A dissertation submitted to the Department of Environmental Sciences and Policy of Central European University in part fulfilment of the Degree of Doctor of Philosophy

Protected Area Management Effectiveness Evaluation in Kruger to Canyons Biosphere Region, South Africa

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Georgina WILSON

April, 2025

Vienna

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ABSTRACT OF DISSERTATION submitted by:
Georgina WILSON for the degree of Doctor of Philosophy and entitled: Protected Area Management Effectiveness Evaluation in Kruger to Canyons Biosphere Region, South Africa.
April, 2025

Effective protected areas are imperative for the protection of biodiversity. Protected Areas Management Effectiveness (PAME) assessments assist managers in evaluating the strengths and weaknesses of management in protected areas, thereby supporting adaptive management. Using online questionnaires, one-on-one semi-structured interviews and focus groups, underpinned by the theories of resilience, strategic adaptive management, and the social-ecological systems framework, this study aimed to explore PAME assessment tools and methods utilised by protected areas in the Kruger to Canyons Biosphere Region (K2C), South Africa. The third version of the South African Management Effectiveness Tracking Tool is the most widely utilised tool in the K2C, however, refinement of its social-economic elements may improve its usefulness for managers. There is an opportunity to develop a new tool for use by managers in new or under-resourced protected areas in the K2C, which may also be useful for managers in similar contexts across the country. Managers in the region acknowledged the importance of communication for learning, and learning is a key step in the adaptive management process. There are several communication networks between protected areas in the K2C, however, protected areas that are geographically isolated or are not part of formalised systems such as the Associated Private Nature Reserves or the Great Limpopo Transfrontier Conservation Area, may miss out on learning opportunities. Through supporting and facilitating PAME processes, the K2C team may also create more opportunities for isolated or disconnected protected area managers to communicate with and learn from other protected areas. The proposed Management Effectiveness Evaluation Readiness Assessment tool is a simplified and condensed version of the Management Effectiveness Tracking Tool, which may be useful for newly declared or resource-constrained protected areas in the K2C, or other biosphere reserves across South Africa. The K2C organisation is a cornerstone of the landscape and is well-placed to facilitate improved PAME and communication between protected areas within its boundaries. Improved PAME supports the adaptive management process and will create long-term resilience for protected areas in the biosphere region's core and buffer zones, thereby underpinning resilience of the biosphere region itself.

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Keywords: protected area, protected area management effectiveness, biosphere region, Kruger to Canyons Biosphere Region, adaptive management, communication, learning, resilience.

Acknowledgements

It's difficult to imagine that one small decision, taken on a random Tuesday at work, could lead me to this point. The Georgina who was writing environmental audit reports behind a desk in Johannesburg could never have thought that 4.5 years later, she would be handing in a PhD dissertation, having been to Europe, survived a pandemic, and spent so much time in the Kruger region. I am so grateful to the spark of courage that allowed me to take a chance on applying for this project, because it has been truly life-changing.

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Thank you to every single manager, owner and employee from the protected areas in my study, for taking time out of what I know are extremely busy schedules to talk to me, explain your processes, and let me pepper you with questions. Your insights and experiences are the real heart of this research, and I learned so much from all of you. Please keep up your amazing work of managing our wonderful protected area estate in K2C.

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LIST OF ABBREVIATIONS

AM	Adaptive management
APNR	Associated Private Nature Reserves
APO	Annual Plan of Operations
BellagioSTAMP	Bellagio SusTainability Assessment and Measurement Principles
BR	Biosphere reserve / region
BREMi	Biosphere Reserve Effectiveness of Management Index
CBD	Convention on Biological Diversity
CDF	Conservation Development Framework
GBF	Global Biodiversity Framework
DAFF	Department of Agriculture, Forestry and Fisheries (former name, now DFFE)
DEA	Department of Environmental Affairs (former name, now DFFE)
DFFE	Department of Forestry, Fisheries and the Environment
EM	Environmental monitors
GBF	Global Biodiversity Framework
GDP	Gross Domestic Product
GD-PAME	Global database of PAME assessments
GEF	Global Environment Facility
GK	Greater Kruger
GKEPF	Greater Kruger Environmental Protection Foundation
GLTFCA	Great Limpopo Transfrontier Conservation Area
ha	hectares
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome

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IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
JMC	Joint Management Committee (of GLTFCA)
K2C	Kruger to Canyons Biosphere Region
KNP	Kruger National Park
KPI	Key performance indicator
LEDET	Limpopo Department of Economic Development, Environment and Tourism
m	metres
MAB	Man and the Biosphere
masl	metres above sea level
mm	millimetres
M & E	Monitoring and evaluation
MEC	Member of the Executive Council
MEERA	Management Effectiveness Evaluation Readiness Assessment
METT	Management Effectiveness Tracking Tool
MOU	Memorandum of Understanding
MPA	Marine Protected Area
MTPA	Mpumalanga Tourism and Parks Agency
NEM:PAA / NEMPAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
NPAES	National Protected Area Expansion Strategy
NPC	Non-profit company
PA	Protected area
PAME	Protected area management effectiveness
PAR	Protected Area Register

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PoWPA	Programme of Work on Protected Areas
PR	Periodic review
RAPPAM	Rapid Assessment and Prioritisation of Protected Area Management
SA	South Africa
SAEON	South African Environmental Observation Network
SAFCOL	South African Forestry Company SOC Limited
SAM	Strategic adaptive management
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SES	Social-ecological system(s)
SMART	Spatial Monitoring and Reporting Tool
SOP	State of Our Parks (method)
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WfW	Working for Water
WNBR	World Network of Biosphere Reserves
WWF	World Wide Fund for Nature
YES	Youth Employment Services

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CHAPTER 1: INTRODUCTION

This chapter will briefly introduce the research that was conducted on Protected Area Management Effectiveness (PAME) evaluation in Kruger to Canyons Biosphere Region (K2C) in South Africa (SA). It will outline the aims and significance of the research, in order to contextualise the details of the following chapters in this dissertation.

1.1 Problem Statement

Protected Areas (PAs) are considered one of the most successful methods of conserving biodiversity in the face of widespread and unrelenting threats (Chape et al., 2005; Possingham et al., 2006). However, biodiversity loss continues despite the increase in the number and spatial extent of PAs (Maxwell et al., 2020) and sometimes, even within these areas (Brandon & Wells, 1992; Craigie et al., 2010; Mora & Sale, 2011; Laurance et al., 2012). In order for PAs to result in real protection and conservation of biodiversity within their boundaries, they need to be effective (Chape et al., 2005; Coad et al., 2015). PAME is defined as the extent to which a PA or PA network is being managed so as to protect its values and achieve its goals and objectives (Hockings et al., 2006). PAME assessment tools have come to the forefront of conservation research as time- and cost-effective measures of the success of PAs (Anthony, 2014), and can support adaptive management (AM) of PAs and PA networks (Coad et al., 2015).

Before the research discussed in this dissertation was conducted, it was unknown which tools or methods PA management teams within K2C were utilising to monitor and evaluate their management effectiveness, whether the results from monitoring and evaluation (M & E) were in line with goals or used to improve management techniques, or what impacts the M &

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E had on the network of PAs in the biosphere region (BR). PAME is an important element of biodiversity conservation, and greater understanding of the situation in K2C was required. The findings and lessons generated from this dissertation are particularly useful for K2C, but may also be applicable to other South African, African and even Global South BRs in a similar context, as well as individual PAs. This study contributes further understanding to the effectiveness of the BR model, social-ecological systems (SES), AM, and PAME within a BR system.

1.2 Research Aims

The main aim of this research project was to determine the extent to which M & E of PAME is being undertaken within PAs in a South African BR. This research further aimed to:

- Understand historical and current management contexts in K2C PAs;
- Understand goals, objectives and interpretation of effectiveness in K2C PAs;
- Investigate what M & E tools/methods are being utilized to measure and improve (if applicable) PAME in relation to the PA's goals and objectives;
- Investigate the occurrence and value of communication relating to AM and PAME, between PAs, as well as other conservation organisations such as the K2C Non-Profit Company (NPC);
- Identify a) scope for improvement of current tools/methods and provide recommendations (if applicable), or b) development of a complementary cost- and time-effective assessment tool relevant to the K2C, other South African biosphere reserves, and potentially other African biosphere reserves; and
- Contribute further understanding to the role of PAME in BR effectiveness.

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1.3 Research Questions

The above-mentioned aims can be translated into the following main research question:

How and to what extent do PA management teams in K2C Biosphere Region implement adaptive management in the form of PAME, and how can PAME be improved?

Sub-questions, which assist in answering the above, include:

1 How do K2C PA management teams plan for M & E of management actions?

2 How are management actions monitored in K2C PAs?

3 How are management outcomes evaluated against management objectives in K2C PAs?

4 How is monitoring and evaluation used to improve management outcomes and/or change management actions in K2C PAs, if at all?

5 How do PA management teams communicate and/or collaborate with other PAs, the K2C NPC and other organisations (i) to improve learning, (ii) concerning M & E of management effectiveness and its tools, and (iii) how does this influence management in the PA?

6 How can current M & E methods be improved and adapted into a general tool applicable to all K2C PAs?

Sub-questions 1-4 are explored in Chapter 5 of this dissertation, sub-question 5 in Chapter 6, and sub-question 6 in Chapter 7.

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1.4 Significance of Research

SA is one of the world's megadiverse countries, home to very high species richness as well as high levels of endemism (Skowno et al., 2019). However, almost half of SA's ecosystems are categorised as threatened and many of the country's threatened species are showing trends of increased extinction risk (Skowno et al., 2019). In addition, a large proportion of SA's human population - often those in close proximity to PAs - battle socio-economic issues such as poverty and lack of education. For example, Bushbuckridge Municipality, one of the municipalities within K2C, faces multiple social stressors, including pervasive poverty and unemployment, high crime rates, skills shortages, high levels of illiteracy, a high prevalence of Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome (HIV/AIDS) and a severe backlog of service delivery or even complete lack of access to basic services in some areas (Bushbuckridge Local Municipality, 2018). BRs present an opportunity for countries like SA to simultaneously protect their unique biodiversity, while addressing the development needs of the population. However, if the PAs which form the core of the BR system are not being effectively managed, then the BR is not fulfilling one of its key objectives; namely, conservation of biodiversity. Some PAs may contribute towards other BR objectives (often through job provision and social outreach programmes), however, development objectives are usually addressed through management actions outside the PA boundaries.

This research is significant because it sheds light on PAME in a key BR in SA, which provides insights and recommendations that can be applied to other South African, African and Global South BRs, as well as individual PAs, in similar contexts. Further understanding of PAME within BRs contributes to increased understanding of BR effectiveness, particularly with regards to achieving the objective of biodiversity conservation. The research also contributes practical understanding to the theoretical knowledge of SES and AM. One of SA's

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priority interventions for protecting biodiversity includes strengthening evaluation for AM (Skowno et al., 2019), and this research investigates the occurrence of such evaluation in K2C, SA's third largest BR. Finally, the research presents an empirical example of the process and outcomes of a purported AM approach, examples of which are scarce (Fabricius & Cundill, 2014). It thus contributes to a broader theoretical understanding of the approach to, and implementation of, AM in BRs. As BRs are complex SES that are dynamically changing with inherent uncertainties, the research contributes to the knowledge of how AM can be utilised in SES to balance socio-economic and ecological aspects.

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CHAPTER 2: LITERATURE REVIEW

2.1 Global context: biodiversity loss and protected areas

In 2020, the World Wide Fund for Nature (WWF) produced a highly impactful report detailing biodiversity loss between 1970 and 2016 (WWF, 2020). The 68% decline in population sizes of vertebrates is described in the report as an "unrelenting destruction of nature" and is noted as "flashing red warning signs" for overall ecosystem health as well as human health and well-being (WWF, 2020). The WWF report was released a year after the United Nations (UN) predicted that within the space of a few short decades, almost one million species will go extinct, due either partially or wholly to human impact (IPBES, 2019). Anthropogenic drivers of biodiversity loss include climate change, pollution, invasive species and disease, overexploitation, and changes to land and sea use (which includes loss and degradation of habitat) (WWF, 2020). PAs are widely recognized as one of the most successful methods of conserving biodiversity in the face of such widespread and unrelenting threats (Chape et al., 2005, Possingham et al., 2006). However, despite the increase in the number and spatial extent of PAs (Maxwell et al., 2020), biodiversity loss continues (Butchart et al., 2010), sometimes even within these areas (Brandon & Wells, 1992; Craigie et al., 2010; Mora & Sale, 2011; Laurance et al., 2012). In assessing the progress made (or not) towards reaching the Convention on Biological Diversity's (CBD's) Aichi Target 11, Maxwell and colleagues (2020) noted that despite an increase in PA extent since 2010, long standing issues such as lack of resources and low management effectiveness compromised the global PA network's ability to conserve biodiversity. In SA in particular, the 2019 National Biodiversity Assessment indicated that despite the expansion of PAs and providing good protection, more than 85% of threatened species (birds, plants, freshwater fishes, amphibians, mammals and butterflies) are under-protected (Skowno et al., 2019).

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In December 2022, the CBD adopted the Kunming-Montreal Global Biodiversity Framework (GBF) (Convention on Biological Diversity, 2022). Following years of continued biodiversity loss, despite the goal set by Aichi Target 11 in 2009, Target 3 of the Kunming-Montreal GBF aims to "Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas… are *effectively conserved and managed* through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures…" (Convention on Biological Diversity, 2022, emphasis added). This target encapsulates the growing emphasis on the qualitative elements of PAs, as well as the quantitative elements (Convention on Biological Diversity, 2022). Target 3 of the Kunming-Montreal GBF is an update of Aichi Target 11, which stated, "By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through *effectively and equitably managed*, ecologically representative and well-connected systems of PAs and other effective area-based conservation measures and integrated into the wider landscape and seascapes" (Convention on Biological Diversity, 2010), emphasis added). This target was reported as "partially achieved" in the Fifth Global Biodiversity Outlook, and although progress had been made towards the numerical target, progress towards the qualitative elements of the target was much slower (Secretariat of the Convention on Biological Diversity, 2020). The importance of effective PA management is also emphasised in the International Union for Conservation of Nature (IUCN's) definition of a PA as: an "area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and *managed through legal or other effective means*" (Dudley & Stolton, 2008: p 9, emphasis added). These targets and definitions indicate that effective management is a critical element in ensuring that PAs across the world result in real protection and conservation of biodiversity (Chape et al., 2005; Coad et al., 2015).

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It should be noted that PAs, even effective ones, are not alone sufficient to halt biodiversity loss in the face of potentially conflicting development targets. The Kunming-Montreal GBF recognises this and Target 14 has been set to "ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework" (Convention on Biological Diversity, 2022). BRs present an opportunity to explore different kinds of biodiversity protection models, using various PA types, and balance conservation with the broader social and economic context, thus providing an inclusive environment for biodiversity protection that does not ignore development needs (Batisse, 1997; Bridgewater et al., 1996).

2.2 Protected area management effectiveness

The effectiveness of PAs is usually measured in one of two ways: how much biodiversity is being protected, and how well PAs are being managed (Chape et al., 2005). However, indicators of extent (how much is being protected) do not necessarily indicate whether the objectives of PAs are being met (Chape et al., 2005). PAME is defined as the extent to which a PA is being managed so as to protect its values and achieve its goals and objectives (Hockings et al., 2006). The issue of management effectiveness of PAs has gathered increasing attention over the last two decades, as more information has come to light about the threats faced by these important conservation assets (including direct threats, lack of resources, and a lack of capacity or institutional structure) (Maxwell et al., 2020; Hockings, 2003). PAME assessments were developed in order to support AM within PAs and PA systems (Coad et al.,

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2015). Evaluating the strengths and weaknesses of management techniques can assist managers and policymakers in more effectively managing their respective PAs (Coad et al., 2015; Hockings, 2003). This increased management effectiveness can be achieved through valuable monitoring and evaluation, adaptation of management, enhanced resource allocation, increased accountability and transparency, and improved community involvement (Hockings et al., 2006). Management effectiveness evaluation, when utilised correctly, also fosters a culture of learning, helps to inform planning and provides positive encouragement when management has been effective (Hockings et al., 2006).

PAME assessment tools such as the Management Effectiveness Tracking Tool (METT) (Stolton et al., 2003), the New South Wales State of Our Parks (SOP) method (Growcock et al., 2009), the Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) tool (Ervin, 2003), the Modified Threat Reduction Assessment (Anthony, 2008), and most recently, the IUCN's Green List of Protected and Conserved Areas (Hockings et al., 2019), have come to the forefront of conservation research as time- and cost-effective measures of the success of PAs (Anthony, 2014). Management effectiveness can be assessed through three main components: the design of the PA and the system, the appropriateness of management, and the achievement of PA objectives (Hockings et al., 2006). PAME assessments follow a generalised framework but are customisable according to the desired outcomes of the assessment and the context of a PA, PA network, region, or organisation (Hockings et al., 2006). PAME assessments divide management actions into several categories: context, planning, inputs, processes, outputs and outcomes (Figure 1) (Hockings et al., 2006). Doing so assists managers in understanding the root cause of successes or failures in management (Coad et al., 2015). PAME assessments can shed light on management efforts in varying levels and types of PAs, as they have been used across multiple types of systems throughout the world (e.g. Anthony & Shestackova, 2015) and each tool uses a standard method to collect

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information, allowing for some level of comparison (Coad et al., 2015). A global database of PAME assessments (GD-PAME) has also been developed as a useful resource which collects PAME data from across the world, including methodologies and indicators, and summarises them under a set of headline indicators (Coad et al., 2015). PAME tools are constantly evolving and some areas requiring improvement include implementing monitoring networks, increasing information sharing, continual evaluation of tool suitability and use of best practice (Anthony, 2014). PAME assessments can increase understanding of PAs and SES in local or regional contexts.

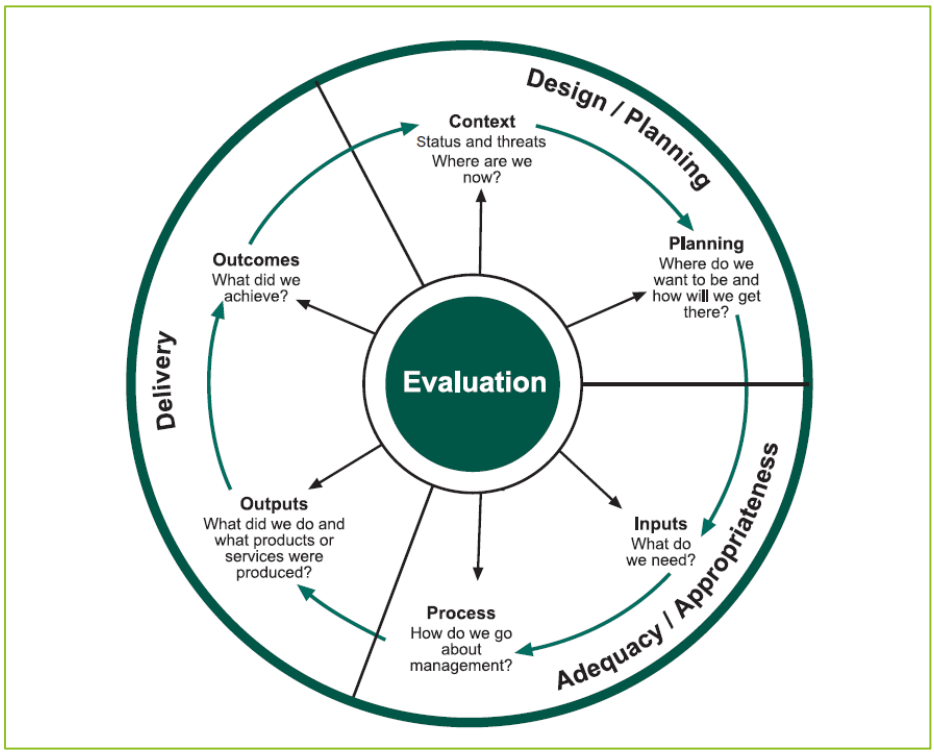

Figure 1: Framework for assessing PAME (Hockings et al., 2006).

