00	R 170,942.80	28000
Total		770		R 38,900,000.00		R 778,000.00	R 4,749,767.80	R 778,000.00
New Fences required	Description	No required	Unit cost	Total distance	Percent of asset value for maintenance	Estimated maintenance	Implementation	
boundary fencing	5 strand with cable	100	60,000	R 6,000,000.00	2%	R 1,200.00	R 7,326.12	1200
Sub total		100		R 6,000,000.00		R 1,200.00	R 7,326.12	R 1,200.00
TOTAL		870		R 44,900,000.00		R 779,200.00	R 4,757,093.92	R 779,200.00

Water system								
Water facility	Description (type)	No	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
Komdomo	Water purification	1	2000000	R 2,000,000.00	2%	R 40,000.00	R 244,204.00	40000
Nahoogte	storage system	1	200,000	R 200,000.00	2%	R 4,000.00	R 24,420.40	4000
Bosdorp: Cockscomb	storage system	6	200,000	R 1,200,000.00	2%	R 24,000.00	R 146,522.40	24000
Bosdorp: Studits	storage system	4	200,000	R 800,000.00	2%	R 16,000.00	R 97,681.60	16000
Total		12		R 4,200,000.00		R 84,000.00	R 512,828.40	R 84,000.00
New water facilities required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
Riverside	extraction and storage	1	300,000	R 300,000.00	2%	R 6,000.00	R 36,630.60	6000
Bosdorp: Cockscomb	storage system	6	300,000	R 1,800,000.00	2%	R 6,000.00	R 36,630.60	6000
De Doorns	extraction and storage	1	300,000	R 300,000.00	2%	R 6,000.00	R 36,630.60	6000
Drinkwaterskloof	extraction and storage	1	300,000	R 300,000.00	2%	R 6,000.00	R 36,630.60	6000
Doornkraal	extraction and storage	1	300,000	R 300,000.00	2%	R 6,000.00	R 36,630.60	6000
Nahoogte	storage system	1	200,000	R 200,000.00	5%	R 10,000.00	R 61,051.00	10000
Sub total		11		R 3,200,000.00		R 40,000.00	R 244,204.00	R 40,000.00
TOTAL		23		R 7,400,000.00		R 124,000.00	R 757,032.40	R 124,000.00

Electricity								
Existing system	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
Cockscomb: Komdomo	2 x 100kw transformers	1.2	750000	R 900,000.00	2%	R 18,000.00	R 109,891.80	18000
Bosdorp: Cockscomb	100kw transformer	30	750,000	R 22,500,000.00	2%	R 450,000.00	R 2,747,295.00	450000
Drinkwaterkloof	50kw transformer	15	750,000	R 11,250,000.00	2%	R 225,000.00	R 1,373,647.50	225000
Nahoogte	50kw transformer	3	750,000	R 2,250,000.00	2%	R 45,000.00	R 274,729.50	45000
Riverside	Diesel Generator	1	100,000	R 50,000.00	2%	R 1,000.00	R 6,105.10	1000
Kasey	50kw transformer	2	750,000	R 1,500,000.00	2%	R 30,000.00	R 183,153.00	30000
Bosdorp: Studits	50kw transformer	10	750,000	R 7,500,000.00	2%	R 150,000.00	R 915,765.00	150000
Total		62		R 45,950,000.00		R 919,000.00	R 5,610,586.90	R 919,000.00
New electricity infrastructure required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
				R -	2%	R -	R -	0
Sub total		0		R -		R -	R -	0
TOTAL		62		R 45,950,000.00		R 919,000.00	R 5,610,586.90	

Other								
Existing system	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
radio system	repeater	4	90000	R 360,000.00	2%	R 7,200.00	R 43,956.72	7200
Solar energisers	electric fencing	8	10,000	R 80,000.00	2%	R 1,600.00	R 9,768.16	1600
Solar pump	water system	1	15,000	R 15,000.00	2%	R 300.00	R 1,831.53	300
Total		13		R 455,000.00		R 9,100.00	R 55,556.41	R 9,100.00
New other system required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
solar systems	water, electric fencing	10	15,000	R 150,000.00	2%	R 300.00	R 1,831.53	300
Sub total		10		R 150,000.00		R 300.00	R 1,831.53	300
TOTAL		23		R 605,000.00		R 9,400.00	R 57,387.94	R 9,400.00

Sewerage								
Existing system	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
Cockscomb: Komdomo	sewage system & reedbeds	2	500,000	R 1,000,000.00	2%	R 20,000.00	R 122,102.00	20000
Total		2		R 1,000,000.00		R 20,000.00	R 122,102.00	R 20,000.00

New system required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
				R -	7%	R -	R -	0
Sub total		0		R -		R -		0
TOTAL		2		R 1,000,000.00		R 20,000.00	R 122,102.00	R 20,000.00

Other								
List asset	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	1
				R -	2%	R -	R -	
Total		0		R -		R -		
List asset	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation	
				R -	2%	R -	R -	
Total		0		R -		R -		0
Subtotal existing assets		160.70		#####		R 2,908,600.00	R 17,757,293.86	R 2,908,600.00
Subtotal new assets required		39.00		R 21,100,000.00		R 419,000.00	R 2,558,036.90	R 419,000.00
TOTAL		199.70		#####		R 3,327,600.00	R 20,315,330.76	R 3,327,600.00

General guidelines of asset values

Typical values

Housing	Size m2	Building cost per m2	Total	Maintenance estimate
3 - bed room house large	200	5,000	1,000,000	2%
3 bedroom house med	180	5,000	900,000	2%
2 bedroom house large	150	5,000	750,000	2%
2-bedroom house medium	100	5,000	500,000	2%
1 bedroom house	80	5,000	400,000	2%
Small house	50	5,000	250,000	2%
Mobile home	20	4,000	80,000	4%
Office	10	4,000	40,000	2%
Workshop	10	2,500	25,000	2%

Typical values

Roads and trails	Size m2	Cost per km	Total main/km	Maintenance estimate
6m tarred road	6 m wide, good spec	1,500,000	30,000	2%
3 m tarred road	3 m wide, light tar covering	1,000,000	20,000	2%
5 m gravel road	Good quality gravel, high speed spec	750,000	75,000	10%
3 m gravel road	light gravel for light traffic	500,000	75,000	15%
graded track with drainage	light traffic mainly 4X4	50,000	7,500	15%
Jeep track some drainage	Only 4X4 use	10,000	1,000	10%
Walking trail	contoured and properly constructed trail	7,500	750	10%

Fences	Description	Cost per km	Total main/km	Maintenance estimate
2 m game fence	Basic game proof fence using Bonnox	70,000	2,100	3%
1,8 m 18 strand fence	Normal 18 strand wire fence	55,000	1,650	3%
1,2 m 8 strand fence	Stock fence with barbed wire	35,000	1,050	3%
16 strand electric fence	Security fence with energisers	80,000	4,000	5%
1,8 m mesh fence	Standard mesh fence	120,000	18,000	15%

Baviaanskloof Nature Reserve

Vehicle & Equipment Requirements

Vehicles

EXISTING	4X4 Bakkie	4X2 Bakkie	Truck	Tractor	Fire truck	Sedan car	Boat	Other	Combi	Total
Cockscomb	4	0	1	0	0	0	0	5	0	10
Western Section	2	2	1	1	0	0	0	5	0	11
Sub-Total	6	2	2	1	0	0	0	10	0	21
NEW Required	4X4 Bakkie	4X2 Bakkie	Truck	Tractor	Fire truck	Sedan car	Boat	Other	Combi	Total
Cockscomb	2	1	1	1	1	0	0	3	1	10
Western Section	3	1	1	1	1	0	0	0	1	8
Sub- total	5	2	2	2	2	-	-	3	2	18
TOTAL NUMBER	11	4	4	3	2	-	-	13	2	39
Estimated purchase price (Ex VAT)	360,000	250,000	750,000	300,000	1,400,000	0	0	120,000	300,000	3,480,000
Total value	3,960,000	1,000,000	3,000,000	900,000	2,800,000	0	0	1,560,000	600,000	135,720,000
Estimated life	5	5	7	7	7	5	5	3	5	
Percentage recovered	30%	30%	30%	30%	30%	30%	30%	30%	30%	
Annual minor capital provision N\$	237,600	60,000	128,571	38,571	120,000	0	0	156,000	36,000	776,743

Asset Register

Furniture						Year				
Item (Existing)	Cost price/unit	Life span	No	Total Value	Provision for replacement	1	2	3	4	5
Office furniture	2,000	3	10	R 20,000	6,666.67	6700	7370	8107	8917.7	9809.47

Board room equipment	3,000	3	2	R 6,000	2,000.00	3000	3300	3630	3993	4392.3
filing cabinets	1,000	3	6	R 6,000	2,000.00	2000	2200	2420	2662	2928.2
Cupboards	2,000	3	4	R 8,000	2,666.67	2700	2970	3267	3593.7	3953.07
Water coolers	2,000	3	4	R 8,000	2,666.67	2700	2970	3267	3593.7	3953.07
Sub Total				R 48,000.00	R 16,000.00	17100	18810	20691	22760.1	25036.11
New Required	Cost price	Life span	No	Total Value	Provision for replacement					
	-	1	0	R -	0.00	0				
Sub-total				R -	0.00	0	0	0	0	0
Total				R 48,000.00	R 16,000.00	R 17,100.00	R 18,810.00	R 20,691.00	R 22,760.10	R 25,036.11

Computers & hi-tech equip						Year				
Item (Existing)	Cost price/unit	Life span	No	Total Value	Provision for replacement	1	2	3	4	5
desk top computers	3,000	3	12	R 36,000	12,000.00	12000	13200	14520	15972	17569.2
laptop computers (GIS ready)	25,000	3	6	R 150,000	50,000.00	50000	55000	60500	66550	73205
Night vision	7,000	3	1	R 7,000	2,333.33	2400	2640	2904	3194.4	3513.84
GPS	2,000	3	20	R 40,000	13,333.33	13400	14740	16214	17835.4	19618.94
printers / faxes	2,000	3	6	R 12,000	4,000.00	4000	4400	4840	5324	5856.4
Sub Total				R 245,000.00	R 81,666.67	81800				81800

New Required	Cost price	Life span	No	Total Value	Provision for replacement					
multifunction fax /copiers	6,000	3	6	R 36,000	12,000.00	12000	13200	14520	15972	17569.2
laptop computers (GIS ready)	25,000	3	1	R 25,000	8,333.33	8400	9240	10164	11180.4	12298.44
Night vision	7,000	3	1	R 7,000	2,333.33	2400	2640	2904	3194.4	3513.84
GPS	4,000	3	6	R 24,000	8,000.00	8000	8800	9680	10648	11712.8
	-	1	0	R -	0.00					
Sub-total				R 92,000	30,666.67	30,800.00	33,880.00	37,268.00	40,994.80	142,942.80
Total				R 337,000.00	R 112,333.33	R 112,600.00	R 33,880.00	R 37,268.00	R 40,994.80	R 224,742.80

ECPTA

Staff

Baviaanskloof

No of work days/yr	200
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Grade	Job description	Number	Cost of employment	Total packages	Rate per day	Grade	Overtime rate
	Regional Manager	1	550,000	550,000	2,750	12	0
	Reserve manager	2	365,524	731,048	1,828	10	0
	Nature conservator	4	176,000	704,000	880	8	2
	Principal field ranger	1	150,233	150,233	751	7	2
	Principal supervisor	1	150,233	150,233	751	7	2
	senior field ranger	3	121,375	364,125	607	6	2
	field ranger	20	106,426	2,128,520	532	4	2
	Receptionist	5	106,426	532,130	532	4	2
	Admin clerk	3	119,350	358,050	597	4	2
	Gate Guards	10	59,159	591,590	296	3	2
	General Assistants	20	50,832	1,016,640	254	2	2
	General Assistants Tourism	6	50,832	304,992	254	2	2
	Stewardship manager	1	365,524	365,524	1,828	10	0
	Extension officers	3	176,000	528,000	880	8	2
				0	0		
				0	0		
	Total	80		8,475,085			

Reserve Overheads

Item	Amount
Communication - telephones, radios, etc	275,000
Postage and courier	27,000
Licences	23,000
Marketing and promotions	55,000
Bank, finance and interest charges	0
Office and accommodation rentals	160,000
Equipment rentals	85,000
Repairs and maintenance	750,000
Municipal services	
Water	80,000
Electricity	150,000
Refuse/sewerage	0
Other	-
Conferences	25,000
Other travel (flights, taxis etc)	300,000
Travel - vehicle allowance	180,000
Supplies and materials	150,000
Stationary and computer supplies	45,000
Tools	143,000
Signage	45,000
Insurance	-
Supplies	

	78,000
Tools	120,000
Fuel and oil	450,000
Professional Fees	100,000
Food and catering	45,000
Other	250,000
Total	3,536,000

Tourism infrastructure costs

Staff and administrative infrastructure upgrades							
Existing Facility	Description	Existing Number	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Komdomo	Reception	1	500000	R 500,000.00	2%	R 10,000.00	R 68,000.00
	Ablution facilities	2	500,000	R 1,000,000.00	2%	R 20,000.00	R 127,000.00
	camp sites	22	50,000	R 1,100,000.00	2%	R 22,000.00	R 143,000.00
Bergplaas	12 bed hiking hut	1	950,000	R 950,000.00	2%	R 19,000.00	R 125,000.00
Rooihoek camp site	primitive camp sites	6	50,000	R 300,000.00	2%	R 6,000.00	R 47,000.00
Doodsklip camp site	primitive camp sites	6	50,000	R 300,000.00	2%	R 6,000.00	R 47,000.00
World Heritage Site Interpretive Centre: Cambria	Interpretive centre	1	4,500,000	R 4,500,000.00	2%	R 90,000.00	R 572,000.00
				R -	2%	R -	R -
							R -
Total		39		R 8,650,000.00		R 173,000.00	R 1,129,000.00
New Facilities required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
World Heritage Site Interpretive Centre: Nuwe	Interpretive centre	1	5,000,000	R 5,000,000.00	2%	R 100,000.00	R 647,000.00

Kloof							
Tourism offices: coleske	Reception	1	500,000	R 500,000.00	2%	R 10,000.00	R 68,000.00
Day visitor site: Nuwe kloof	day visitor area	1	500,000	R 500,000.00	2%	R 10,000.00	R 68,000.00
				R -	2%	R -	R -
Sub total		3		R 6,000,000.00		R 120,000.00	
TOTAL		42		R 14,650,000.00		R 293,000.00	R 783,000.00

Roads							
Existing Road	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Rooihoek access	gravel	6	50,000	R 300,000.00	2%	R 6,000.00	R 38,200.00
Doodsklip access	gravel	3	50,000	R 150,000.00	2%	R 3,000.00	R 19,900.00
Coleske	gravel	2	50,000	R 100,000.00	2%	R 2,000.00	R 13,300.00
Bergplaas	gravel	1	50,000	R 50,000.00	2%	R 1,000.00	R 7,400.00
Komdomo	gravel	4	50,000	R 200,000.00	2%	R 4,000.00	R 25,700.00
Total		16		R 800,000.00		R 16,000.00	R 104,500.00
New Roads/upgrades required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Doodsklip access	gravel	4	50,000	R 200,000.00	2%	R 1,000.00	R 8,000.00

Sub total		4		R 200,000.00		R 1,000.00	
TOTAL		20		R 1,000,000.00		R 17,000.00	R 104,500.00

Trails							
Existing trail	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Komdomo	day trail, unguided	3	7500	R 22,500.00	2%	R 450.00	R 2,900.00
Total		3		R 22,500.00		R 450.00	R 2,900.00
New trails required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Bergplaas	day trail, unguided	8	7,500	R 60,000.00	2%	R 150.00	R 1,130.00
Riverside	guided trail	25	7,500	R 187,500.00	2%	R 150.00	R 1,130.00
Goedehoop	day trail, unguided	8	7,500	R 60,000.00	2%	R 150.00	R 1,130.00
multiday hike	multi day wilderness , guided	75	10,000	R 750,000.00	2%	R 200.00	R 1,440.00
Sub total		116		R 1,057,500.00		R 650.00	R 4,830.00
TOTAL		119		R 1,080,000.00		R 1,100.00	R 7,730.00
Fencing							
Existing fencing	Description (type)	No	Unit cost	Total Asset Value	Percent of asset value for	Estimated maintenance	Implementation

					maintenance		
Komdmo	game fencing	6	50,000	R 300,000.00	2%	R 6,000.00	R 36,600.00
Total		6		R 300,000.00		R 6,000.00	R 36,600.00
New Fences required	Description	No required	Unit cost	Total distance	Percent of asset value for maintenance	Estimated maintenance	Implementation
Rooihoek	Cable	4	10,000	R 40,000.00	2%	R 200.00	R 1,270.00
Doodsklip	Cable	4	10,000	R 40,000.00	2%	R 200.00	R 1,270.00
Sub total		8		R 80,000.00		R 400.00	R 2,540.00
TOTAL		14		R 380,000.00		R 6,400.00	R 39,140.00

Water system							
Water facility	Description (type)	No	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Coleske	fountain & piping	4	10,000	R 40,000.00	2%	R 800.00	R 4,884.08
Komdomo	purification & piping	1	1,000,000	R 1,000,000.00	2%	R 20,000.00	R 122,102.00
Bergplaas	fountain & piping	7	10,000	R 70,000.00	2%	R 1,400.00	R 8,547.14
Total		12		R 1,110,000.00		R 22,200.00	R 135,533.22

New water facilities required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Rooihoek camp site	solar pump, storage and piping	8	65,000	R 520,000.00	2%	R 1,300.00	R 7,936.63
Doodsklip camp site	solar pump, storage and piping	3	65,000	R 195,000.00	2%	R 1,300.00	R 7,936.63
Sub total		11		R 715,000.00		R 2,600.00	R 15,873.26
TOTAL		23		R 1,825,000.00		R 24,800.00	R 151,406.48

Electricity							
Existing system	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Bergplaas	Solar	0.3	20000	R 6,000.00	2%	R 120.00	R 732.61
Komdomo	50kw transformer	4	50,000	R 200,000.00	2%	R 4,000.00	R 24,420.40
Total		4		R 206,000.00		R 4,120.00	R 25,153.01
New electricity required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
				R -	2%	R -	R -
Sub total		0		R -		R -	
TOTAL		4		R 206,000.00		R 4,120.00	R 25,153.01

Other							
Existing system	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
				R -	2%	R -	R -
Total		0		R -		R -	R -
New Other system required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
				R -	2%	R -	R -
Sub total		0		R -		R -	R -
TOTAL		0		R -		R -	R -

Sewerage							
Existing system	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
Komdomo	reedbeds	0.1	1000000	R 100,000.00	7%	R 7,000.00	R 42,735.70
Total		0		R 100,000.00		R 7,000.00	R 42,735.70
New system required	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
				R -	7%	R -	R -

Sub total		0		R -		R -	R -
TOTAL		0		R 100,000.00		R 7,000.00	R 42,735.70

Other							
List asset	Description (type)	Length (km)	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
				R -	2%	R -	R -
Total		0		R -		R -	R -
List asset	Description	No required	Unit cost	Total Asset Value	Percent of asset value for maintenance	Estimated maintenance	Implementation
				R -	2%	R -	R -
Total		0		R -		R -	R -
Subtotal existing assets		175.40		R 11,623,500.00		R 213,970.00	R 1,373,851.93
Subtotal new assets required		134.00		R 8,052,500.00		R 124,650.00	R 23,243.26
TOTAL		309.40		R 19,676,000.00		R 338,620.00	R 1,397,095.19

Tourism infrastructure costs

Existing Facility	Description	Year					
		1	2	3	4	5	6
Komdomo	Reception						
	Ablution facilities	10000	11000	12000	15000	20000	25000
	camp sites	20000	22000	25000	28000	32000	36000
Bergplaas	12 bed hiking hut	22000	25000	28000	32000	36000	40000
Rooihoek camp site	primitive camp sites	19000	22000	25000	28000	31000	35000
Doodsklip camp site	primitive camp sites	6000	7000	9000	11000	14000	18000
World Heritage Site Interpretive Centre: Cambria	Interpretive centre	6000	7000	9000	11000	14000	18000
		90000	100000	110000	122000	150000	165000
Total							
New Facilities required	Description	R 173,000.00	R 194,000.00	R 218,000.00	R 247,000.00	R 297,000.00	R 337,000.00
World Heritage Site Interpretive Centre: Nuwe Kloof	Interpretive centre						
Tourism offices: coleske	Reception	100000	110000	122000	150000	165000	180000
Day visitor site: Nuwe kloof	day visitor area	10000	11000	12000	15000	20000	25000
		10000	11000	12000	15000	20000	25000
Sub total							
TOTAL		120000	132000	146000	180000	205000	230000
		R 240,000.00	R 264,000.00	R 292,000.00	R 360,000.00	R 410,000.00	R 460,000.00
Roads							
Existing Road	Description (type)						
Rooihoek access	gravel	1	2	3	4	5	
Doodsklip access	gravel	6000	6600	7400	8200	10000	11000