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2.3 Biosphere reserve effectiveness

BRs present an opportunity to experiment with interdisciplinary approaches that balance both social and ecological needs (UNESCO, 2024b) in the face of changing conservation goals. The concept of BRs was developed under the United Nations Educational,

Scientific and Cultural Organisation's (UNESCO's) Man and the Biosphere (MAB) programme and there are now 759 BRs in 136 countries, 25 of which are transboundary sites (UNESCO, 2024a). BRs seek to reconcile biodiversity conservation and sustainable resource use through four strategic objectives: 1) biodiversity conservation, restoration of ecosystem services and sustainable use of natural resources, 2) contribution to sustainable, healthy and equitable human societies and economies, 3) facilitation of learning and education through biodiversity and sustainability science, and 4) support for climate change mitigation and adaptation (UNESCO, 2017). The main functions of BRs are conservation, logistic support, and sustainable development, implemented through a landscape model which contains three management zones (Figure 2): a *core* area/s, set aside for protecting biodiversity; *buffer* zone/s adjoining the core area/s, utilised for ecologically compatible land uses, research and education; and a *transition* area, which is flexible and may contain a variety of sustainably managed land uses (UNESCO, 1996). The idea of BRs as learning laboratories where knowledge, experience and experimentation serves to improve the relationship between conservation and development is a key focus area of the MAB programme (Ishwaran et al., 2008). BRs are just one example of many landscape tools that are being explored globally in order to balance human and ecological needs in SES; for example, the European Union funded Naturescapes project is investigating how assemblages of nature-based solutions can function on a landscape level to address complex sustainability issues (Naturescapes, 2024).

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Figure 2: Stylised portrayal of the Biosphere Reserve model (UNESCO, 2024b).

Conceptually, BRs present an attractive model for balancing divergent needs, however, the practical realisation of this goal presents a challenge (Coetzer et al., 2014; Ferreira et al., 2020). Not all conservation areas are suitable for BR designation and the network of BRs has been in fluctuation since the implementation of the Seville Strategy in 1995, when sustainable development became a key objective of the MAB programme (Price, 2002). In order to support AM, help to effectively allocate resources, encourage transparency and assist in involving a broader network of people in promoting values of the area being managed, the effectiveness of BR management can be evaluated (Hockings et al., 2006). Based on the definition of management effectiveness from the PAME literature, management effectiveness of BRs is defined as how well a BR is being managed in order to meet its particular goals (Hockings et al., 2006; Matar & Anthony, 2017). Management effectiveness encompasses design of individual sites as well as networks (such as BRs), adequacy and appropriateness of management systems and delivery of objectives (Hockings et al., 2006). When examining BR effectiveness using a SES framework, it becomes clear that there are multiple social and ecological factors, interacting at several scales (local, regional and international), which impact

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whether a BR can effectively achieve its objectives (Ferreira et al., 2018). Understanding and analysing the key factors affecting BR effectiveness improves understanding of management approaches and scale mismatches, and this understanding can contribute towards the improvement of long-term sustainability of BRs (Ferreira et al., 2018). There has been some history of inadequate linkage of conservation and effective sustainable development in BRs (Stoll-Kleemann et al., 2010). This disconnect may have been caused by lack of resources, differences in conservation and development agendas, structural barriers (e.g., poverty, corruption) or the initial lack of clarity regarding what sustainable development involved when BRs were first conceptualised (Stoll-Kleemann et al., 2010). The link between conservation and sustainable development must be addressed through knowledge exchange, adaptive and participatory learning, effective communication, recognition of local communities and improved local resource use regulation (Stoll-Kleemann et al., 2010). The BR concept may prove particularly effective in countries with a history of inequality, such as SA, as such countries face the challenge of addressing both conservation and lingering socio-economic needs; however, potential issues such as exploitative development agendas should be acknowledged and managed for (Coetzer et al., 2014). If social equity issues and exploitative agendas affecting a BR are appropriately addressed and managed, BRs present the potential to deliver social-ecological solutions through their integrated management approach, with an emphasis on human-centred conservation and learning (Coetzer et al., 2014). Furthermore, if different types of PAs are included within the BR, this diversity may contribute to the system's functionality and help to balance the trade-offs between economic and biodiversity objectives (Chidakel et al., 2020). However, as seen in a recent example from Vhembe BR in SA, BR designation alone cannot protect landscapes from exploitation under the guise of development, and need to form part of a wider commitment to biodiversity protection (Dzerefos, 2024; Living Limpopo, 2024).

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Since the implementation of the Seville Strategy in 1995, in order to encourage the AM approach, UNESCO has required BRs to assess their conformity to the designation criteria every ten years using the Periodic Review (PR) process, and this is currently the only mandated mechanism for evaluation of BR implementation (UNESCO, 1996; Matar & Anthony, 2017). A new tool has recently been developed to assist BRs in assessing management effectiveness (Biosphere Reserve Effectiveness of Management Index- BREMi), however, it has only been trialled in the Arab MAB network so far, and has not been adopted globally (Matar & Anthony, 2022). In comparison to PAME in individual PAs, the implementation of PRs in BRs has been much slower, with many BRs not complying to the requirement until the implementation of UNESCO's Exit Strategy in 2013, when non-compliant reserves faced removal from the network (Matar & Anthony, 2018). The PR process was successful in removing BRs which did not conform to the ideals of the model (usually voluntary removals by the member states) from the World Network of Biosphere Reserves (WNBR) (Coetzer et al., 2014). The PR process has also proved useful for refining the design and planning of BRs for implementation of the strategic goals (Matar & Anthony, 2017). However, the PR lacks indicators to measure outcomes-based effectiveness and is perceived by some as an exercise in compliance only, providing little practical benefit (Matar & Anthony, 2017). In addition, the ten year gap between evaluations is too long to monitor changes in management cycles (Matar & Anthony, 2017). Other issues with the PR process include bias as a result of self-evaluation, lack of communication from the regional MAB offices and, specific to the Arab region, problems with translation and political instability (Matar & Anthony, 2018). PRs have proven, in their current form, to be largely a soft evaluation tool, not adequate to truly assess the effectiveness of a BR in fulfilling its objectives (Matar & Anthony, 2017). Evaluation of management can be utilised as a tool for AM if it is approached as a learning and collaborative process wherein organisations work together to improve understanding of common issues, confront uncertainty

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and thus, increase their capacity to adapt to change (Reed & Egunyu, 2013). However, the PR's limited mandate and focus on compliance to designation criteria, rather than on performance of management, provides limited insight into understanding of root causes of success or failures in BRs, and in its current format is not well suited for improving BR effectiveness through AM (Matar & Anthony, 2017; Ferreira et al., 2018). There is some evidence to suggest that learning opportunities may start to emerge with subsequent assessments and improvements to the process (Reed & Egunyu, 2013). This exchange of learning in management is very compatible with the objectives of BRs and their requirement to engage in participatory processes (Reed & Egunyu, 2013). In order for PRs to become an effective learning tool in BRs, they need to encourage earnest self-evaluation and critical reflection by BR managers, as well as critical evaluation by external reviewers and stakeholders (Reed & Egunyu, 2013). Furthermore, PRs need to include mechanisms for follow-up of results in a timely manner to improve management of the BR as well as sharing of lessons across regional MAB networks (Reed & Egunyu, 2013). Despite the similarities between PAME and the BR PR process, the two processes remain completely separate and non-complementary, and the PR process does not currently meet several criteria for effective evaluation, specifically (Matar & Anthony, 2017):

- It is not certain whether the PR process is useful to managers or stakeholders.
- PR reporting is resource-intensive and perceived as an administrative exercise to fulfil top-down requirements of UNESCO.
- Many PRs do not include a satisfactory participatory process, as a result of lack of infrastructure to conduct these processes in some BRs.
- The PR form is not flexible to varying contexts of BRs.
- It is not well-designed to contribute meaningfully to an AM process.
- Indicators do not include room for expansion on the balance between human and natural perspectives.

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2.4 Local context: K2C and South African protected areas

2.4.1 Kruger to Canyons Biosphere Region

BRs are a major tool utilised for landscape-scale management in SA, alongside World Heritage Sites and transfrontier parks (Pool-Stanvliet, 2013). The first South African BR was designated in the Western Cape in 1998 (Pool-Stanvliet, 2013) and there are now ten BRs in the country (UNESCO, 2024a). South African BRs face two major challenges: a lack of information and support for the concept as a whole, and the perception that they are an instrument only for conservation, used to stimy development (Pool-Stanvliet, 2013). However, if these challenges can be overcome, BRs in SA present an opportunity to bring international recognition and funding to the region, foster collaborative thinking, and address national goals (such as climate change mitigation and adaption, and social development) (Pool-Stanvliet, 2013). In addition, they need to be supported by a system that recognises their importance and the importance of biodiversity conservation as a whole, or BRs in SA will continue to face challenges such as those currently faced by Vhembe BR, where a vast open-cast coal mining operation funded by a Chinese- South African partnership threatens water resources, rural communities, and thousands of protected trees, flying directly in the face of the goals of the BR model (Dzerefos, 2024; Living Limpopo, 2024).

K2C, the focus of this study, is located in the northeast of the country and was designated in 2001 through an initiative driven by the Lowveld Community (K2C, 2020; Pool-Stanvliet, 2013). K2C is a region of diverse geography, ecosystems, biodiversity, management types, land uses, and cultures (K2C, 2020). K2C encompasses 2 474 700 hectares (ha) of land across SA's Mpumalanga and Limpopo provinces (K2C, 2024). Of this, at least 1.4 million ha are dedicated to conservation, including a variety of PA types such as Kruger National Park

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(KNP), ten provincial reserves (a total of 898 300 ha of formally protected land) and many private nature reserves (an additional 40 000 ha) (K2C, 2020). The formally protected land (KNP and provincial reserves) constitutes the core of the BR, while the privately protected land makes up the buffer zone (Figure 3) (K2C, 2020). These PAs are managed through a variety of different governance structures, such as national and provincial level government (KNP and provincial reserves), private landowners, communities, and partnerships between some of these entities.

K2C encompasses several nationally important land uses, ranging from conservation and tourism in the core and buffer zones, to agriculture (commercial and subsistence), forestry, mining, and rural and urban development in the transition zone (K2C, 2020). Further complexity is added to K2C's PA network by land claims on protected land; a type of land reform introduced to SA after the end of Apartheid, which allows indigenous South Africans to reclaim land their forefathers were forcibly removed from in the past (Kepe et al., 2005). In South African PAs subject to land claims, the preferred solution is for settlement to be followed by a co-management arrangement between conservation authorities and the successful claimant communities (Kepe, 2008). However, the co-management model is not always successful and faces multiple challenges (Cundill et al., 2013; Qwatekana & Mazibuko, 2020). In some cases, it may be more practical to utilise other settlement options, such as financial compensation or a lease-back agreement (Qwatekana & Mazibuko, 2020).

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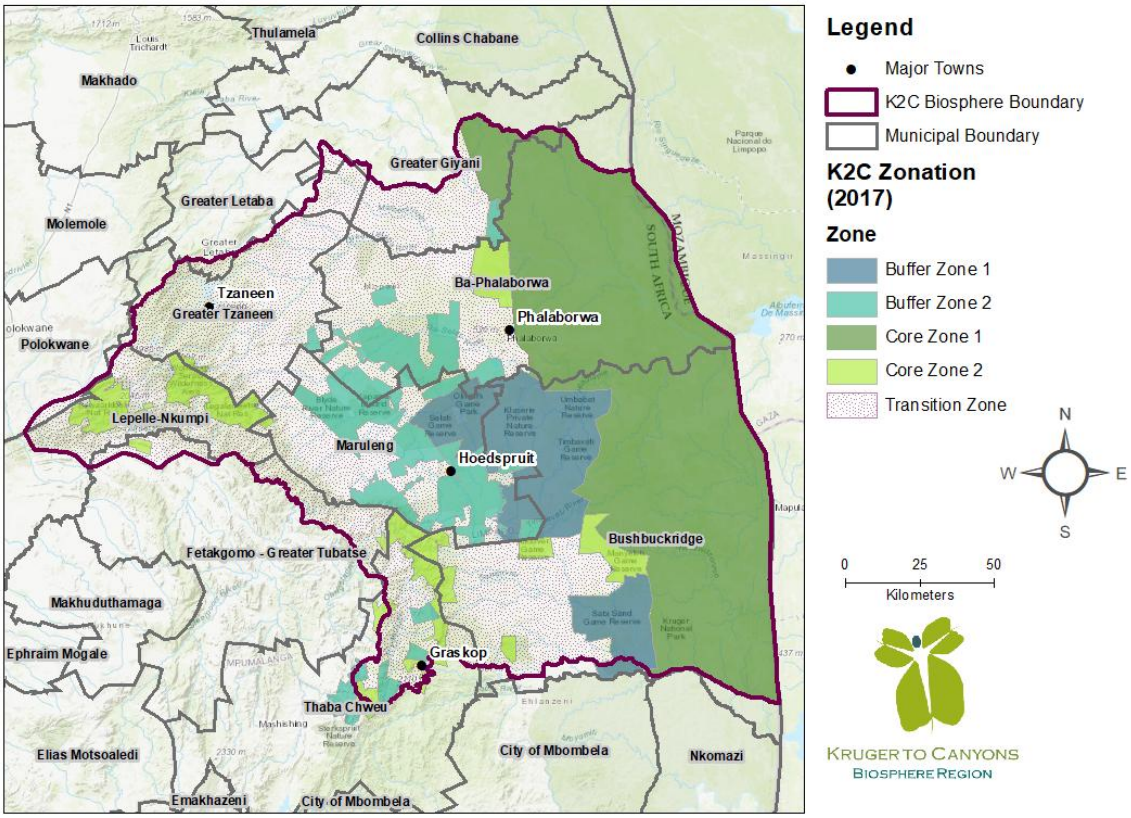

Figure 3: Zoning of K2C, indicting the core zones in shades of green, the buffer zones in shades of blue and the transition areas in stippled red (produced by and used with permission from K2C NPC, 2023).

The area currently occupied by K2C and its core reserve area, KNP, is marred by a difficult socio-political history. Between 1898 and 1926, indigenous people were removed from the land, resulting in a level of public hostility towards the park establishment (Venter et al., 2008). The nucleus of the KNP was formed in 1926, when Sabie Game Reserve, established in 1898, was merged with Shingwedzi Game Reserve, established in 1903 (SANParks, 2024). In 1948, the South African Apartheid government introduced the concept of "homelands", whereby black South Africans not directly engaged in active service to the white economy were forced to live in areas outside and away from white-populated areas (Pollard et al., 2003). These areas became overcrowded and impoverished, as the South African government placed minimal emphasis on investment and development of homelands (Pollard et al, 2003). Homelands for the Tsonga, Pedi, Venda and Swazi people were established in the lowveld of

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SA on or near the borders of KNP, resulting in a very high human population around some sections of the park (Pollard et al, 2003; but see Anthony, 2006, who demonstrated that there are areas within former homelands that are still ecologically intact, and able to support habitats and wildlife), in a region now partly included within K2C's boundaries. This in turn resulted in intense land utilisation in these areas for farming and harvesting, infeasible job creation schemes by homeland governments and high levels of conflict over land and resources – with the final result of high levels of political instability (Percival & Homer-Dixon, 1998; Pollard et al., 2003), a problem still plaguing the region around KNP. Bushbuckridge Municipality, one of the municipalities within K2C, is currently characterised by high levels of unemployment and poverty, as well as high rates of influx by foreign nationals (Bushbuckridge Local Municipality, 2018). Maruleng Municipality, the central node of the BR and the location of the K2C NPC offices, faces similar issues, including poverty, unemployment, dependence on subsistence living and limited access to basic services (Maruleng Local Municipality, 2023).

The Greater Kruger (GK) landscape, which includes KNP, the PAs adjacent to KNP on its western borders, and all the land users between the PAs and the critical water resource areas on the Drakensberg escarpment, supports a human population of over 2.5 million, living in rural and peri-urban communities (Conservation Outcomes, 2020b). While the GK operates across a larger landscape than the K2C (Figure 4), the opportunities and challenges in the two regions often overlap and are very similar (GKSDP, 2020). Challenges faced by the GK area outside PA boundaries include unemployment, poverty, lack of participation in the conservation economy, lack of basic services, protests, poor communication platforms, waste and pollution, human-wildlife conflict, land transformation and incompatible land use, unhealthy and/or polluted water catchments, animal diseases, dependence of the population on natural resources (including sand mining), mining impacts, poor governance, and climate change vulnerability (GKSDP, 2020). The GK area contributes approximately 18 700 jobs

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through leisure tourism, 6 600 through PA management, 135 through hunting tourism, and 69 through social investment (Conservation Outcomes, 2020b). GK PAs and the commercial operations within them employ an estimate of 68% unskilled workers, providing crucial job opportunities in an area where skill levels are low and unemployment rates high (Conservation Outcomes, 2020b). These four sectors further generate a total income of over R6 billion, contributing approximately R3.3 billion to the Gross Domestic Product (GDP) and R756 million in taxes, thus indicating the importance of PAs for the economy of both the local region and the country as a whole (Conservation Outcomes, 2020b). The PAs within the GK region of K2C are estimated to spend 89% of their operational costs within the local provinces (Conservation Outcomes, 2020b). PAs in the GK network also invest in community upliftment, either through direct donations or through capital-related or development programmes (e.g. upgrading or building infrastructure, or providing bursaries, etc.) (Conservation Outcomes, 2020b).

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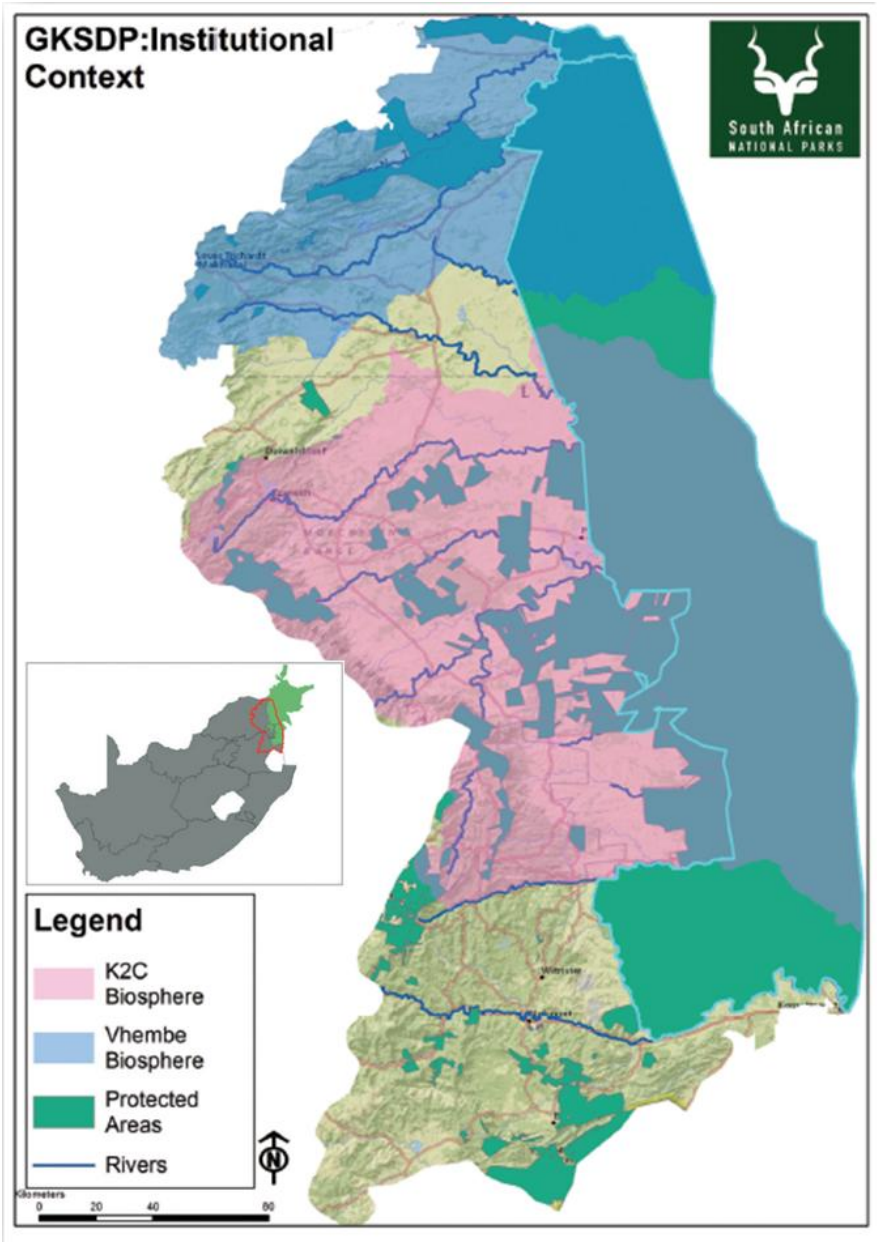

Figure 4: Map indicating the overlap of K2C with the GK landscape (K2C shown in pink) and the location of the GK in SA (outlined in red in insert) (GKSDP, 2020).