Coleske	gravel	3000	3300	4000	4500	5100	5700
Bergplaas	gravel	2000	2200	2600	3000	3500	4000
Komdomo	gravel	1000	1100	1400	1800	2100	2500
Total		4000	4400	5100	5800	6400	7200
New Roads/upgrades required	Description	R	R	R	R	R	R
		16,000.00	17,600.00	20,500.00	23,300.00	27,100.00	30,400.00
Doodsklip access	gravel						
Sub total		1000	1200	1600	2000	2200	2500
TOTAL		1000	1200	1600	2000	2200	2500
		R	R	R	R	R	R
		17,000.00	18,800.00	22,100.00	25,300.00	29,300.00	32,900.00
Trails							
Existing trail	Description (type)						
Komdomo	day trail, unguided	1	2	3	4	5	
Total		450	500	550	650	750	1000
New trails required	Description	R	R	R	R	R	R
		450.00	500.00	550.00	650.00	750.00	1,000.00
Bergplaas	day trail, unguided						
Riverside	guided trail	150	200	220	260	300	350
Goedehoop	day trail, unguided	150	200	220	260	300	350
multiday hike	multi day wilderness , guided	150	200	220	260	300	350
Sub total		200	220	280	340	400	450
TOTAL		R	R	R	R	R	R
		650.00	820.00	940.00	1,120.00	1,300.00	1,500.00
		R	R	R	R	R	R
		1,100.00	1,320.00	1,490.00	1,770.00	2,050.00	2,500.00
Fencing							
Existing fencing	Description (type)						
Komdmno	game fencing	1	2	3	4	5	
Total		6000	6600	7200	8000	8800	9800
New Fences required	Description	R	R	R	R	R	R

		6,000.00	6,600.00	7,200.00	8,000.00	8,800.00	9,800.00
Rooihoek	Cable						
Doodsklip	Cable	200	220	250	280	320	360
Sub total		200	220	250	280	320	360
TOTAL		R 400.00	R 440.00	R 500.00	R 560.00	R 640.00	R 720.00
		R 6,400.00	R 7,040.00	R 7,700.00	R 8,560.00	R 9,440.00	R 10,520.00
Water system							
Water facility	Description (type)						
Coleske	fountain & piping	1	2	3	4	5	
Komdomo	purification & piping	800	880	968	1064.8	1171.28	1288.408
Bergplaas	fountain & piping	20000	22000	24200	26620	29282	32210.2
Total		1400	1540	1694	1863.4	2049.74	2254.714
New water facilities required	Description	R 22,200.00	R 24,420.00	R 26,862.00	R 29,548.20	R 32,503.02	R 35,753.32
Rooihoek camp site	solar pump, storage and piping						
Doodsklip camp site	solar pump, storage and piping	1300	1430	1573	1730.3	1903.33	2093.663
Sub total		1300	1430	1573	1730.3	1903.33	2093.663
TOTAL		R 2,600.00	R 2,860.00	R 3,146.00	R 3,460.60	R 3,806.66	R 4,187.33
		R 24,800.00	R 27,280.00	R 30,008.00	R 33,008.80	R 36,309.68	R 39,940.65
Electricity							
Existing system	Description (type)						
Bergplaas	Solar	1	2	3	4	5	
Komdomo	50kw transformer	120	132	145.2	159.72	175.692	193.2612
Total		4000	4400	4840	5324	5856.4	6442.04
New electricity required	Description	R 4,120.00	R 4,532.00	R 4,985.20	R 5,483.72	R 6,032.09	R 6,635.30

Sub total		0					
TOTAL		0	0	0	0	0	0
		R	R	R	R	R	R
		4,120.00	4,532.00	4,985.20	5,483.72	6,032.09	6,635.30
Other							
Existing system	Description (type)						
		1	2	3	4	5	
Total							
New Other system required	Description	R	R	R	R	R	R
		-	-	-	-	-	-
Sub total		0					
TOTAL		0	0	0	0	0	0
		R	R	R	R	R	R
		-	-	-	-	-	-
Sewerage							
Existing system	Description (type)						
Komdomo	reedbeds	1	2	3	4	5	
Total		7000	7700	8470	9317	10248.7	11273.57
New system required	Description	R	R	R	R	R	R
		7,000.00	7,700.00	8,470.00	9,317.00	10,248.70	11,273.57
Sub total		0					
TOTAL		R	R	R	R	R	R
		-	-	-	-	-	-
		R	R	R	R	R	R
		7,000.00	7,700.00	8,470.00	9,317.00	10,248.70	11,273.57
Other							
List asset	Description (type)						
		1	2	3	4	5	
Total		0					
List asset	Description	R	R	R	R	R	R

		-	-	-	-	-	-
Total							
Subtotal existing assets		R -	R -	R -	R -	R -	R -
Subtotal new assets required		R 213,970.00	R 239,272.00	R 268,057.20	R 302,468.92	R 358,083.81	R 404,462.19
TOTAL		R 124,650.00	R 137,320.00	R 152,186.00	R 187,140.60	R 212,946.66	R 238,907.33
		R 338,620.00	R 376,592.00	R 420,243.20	R 489,609.52	R 571,030.47	R 643,369.52

General guidelines of asset values

Typical values

Housing	Size m2	Building cost per m2	Total	Maintenance estimate
3 - bed room house large	200	5,000	1,000,000	2%
3 bedroom house med	180	5,000	900,000	2%
2 bedroom house large	150	5,000	750,000	2%
2-bedroom house medium	100	5,000	500,000	2%
1 bedroom house	80	5,000	400,000	2%
Small house	50	5,000	250,000	2%
Mobile home	20	4,000	80,000	4%
Office	10	4,000	40,000	2%
Workshop	10	2,500	25,000	2%

Typical values

Roads and trails	Size m2	Cost per km	Total main/km	Maintenance estimate
6m tarred road	6 m wide, good spec	1,500,000	30,000	2%
3 m tarred road	3 m wide, light tar covering	1,000,000	20,000	2%
5 m gravel road	Good quality gravel, high speed spec	750,000	75,000	10%
3 m gravel road	light gravel for light traffic	500,000	75,000	15%
graded track with drainage	light traffic mainly 4X4	50,000	7,500	15%
Jeep track some drainage	Only 4X4 use	10,000	1,000	10%
Walking trail	contoured and properly constructed trail	7,500	750	10%

Income													
				Year									
Resources	Amount	Rate per unit	Total	1	2	3	4	5	6	7	8	9	10
Game	0	0	0	0	0	0	0	0	0	0	0	0	0
Forest products	0	0	0	0	0	0	0	0	0	0	0	0	0
Fish	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0
Entrance fees	56,000	30	56,000	264,000	290,400	319,440	351,384	386,522	425,175	467,692	514,461	565,907	622,498
Leases	0	0	0	0	0	0	0	0	0	0	0	0	0
Concessions	0	0	0	0	0	0	0	0	0	0	0	0	0
Accommodation	174,303	170	174,304	200,000	220,000	242,000	266,200	292,820	322,102	354,312	389,743	428,718	471,590
Activities	250,000	75	250,000	270,000	297,000	326,700	359,370	395,307	434,838	478,321	526,154	578,769	636,646
Total	480,303	275	480,304	734,000	807,400	888,140	976,954	1,074,649	1,182,114	1,300,326	1,430,358	1,573,394	1,730,734

Baviaanskloof Cash-Flow Summary

Initial Capital				Estimated maintenance		
ECPTA conservation	Existing	New	Total	Existing	New	Total
Staff and administrative infrastructure upgrades	R 58,950,000	R 11,750,000	R 70,700,000	R 1,098,500	R 377,500	R 1,476,000
Roads & tracks	R 2,550,000	R -	R 2,550,000	R 51,000	R -	R 51,000
Trails	R 102,500	R -	R 102,500	R 2,050	R -	R 2,050
Fencing	R 38,900,000	R 6,000,000	R 44,900,000	R 778,000	R 1,200	R 779,200
Water system	R 4,200,000	R 3,200,000	R 7,400,000	R 84,000	R 40,000	R 124,000
Electricity	R 45,950,000	R -	R 45,950,000	R 919,000	R -	R 919,000
Other	R 455,000	R 150,000	R 605,000	R 9,100	R 300	R 9,400
Sewerage	R 1,000,000	R -	R 1,000,000	R 20,000	R -	R 20,000
Other	R -	R -	R -	R -	R -	R -
Total	R 152,107,500	R 21,100,000	R 173,207,500	R 2,961,650	R 419,000	R 3,380,650

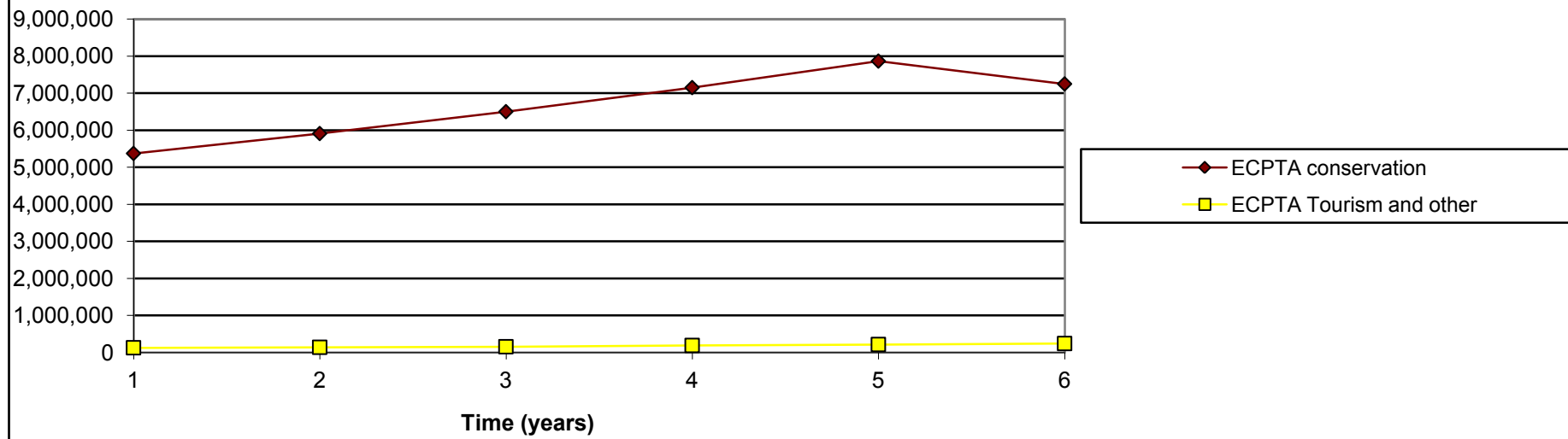
Initial Capital				Estimated maintenance		
ECPTA Tourism and other	Existing	New	Total	Existing	New	Total
Staff and administrative infrastructure upgrades	R 8,650,000	R 6,000,000	R 14,650,000	R 173,000	R 120,000	R 293,000
Roads	R 800,000	R 200,000	R 1,000,000	R 16,000	R 1,000	R 17,000
Trails	R 22,500	R -	R 22,500	R 450	R 650	R 1,100
Fencing	R 300,000	R 80,000	R 380,000	R 6,000	R 400	R 6,400

Water system	R 1,110,000	R 715,000	R 1,825,000	R 22,200	R 2,600	R 24,800
Electricity	R 206,000	R -	R 206,000	R -	R -	R -
Other	R -	R -	R -	R -	R -	R -
Sewerage	R 100,000	R -	R 100,000	R 7,000	R -	R 7,000
Other	R -	R -	R -	R -	R -	R -
Total	R 11,188,500	R 6,995,000	R 18,183,500	R 224,650	R 124,650	R 349,300

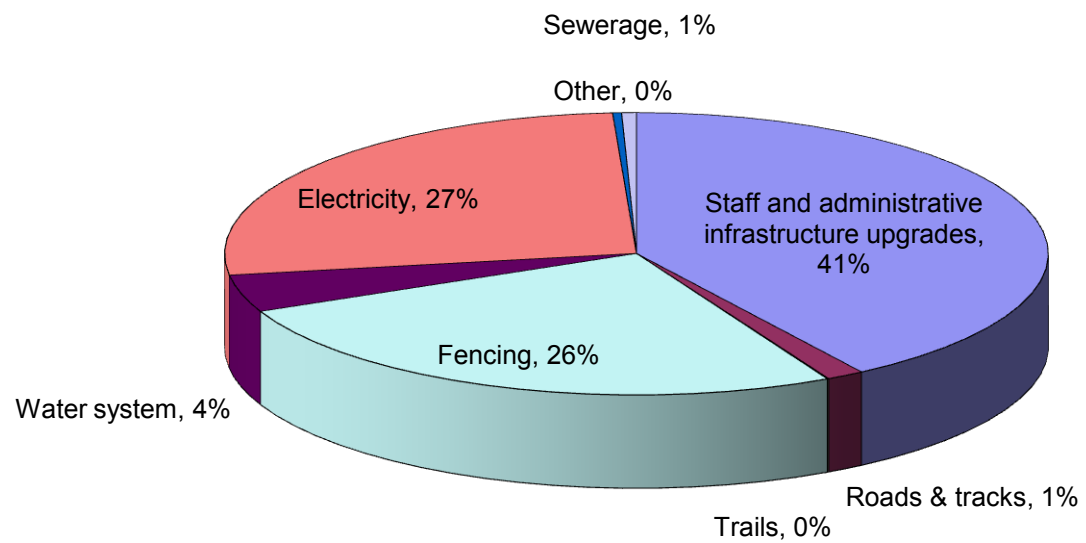
Operational		Amount
Allocated		R 10,732,282.28
Overheads		R 3,536,000.00
Minor capital		R 112,333.33
Total		R 14,380,615.61

Breakdown of costs	N\$	Percentage of total
Staff	8,475,085	61%
Overtime and S&T	105,000	1%
Travel	684,780	5%
Contracted	300,000	2%
Supplies & tools	690,000	5%
Overheads	3,536,000	25%
Minor Capital	112,333	1%
Annual requirement	13,903,198	100%

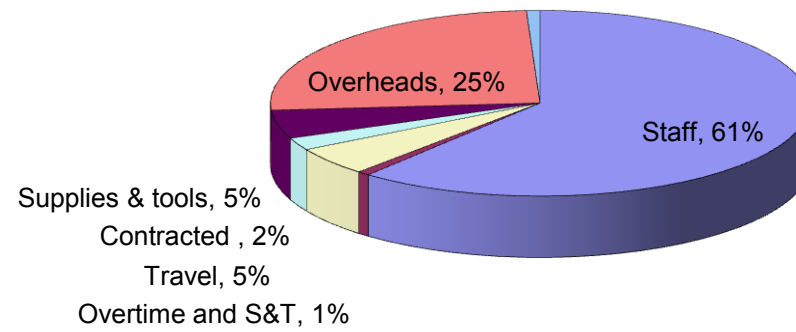
Summary cash flows Baviaanskloof



Relative asset values



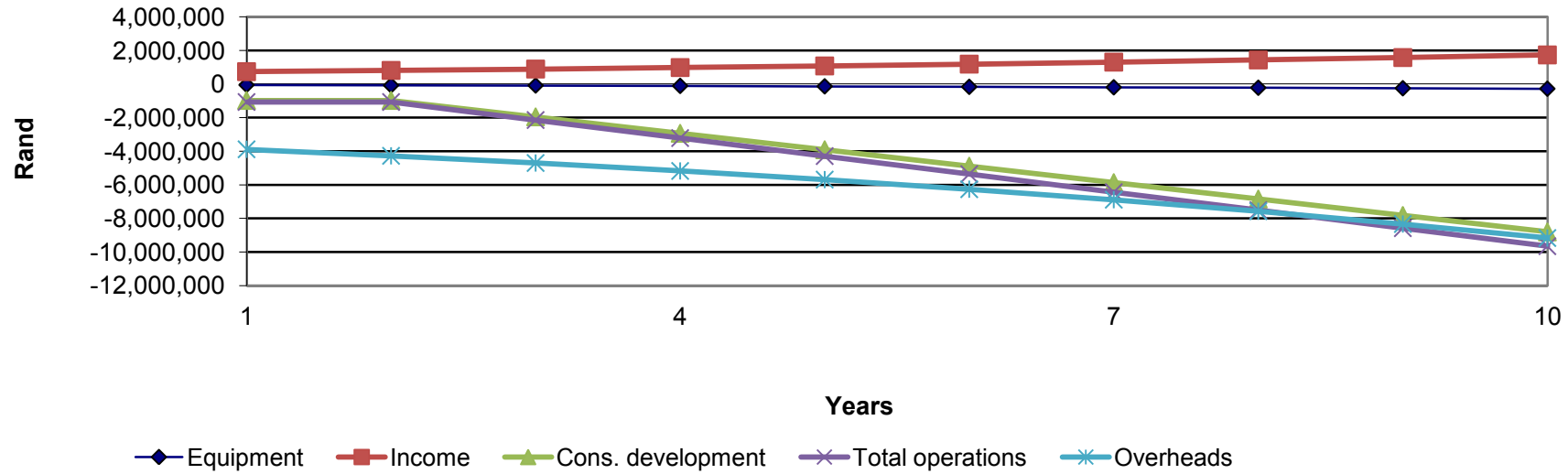
Annual operational expenses by category



**10 year projections -
operational**

Annual Operations	Total	1	2	3	4	5	6	7	8	9	10
Activity											
BIODIVERSITY	4,813,790	481,379	481,379	962,758	1,444,137	1,925,516	2,406,895	2,888,274	3,369,653	3,851,032	4,332,411
Aquatic	0	0	0	0	0	0	0	0	0	0	0
BIODIVERSITY	3,649,973	364,997	364,997	729,995	1,094,992	1,459,989	1,824,987	2,189,984	2,554,981	2,919,979	3,284,976
0	2,268,519	226,852	226,852	453,704	680,556	907,408	1,134,260	1,361,112	1,587,963	1,814,815	2,041,667
Total Operations	-10,732,282	-1,073,228	-1,073,228	-2,146,456	-3,219,685	-4,292,913	-5,366,141	-6,439,369	-7,512,598	-8,585,826	-9,659,054
Conservation Development											
BIODIVERSITY	1,831,180	183,118	183,118	366,236	549,354	732,472	915,590	1,098,708	1,281,826	1,464,944	1,648,062
Aquatic	0	0	0	0	0	0	0	0	0	0	0
BIODIVERSITY	1,232,200	123,220	123,220	246,440	369,660	492,880	616,100	739,320	862,540	985,760	1,108,980
0	6,721,837	672,184	672,184	1,344,367	2,016,551	2,688,735	3,360,919	4,033,102	4,705,286	5,377,470	6,049,653
Total Development	-9,785,217	-978,522	-978,522	-1,957,043	-2,935,565	-3,914,087	-4,892,609	-5,871,130	-6,849,652	-7,828,174	-8,806,695
Equipment	-112,333	-56,167	-84,250	-89,867	-112,333	-140,417	-168,500	-196,583	-224,667	-252,750	-280,833
Overheads	-3,536,000	-3,889,600	-4,278,560	-4,706,416	-5,177,058	-5,694,763	-6,264,240	-6,890,664	-7,579,730	-8,337,703	-9,171,473
Income	480,304	734,000	807,400	888,140	976,954	1,074,649	1,182,114	1,300,326	1,430,358	1,573,394	1,730,734
Requirement incl Capex and minor Capital	24,646,137	6,731,517	7,221,960	9,787,923	12,421,595	15,116,829	17,873,604	20,698,072	23,597,005	26,577,847	29,648,790