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Although not directly involved in direct management of the PAs, the K2C team, through contact with PA managers and landowners, assists in driving the legal declaration of protected land within the BR. The K2C team often works alongside the government and other organisations on projects involving the PAs, e.g. the Global Environment Facility (GEF) METT project and the government-funded Youth Employment Services (YES) project. The K2C team's contact with the PA managers through its various projects results in the formation

of good working relationships, which in turn creates opportunities for future projects. K2C is not legally obligated to assist the PAs within its boundaries, but by supporting PA management, it ensures the effective protection of its core and buffer zones, which contributes toward the MAB objective of biodiversity conservation.

K2C actively produces research through a number of partnerships with tertiary education facilities, as well as the SAEON (South African Environmental Observation Network) Ndlovu Node, which focuses on research in the savanna biome (Pool-Stanvliet & Coetzer, 2020). Between 2013 and 2023, K2C in partnership with local management authorities, implementation partners, and funders, has implemented over 20 projects in the region (K2C, 2023a). Many of these projects aimed to link biodiversity conservation and sustainable development, with various focal points, including PA expansion and conservation area management, water security and catchment restoration, agro-ecology and sustainable land management, and increasing capacity and environmental awareness in local communities (K2C, 2023a). Between 2017 and 2023, K2C, through engaging with landowners and government representatives, supporting and guiding the administrative declaration process and creating management plans for prospective PAs, assisted in legally declaring 110 542 ha of land under the National Environmental Management: Protected Areas Act (NEM:PAA/NEMPAA, Act 57 of 2003). This led to improved management of 59 615 ha, and restoration of 33 642 ha of land (K2C, 2023a). In addition, 72 METT assessments were conducted within 24 PAs, 6 PA management plans were supported, and over 70 000 iNaturalist observations were noted (K2C, 2023a). Due to the K2C being reliant on external funding based on specific initiatives, all projects are aimed at implementation, rather than monitoring- except in cases where monitoring is the focus of the fund, such as the GEF METT project (see Section 7.1.2 for more information). The K2C was involved in the creation of approximately 308 jobs per year for this time period, created seven documentary films, held 12 research colloquiums,

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and supported 18 research studies in the landscape (K2C, 2023a). The work of K2C is intrinsically linked to the GKSDP, and the impact of the work conducted through the BR is far-reaching and highly impactful (K2C, 2023a).

2.4.2 Protected areas in South Africa

SA depends on PAs as vital components of its ecological infrastructure, providing ecosystem services and resilience (DEA, 2016). National legislature in the form of the NEM:PAA recognises several categories of PAs (special nature reserves, national parks, nature reserves, marine PAs, and protected environments) as well as world heritage sites (specially protected forest areas and mountain catchment areas) (DEA, 2016). K2C, with its magnitude and diversity, contains many of these different types of PAs: a national park, multiple nature reserves, a protected environment, and some forest nature reserves. At the time of publishing, the National Protected Area Expansion Strategy (NPAES) was noted as being implemented through the country's 12 PA agencies, including the nine provincial agencies, South African National Parks (SANParks), Department of Agriculture, Forestry and Fisheries (DAFF) and Department of Environmental Affairs (DEA) (DEA, 2016) - DAFF and DEA have subsequently been merged to form the Department of Forestry, Fisheries and the Environment (DFFE). As the K2C covers land in both Mpumalanga and Limpopo provinces, both provincial institutions (Mpumalanga Tourism and Parks Agency, MTPA, and the Limpopo Department of Economic Development, Environment and Tourism, LEDET) operate within the landscape and are responsible for PA management at a provincial level. K2C includes a large portion of KNP, which is managed by SANParks, and the forest nature reserves within its boundaries are managed by DFFE or its partner institution, South African Forestry Company SOC Limited (SAFCOL). The NPAES makes particular note of the institutional and budgetary constraints facing PA expansion in SA (DEA, 2016). A recent study emphasised this, stating a limited

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capacity to implement PA expansion and management as a barrier to the effectiveness of SA's PA network (Patel et al., 2023). First, very few staff members are dedicated to PA expansion, and those who are, are unevenly distributed throughout the institutions (DEA, 2016). Second, institutions have highly variable annual operational budgets, and only R15 million was set aside for all terrestrial institutions excluding SANParks (DEA, 2016). NEMPAA and SA's active and successful biodiversity stewardship programme allows for provincial conservation agencies to utilise contractual agreements to increase their PA estate (DEA, 2016; SANBI, 2018). In such cases, the landowner or community who owns the land retains ownership but agrees to certain restrictions, which are often recorded in the title deeds and are thus enforceable even if the land changes hands (DEA, 2016). In return, the provincial agency commits to assisting with certain management matters, to a greater or lesser extent depending on the agreement and the agency's capacity (DEA, 2016). Through signing these biodiversity stewardship contracts, landowners and communities can contribute to the province's PA estate, and they are benefitted by exclusion from property rates, a form of tax levied on the market value of land (DEA, 2016). During implementation of Phase 1 of the NPAES, which occurred between 2008 and 2014, 67% of the newly declared land was either privately owned or under communal tenure (DEA, 2016). This figure highlights the importance of biodiversity stewardship through contractual agreements with landowners in the country's efforts to increase the amount of land under protection (DEA, 2016; SANBI, 2018). K2C is no different in this matter, with 400 000 ha of its 1.4 million ha of protected land under private ownership in 2020, a figure which has certainly increased since (K2C, 2020).

According to South African law, specifically NEMPAA and its associated Norms and Standards (Norms and Standards for the Management of Protected Areas in South Africa, GN 382), PAs are required to report on the implementation of their management plans, and this applies to the PAs within K2C. In addition, some PAs within the K2C network (including KNP

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and those with open borders to KNP) are part of the Great Limpopo Transfrontier Conservation Area (GLTFCA) Cooperative Agreement (Conservation Outcomes, 2020a). As part of this agreement, signatory PAs need to adhere to guidelines for PA monitoring, evaluation and reporting, which aim to ensure compliance to legislative and regulatory requirements, create a standardised reporting process and ensure reports are correctly prepared and submitted (Conservation Outcomes, 2020a). The guidelines give direction to monitoring, evaluating and reporting of PA management so as to ensure that AM is encouraged, monitoring is relevant and scientific, actions are suitably recorded and reported on, and a level of transparency is ensured (Conservation Outcomes, 2020a). In order for the PAs to adhere to the guidelines, they implement the METT-SA (a South African specific version of the METT) to measure management effectiveness (Conservation Outcomes, 2020a). This process also assists them in adhering to the reporting requirements of NEMPAA's Norms and Standards (Conservation Outcomes, 2020a). The aim of this requirement is to encourage PAs to adapt their management plans periodically, in accordance with the findings of the METT (Conservation Outcomes, 2020a). In this way, select PAs in the K2C purportedly implement AM: namely, those within the GLTFCA project, and provincial PAs. However, it should be noted that a study conducted in 2023 identified that in general, South African provincial PAs are not being managed effectively (Patel et al., 2023). Provincial PAs in Mpumalanga and Limpopo, the two provinces K2C encompasses, were amongst those found to be facing the greatest number of challenges to effective management (Patel et al., 2023). Challenges faced by provincial PAs include inadequate budgets, high levels of vacancies and loss of experienced staff, poaching, unmaintained fences, alien invasive species, poor tourism infrastructure, lack of return on investment, irregular expenditure and imbalanced salaries (Patel et al., 2023). Thus, the AM approach in certain PAs in the region is likely not being fully implemented.

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While there is no silver bullet solution in the context of global biodiversity loss and local under-protection, effectively managed, adaptive PAs that foster learning are a key weapon in the arsenal of biodiversity and ecosystem protection. When PAs exist within a BR, such as in the case of K2C, there is an opportunity to create a balanced SES that results in benefits for both humans and biodiversity. PAME measurements can also be utilised to show whether the BR is meeting its biodiversity conservation objective. This research will seek to understand the status of PAME within PAs in the K2C, a South African BR that contains both extremely high levels of biodiversity, and a large human population plagued by poverty and unemployment.

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CHAPTER 3: THEORETICAL FRAMEWORK

The investigation of the implementation of PAME in a South African BR requires development of a layered conceptual framework, in which the first, all-encompassing layer recognises the complexity of PAs and BRs as SES, with varied challenges and opportunities. The second layer of the framework is the use of PAME as an AM tool to monitor management actions in an SES that is subject to a multitude of changing environmental and social pressures. A third layer of the framework is added by the use of AM to build resilience in PAs, in order to allow them to persist through time in the same, similar, or improved state. This framework provides a theoretical basis for the ultimate goal of the research: improved understanding and management of PAs in a BR, a complex SES, in order to provide sustainable, long-term biodiversity protection alongside human development. This framework is depicted in Figure 5.

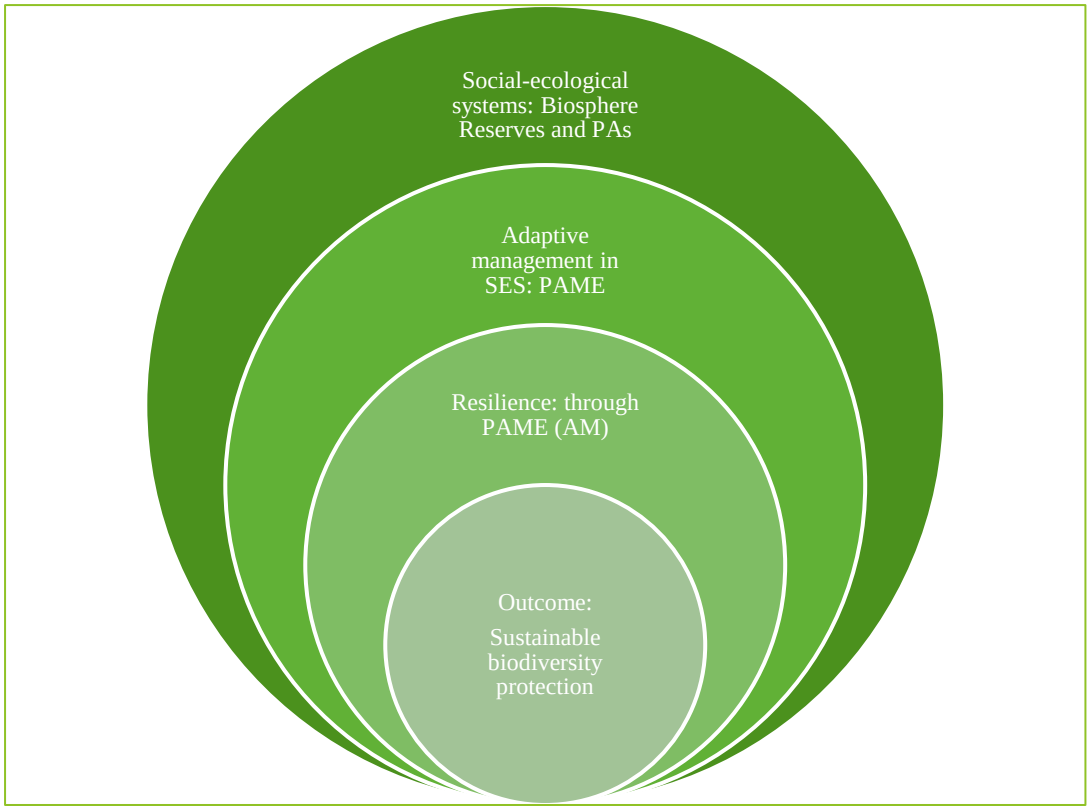

Figure 5: Theoretical and conceptual framework.

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3.1 Social-ecological systems framework

According to the SES framework proposed by Ostrom (2009), SESs are composed of several subsystems: a resource system, a resource unit, users, and governance systems (Figure 6). Each subsystem contains multiple second-level variables, the importance of which vary depending on the system and topic under study (Ostrom, 2009). Examples of second-level variables within a resource system include clarity of boundary, size of the system, productivity of the system and predictability of system dynamics (Ostrom, 2009). Examples of resource unit variables include resource unit mobility, growth or replacement rate, economic value and number of units (Ostrom, 2009). Examples of user second-level variables include number of users, leadership, norms or social capital and knowledge of the SES (Ostrom, 2009). Finally, examples of governance system second-level variables include government organisations, non-government organisations and operational rules (Ostrom, 2009). The subsystems and the variables within them interact to produce outcomes that affect the entire SES, which then feedback to affect the subsystems, their components and other SESs (Ostrom, 2009). This framework purports that humans have the ability to self-organise in such a way so as to sustainably utilise the natural resources within a SES; however, the likelihood of this occurring depends on what factors are affecting the system (Ostrom, 2009). For BRs to be sustainable over time (a key objective), self-organisation is important and results in relative stability, in the sense that the system's variability stays within one domain of attraction (i.e. there is a high level of system resilience) (Allen et al., 2014).

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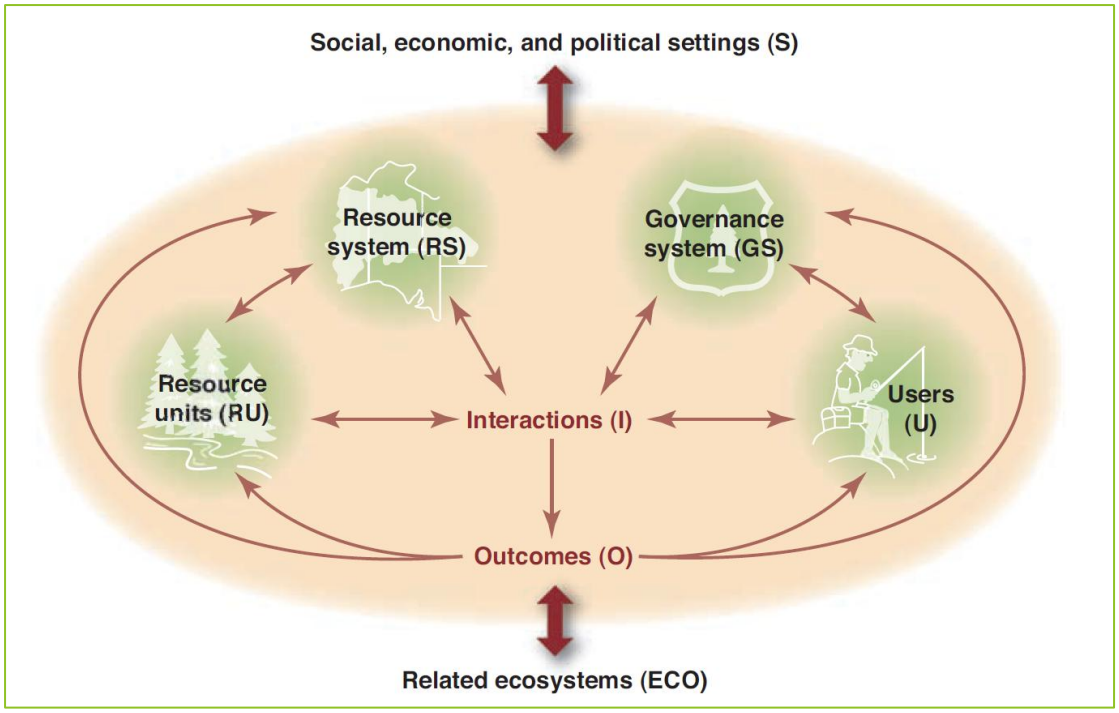

Figure 6: The subsystems to be considered in analysing SES (Ostrom, 2009).

Over time, the view of PAs as exclusion zones has changed to reflect the increased awareness of the interconnection between humans and ecosystems; PAs can now be understood as complex SES in which ecological, socio-economic and political processes interact (Cumming et al., 2015). PAs are also known to provide a number of benefits to humans through the provision of ecosystem goods and services, including those related to economy, culture and well-being (Buckley et al., 2019; Dudley et al., 2010) - although the distribution of which societal sectors actually enjoy these benefits may be contested (Dudley et al., 2010, Chidakel et al., 2020). People usually modify the ecological systems on which they depend through means such as habitat simplification and fragmentation, which then affects the system's function, stability and resilience (Cumming & Allen, 2017). This modification often results in unforeseen ecological changes and a series of complicated feedback loops (Cumming & Allen, 2017). In order to reach their objectives, PAs need to be developed for long-term ecological, socio-economic and political sustainability (Cumming & Allen, 2017).

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Adaptive dynamics are an inherent characteristic of SESs: components of the system, their interrelationships, and the internal changes and unpredictability that follow should be allowed to change and the system should adapt to this, without shifting to a different state (Cote & Nightingale, 2012). Within PAs, there are clear social and ecological interactions. Ostrom (2009) proposes that the first step in maintaining a sustainable SES is the identification of the relevant factors and analysis of their inter-relationships. Following this, in order to ensure sustainability of PAs, it is important to understand what ecological, social and political factors or contexts impact and shape the system across multiple scales (Cumming et al., 2015). In doing so, the emphasis is placed on embracing the complexity of the system, rather than attempting to disaggregate and simplify it (Ostrom, 2009). Thereafter, once understanding the role/s that the social context plays on the system, it may be necessary to include a diverse group of stakeholders in management decisions, in order to develop more suitable management guidelines (Armitage et al., 2009), which draw upon both social and ecological approaches (Cote & Nightingale, 2012). Inclusion of the social approach in such systems may allow for analysis of important social dynamics, such as power and culture, which may be overlooked by taking a purely ecological approach (Cote & Nightingale, 2012). The following implications must be considered when managing PAs as SESs, and are therefore of importance for PAs within K2C: 1) scales of processes affecting management can be identified through analysing drivers of change; 2) when planning new PAs, long term success may be improved through an emphasis on larger areas encapsulating a variety of different objectives; and 3) institutional systems may form barriers to AM of PAs as SES, and these should be challenged in order to balance bottom up and top down influences (Cumming et al., 2015). In fact, in several cases where various different stakeholders have worked together and successfully dealt with natural resource issues, social networks were proven to be an extremely important element in the process, even more so than formal institutions, and this should be leveraged within the K2C

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landscape to ensure that current scientific research and indigenous traditional knowledge are utilised to maximise AM (Bodin & Crona, 2009).

3.2 Adaptive management theory

Due to the lack of scientific understanding of mechanisms at work within complex SES, there have been difficulties in translating science into practical management recommendations (Allen & Garmestani, 2015). AM is a management approach based on scientific understanding, which focusses on managing for uncertainty, questioning assumptions and "learning through doing" (Allen & Garmestani, 2015). The AM model recognises that the various interactions and feedback loops present in SES result in inherent unpredictability; this recognition can then be leveraged by managers to foster resilience and flexibility (Holling, 2001, Allen & Garmestani, 2015). There are many variations of the plan-do-check model, and different versions of the AM process have been proposed and utilised in management science - most of these are consistent in that they revolve around six core steps (Figure 7) (Allen & Garmestani, 2015):

- Assess: relevant stakeholders should be involved in assessing the management scenario in relation to baseline data.
- Design: setting of objectives and relevant, testable management policies.
- Implement: action the management policies with scientific rigour.
- Monitor: monitor the outcomes of the action.
- Evaluate: check the monitoring data to determine whether new information was gained and how it compared to expectations.
- Adjust: make changes to the management policy in light of information gained during monitoring and evaluation.