Operational expenses and income



ANNEXURE B: RISK ASSESSMENTS OF ECPTA

ENVIRONMENTAL ASSESMENT

POLICY CRITERIA	RATING
Demonstrated commitment to set objectives & targets for the management of the company's direct environmental impacts	2
Demonstrated commitment to reduce or minimise negative impacts of products & services	1
Demonstrated commitment to the use of management systems & targets which include resource efficiency targets, initiatives or programmes which are appropriate to the company's size, business and geographic spread of operations	2
Demonstrated commitment to identifying, assessing & reducing the environmental impact of: • Direct involvement in projects • Activities performed by contractors • Use of products & services	1
Demonstrated commitment to monitor natural resource utilisation & development of indicators to assess progress against recognised standards	0
Commitment to promote innovative research, training & technology cooperation in search for environmentally friendly solutions for company's environmental impact	1
MANAGEMENT & PERFORMANCE CRITERIA	RATING
Demonstrated raising of internal awareness of company's significant direct & indirect impacts	1
Documented management systems which include targets, initiatives or programmes appropriate to the companies size, business & geographic spread of operations to address & monitor direct impacts	1
Internal reporting processes & structures & management	1

review in place to monitor performance in relation to direct impacts	
Evidence of risk assessment in relation to significant indirect environmental impacts resulting from: • Direct involvement in projects • Activities of contractors • Uses of products & services	1
Evidence of achievement of targets or continual improvement or measures to move towards this process	1
Processes & structures in place for internal auditing of environmental practices, including remedial action to review & implement results / findings	0
Remedial action in place to review & implement findings of risk assessment in relation to indirect impacts	1
Evidence of monitoring & performance in relation to indirect impacts	1
REPORTING & CONSULTATION CRITERIA	RATING
Regular, clear & comprehensive disclosure of major environmental objectives relevant to the company including of performance against environmental targets	1
Public disclosure of quantitative, comparable data on major environmental issues relevant to the company	1
Independent verification by suitably qualified persons	0
Stakeholder engagement	2

ECONOMIC ASSESSMENT

POLICY CRITERIA	RATING
Demonstrated commitment to the use of reasonable business targets, key performance indicators or scorecards, appropriate to the company's size, business and geographic spread of operations	2
Evidence of an understanding of strategic risks & opportunities relating to the medium & long term	1
Evidence of efforts to investigate the economic impact the company's activities may have on entities or persons within the company's sphere of influence or where it operates	1
Evidence of objectives set in relation to research & product development appropriate to the company's size, business & geographic spread of operations	0
Demonstrated commitment to the protection and valuation of company assets & intellectual property	2
MANAGEMENT & PERFORMANCE CRITERIA	RATING
Documented targets, initiatives, programmes or management systems to address strategic risks & opportunities in the medium & long term	1
Internal reporting processes & structures & management review in place to monitor performance against targets	2
Documented targets, initiatives, programmes or management systems in relation to research & product development	1
Evidence of initiatives, programmes or management systems relating to the valuation & protection of assets (including IT) & intellectual property	2
Evidence of the understanding of the economic benefits of company activities on persons or entities where the company operates	1
Risk & crisis management in place	1

Measurement of contribution to financial performance by new areas of business identified as means of addressing key risks	1
REPORTING & CONSULTATION CRITERIA	RATING
Regular, clear & comprehensive disclosure of major economic sustainability issues relevant to the company including of performance against economic targets	2
Public disclosure of quantitative, comparable data on major economic sustainability issues relevant to the company	1
Stakeholder engagement	2

SOCIAL ASSESSMENT

POLICY CRITERIA	RATING
Demonstrated commitment to set objectives relating to employee upliftment & skills development	2
Demonstrated commitment to set objectives relating to equal opportunities, non discrimination & empowerment such as BEE & affirmative procurement	2
Demonstrated core set of company principals to address basic labour standards, human rights, disciplinary policies, corporate social responsibility	2
Demonstrated commitment to stakeholder involvement on social sustainability issues	2
Demonstrated objectives relating to employee occupational health & safety, including HIV / AIDS	2
Demonstrated commitment to the practices recognising the importance of partnerships of corporate social responsibility strategies	1
Demonstrated commitment to the implementation of corporate social responsibility strategies which are aligned to the company's overall business strategy & which reflects an ongoing commitment from the company	2

MANAGEMENT & PERFORMANCE CRITERIA	RATING
Documented initiatives to address employee OHS including the impact of HIV / AIDS on the company's activities	1
Documented targets, initiatives or programmes to address equal opportunities, non discrimination & empowerment such as BEE & affirmative procurement & skills development appropriate to the company's size, business & geographic spread of operations	2
Documented targets, initiatives or programmes relating to corporate social investment, capacity building, local procurement programmes & job creation opportunities appropriate to the company's size, business & geographic spread of operations	1
Evidence of risk assessment in relation to social impact of: • Direct involvement in projects • Activities of contractors • Uses of products & services	1
Procedures in place for stakeholder engagement & feedback	2
Procedures in place to achieve resolution of disciplinary or grievance issues evidencing a clear ability to deal with dishonesty, corruption or unethical behaviour by employees or people with whom the company does business	2
Achievement of targets relating to BEE, employment equity, procurement & skills development	2
Active community relations	2
REPORTING & CONSULTATION CRITERIA	RATING
Public disclosure of quantitative, comparable data on major social sustainability relevant to the company	2
Stakeholder engagement	2
Performance against targets reported on	1

ANNEXURE C: ECPTA STRATEGIC OBJECTIVES

Through its strategic intent, the ECPTA Board agreed several key principles around its stated goals:

- Expand ECPTA's commercial profile to lessen dependency on grant and donor funding with the ultimate aim of becoming sustainable,
- Commercial processes will contribute to provincial PGDP but will create new challenges for the organisation and its human capital which will require a fundamental shift in business processes,
- Expanding protected areas under ECPTA's control will maximise interventions and will have positive effect on its portfolio and revenue,
- Development of an ICT strategy to support the strategic linkages between head office and protected areas and improve overall efficiencies,
- Strengthening relationships with key stakeholders and suppliers,
- Recognising that communities are ECPTA's most critical stakeholder and focusing on strengthening overall co operation with communities.

The organization's vision, mission and values have therefore being brought into line with its strategic intent and are set out below.

a. Mission

To be a premier entity in managing biodiversity through mutually beneficial partnerships by 2010

b. Vision

The ECPTA undertakes best practice conservation management and utilization of natural resources within the Eastern Cape Provincial Parks, in partnership with communities and other stakeholders.

c. Values

Integrity	Work ethically, honestly and transparently.
Accountability	Act honourably and take ownership of our actions and the outcomes thereof.
Excellence	Provide the best possible service.
Partnership	Build and sustain constructive and mutually beneficial partnerships with clear goals and objectives.
Sustainability	Pursue sustainable management of resources through application of good governance principles.
Learning	Support continued learning for the growth of individuals for the benefit of the organization.

d. Goals

The ECPTA has adopted the following Goals for 2008 - 2010:

GOAL 1: Develop & maintain a functional, competent and sustainable organisation	Ensuring that the organization is financially sustainable in the long-term by increasing the commercial income, investing in its people and processes, establishing an investment fund as well as a research and development fund and securing government funds for effective delivery of services.
GOAL 2: Linking People and Parks	Increase participation of people in the parks for mutual benefit.
GOAL 3: Institutionalize biodiversity conservation best practice	Improve on the processes of biodiversity management.
GOAL 4: Enhance the image of the organization	Provide a platform for the visibility of the organisation and management of its public profile
GOAL 5: Optimize linkages between biodiversity and economic development initiatives	Strengthening the link between biodiversity and economic development initiatives by introducing innovative programmes.

The relationship between the Goals and Strategic Objectives is reflected in the following diagram:



(Source: ECP Business Plan 2008 – 2010, ECPTA revised strategic plan 2010 - 2011)

ECPTA Goals and Strategic Objectives for 2008 - 2010

Goals	Strategic Objectives
GOAL 1: Develop & maintain a functional, competent and sustainable organisation	• Compliance with Legislation • Grow commercial revenue • Organisational Transformation • Effective Knowledge management • Increase funding for Research and Development, social responsibility, internal CAPEX and other projects
GOAL 2: Linking People and Parks	• Create and maintain an enabling environment for community and stakeholder participation • Develop co -management arrangements to ensure biodiversity sustainability • Develop access and benefits sharing models • Develop an Information management system database of stakeholders
GOAL 3: Institutionalize biodiversity conservation best practice	• Develop instruments to conserve biodiversity • Invest in internal roads and eco-tourism infrastructure • Integrate a limited yet growing understanding of global change into all decision making
GOAL 4: Enhance the image of the organisation	• Develop and maintain a culture of excellence in service delivery • Enhance corporate identity and organisational culture

GOAL 5: Optimize linkages between biodiversity and economic development initiatives	• Implement labour intensive projects in reserves • Develop sustainable natural resource use • Establish linkages with social & economic initiatives to promote reserves as a catalyst to LED • Increase commercial revenue • Promote regional infrastructure development around reserves
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ANNEXURE D: WILLINGNESS TO PAY QUESTIONNAIRE

WILLINGNESS TO PAY SURVEY – NELSON MANDELA BAY METRO

Name:

Date:

Interviewer:

The survey is for research purposes and is intended to obtain your personal opinion so there are no: right” or” wrong” answers – if you are unsure of your opinion then you can answer: don’t know”.

Section A: Environmental Awareness

- i) How important do you think environmental concerns are in comparison to socio economic issues (HIV / AIDS, education, crime, etc)?
- 1 2 3 4 5 6 Don't Know
- 1 = not important; 5 = very important
- ii) Are you aware that NMBM faces critical water shortages in the future?
- Y N Don't know
- iii) Do you know that NMBM is water constrained?
- Y N Don't Know
- iv) Do you think water is important to NMBM?
- 1 2 3 4 5 6 Don't Know
- 1 = not important; 5 = very important
- v) Why do you think water is important?
- Development of NMBM
 - Basic human requirement
 - Socio economic growth
 - Don't Know
 - Other
- vi) Why do you think water is not important?
- a. Don't care about environmental issues
 - b. More important issues at hand
 - c. Don't know of any water constraints
 - d. Don't know
 - e. Other
- vii) Do you think that the water supply to NMBM is under threat?
- Y N Don't know
- viii) What do you think are the main threats to the water supply?
- a. Over utilization of water
 - b. Wasting water
 - c. Poor infrastructure and maintenance
 - d. Climate change

- e. Catchment degradation due to alien infestations & fire
- f. Don't know
- ix) Do you know where NMBM gets its water supply from?
Y N Don't know
- x) Can you name the supply dams?
Y N Don't know
- xi) Do you know where the main catchments are for NMBM?
Y N Don't know
- xii) Can you name them?
Y N Don't know

Section B: Valuation

The concept of payment for ecosystem services is the basis of this questionnaire and the end result is to determine whether there is a willingness to pay for the long term protection and security of water for NMBM. The payment for ecosystem services concept is based on the user pays principle, i.e. the end user is willing to pay to have the water sources protected.

- xiii) Do you think that it is important to protect the catchments (Baviaanskloof Nature Reserve and World Heritage Site and Kouga)?
Y N Don't know
- xiv) Do you think that it would be feasible to for NMBM to pay (through the end user) for the protection of the catchments?
Y N Don't know
- xv) Do you know the current basic water tariff that NMBM charges users per 1000 liters?
Y N Don't know
- xvi) Would NMBM be willing to consider paying for the protection of long term water security of the Baviaanskloof Nature Reserve and World Heritage Site catchment?
Y N Don't know
- xvii) Which of the following amounts per 1000 L do you think that NMBM be willing to consider?
 - a. 0.05 cents per 1000 L
 - b. 0.10 cents per 1000 L
 - c. 0.15 cents per 1000 L
 - d. 0.20 cents per 1000 L
 - e. 0.25 cents per 1000 L
 - f. Other
- xviii) Would you consider different charges for domestic and industrial water usage?
Y N Don't know
- xix) Would you consider different charges for domestic household dependent on different historical usages?
Y N Don't know

Questions re NMB water provision:

- xx) How many water users are there in the metro?
- xxi) How many are domestic users and how many industrial?
- xxii) What percentage of the metro gets water from the Kouga Dam and how many households would this be?
- xxiii) Are there any industries that receive water from the Kouga system? If yes, how many?
- xxiv) What is the basic water rate for the metro for domestic and industrial use?
- xxv) The metro provides basic water usage to households, after the basic water allocation has been used, what is the payment per Kilo liter and is this on a sliding scale?
- xxvi) Is there a cost difference in purifying water from the Kouga dam and Gariep Dam? If so, what are the costs of this purification?

I am currently doing completing an MBA at Rhodes University and as part of the completion of the MBA, am required to do a thesis. I have chosen to do my thesis on the potential of obtaining Payment for Eco System Services for the Baviaanskloof Nature Reserve and World Heritage Site Nature Reserve as this is one of the important catchment areas for the Kouga Dam that supplies water to Port Elizabeth and the citrus industry in the Gamtoos Valley.

The questionnaire attached forms part of my research into the potential of obtaining payment for eco system services. The principal of eco system services is that the end user pays towards ensuring that an essential service is maintained in an optimal state and continues to provide the essential service. The service in this case is water catchment and provision.

Your time taken to complete the questionnaire is appreciated.

Wayne Erlank

ANNEXURE E: STATUS OF LAND CLAIMS ON ECPTA RESERVES

<i>Claim</i>	Park Name	Property description	District municipality	Ha	Status	Challenges
<i>MacDonald & Phillips</i>	Tsolwana Reserve Nature	Portion of the farm Lily Fountain No. 344, Remainder of portion Magemans Hoek No. 345, Remainder of the farm Magerman's hoek No. 345, Portions 1 & 2 of Farm Donnybrook 349, Portion 1 of Farm Vrisgewaard No. 350	Chris Hani	14652.6901	Claims have been validated and property valuations were conducted. Negotiations	Protracted negotiations as the claimants are not accepting the valuation and the amounts offered for compensation. Claimants conducted their valuation which came up with huge amounts
<i>Lower and Upper Didimana community claims.</i>	Tsolwana Reserve nature	Dots, Lilyfontein, Larendse Farms	Chris Hani	14652, 6901	Preliminary investigation conducted. Further research is being conducted.	Competing claims. Awaiting outcomes of research process
<i>Upper Zangqokhwe Community</i>	Tsolwana Reserve Nature	Dots, Lilyfontein, Larendse	Chris Hani	14652. 6901	Research completed	Claim not compliant as dispossession occurred before 1913. Still awaiting the response from the claimants.
<i>Swaartbooi Family</i>	Mpofu Nature Reserve	Nootuitgedaght Farm No. 986 and Farm No. 1022	Amathole	3424.00	Claim was researched and validated. Verification of claimants to be conducted	The nature reserve forms part of a bigger claim consolidated with agricultural farms. The research took a long time due to unavailability of information

<i>Double Drift Community</i>	Double Drift Nature Reserve	Nottingham Farm 215, Brakefontein, Fort Willshire Farm 217, Kodoos Kloof farm 218, Welcome Rock Farm 221, Lekfontein Farm 222, Farm no. 223, Naudes Hoek Farm 224, Double Drift Farm 231, Driefontein Farm 235, Bosch Place Farm 236, Portions 1,2 & 3 of Brakefontein Farm 219, Portions 1, 2, & 4 of welcome Rock Farm 220	Amathole	13546.783	Claim is partially settled as a phased claim. Claimants have been paid financial compensation. Awaiting the signing of Settlement Agreements and transfer of land to the claimants	Protracted Negotiations on the restoration of land to the claimants. RLCC and Eastern Cape Parks Board finalizing the signing of the settlement Agreement.
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<i>Fort Brown</i>	Sam Knott-Andries Vosloo Nature Reserve	Portion 5 of Hermanus Kraal, Kentucky Farm 107, Lowerstof Farm 115, Outspaning RE, Grasslands Farm 117	Cacadu	697.5600	Preliminary investigation has been conducted. Further Research conducted to	It transpired from the service provider that upon his investigation 18 communities are involved instead of one community. The claimants are scattered all over the country, and the contract for the service provider was extended. The current owners are challenging the validity of the claim.
<i>Grootboom Family</i>	Baviaanskloof Nature Reserve and World Heritage Site Mega Reserve (Baviaanskloof Nature Reserve and World Heritage Site Wilderness Area, Stinkhoutberg, Formosa, Cockscomb)	Toverwater Farm No. 177	Cacadu	2270.6092	Sec 42 (D). Claim validated and valuation conducted	The claimants were not clear about the land they are claiming. Mapping and plotting of land was undertaken to establish the correct property description.
<i>Nyati Family</i>	Groot Uye (Addo Elephant Park)	Portion 1&3 Farm No. 41 (Groot Uye)	Cacadu	547.3375	Settled. Updating claimant verification for the release of grants. Busy with the formation of legal entity. Working out the details for the transfer of the subject property to the family's legal entity.	Ongoing family dispute which hampers the finalisation of verification of descendent Sarah Nyathi. Lack of commitment and co- operation from the other members of the family.
<i>Ngqinisa Community</i>	East London Coast Nature Reserve	Farm 1168	Amathole	3424.00	Research was conducted. The claim is now at the verification stage	Community disputes and boundary disputes

<i>Mkhaba Family claim</i>	East Coast Nature Reserve	Farm 274 and Portion 1 of Farm 274	Amathole	163. 3800	The claim was investigated and validated. Claimant verification was conducted. Property Valuation is being conducted.	Current owner who is operating the resort within the nature reserve is disputing the validity of the claim. Negotiations are on-going.
<i>Dwesa Cwebe</i>	Dwesa and Cwebe Nature Reserve		Mbashe	3900.00	Settled.	The Wild Coast project funded by the EU and UNDP has bought a Boat to improve the MPA management as several cases of Abalone poaching have been reported. Training will be provided to community members to patrol the coastline The challenge of non-implementation of the Development Plan still remains. A meeting was held with the municipal Manager to highlight the challenges and a new implementation was designed and its implementation will be monitored A new Reserve Manager has been appointed to take over from the previous Manager who had problems with the community.

<i>Hluleka Community</i>	Hluleka Nature Reserve	Lucingweni Admin Area	OR Tambo	1238.7553	Settled	Institutional arrangements and implementation of the settlement agreement. The disposal of the land the provincial State land disposal Committee.
<i>Caguba Community</i>	Silaka NR		Port St. Johns	34.25	Settled	The claim has been settled but there are still community disputes. Status quo still remains but a meeting has been scheduled for the 21 st August 2009 to iron out community conflict and cha a way forward for the implementation of plans.
<i>Caguba Community</i>	Silaka NR		Port St. Johns	34.25	Settled	The claim has been settled but there are still community disputes. Status quo still remains but a meeting has been scheduled for the 21 st August 2009 to iron out community conflict and cha a way forward for the implementation of plans.
<i>Kwa-Lindile & Zimbane</i>	Nduli/ Luchaba Nature Reserve	Erf 912	OR Tambo	170.00	Research	The claim was referred to the Land Claims Court as the King Sabatha Dalindyebo Municipality is disputing the validity of the claim. The claim is competing with Zimbane community claim.

<i>Mkambati community</i>	Mkambati Reserve	Nature	OR Tambo	17400.00	Settled.	Asgisa Eastern Cape and SAPPI will be strategic partners to the forestry operation that is in place in Mkambati following the termination of the lease agreement with the previous
<i>Ntsekeni Community</i>	Ntsekeni Reserve	Nature	Alfred Nzo	.	Research	The claim has been transferred to KZN office with all other claims in Umzimkulu due to the changes of borders

<i>Ongeluksnek Community</i>	Ongeluksnek Reserve	Nature	Portions 1 & 2 of Drakensrock Farm No. 93 Portion 1 of Tennyson Farm No. 97 Remainder of Motley Farm No. 98 Portion 1 of Charles mills Farm No. 98 Marshall Clarke Farm No. 100 Portion 1 of Ripon Farm No. 101 Remainder of Charles Mills farm No. 104 Remainder of Ongeluksnek Farm 105 Rem. of Farm Killarney no. 106 Rem. of Bonnievale Farm No. 107 York Outspan Farm No. 109 Hilda Heath Farm No. 112 Rem. of O'Connors camp Farm No. 94	Alfred Nzo	7337.1100	Mediation. The mediation process has started	The Farmers Union is disputing the validity of the claim and the restitution award
	Commando Drift Reserve	Nature		Chris Hani	5983.00	Research	