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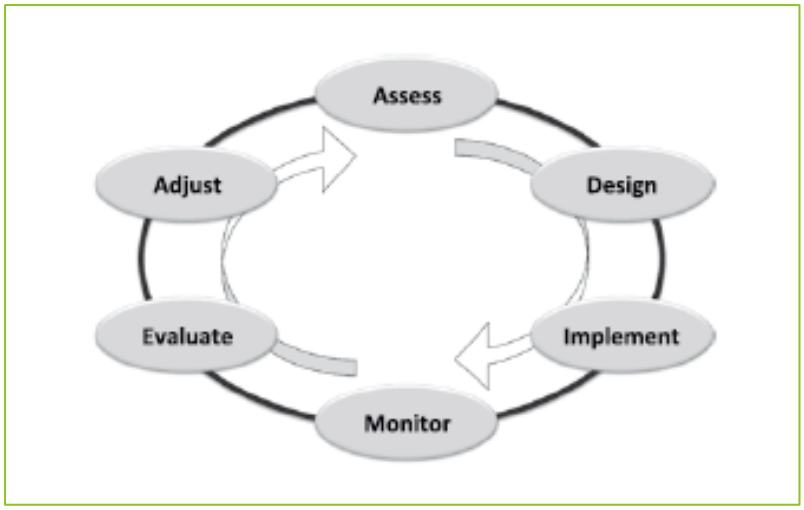

Figure 7: The adaptive management cycle (Allen & Garmestani, 2015).

This iterative cycle is then continuously repeated in order to create a feedback loop of learning (Allen & Garmestani, 2015). The circular AM cycle commonly referred to in conservation consists of the following phases, as shown in Figure 8 (Conservation Measures Partnership, 2004):

- Conceptualisation: define team, scope, vision, and targets, identify threats and complete situation analysis;
- Planning: develop action plan (including goals, strategies, assumptions, and objectives), monitoring and evaluation plan and operational plan;
- Implementation: develop short-term work plan and timeline to implement desired actions, develop and refine budget and then implement the plan;
- Analysis: collect and prepare data for analysis, analyse the results;
- Use/adaptation: use results and adapt strategic plan where necessary;
- Communication: document what was learnt, communicate the lessons, and create a learning environment; and
- Iteration: start the process from the beginning.

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This circular process allows for information to feed back into the system (Hockings et al., 2006).

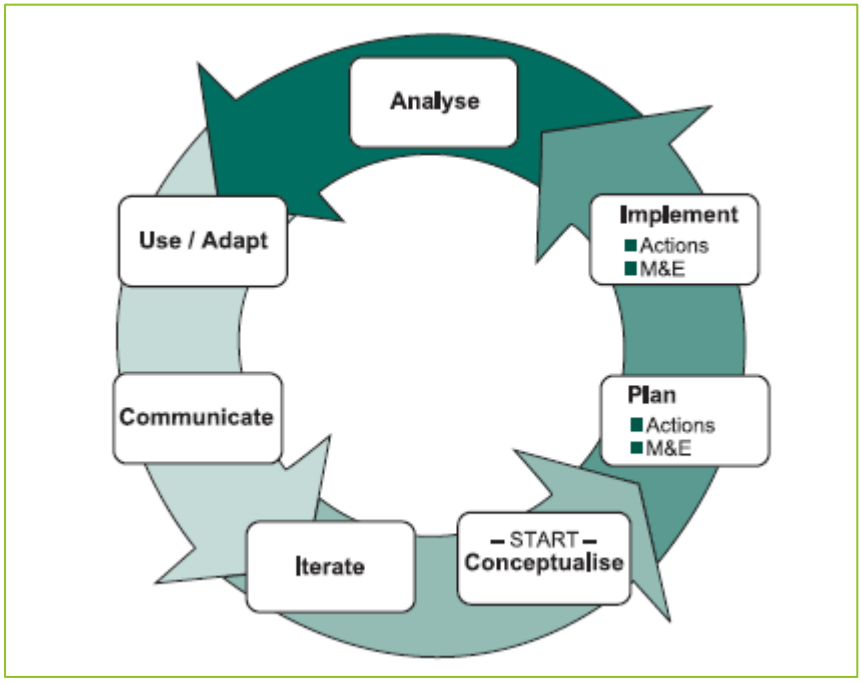

Figure 8: The adaptive management cycle (Hockings et al., 2006, sourced from Conservation Measures Partnership, 2004).

When AM is put into practice, learning can occur over a short period of time, through experimentation, as well as over a longer periods, for individuals and within organisations (Berkes & Turner, 2006; Fabricius & Cundill, 2014). Single loop learning is learning from existing practices in order to improve performance, while double loop learning is critically reflecting on and inquiring into the governing variables, values and norms of the organisation (Tosey et al., 2012; Fabricius & Cundill, 2014). If AM is ideally implemented, managers should experience both types of learning (Fabricius & Cundill, 2014). Single loop learning is imperative for making progress in ecosystem management, and double loop learning is important for innovation and critical review (Fabricius & Cundill, 2014). In addition, learning about the learning process itself ("deutero-learning") should also occur when AM is practiced (Fabricius & Cundill, 2014).

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AM provides the capacity to adapt and respond to change in order to persist, and thus, can assist unpredictable SESs in becoming more resilient (Folke et al., 2010, Allen & Garmestani, 2015). AM has much potential for use in PAs, particularly if similar management approaches are used in several systems or across broader networks (Leverington & Hockings, 2004). One of the major reasons PAs undertake management effectiveness evaluations is to improve management in changing social and ecological environments using an adaptive approach (Hockings et al., 2006). However, as in the case of BR PRs, sometimes evaluations are completed purely to comply with top-down directives (Matar & Anthony, 2018). The benefits of utilising AM in PAs include the following:

- Evaluation of management decisions allows managers to:
    - review and understand the strengths, weaknesses, and outcomes of a management decision;
    - learn from the results;
    - adapt and improve strategies towards improved effectiveness;
    - address threats more appropriately; and
    - maximise benefits achieved from PA (Hockings, 2003, Hockings et al., 2006, Roux & Foxcroft, 2011).
- The process encourages the view of unanticipated outcomes as learning opportunities that are integral to the process, rather than as mistakes (Leverington & Hockings, 2004).
- Utilisation can improve understanding of the management process, build a good knowledge base for any potential future projects and to share knowledge and insights between different PAs or networks (Leverington & Hockings, 2004).

Strategic adaptive management (SAM) is a version of the AM approach used in KNP, as well as other national parks and PAs in SA, which emphasises multiple feedback loops between the stages of the AM process (Roux & Foxcroft, 2011, Biggs et al., 2011). The aim of

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SAM is to be strategic about planning actions, adaptive (so that learning takes place), and participatory (Roux & Foxcroft, 2011). SAM differs from the conventional AM approach in its nested or modular approach, which provides the opportunity for managers to begin at any step of the adaptive cycle (Roux & Foxcroft, 2011). Use of the SAM framework within SANParks reserves has been largely in relation to biophysical factors, such as biodiversity monitoring (Anthony & Swemmer, 2015). Understanding of how SAM is, or can be, utilised within the social realm of an SES is limited and faces several challenges (e.g. application of qualitative methods in a conservation setting) (Anthony & Swemmer, 2015). Thus, this research will delve into the application of SAM within a social-ecological context (PAs within a BR), generating useful insight into the real-world application of SAM in complicated SES.

Adaptive co-management is a form of AM that emphasises mutual learning and cooperation between various stakeholders, such as local communities, researchers and conservation agencies (Roux & Foxcroft, 2011). SAM incorporates the iterative learning approach of AM, the focus on mutual learning from adaptive co-management, and the emphasis on looking forward (or strategizing) to encourage actions based on foresight and purpose (Roux & Foxcroft, 2011). Utilising an AM approach in a complex SES is likely to result in many learning opportunities, due to the inclusion of diverse stakeholders, open communication, and exposure of stakeholders to new knowledge sources and worldviews (Fernández-Giménez et al., 2019; Schusler et al., 2003). The steps in the SAM cycle are as follows: vision creation, objective setting, scoping of options for objectives and implementation of selected objectives, followed by evaluation and learning (Figure 9, Roux & Foxcroft, 2011). These steps are divided into three broad categories: adaptive planning, adaptive implementation and adaptive evaluation (Roux & Foxcroft, 2011).

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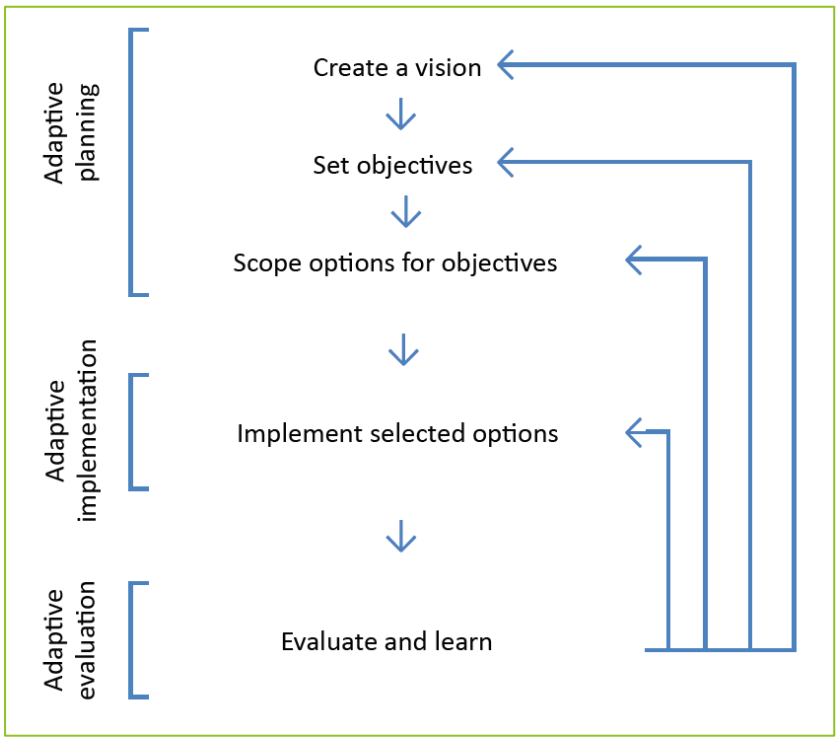

Figure 9: Steps of the strategic adaptive management process (Roux & Foxcroft, 2011).

3.3 Social-ecological resilience

Using the resilience concept of panarchy is helpful to understand PAs and BRs, as understanding scale and processes across different scales is key to SES management and sustainability (Berkes & Ross, 2016). Although panarchy was initially an ecological concept, it can be applied to systems in which humans and the environment interact (Berkes & Ross, 2016). Panarchy has been described as the concept of complex and continually evolving systems, such as linked human-nature systems or SES, "interlinked in never-ending adaptive cycles of growth, accumulation, restructuring, and renewal" (Holling, 2001: p 392). Adaptive cycles (Figure 10) consist of three major elements which shape the response of the system to crises: 1) potential for change, which determines the number of possible future outcomes in the system; 2) connectedness between variables and processes, which reflects system flexibility and/or rigidity; and 3) adaptive capacity, which reflects the system's ability to remain

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functional in the face of perturbation (resilience) (Holling, 2001). Adaptive cycles go through phases of exploitation, conservation, release and reorganisation (Figure 10). During the exploitation phase, there is rapid colonisation of recently disturbed areas: in ecological systems, easily dispersed and rapid growing species (pioneer species) compete for available resources, and in social systems, opportunists enter an entrepreneurial market with innovative ideas for products or services, which can aggressively dominate the market (Gunderson & Holling, 2002). As the system proceeds slowly (usually over a long period of time) to the conservation phase, it accumulates energy, resources, capital, or material (Gunderson & Holling, 2002). In an ecosystem, this is represented by an accumulation of resources for growth, slower growth, competition (a few species compete for available resources) and moderated microclimatic variability (Gunderson & Holling, 2002). In a socio-economic system, this phase could be represented by a bureaucratic hierarchy in businesses, where potential accumulates in the form of employee skills, networks of relationships and trust between suppliers and clients (Gunderson & Holling, 2002). In this phase, connectedness (the interactions between the various system users) and stability increase as resource capital increases (Gunderson & Holling, 2002). The most successful system users (including humans) utilise the system resources to expand and accumulate potential, thus controlling external variability (Gunderson & Holling, 2002). Connectedness increases as entities form relationships, dominant actors prevent other competitors from utilising resources despite potential for such use being high, and the system becomes more rigid; in turn, resilience decreases, and the system becomes more vulnerable to disturbances (Gunderson & Holling, 2002). The next phase is that of release, or "creative destruction": at this point, the system users have become overconnected and are suddenly released, as connections are severed by a disturbance (Gunderson & Holling, 2002). In an ecological system, the release could be facilitated by a fire, an outbreak of pests, a drought, or any other shock to the system (Gunderson & Holling, 2002). In a socio-economic

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system, release could take the form of a new company director who questions the way things have been done, an over-saturated market resulting in narrowed profit margins, or a new minister in government who changes rules or regulations (Gunderson & Holling, 2002). In a company that has become over-bureaucratised, rigid and internally-focused (over-connected) this could trigger the release or downfall, resulting in cost-cutting and loss of trust. After the release phase, there is a sudden increase in uncertainty as the system quickly proceeds to the reorganisation phase (Gunderson & Holling, 2002). The reorganisation phase provides high potential for growth (Gunderson & Holling, 2002). In an ecological system, this phase is represented by soil processes allowing nutrients to become available for use by species, and the appearance of pioneers taking advantage of this opportunity (Gunderson & Holling, 2002). In a socio-economic system, the potential takes the form of an economic recession or social transformation, paving the way for innovation and restructuring of society or business (Gunderson & Holling, 2002). In this phase, interactions between all elements in the system are weak and connectedness is low; thus, any number of new or different connections could form (Gunderson & Holling, 2002). During the reorganisation phase, resources become available for exploitation and the adaptive cycle starts again (Gunderson & Holling, 2002). Importantly, in a sustainable system, resources are only partially eroded after a disturbance, not completely eliminated, thus allowing the system to fluctuate without flipping into a different state or going extinct (Gunderson & Holling, 2002). In K2C, for example, this sustainability could be represented by a new management team supporting the BR, causing a disturbance in the previously established system; however, no money, human capital or biodiversity would be lost. Therefore, that capital (human and natural) would be available for the management team to utilise in developing new system connections. At this time, it is estimated that the K2C as a system is in the mid-stages of the conservation phase, slowly accumulating resources in the form of financial capital, network connections and skills.

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Designation of the K2C as a BR in 2001 (23 years ago) may have acted as a release mechanism for the previous system, and during reorganisation, the K2C management team was a new connection that formed. It should be noted that the K2C is a very large and complex system: smaller systems within the region may indeed be in their own phase of the adaptive cycle (for example, a private PA within the system may have just been taken over by new owners with different management ideas, thus placing it in the release or reorganisation phase).

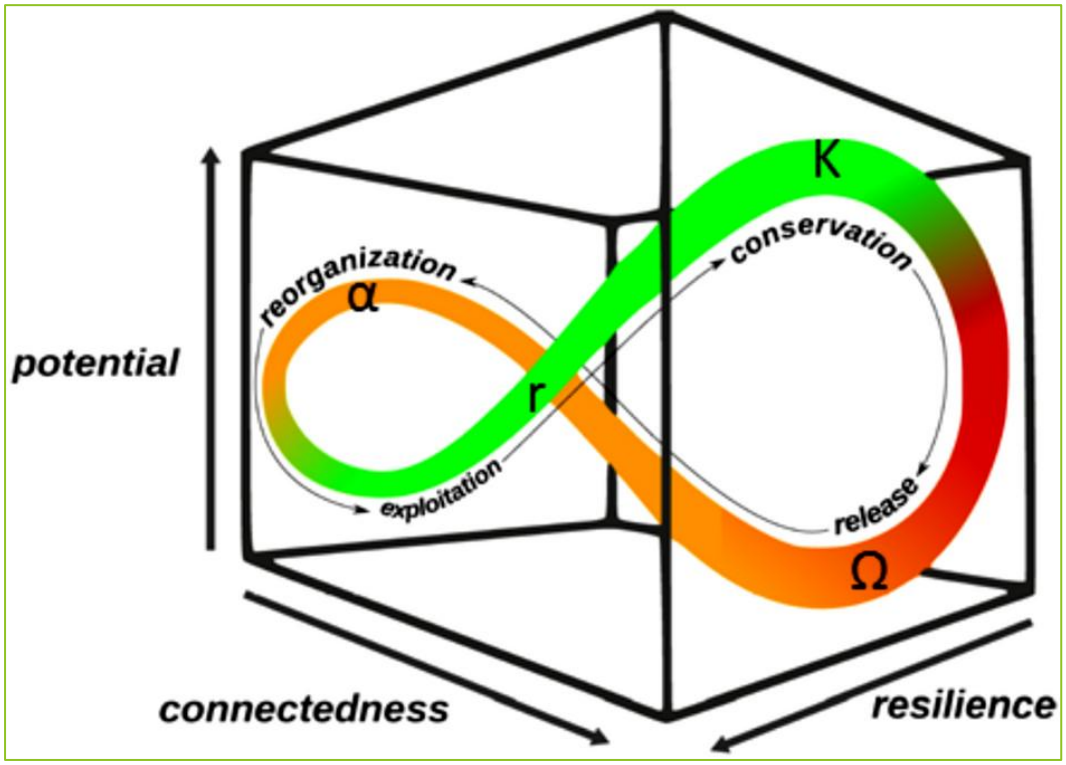

Figure 10: Diagram illustrating the movement of a system between the phases of exploitation, conservation, release and reorganisation. Closely spaced arrows indicate a slow process, whereas long arrows indicate a sudden change. Two system properties are reflected on the x and y axes: potential and connectedness (Gunderson & Holling, 2002, sourced from Castell & Schrenk, 2020).

Resilience, according to Holling's definition pertaining to ecological systems, is the ability of systems to absorb changes to internal and external variables and still persist (Holling, 1973). The resilience of the system determines the likelihood of either its persistence or extinction (Holling, 1973). Since its conception, the theory of resilience has been extended to

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apply to SES, following the recognition that humans and nature are inextricably linked (Folke et al., 2010). Resilience in the context of SES refers to the ability of the system to adapt to change, without exceeding a critical threshold whereby the system would change irreversibly or shift regimes to an undesirable state (Walker et al., 2004; Folke et al., 2010). "Resilience thinking" requires understanding that the world is changing, and that when engaging with that change through understanding, it is possible to work with change rather than be a victim of it (Walker et al., 2004). Resilience fluctuates as the system moves through the adaptive cycles discussed above (Gunderson & Holling, 2002). Periods of low connectedness and high resilience and potential, such as the reorganisation phase, present opportunities for novelty and experimentation: the resilience in these stages allows for testing of different connections (facilitated by the low connectedness) without risk of completely losing the system (Gunderson & Holling, 2002). Resilience remains high and connectedness low in the exploitation phase, as the system users are adapted to high variability (Gunderson & Holling, 2002). SES are highly complex and affected by multiple variables, which makes prediction almost impossible, even if all the components are understood (Walker et al., 2004). Some of the variables in a SES can be considered key to system change. If the threshold of one of these variables is crossed, it may result in undesirable change to the whole system (Walker et al., 2004). Resilience can be measured by the system's distance from those thresholds, i.e. how close it is to crossing the threshold and changing the regime of a key variable (Walker et al., 2004). Focussing on resilient systems will encourage development of sustainable SES that can adapt to a variety of changes (Walker et al., 2004).

Using the resilience concept in management of PAs and PA networks would allow PAs to maintain their function when faced with external factors, which they are vulnerable to (Cumming et al., 2015, Maciejewski et al., 2015). In order for PAs to be resilient to change, they need to be politically viable for the foreseeable future, in relation to both their biophysical

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character, as well as their management (Cumming et al., 2015). Within a panarchy, processes act from top-down, bottom-up and side-to-side (Allen et al., 2014). As previously discussed, there are multiple elements working across multiple scales within PAs and PA networks that need to be understood in order to manage them for long-term resilience (Cumming et al., 2015). For example, the societal benefit of PAs, such as nature-based tourism, affects their resilience through cross-scale interactions, which need to be identified and mitigated (Maciejewski et al., 2015). Effectiveness, as well as issues and opportunities in SES such as PAs and BRs, may have integrated social and ecological influences across various scales (Ferreira et al., 2018).