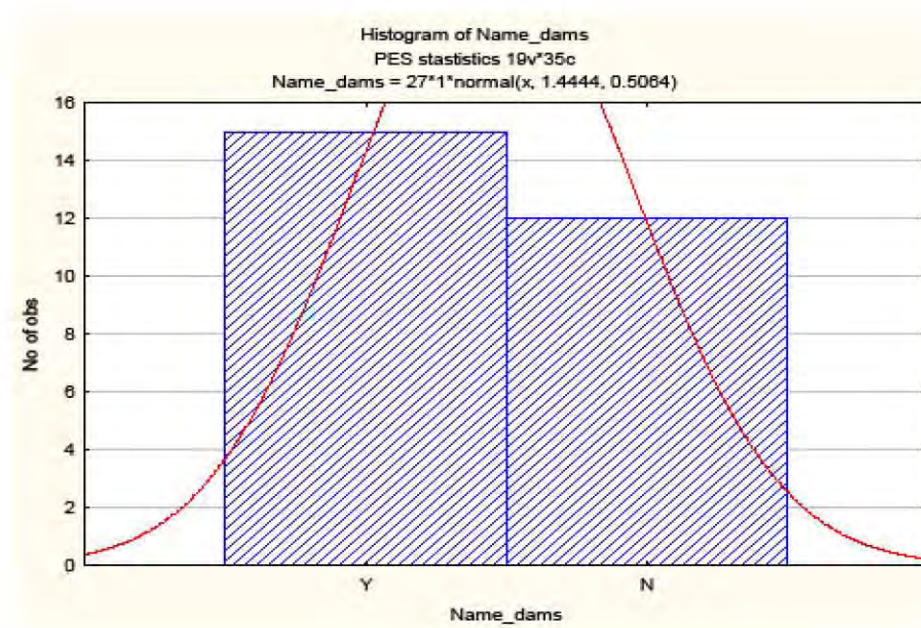
ANNEXURE F: STATISTICAL GRAPHS AND SUMMARY QUESTIONNAIRES

Env. concerns	water crisis	water const	water NB	why	supply threat	main threats	where water	name dams	catchments?	name catch	protect catch	pay water	basic tariff	pay water?	what	Dom. v ind.	charges hist. dist
5	y	y	5	human req	y	over utilisation	y	y	y	y	y	y	y	y	other	maybe	n
4	y	y	5	human req	y	climate	y	y	n	n	y	y	n	y	0.25	y	y
3	y	y	5	human req	y	over utilisation	y	y	y	y	y	y	y	y	0.15	y	n
5	y	y	5	human req	y	poor infra	y	n	y	n	y	y	n	y	0.25	y	n
5	y	y	5	human req	y	climate	y	y	y	y	y	y	n	y	other	y	n
5	y	y	5	develop NMBM	y	poor infra	y	y	y	y	y	y	n	y	R 1	y	n
5	y	y	5	human req	y	over utilisation	y	n	y	n	y	y	n	y	0.2	y	n
5	y	y	5	human req	y	wasting	y	y	n	n	y	y	n	y	0.25	y	n
5	y	y	5	human req	y	wasting	n	y	n	n	y	y	n	y	0.25	y	n
5	y	y	5	human req	y	poor infra	y	y	y	n	y	y	y	y	0.25	y	n
5	y	y	5	human req	y	poor infra	y	n	y	n	y	y	n	y	0.25	y	n
5	y	y	5	human req	y	over utilisation	y	n	n	n	y	y	n	y	0.15	y	n
5	y	y	5	human req	y	over utilisation	y	n	n	n	y	y	n	y	0.25	y	n
5	y	y	5	human req	y	wasting	n	n	n	n	y	y	n	y	0.2	y	n
5	y	y	5	human req	y	over	y	n	y	y	y	y	n	y	0.25	y	n

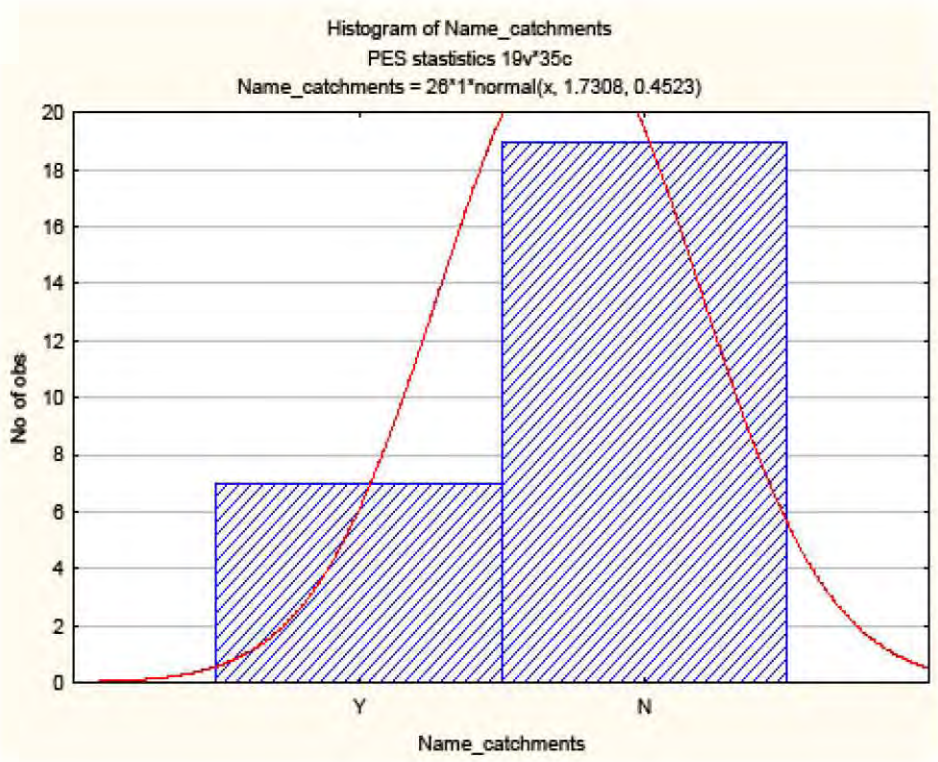
						utilisation												
5	y	y	5	socio economic	y	wasting	y	y	y	y	y	y	n	y	other	y	n	
5	y	y	5	human req	y	poor infra	y	n	n	n	y	y	n	y	0.2	y	n	
5	y	y	5	human req	y	poor infra	n	n	n	n	y	y	n	y	0.25	y	n	
5	y	y	5	develop NMBM	y	wasting	y	y	n	n	y	y	n	y	0.25	y	n	
5	y	y	5	socio economic	y	over utilisation	y	y	n	n	y	y	y	y	0.2	y	n	
5	y	y	5	human req	y	over utilisation	y	y	n	n	y	y	n	y	0.2	y	n	
5	y	y	5	socio economic	y	wasting	y	y	y	y	y	y	y	y	0.2	y	n	
5	y	y	5	develop NMBM	y	poor infra	y	n	n	n	y	y	n	y	0.15	y	n	
5	y	y	5	human req	y	wasting	y	n	y	n	y	y	y	y	0.25	y	n	
5	y	y	5	human req	y	wasting	y	y	y	y	y	y	n	y	0.2	y	n	
5	y	y	5	socio economic	y	wasting	y	y	n	n	y	y	n	y	0.2	y	n	
4	y	n	4	develop NMBM	n	wasting	n	n	n	n	y	y	n	don't know	0.15	y	don't know	
3	y	y	5	human req	y	catchment degrad	y	y	y	y	y	y	n	y	0.1	y	y	
3	y	y	5	human req	y	over utilisation	y	y	y	y	y	y	y	y	0.15	y	y	
3	y	y	4	develop NMBM	y	wasting	y	y	y	y	y	n	n	y	0.1	y	y	
5	y	y	don't	human req	y	over	don't	y	n	don't	y	y	n	don't	0.05	y	n	

			know			utilisation	know			know				know			
															11		
	100	30	28		100		26	21	16	11		30	7	29	2		
		1	2				4	10	15	19		1	24	2	4		
			1				1			1		31	31	31	8		
		31	31				31	31	31	31					5		
		96.77 42	90.323				83.87 1	67.74 19	51.612903	35.48 4	100	96.77 4194	22.58 0645	93.5484	1		
		3.225 81	6.4516				12.90 32	32.25 81	48.387097	61.29		3.225 8065	77.41 9355	6.45161	31		
			3.2258				3.225 81			3.225 8							
		100	100				100	100	100	100					35.4 84		
															6.45 16		
															12.9 03		
															25.8 06		
															16.1 29		
															3.22 58		