When examining K2C as a complex SES, it becomes clear that the resilience and sustainability of the system is impacted by actors and processes at various scales. For example: K2C's international BR designation requires the management team to make decisions with the aim of complying to this designation. These decisions impact the BR at much smaller scales, e.g. individual PAs are required to properly mark their boundaries. As another example, SA's national and provincial laws impact individual PA scale management decisions within K2C. The NEM:PAA governs designation, management and administration of PAs within K2C, while the Mpumalanga Nature Conservation Act (Act 10 of 1998) and the Limpopo Environmental Management Act (Act 7 of 2003) at the provincial level governs natural resource use within areas of K2C in the Mpumalanga and Limpopo Provinces respectively. Communities, businesses and individuals within K2C are impacted by the above-mentioned processes and may affect higher-level processes through their actions as well. In a final example, individuals within a community may pollute a water resource through illegal dumping. This in turn results in management implications further downstream for PAs and agricultural businesses. These examples indicate that K2C is a complex web of interactions between varying scales of organisation within the region, and all of these processes need to be considered when examining effectiveness and resilience of the BR. Thus, the resilience of the

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PAs and their governance models impacts the resilience of the BR as a whole. This research specifically addresses the monitoring and evaluation of PA-level management effectiveness within the K2C, which impacts and is impacted by different actors and processes at higher and lower levels.

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CHAPTER 4: METHODOLOGICAL APPROACH

4.1 Epistemology

In order to answer the research question and sub-questions, this research employed a mixed-method or hybrid approach using both quantitative and qualitative data, based on epistemological pluralism, or the theory that "in any given context, there may be several valuable ways of knowing, and … accommodating this plurality can lead to a more successful integrated study" (Miller et al., 2008). Multiple perspectives in conservation may lead to conflict during decision-making (Levin et al., 2020). It is thus important that scientists working within conservation science acknowledge that there are multiple perspectives on environmental issues and make an effort to embrace epistemological pluralism (Levin et al., 2020). An epistemological pluralist, mixed-method approach will assist in providing insight into a complex SES in SA, faced with the wicked problem of addressing threats to both social and natural systems.

This research was carried out based on the ontological and epistemological assumptions held by the researcher. First, the ontological assumption is the existence of a single reality (positivism or realism). In the context of ecological systems, there are material consequences for decisions made by managers: individuals live or die and populations increase or decrease. This approach does, however, become more complex when considering somewhat abstract ideas - such as "effectiveness", and it is conceded that different people interpret reality in different ways. This has been directly linked to conflict in conservation science, where the causes and consequences of urgent conservation challenges may be perceived differently by different individuals (the Rashomon effect) (Levin et al., 2020). Conflict arises when decisions need to be made quickly in order to address the urgent challenge, and all perspectives provided are plausible and coherent (Levin et al., 2020). Thus, the specific branch of positivism that this

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research has been underlain by is critical realism (Moon & Blackman, 2014). Critical realism is the acceptance that although a single reality exists, the nature of reality can change as humans' capacity to understand it changes and true reality can only be understood through broad, critical examination (Moon & Blackman, 2014). Based on these ontological assumptions, it is assumed that the findings of this research represent "a reality" of management in the PAs, from the perspective of PA managers working within the BR. As expected, those perspectives have similarities and are, to a certain extent, generalisable. The general theoretical perspective of this research was that of post-positivism, which takes the view that several methods should be used to uncover the true reality, as all methods are lacking in some way (Moon & Blackman, 2014). Indeed, as this research is intended to be interdisciplinary and bridge the ecological and social sciences, multiple methods were required to move towards a clear picture of effectiveness in K2C PAs.

Second, the epistemological assumption inherent in this research was based on epistemological pluralism. To some extent, there are roots in post-positivist objectivism; that is, reality exists and can be studied with the correct tools but "humans can never know reality perfectly" (Moon & Blackman, 2014:7). Objectivist research is applicable to other contexts (valid) and is reliable (consistent results obtained) (Moon & Blackman, 2014). As this research looked into a common issue of PAs (effectiveness) and asked similar questions of all managers (around use of monitoring and evaluation techniques), it incorporated these attributes. However, epistemological pluralism recognises that knowledge is contingent and that there may be more than one valuable way of knowing (Miller et al., 2008). Through the methodological approach of this research, the methods of monitoring and evaluation of PAME in K2C has been discovered, and these methods represent a truth that is generalizable (to a certain extent), verifiable and valid. It is acknowledged that individuals may interpret reality differently according to their various worldviews and personal life experiences. Thus, it is

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accepted that the operationalisation of the term and concept of "effective management" differed between managers of different PAs. However, due to shared understanding and similar accepted “best practices” within the PA network, there was also some similarity between managers. This was not something that the research sought to avoid; rather, the individual interpretations of this term and how it is put into practice formed the basis of this study. It was expected that the PAs would utilise different means of monitoring and evaluating effectiveness, in accordance with what they view as important for effectiveness. Each manager or management team undertakes monitoring or evaluation tasks in line with what they or their organisation believe is important - thus, the findings of the study are necessarily value-laden. It is important to note, however, that interviews sought to uncover an actual measure of effectiveness utilised by the interviewees: whatever is being measured must be monitored over time to show changes and movement toward a management objective. Therefore, the data upon which managers base their view of effectiveness is measurable (quantitatively or qualitatively), although it is based on a certain interpretation of effectiveness. In practice, this can be explained as follows: a certain manager may believe that their PA is effective as it has a thriving elephant population, however, many other species in the reserve are declining and habitat is being lost through transformation into agricultural land. This is an extreme example, however, it serves to prove the point that there is a reality to effectiveness, regardless of a certain perspective.

In order to provide objectivity in this research, it is important to acknowledge that all knowledge is situated and comes about as a result of the knower’s ontological and epistemological position (Haraway, 1988). Therefore, a final underlying assumption of the research is that no findings can be, or will even attempt to be, free from the influence of the researcher’s perspective. It is thus acknowledged that this research represents the findings made by a white, English-speaking South African female with an academic background in Zoology. Due to the South African rural context in which the research took place, it is acknowledged

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that the race, gender and home language of the researcher may have impacted the outcomes, as interviewees may have felt less or more comfortable, to varying degrees, in discussing or elucidating on their management approaches. Interviewees may have felt that the researcher would judge their approach and felt compelled to share fewer details. Conversely, some managers may have felt more comfortable sharing more information or details, as the researcher is female. Therefore, all the interviews may not cover management approaches to the same depth, which reduces the level to which the approaches can be compared with each other. It is the opinion of the researcher that despite this, the findings from this research still provide valuable insight into management effectiveness monitoring and evaluation within PAs in K2C. It is again emphasised that the description of "effectiveness" from various managers was not an abstract ideal but needed to be described using monitoring or evaluation data (outside of the needs of this study, PA managers are generally required to provide such information periodically, according to the organisational, regional or national requirements). In fact, the interview question, "What would you consider effective management of your PA? Why do you say that?" was followed by the following two questions: "Do you plan to monitor or evaluate effectiveness?" and "Do you monitor or evaluate management effectiveness of your reserve(s)- or how else do you know if the PA is being managed effectively / not?"

As the research was conducted with a specific set of actors within the BR (PA managers / management teams), there is a level of uncertainty applicable to the findings. Effectiveness was explored from the perspective of PA management only (and in relation to their objectives), not from other stakeholder perspectives (such as government entities, surrounding communities, tourists, etc.) As far as possible, uncertainty was avoided, within the limitations of the sample utilised, through thorough in-depth interviewing and discussions. However, uncertainty around effectiveness generated by the singular perspective being explored, has been accepted and made clear.

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4.2 Research site

This study was conducted within K2C (Figure 11), located in the northeast of SA and designated in September 2001 (K2C, 2020). K2C encompasses high-altitude grasslands (the "highveld"), semi-arid, low-lying savanna (the "lowveld") and afro-montane forest on the Drakensberg escarpment that divides these two ecological regions (K2C, 2020). K2C also incorporates a freshwater aquatic biome and associated riparian forest, across an altitudinal range of 200 to 2050 metres above sea level (masl), resulting in high levels of biodiversity and endemism (K2C, 2020). Rainfall varies from 400 millimetres (mm) per annum in the lowveld to 3000 mm per annum on the Drakensberg escarpment, which is the source of eight perennial rivers (K2C, 2020).

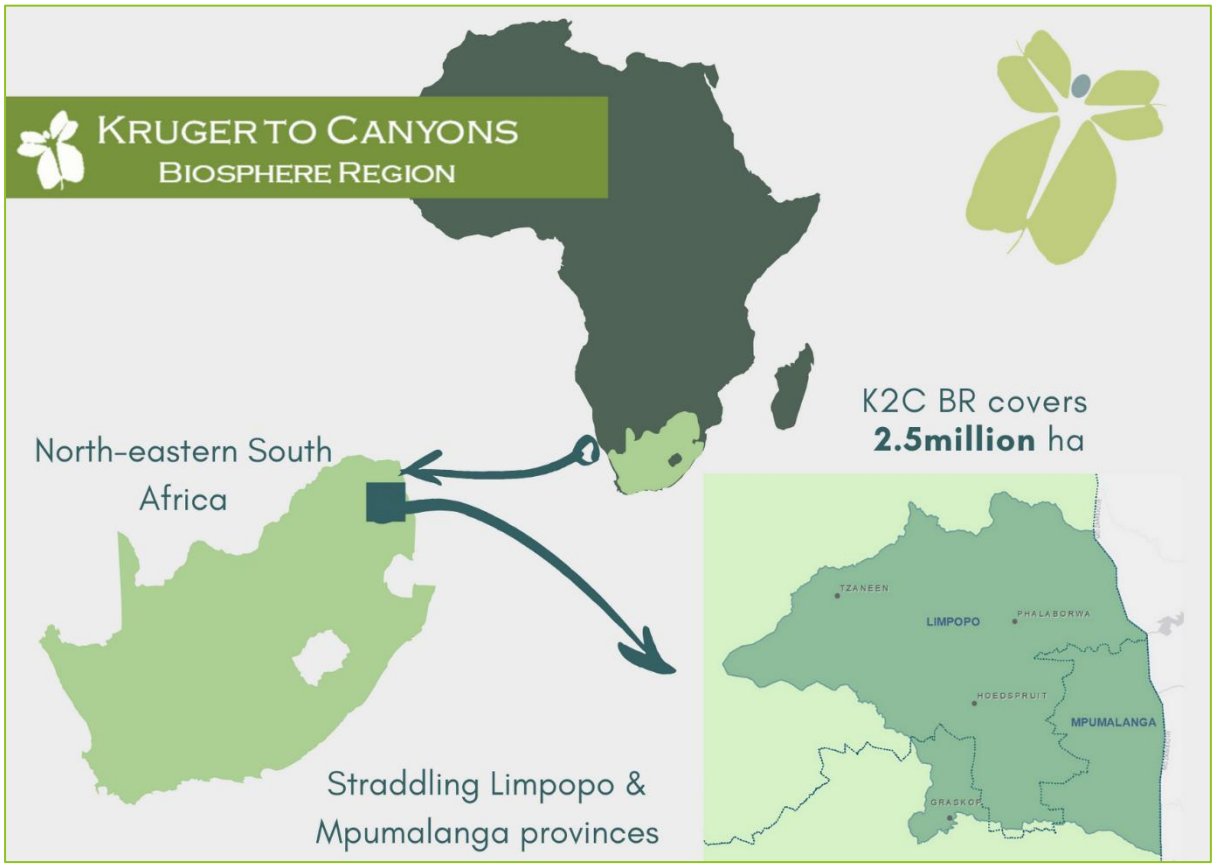

Figure 11: Location of K2C (K2C, 2024).

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4.3 Case study approach

Utilising the case study approach is useful in order to explain, describe or explore the various facets of a complex issue in a real-life context (Crowe et al., 2011). This research is an example of an instrumental case study, where the particular case of K2C has been used to gain a broad scale understanding of the issue of PAME in South African BRs. The case study approach is beneficial for collecting a lot of information to describe why and how something is occurring, and what gaps may exist, which can help to refine the theory behind the issue (Crowe et al., 2011). The positivist approach to case studies in particular, allows for the testing and refining of theory on the basis of what is discovered in the case study (Crowe et al., 2011). Downfalls to using the case study approach include the following potential issues: choosing an inappropriate case, collecting a lot of irrelevant data, incorrectly defining the case, not implementing a rigorous approach, ethical issues and issues with integrating the theoretical framework (Crowe et al., 2011). These can be overcome by being able to justify the choice of case, aligning data collection with research objectives (however, a certain amount of flexibility is also required) and being clear about which components are related to the case or not (Crowe et al., 2011). Furthermore, to ensure rigour, the methodology should include triangulation (which in this case, has been done using the collection of both quantitative and qualitative data), respondent validation, and transparency throughout the process (Crowe et al., 2011). In order to avoid ethical issues, respondents were anonymous and participation was on a basis of informed consent only (Crowe et al., 2011). Integration with the theoretical framework is difficult to ensure, however, the research has been undertaken with allowance for unexpected issues to occur and with a clear epistemological standpoint, allowing for testing of various preliminary explanations (Crowe et al., 2011).

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4.4 Data collection methods

In order to gather the most comprehensive dataset possible and in line with the practice of epistemological pluralism, the research was undertaken using a three-phased mixed-method approach (

Figure 12). Quantitative data were collected through online questionnaires. These data were used to complement qualitative data collected through semi-structured interviews, focus groups, and selected questions within the questionnaires. The quantitative data provided a base from which the researcher gained progressively deeper insight into PAME monitoring and evaluation in K2C as the study progressed.

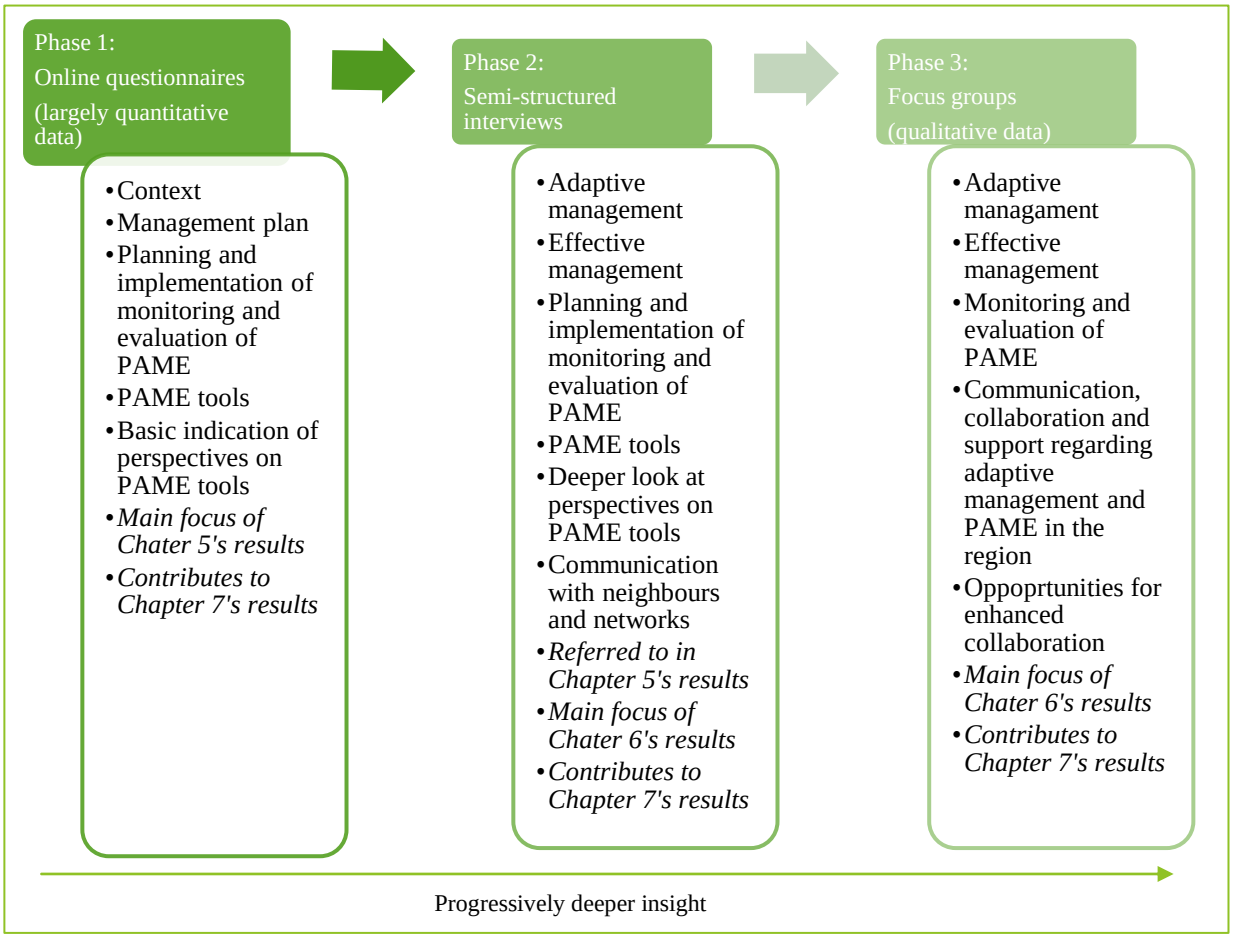

Figure 12: The three phases in which the research took place.

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4.4.1 Archival research

This research originally intended to utilise archival research to gather quantitative data and information from a variety of documents, including Management Plans, Progress Reports, previous PAME questionnaires (e.g. METT-SA, which some PAs are required to undertake), and minutes of meetings. However, many of the participants did not have relevant Management Plans, and some were not willing to share them. Therefore, much of the archival information came from the South African Protected Area Registrar (PAR)[2], which turned out to be an unreliable source for some elements. The following data were gleaned from the PAR for a selection of the PAs studied: spatial extent, geographical location, designation date, and protection category. The METT-SA-Version 3 spreadsheet and reports from the GEF METT project undertaken by select K2C staff members within the GLTFCA PAs were reviewed as additional background information.

4.4.2 Questionnaire

Online questionnaire data were collected between January and July 2022, using the Qualtrics XM platform3 (See Appendix A for a copy of the questionnaire). Data collected using the online questionnaire include background data such as province, size, designation status, ownership, management and governance structure, and surrounding land use. Data regarding the management planning of the PA were also collected, including the existence of a management plan, date of original and subsequent revisions of the management plan, objectives of the PA encapsulated within the management plan (if applicable), and the presence

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[2] https://dffeportal.environment.gov.za/portal/apps/webappviewer/index.html?id=7e27f116dd194c1f9d446dacc76fe483

[3] https://qualtrics.ceu.edu/jfe/form/SV_bOQkeZ2ZiSoEcqq

of the phrases “adaptive management” and “management effectiveness” within the management plans. Further questions required participants to indicate to what degree they felt that their PA followed an adaptive management process. The main section of the questionnaire dealt with both the use and utility of any standardised and/or non-standardised PAME tools employed by the participating PAs. The questionnaire also included optional qualitative questions, to solicit ideas or suggestions for improved M&E techniques or more relevant research. In order to reduce survey fatigue, the questionnaire was structured so that if a respondent selected an option as “not applicable”, all linked fields were hidden. Furthermore, some questions included forced responses to ensure that all relevant data were captured. Finally, many of the questions had an “other” option where respondents could insert their own data if the options provided were irrelevant. This encouraged autonomy, i.e., ensured that respondents did not feel forced to comply with the ideas of the questionnaire.

4.4.3 Semi-structured interviews

Interviews are a useful tool in mixed-method studies, which are used to gain more in-depth details to supplement data from quantitative data collection methods such as questionnaires (Edwards & Holland, 2013). Interviews allow researchers insight into the perceptions and experiences of participants, as well as gain further understanding of social processes and relationships (Edwards & Holland, 2013). Further, interviews may assist researchers in getting more complete answers, and are relatively flexible, but using this method can be time-consuming, limited to small scale and may potentially result in inconsistencies (Brown, 2001). This was mitigated through the additional use of questionnaires and focus groups.

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Individual, semi-structured interviews were conducted with PA managers or management team representatives. Before the interviews, participants were provided with an infographic that outlined the general themes of the interview (See Appendix B for the infographic). Participants were encouraged to answer the online questionnaire before the interview, as many questions were similar and/or linked. The interview questions revolved around the themes of adaptive management, management effectiveness and its monitoring and evaluation, and the use of PAME tools (See Appendix C for a copy of the interview protocol). Questions were fairly broad, and interviewees were encouraged to share their own experiences.

4.4.4 Focus groups

Focus groups are defined as a type of interview between a researcher and more than one individual, structured to gather detailed opinions and knowledge about a specific topic from a selected group of participants (Bader & Rossi, 2002; Schensul et al., 1999). Three focus groups were held at the end of the data collection period, in July 2022, in order to clarify any issues that arose in the interview phase. Focus groups were divided according to PA management types. The first focus group consisted of three participants from smaller, isolated and (although this was unintentional) currently unproclaimed PAs. The second focus group consisted of three attendees from government or parastatal management agencies. The final focus group consisted of two attendees from private PAs. The focus groups were structured this way to ensure that there was some contextual similarity between the participants, enabling a slightly narrower focus. Focus groups took place over the course of two two-hour sessions, with refreshments provided in the break. Focus groups made use of the same question themes as the interviews and were facilitated and transcribed by the researcher.

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4.5 Sampling procedure

In order to adequately assess the implementation of PAME in K2C, all of the approximately 40 PAs within the BR (those forming part of both the core and buffer zones) were selected for sampling, via the PA manager or a suitable PA representative or team. All known PA managers within the K2C landscape were invited to participate in this study via email. As expected, some managers / representatives did not respond to emails or declined to participate in the interview element of the study due to time constraints. In total, 19 responses to the online questionnaires were received (of which three were incomplete), 17 managers were interviewed directly (four of whom were representatives of organisations which are responsible for the management of a group of PAs), and eight managers (two of whom were representatives of organisations which are responsible for the management of a group of PAs) were involved in the focus groups. Due to the demanding schedules of PA managers within this region, most were not able to participate in all three data collection phases – only one PA representative participated in the online questionnaire, an interview and a focus group. The PAs which are part of a larger PA network managed by organisations are those that are state-managed, or managed by a parastatal, and while some of the PAs in the networks have individual managers, some are managed centrally by the organisation. Therefore, the inclusion of perceptions of upper-level managers within those organisations still gives valuable insight into this topic. In total, 22 individual PAs are represented in the data, as well as four national-level, provincial level, or parastatal management entities, which are responsible for the management of several PAs within the K2C landscape. There are approximately 40 PAs in K2C, 10 of which are provincially managed, and eight of which are managed by national government or a parastatal entity, or a partnership between the two. As representatives from these organisations were either interviewed or present in a focus group, the study covered approximately 90% of the PAs in K2C. Sampling was constrained to the PAs only (i.e. did not include communities

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outside of the PAs, located within the transition zones). For some PAs, province and size data were extracted from the PAR. One questionnaire response was excluded from all analyses as the origin of the response could not be linked back to a PA in the region, and the response was incomplete.

4.6 Ethical considerations

This research included the use of human subjects (through the use of questionnaires, interviews and focus groups); specifically, PA managers or management team representatives. Individuals who participated in this study undertook risk through the potential publication and dissemination of information on management effectiveness in their PA. All data are kept confidential and anonymous in order to protect the identities and job security of participants, and any publication of the data does not include names of individuals or PAs. All participants were informed of the details of this study via email, on the first page of the online questionnaire, and during the interviews and focus groups. Participation was voluntary. The research was undertaken under compliance with the Declaration of Helsinki, with ethical approval from Central European University (Central European University's Ethics Checklist is attached in Appendix D), and after having been presented to the K2C and the GLTFCA's Joint Management Committee, without objection. Data from the interview's will be stored on the researcher's private computer and OneDrive, without any names mentioned in either the file names or the transcription notes. A separate, password-protected file with a list of pseudonyms for the interview participants will also be similarly stored, in case the need for further interrogation of the data arises.

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4.7 Analysis

Use of the mixed method approach detailed above required analysis of both qualitative and quantitative data. Qualitative insight into this issue is essential as quantitative data may exclude some nuances due to various operationalisations of the term "effectiveness", and the variety of monitoring or evaluation approaches used in the different types of PAs. Quantitative and qualitative data are triangulated in order to provide complementarity and deeper insight into the research (Nightingale, 2016). Triangulation between the qualitative and quantitative data is useful to either confirm findings or indicate issues between what is "said" (i.e. claims put forth in the questionnaires) and what is "done" (i.e. what the managers confirmed in the interviews). This approach to data collection addressed the interpretive nature of this research while providing reliable data which will stand up to scrutiny in both natural and social science. It was expected that the quantitative data (such as management model) would impact the results from the interviews (such as what is being measured as effectiveness).

4.7.1 Quantitative data

Quantitative data were analysed and presented using descriptive statistics in Microsoft Excel. Besides the basic count of categorical data, Excel was also used to calculate the percentage, mean and standard deviation of data, in order to give an overall picture of PAME in K2C. The interviews and focus groups were used to corroborate the quantitative information, ensuring that no PAME tools had been excluded, and allowed deeper insight into the perception of the tools by PA managers.

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4.7.2 Qualitative data

The qualitative data collected in this study consisted of answers to open-ended questionnaire answers, interview and focus group transcripts and field notes. The data was analysed using content analysis and coding. During content analysis, Atlas.ti Windows (Version 22) was utilised to code and analyse the interview and focus groups transcriptions. Coding procedures were defined, rigorous and consistently applied in order to ensure that the data are valid and reliable, in accordance with the standards for qualitative research (Williams & Moser, 2019). The open, axial and selective coding strategy was utilised in a non-linear, iterative process as per Figure 13 (Williams & Moser, 2019). During open coding, broad concepts or themes for categorisation were identified (e.g. "communication") (Williams & Moser, 2019). Axial coding, the second level, refined the concepts and defined the relationships identified during open coding, and required continual analysis and cross referencing (e.g. "communicating about PAME") (Williams & Moser, 2019). Selective coding allowed the researcher to select meaningful data from the axial categories in order to develop common theories from the data (Williams & Moser, 2019). Throughout the iterative coding process, codes were continually refined and clarified. Abductive coding was utilised as it was not known whether AM played a role in PA effectiveness. An abductive mode of analysis (a combination of induction and deduction) allows for the discovery of categories within the data, while also importing concepts gathered from the relevant literature (Timmermans & Tavory, 2012).

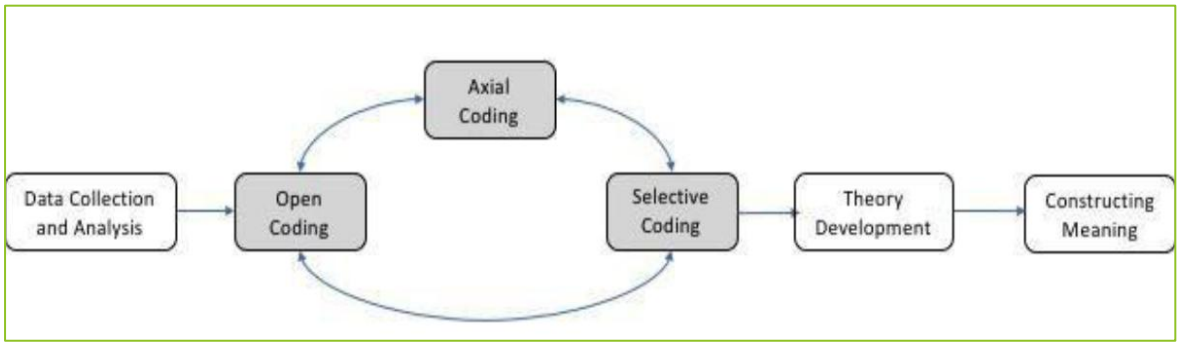

Figure 13: Non-linear coding process for qualitative research (Williams & Moser, 2019).

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4.8 Limitations

4.8.1 Epistemological

The value-laden methodological approach described in Section 4.1 may have resulted in some bias during data collection, such as discrepancies in the depth of details provided by different managers. This was addressed through careful and thorough interviewing, with questions structured to gather all relevant information. Semi-structured interviews allowed for some changes to the questions, dependent on the answers given by respondents. The mixed method approach utilised in this study was undertaken with the requirements for robust quantitative and qualitative data in mind, in order to ensure that the results hold up to scrutiny in both natural and social sciences. The quantitative data are reliable, valid, generalisable and objective, and the qualitative data are similarly dependable, credible, transferable and confirmable. While some of these criteria may be criticized by social scientists, within the context of this research, the qualitative data are useful for the end goal, which is applicable to this single case study (K2C).

4.8.2 Theoretical

While the majority of respondents were familiar with the term “adaptive management”, their understandings were more practical, in comparison to academic theory. Management is therefore unlikely explicitly taking place with the SES, AM or resilience theories in mind (although this likely happens implicitly to a certain level). Thus, the practical reality does not necessarily directly reflect the theoretical expectations. Abductive coding was utilised to ensure that new, unexpected theoretical themes (as well as preconceived theories) could be extracted

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from the data during analysis. In addition, while many managers were conducting M & E, they did not necessarily link it with the term of "management effectiveness". However, the use of qualitative data collection processes allowed for explanation by the researcher, as well as thorough exploratory questioning. The subsequent answers and transcriptions could then be thoroughly analysed for relevant data. This ensured that all relevant data were collected, even if the managers did not necessarily realise that they were monitoring "management effectiveness", or if these concepts were not specifically linked within the management plans.

4.8.3 Methodological

PAs that were delineated on the South African PAR were not necessarily functioning PAs in reality. According to the K2C team, it is suspected that some of the relevant landowners may not even know that they are operating on protected land. Contact details for some managers or management teams in K2C proved impossible to find. Some managers were impossible to get hold of or were not available for interviews. With regards to provincially managed PAs, some PAs did not have a dedicated manager at the time of the study, while others proved impossible to reach or identify. While in some cases, this may have been due to overwhelmed organisational inboxes, it is also possible that certain provincial PA managers were not comfortable discussing PAME or METT due to issues with low METT performance scores. In addition, as mentioned in Section 4.4, some managers were not able to participate in all phases of data collection due to time constraints. Many managers are solely responsible for thousands of hectares of protected land, within which reside high maintenance species such as elephants, rhinos, and lions. Other managers head up small teams on even larger pieces of land. Managers are often held responsible for a wide variety of management aspects, from security and budgeting to species management, fire management and vegetation management;

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sometimes even tourism management. Thus, amongst all their responsibilities, they were not able to make time to participate in all aspects of the study. Therefore, although the research presents a broad picture of PAs in K2C, there are some missing data points. Some online interviews had to be conducted as a result of unexpected illness, or distance from the study site to the office of the interviewee. This may have resulted in a loss of personal connection, which may have resulted in fewer details being shared. However, through careful and thorough interviewing in an online setting, all relevant information was gathered. Load shedding (an issue in SA whereby the government switches off electricity supply to the grid for several hours at a time) resulted in a loss of power, and thus, internet at multiple intervals throughout the data collection period. Although this interfered with some aspects of the work, interviews were not affected by the problem. During the focus groups, some participants had to unexpectedly cancel their attendance due to unforeseeable events.

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CHAPTER 5: MONITORING & EVALUATION

This research chapter will address the following research sub-questions:

1. How do K2C PA management teams plan for monitoring and evaluation of management actions? (Section 5.2)
2. How are management actions monitored in K2C PAs? (Section 5.3)
3. How are management outcomes evaluated against management objectives in K2C PAs? (Section 5.3)
4. How is monitoring and evaluation used to improve management outcomes and/or change management actions in K2C? (Section 5.3)

Through addressing the above questions, the chapter meets the first set of aims of the research, vis-à-vis, understanding management context, as well as goals, objectives and interpretation of effectiveness in K2C PAs. The third aim of the dissertation, investigation into the use of M & E tools, forms the main body of these research findings. This chapter discusses the findings relevant to the above research questions and should be read alongside Chapters 1-4 above, in order to understand the broader contextual and theoretical setting. The findings presented here are drawn mainly from online questionnaires, but data from interviews and focus groups also informed some of the conclusions (Figure 12).

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5.1 Context of K2C PAs

The results in this section focus on the contextual elements of the responding PAs in K2C. PAs that are designated[4], in the process of designation, and those who may consider designation in the future (i.e., not currently designated) are included in the data represented (**Error! Reference source not found.**). This allows for the inclusion of a myriad of PA types t hat face different, context-specific challenges and presents a varied perspective that gives a broader outlook of the state of PAME monitoring and evaluation in the K2C landscape.

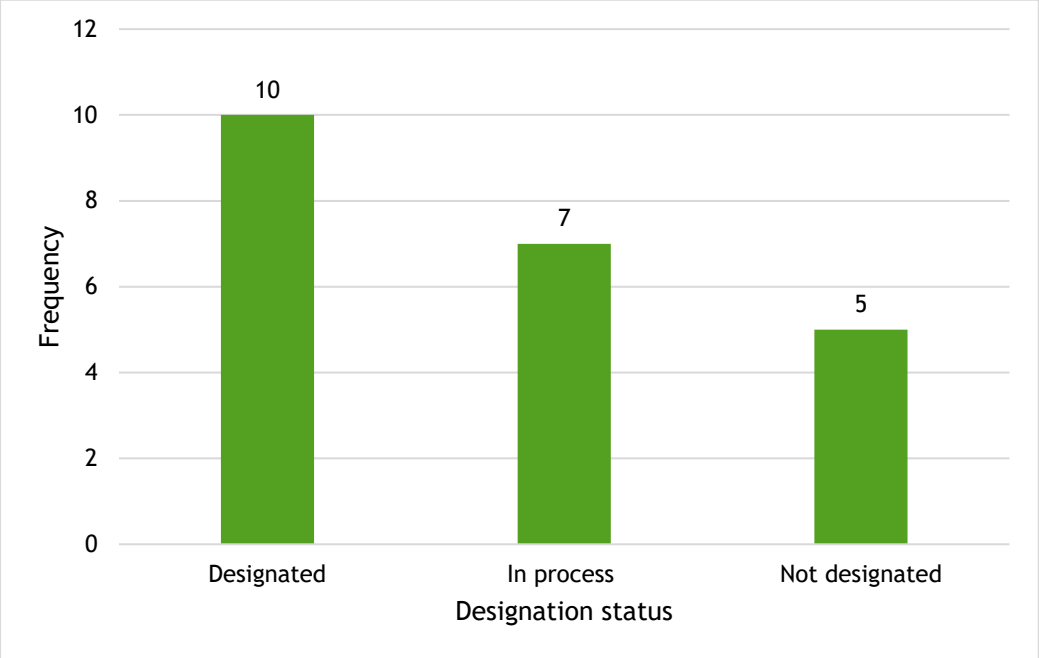

Figure 14: Designation status of the sampled PAs (n = 22). Note: One respondent indicated that the PA was designated, but there is no legal proof that this is the case, and the PA has been classified as "not designated".

The majority of the PAs in the study fall into Limpopo Province, and two straddle both Limpopo and Mpumalanga Provinces (**Error! Reference source not found.**). This was e

[4] Designated under NEMPAA, with the associated legal obligations as discussed in Section 2.4.2. Those reserves not currently designated are managed for biodiversity conservation by choice and have no legal obligation to do so.

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xpected because although K2C encompasses areas across both provinces, most of the BR lies within Limpopo, along with the BR hub of Hoedspruit. The location of the PAs has consequences for management, as provincial conservation agencies have jurisdiction over the PAs within their boundaries; management in Limpopo PAs is overseen by LEDET, while management in Mpumalanga PAs is overseen by MTPA. This affects management if a certain issue needs provincial authorisation or assistance (including, but not limited to, game management and endorsement of the management plan). In one case, the management plan of a well-established PA has not been approved despite years of effort due to issues in the provincial department, which could possibly be attributed to bureaucratic delays. As one interviewee explained, "…*in 2016 they submitted an application to the* [provincial department representative] *which was thrown out because there was some issue in the department and they didn't process our application*".

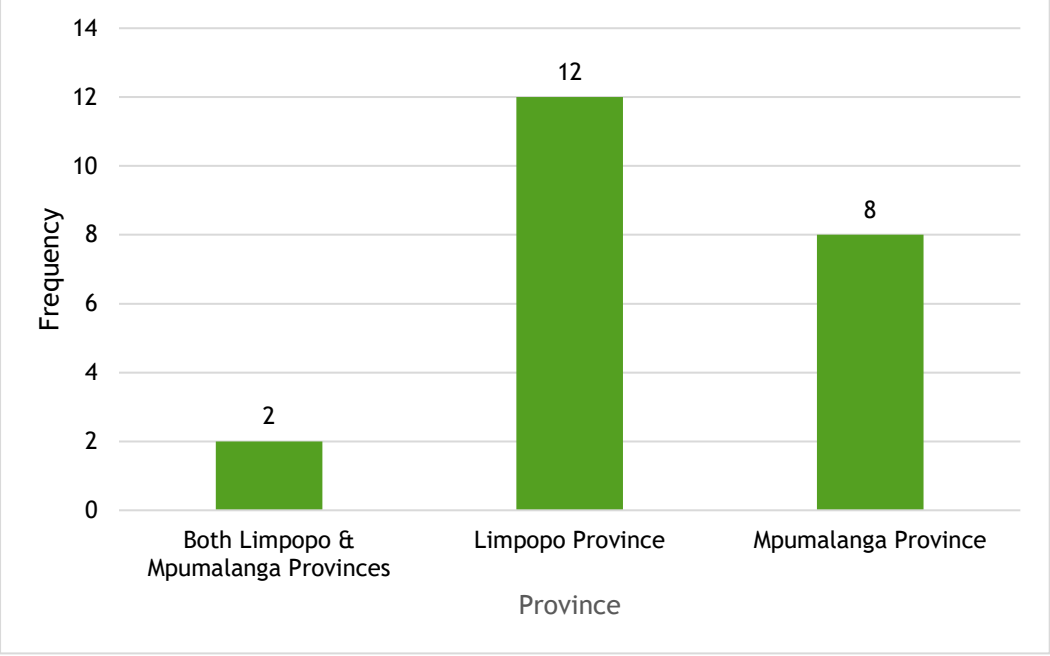

Figure 15: Provinces in which sampled PAs are located (n = 22).

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Most of the responding PAs were privately governed, however representatives from community or co-managed PAs, provincially-managed PAs, and one PA managed at a national level, also responded to the questionnaire (**Error! Reference source not found.**). The g overnance model has a strong influence on many factors of management within the PA and may result in challenges or opportunities which impact M & E of management effectiveness, as well as the ability of the PAs to implement management adjustments once monitoring and/or evaluation has indicated the need for a directional change, as part of an AM process. Budgetary and staffing constraints of the provincially managed reserves in K2C have resulted in a loss of monitoring programmes, as expressed in frustration by some of the interviewees. These sentiments reflect concerns regarding equipment and software needs: "*Our problem currently is, there is no budget for these devices, and there's also no money for the development of the apps, and management of the database to analyse the stuff*"; monitoring programme implementation: *"…next year, our veld condition assessments have been removed from our budget by the department, saying they don't have money for it*"; and staffing shortages: "*So we are totally out of staff. So that's where we fall flat*". These views of PAs within the K2C echo the global pattern of under-resourcing of PAs (Coad et al., 2019). Privately governed PAs within K2C vary in terms of both the number of landowners within the PA and the use of the PA by those landowners. Some may be owned by a single person, some by less than ten people, and others by more than 20 people (pers. comm., K2C management team). Some of the landowners may only utilise the land for private enjoyment, while others run internationally acclaimed ecotourism lodges, and others still use the land for game hunting. In fact, these various types of land uses can also co-exist within one PA (pers. comm., K2C management team). These variances within one governance type further complicate management effectiveness, and M & E thereof. In the PAs where governance is noted as "community", management may be undertaken by a private entity on behalf of the community. Provincial-

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level PAs also often have co-ownership or co-management agreements in place with surrounding communities. In these cases, usually, the protected land has undergone a land claim, as noted in Section 2.4.1. The structure for these PAs differs between individual PAs and across different provinces but usually involves the community gaining a direct benefit from the PA (DEA, 2016). Thus, the varied governance models of the PAs in K2C contribute to the complexity of the landscape.