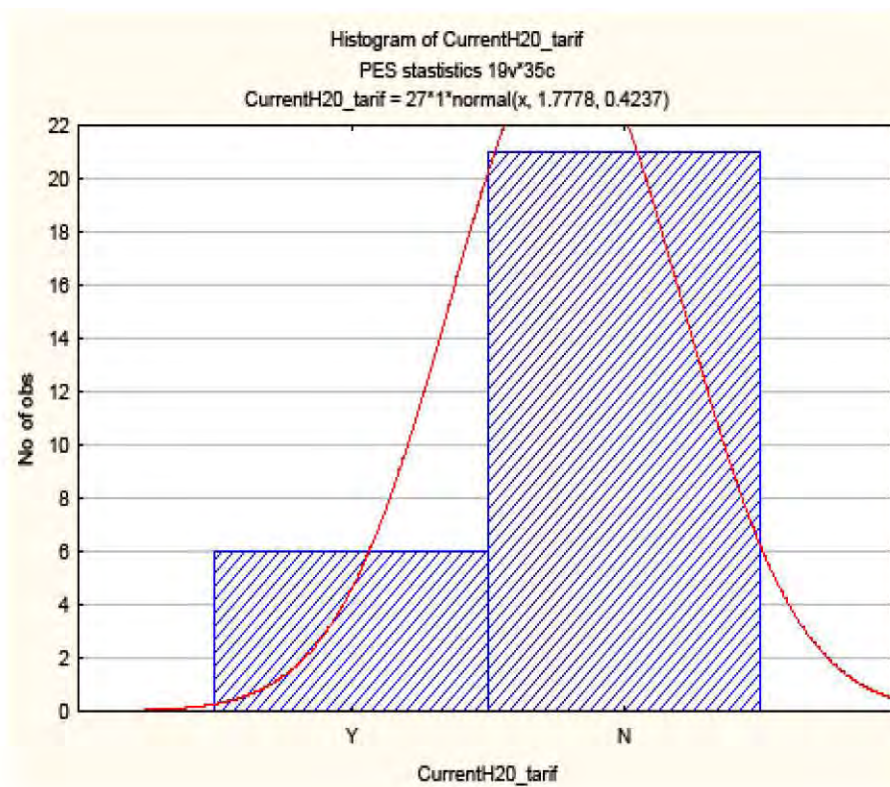
Statistical analysis for name of dams



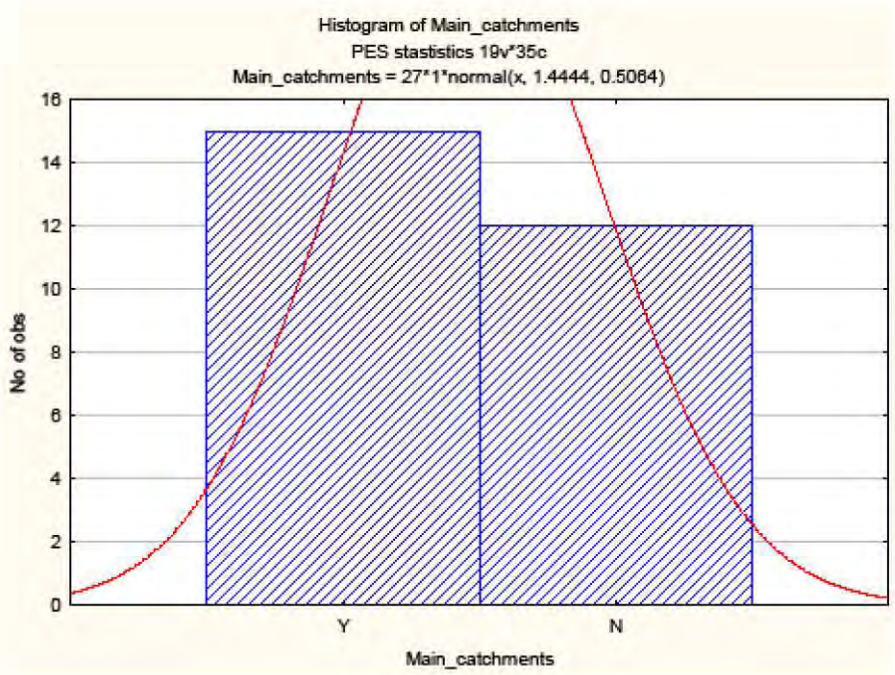
Statistical analysis for name of catchments



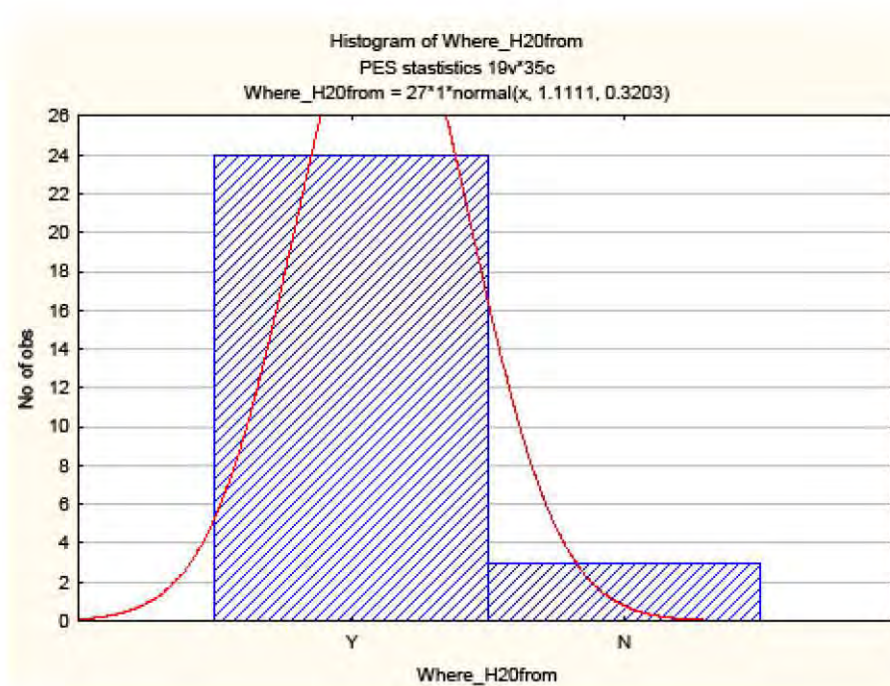
Statistical analysis for water tariff payment



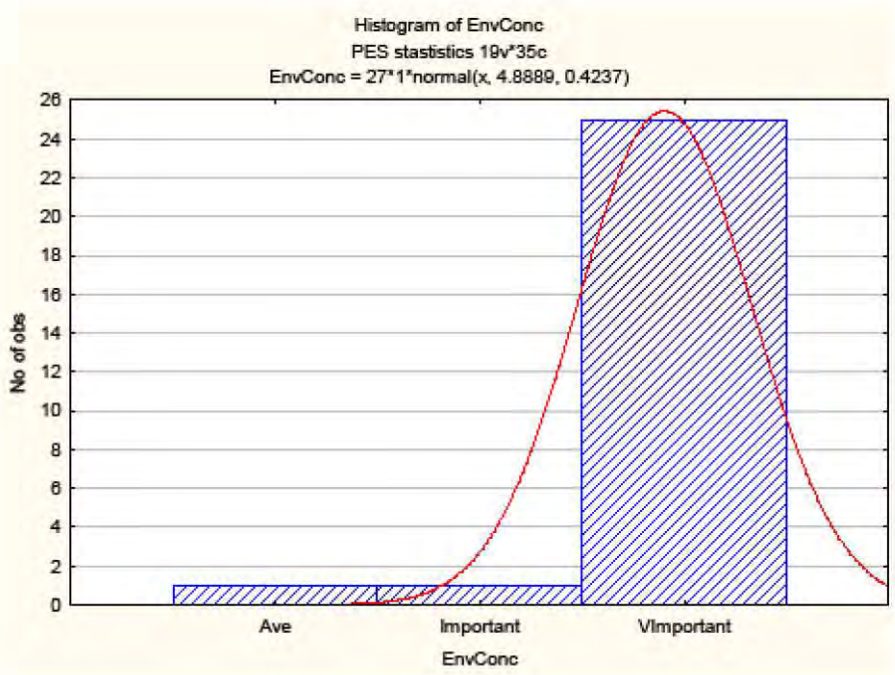
Statistical analysis for main catchments



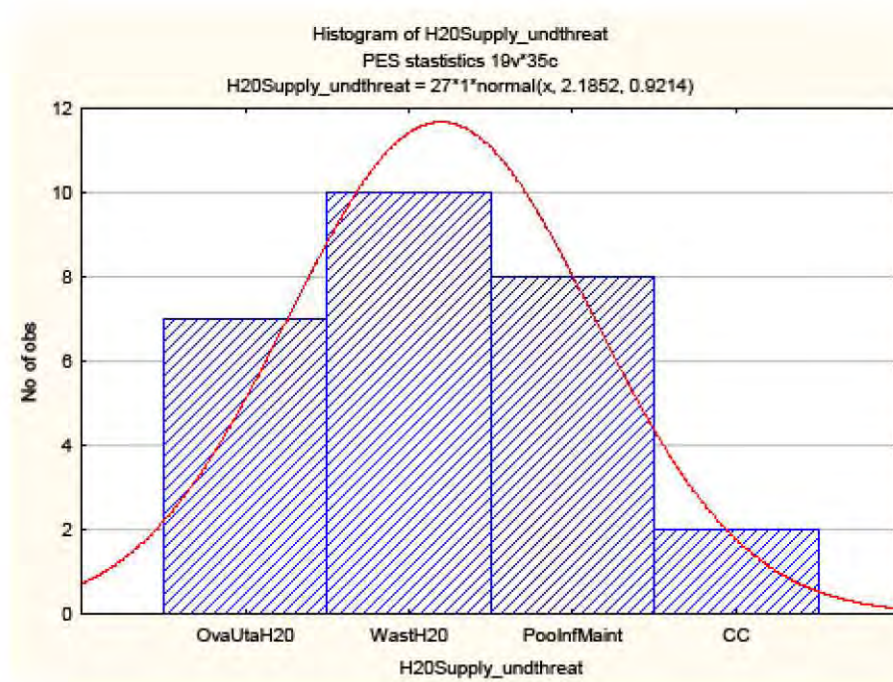
Statistical analysis for origins water for NMBM



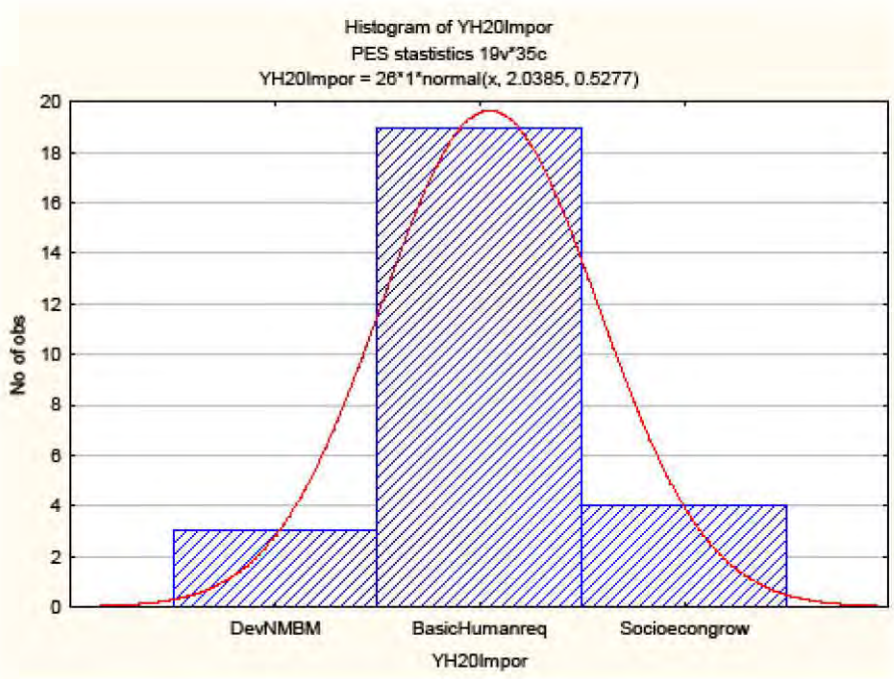
Statistical analysis for environmental concerns for NMBM



Statistical analysis for water supply under threat for NMBM



Statistical analysis for importance of water for NMBM



Statistical analysis of willingness to pay for water in cents per kilolitre