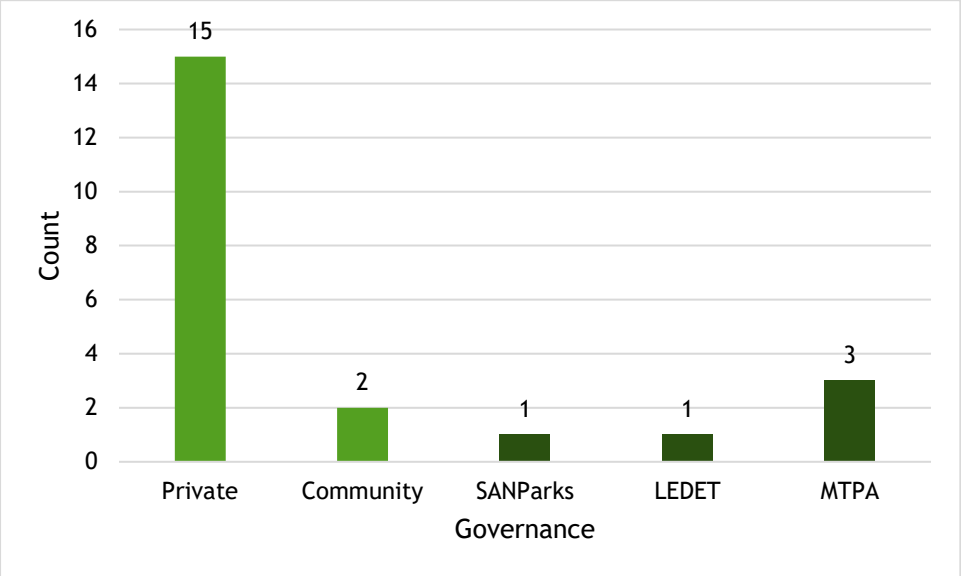

Figure 16: Governance models of sampled PAs (n = 22). Note: Dark green bars represent provincial or national level governance.

PAs in K2C vary greatly in size, from approximately 1 000 ha to >60 000 ha (mean = 16,454.2 ha, sd = 17,470.46; Figure 17). The size of a PA impacts multiple facets of management, from the amount of revenue that can be made off the land (carrying capacity) to the animals that can be placed within its boundaries and the tools that can be used, as indicated by this manager's question regarding PAME evaluation tools applicable to smaller PAs: "*Is there anything that small reserves- and I'm not talking about like 10,000 hectares, I'm talking about 3- 4000 hectares- there's no tool that we can use for that?*". This adds another layer of complexity to the region, to management, and to PAME.

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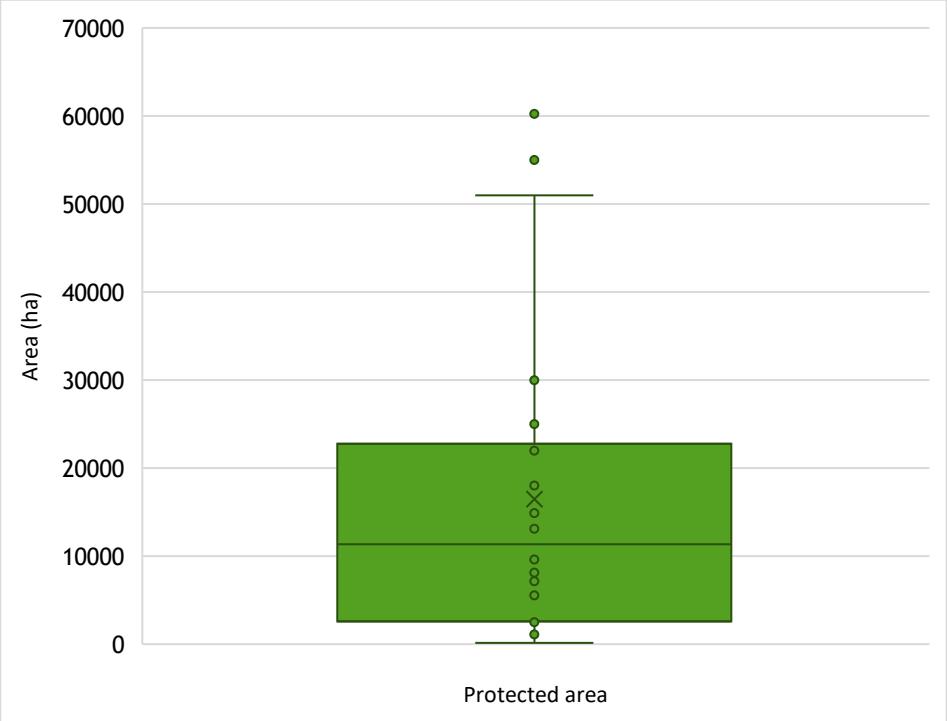

Figure 17: Box and whisker plot indicating the variation in size of sampled PAs (n = 22).

There is a common theme amongst the PAs in K2C, which is that, unsurprisingly, all responding PAs (100%) which had a management plan or other document with stated objectives had one or more objectives focussed on biodiversity (

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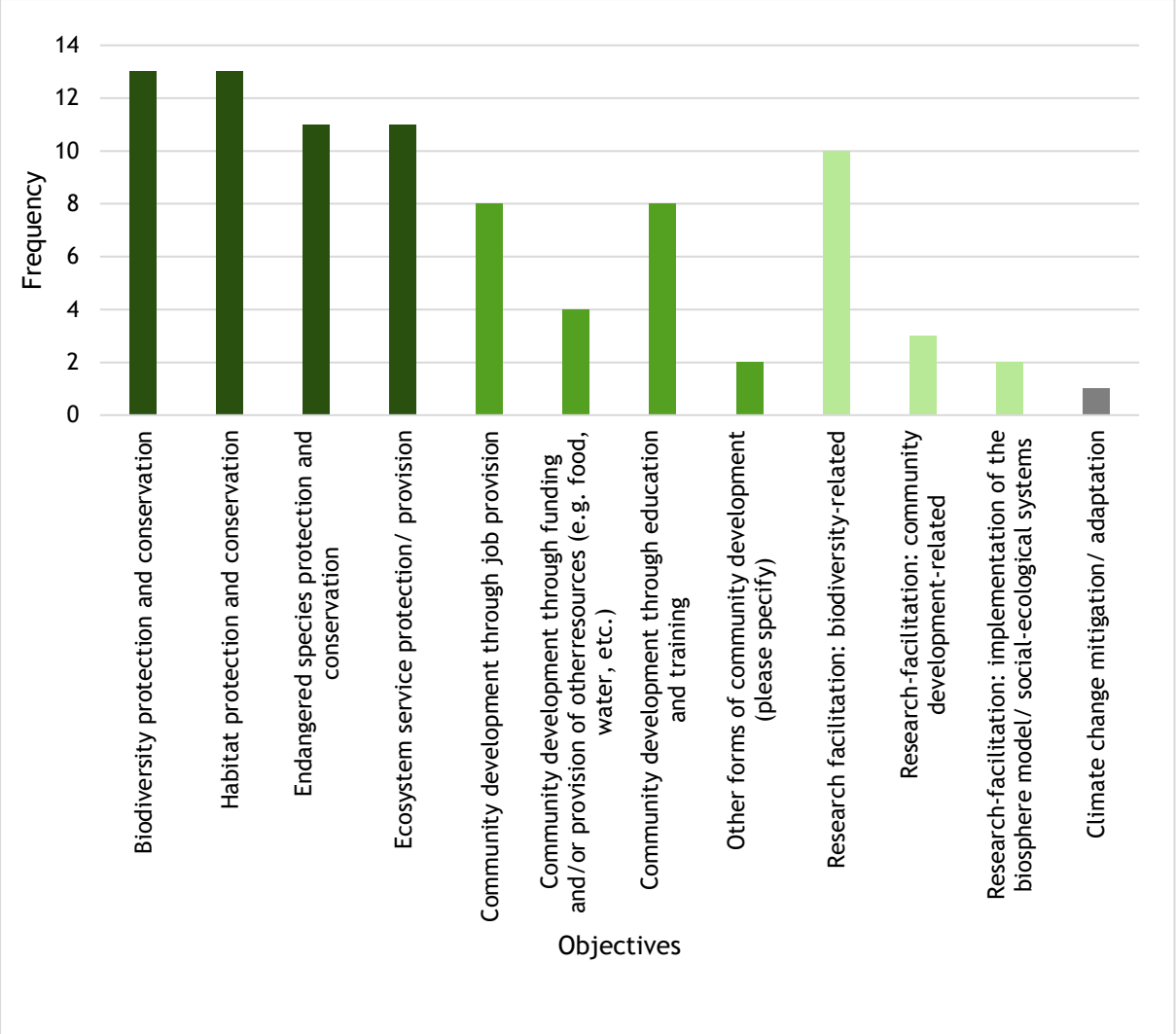

Figure 18). This indicates that the primary goal of the PAs in the region is biodiversity conservation. In line with this, when questioned during the interview, many respondents noted that, to them, management effectiveness meant a thriving ecosystem, whether in terms of animals: "*Well, at a minimum, your biodiversity measures at least not being out of range… So as long as* [the stakeholders/ landowers are] *generally happy and seeing things… as long as the game viewing remains good*", "[Visitors] *actually come here for the wildlife and the environment. So, if we don't manage that properly and it's not functioning properly, people see that*", "*Well, essentially, we have a controlled area, and we want to make sure… we keep the numbers of all species in as much equilibrium as possible…we want to make sure it's a managed system*", or abiotic factors such as soil: "*Well I think that our effective management*

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is our gravel road maintenance, because that's one of the biggest drivers of soil erosion", or even the ecosystem in general: "*preserve the status quo of the grassland. That would be a primary aim*". In addition, many PAs also had objectives related to community development, with 10 of the 14 respondents selecting at least one community-related objective from the listed options (71.4%) (

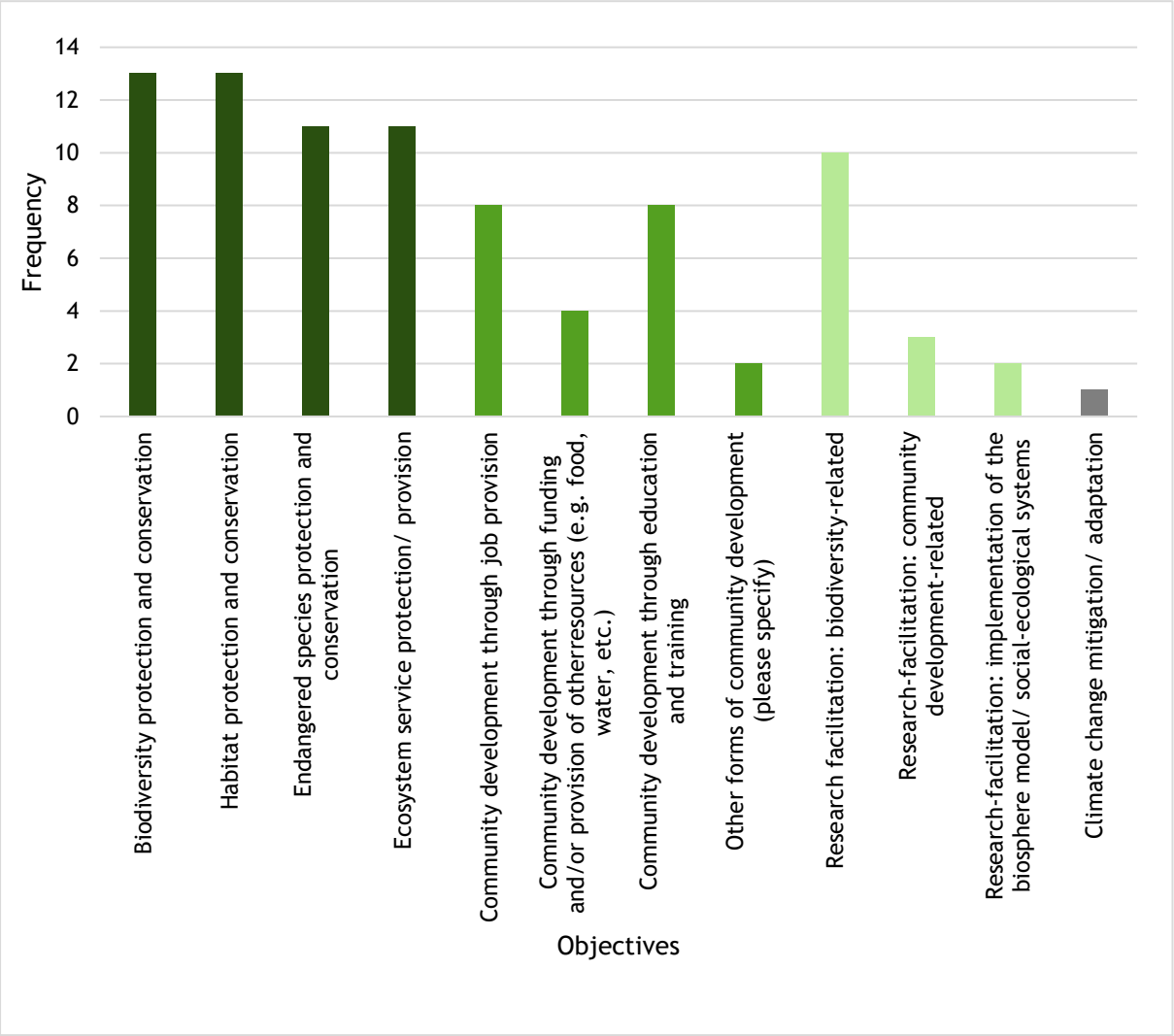

Figure 18). Research-related objectives were generally connected to biodiversity, while climate change objectives did not appear to be a priority in the majority of the responding PA's management plans (

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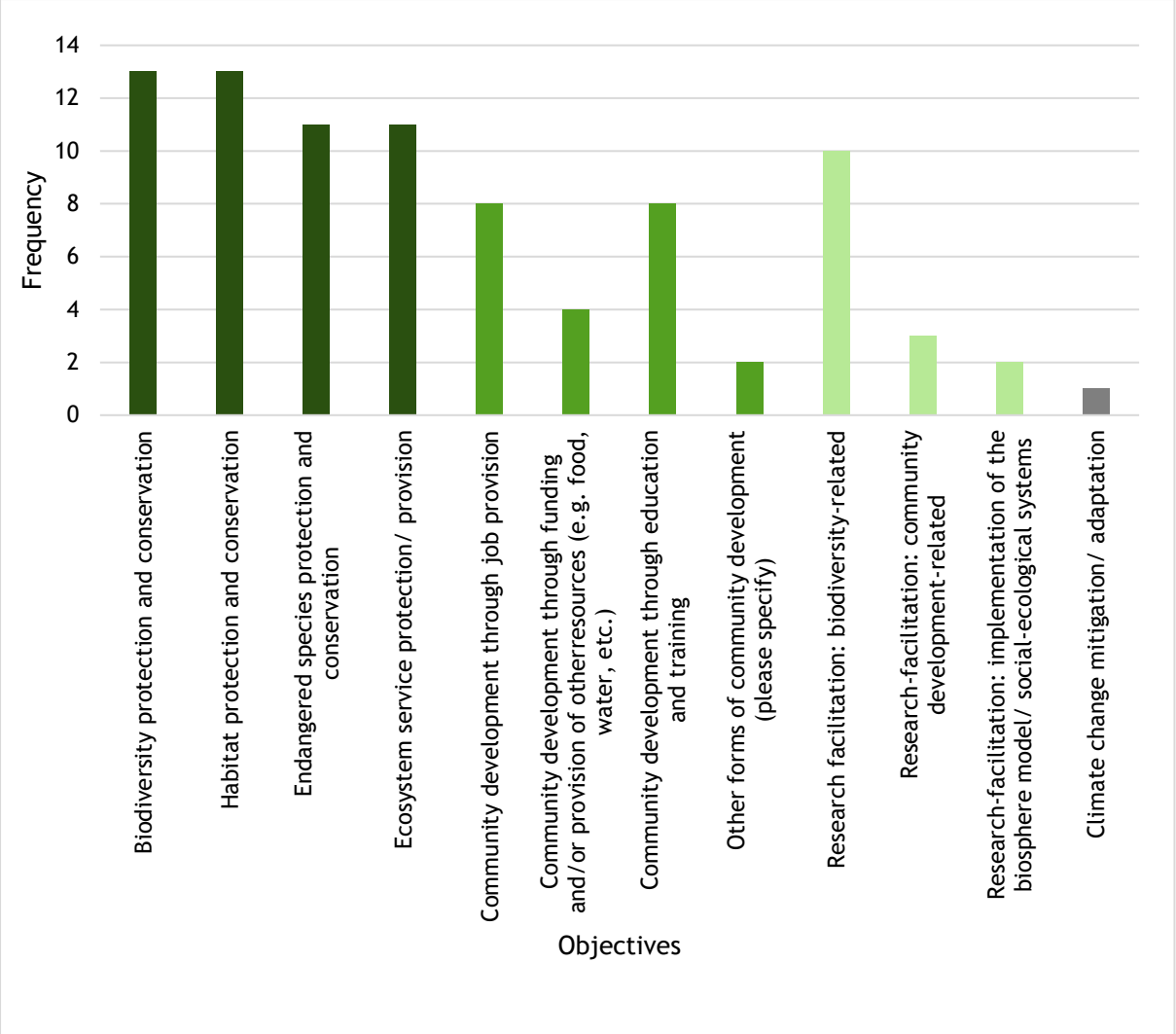

Figure 18). The objectives of a specific PA have a particular bearing on the type of data that are collected for monitoring and evaluation purposes, which will be further highlighted in Section 5.3.1.

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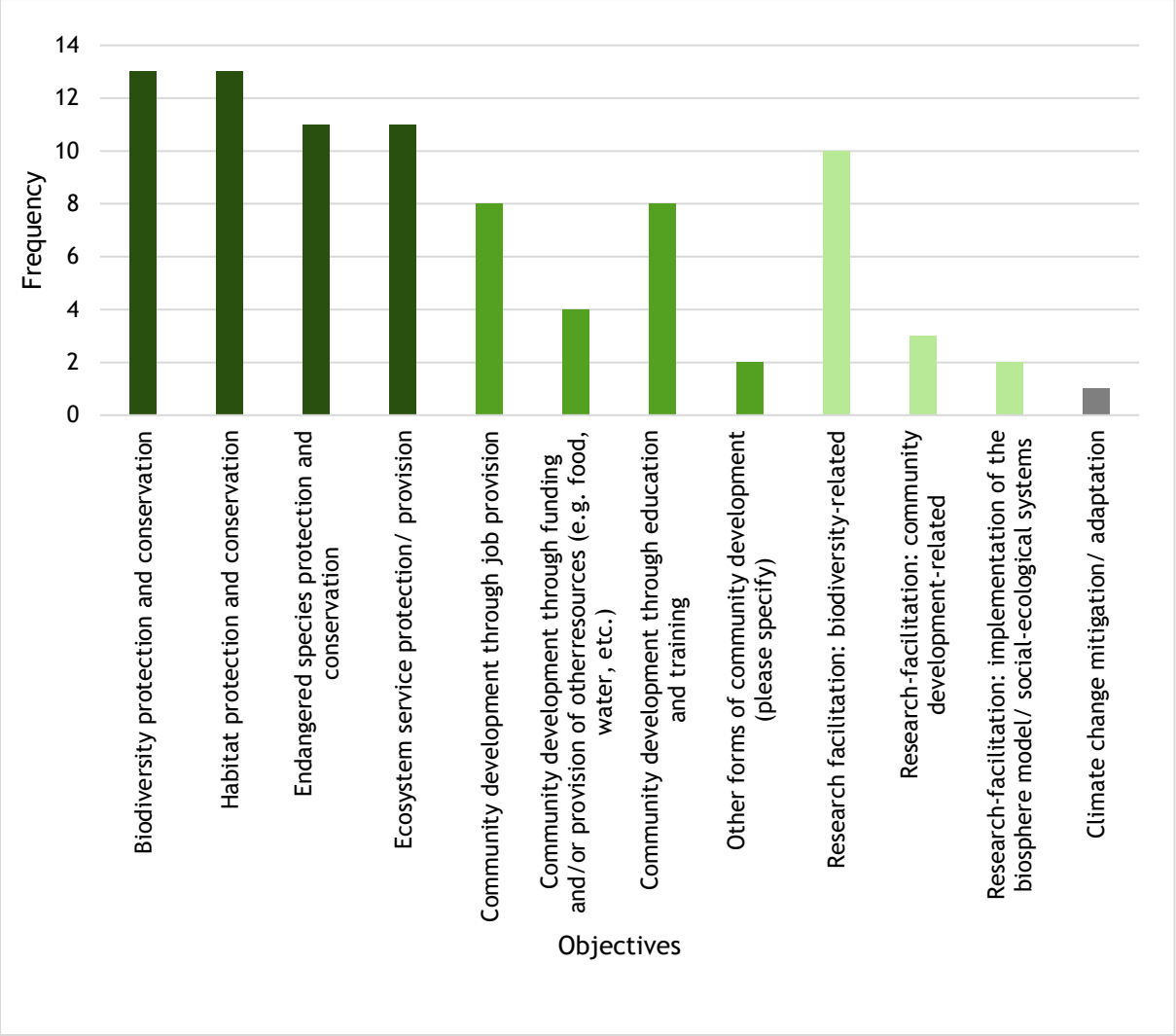

Figure 18: Objectives of sampled PAs in K2C (n = 14). Note: Most respondents selected >1 objective. Dark green bars represent biodiversity-related objectives, mid-green bars represent community-related objectives, pale green bars represent research-related objectives, and the grey bar represents climate-change related objectives.

5.2 Planning for monitoring and evaluation

Ten of 16 (62.5%) respondents noted that their PA management plans contained specific reference to "effective management", while six respondents noted the term was not referenced at all in their plans. All but one of the questionnaire respondents noted that they had a plan to monitor and evaluate the effectiveness of their PA: either a formal M & E plan in writing or they had the intention to start an M & E programme. These data may indicate that, although some PAs may plan and implement M&E, this may not be directly linked (within the management plan, or even within the manager's mind) to the term or concept of "management effectiveness". The large proportion of respondents who noted "yes" indicates a widespread

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acknowledgement of the importance of M&E in PA management. In the case of the single PA without M & E plans, the interviewee noted that the PA is currently facing multiple start-up challenges, including the presence of cattle farmers on the land, lack of funding to complete infrastructure development, fencing issues, and staffing shortages. This is an indicator that managers prioritise certain basic aspects of PA establishment and management, before considering the planning and implementation of M & E, as explained by another manager: "*Sure, obviously, there's a lot of stuff we don't monitor at the moment. That's just because we don't have the capacity… And we deal with the most important things at the moment. So roads are fairly important because we had an erosion problem. And then, obviously it was first anti-poaching because that was our biggest problem, then budget, then roads. The vegetation management has started now where we're implementing fire."* It is important, therefore, that managers are properly supported with the appropriate funding and resources, before being expected to plan and implement M & E. It would be helpful in these cases for government agencies to provide a suite of incentives to encourage holistic PA establishment, including planning and operational support, fire and invasive plant management services, advice on natural resource use, facilitation of partnerships and connections, marketing resources, enforcement support, and assistance with expensive aspects such as particular game species or fencing (DEA, 2016).

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5.3 Implementation of monitoring and evaluation

As noted above, the majority of questionnaire respondents have a plan for, or intend to start, monitoring and/or evaluating their PAs. However, results showed that only nine of 16 respondents (56.3%) actually implemented their plans, indicating tangible challenges and barriers to the implementation of M & E plans. The PAs that answered "no" to implementation

are all disconnected from the GLTFCA PAs and are relatively small in size (≤15 000 ha). This suggests that smaller PAs in K2C or those not connected to the BR core or GLTFCA network may either face more barriers to implementation of M & E, or have fewer incentives to implement it. Non-GLTFCA PAs generally (with some exceptions) have less access to funds and are often managed by a single manager rather than a management team. They are also not usually mandated to monitor and evaluate their effectiveness, unlike GLTFCA PAs. These smaller, disconnected PAs could potentially also benefit the most from increased support for the facilitation of M & E. Many of these PAs are located within critical connectivity or water-provisioning areas of K2C. It is possible that there is a level of M & E being undertaken within these PAs on an informal basis by the managers (e.g. they may be continually watching a population of certain species for changes), however, due to the lack of formalised methodology and reporting, such monitoring may not be reliable enough to determine the PA's effectiveness, and is not included in this research.

5.3.1 Use of specific PAME tools in K2C PAs

In addition to the 16 PAs discussed above, insight from two additional PAs was gained from interviews (n = 18), as the managers participated in the interviews but not the questionnaires. However, six of the original PA perspectives could not be corroborated with interview data (i.e., the PA representatives participated in the questionnaire but not the interview). In the case of these six PAs, it is possible that other methods of effectiveness M & E are employed (such as formal or informal biodiversity or other surveys), which may have been omitted from the questionnaires through oversight or difference in understandings.

All but one of the respondents who indicated "yes" to implementation also indicated "yes" to the use of a standardised PAME tool. The METT-SA Ver. 3 (see Appendix D) is the

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most widely utilised standardised PAME tool in the K2C landscape, probably due to the obligatory use of the tool by several of the PAs within BR, including all those that are signatories to the GLTFCA (Section 2.4.2; **Error! Reference source not found.**). P rovincially-managed PAs are also required to undertake annual METT-SA assessments in order to comply with SA legislation. These requirements contribute to the high usage of METT-SA in the landscape. All respondents who use a PAME tool indicated that they utilised METT-SA Ver. 3. "Use" in this case refers to completion of the METT-SA Excel questionnaire, but does not cover management actions taken thereafter once a score has been determined. With that in mind, several representatives of provincially-managed PAs expressed frustration at the implementation and outcome of the METT process, noting that budgetary constraints hinder changes to management once METT scores are received: "*But I'm behind with that because of budget constraints and stuff like that*"; "*…on a reserve scale, realistically, the managers don't have the money, so they just say, ah, you know what, METT is not working, it's too difficult, we don't have budget, we can't do anything, we keep on sending requisitions, so METT is just to tick off*." Three respondents, all of whom are within the GLTFCA network, indicated that they use the GLTFCA Cooperative Agreement reporting template, as required annually by all signatories of the agreement. Two PAs indicated that they utilised the Spatial Monitoring and Reporting Tool (SMART[5]). One representative noted during an interview that he didn't think the PA was using the SMART tool yet to its full capabilities, arguing that "*We have to use that more effectively. We have this amazing technological tool, we're just not using it effectively*." This statement could indicate that there is a need for further training or support in the use of various PAME tools within the BR, which is highlighted again by the general interest and curiosity around the tools expressed by several managers. Two PAs indicated that they use

[5] https://smartconservationtools.org/, accessed on 20 March 2023

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tools of their own design, and one indicated the use of the Balanced Scorecard (SANParks, n.d.). It is important to note that "use" of a tool may mean different things to different managers. In this case, it is clear that some managers only complete the METT questionnaire because they are required to, while others utilise their scores and the outcomes of the questionnaire to guide management action. This is discussed further in Sections 5.3.2 and 5.3.3.

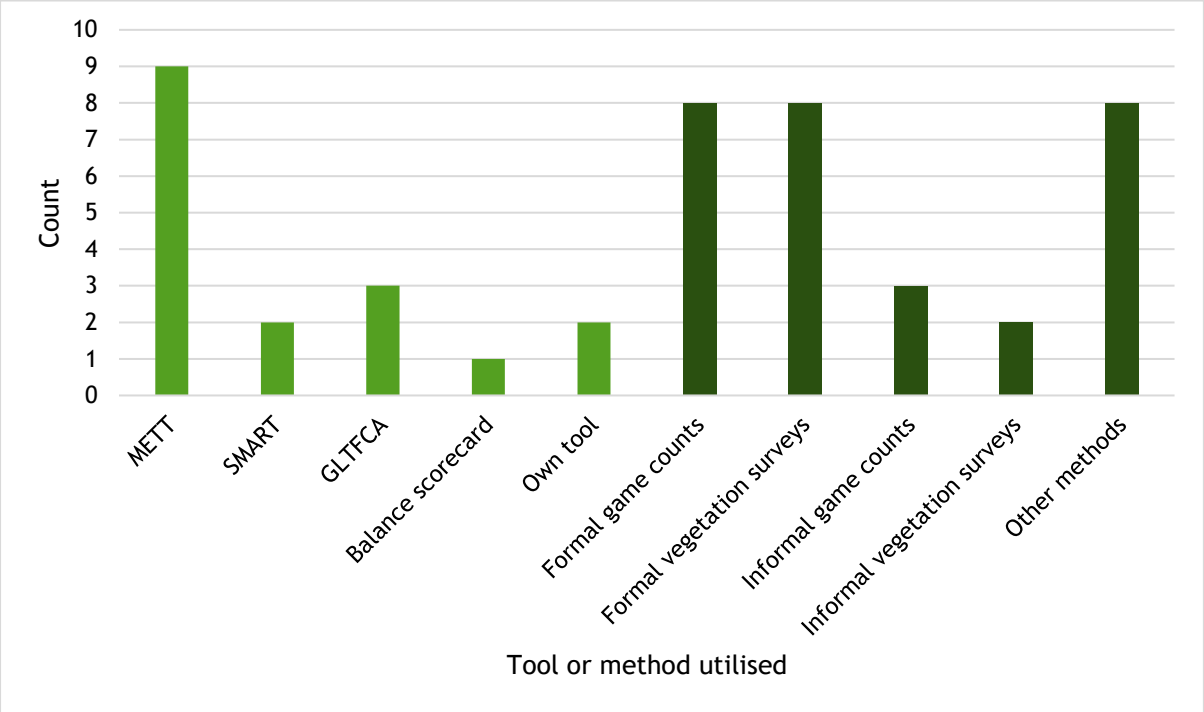

Figure 19: Specific tools and generlised methods utilised to monitor and/or evaluate PAME (n = 18). Note: Some PAs use >1 tool. Dark green bars represent generalised monitoring 'methods', rather than standardised tools used to evaluate PA effectiveness. 'Other methods' include ad hoc or once-off surveying of specific species, or monitoring of climatic data (e.g., rainfall, temperature).

In addition to the standardised tools discussed above, generalised methods such as formal game and/or vegetation surveys formed the basis of many of the respondents' monitoring programs, with other methods including informal counts (such as using citizen science or photographic series) and monitoring other biophysical data (e.g., rainfall, temperature, invasive alien plants, erosion). The collection of these data is in line with the

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objectives of the responding PAs, as biodiversity-related objectives were selected as applicable by all respondents (

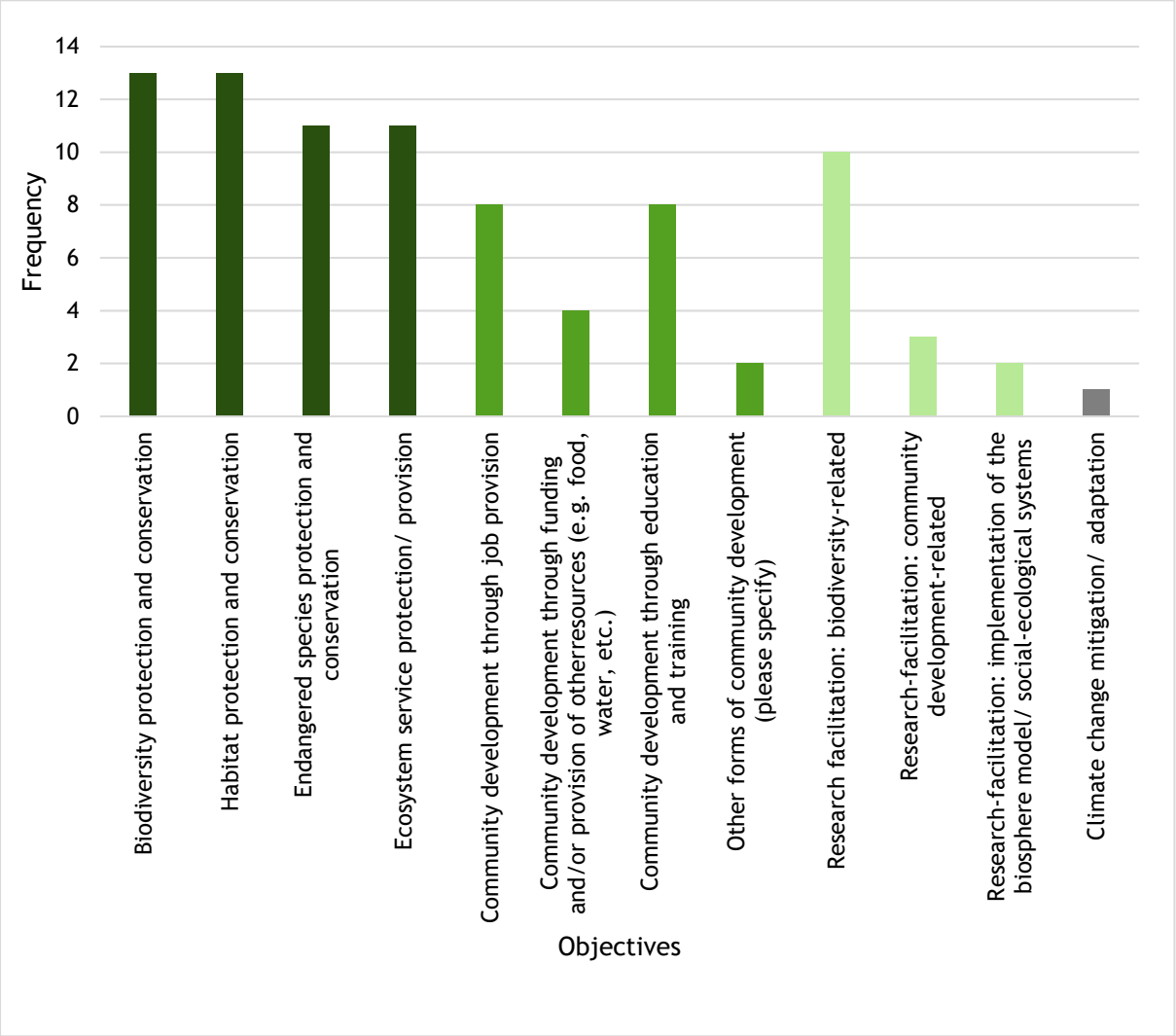

Figure 18). Furthermore, those PAs that use a formalised tool such as METT often also use one or more of the generalised methods to collect data, the results of which feed into their METT assessment answers. However, as the methods for carrying out this type of data collection vary, it is not possible to make assumptions around the robustness or accuracy of such data, nor to what extent it genuinely reflects management effectiveness. None of the PAs indicated that management effectiveness or PA effectiveness was monitored through the collection of socio-economic data (outside of socio-economic data that forms part of some of the tools in use). Some managers mentioned the importance of their budgets, but it was generally not indicated

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as a PAME M & E technique. Socio-economic data that could be collected by PAs includes, but is not limited to, use of budget, a perception study with neighbouring landowners or communities, a measure of benefits that flow from the PA into the surrounding communities (monetary or otherwise), or a measure of the success of upliftment programmes - for example, if a PA sponsored the building of a primary school in an adjoining village, the number of students successfully reaching high school, or matriculating, could be an indicator of the actual benefits provided by the school. The lack of socio-economic data may be in part due to the relative difficulty of collecting it, as emphasised by one interviewee, "*The hearts and minds of communities and things like that are a lot more difficult to measure, and I think we often fail more than we succeed in this regard*." It may reflect the general lack of appropriate measures and indicators for socio-economic PA outcomes, even across a variety of PAME tools (Corrigan et al., 2017). It may also indicate, as was alluded to by some PA representatives, that social elements are not perceived as relevant to some of the PAs, particularly those that are devoid of adjacent communities: "*there's no community land that adjoins us*"; "*We're totally encompassed by other buffer properties, so we're quite isolated*". However, it must be noted that the majority of questionnaire respondents indicated that their PAs had objectives related to communities (

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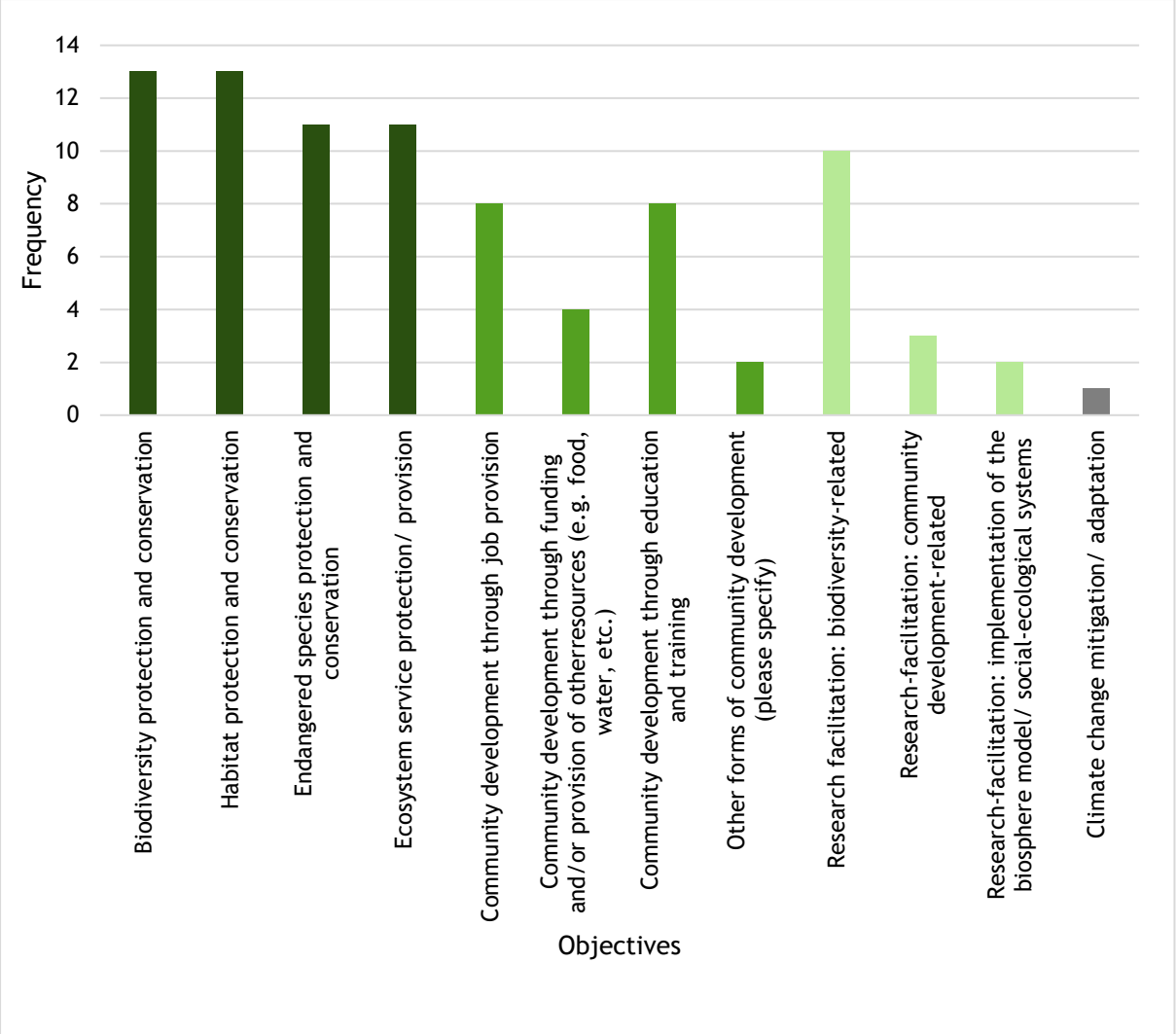

Figure 18). Socio-economic data would likely be most useful in order to evaluate effectiveness of the PA in achieving such objectives. Thus, there may be a potential mismatch between the objectives of the PAs and the data that they collect to monitor or evaluate effectiveness. PAs that do not utilise the standard tools such as METT, which often include some socio-economic indicators, are likely at risk of under- or over-stating their achievement of community-related objectives (Anthony, 2014; Miller & Ross, 1975). It is important that PAME assessments include socio-economic indicators that are balanced when evaluating impacts, and are clear and specific, to ensure that successes (or failures) can be accurately attributed to actions (Corrigan et al., 2017). For PAs that exist within the BR model of K2C, correct and accurate monitoring of socio-economic outcomes is paramount, because they are part of a SES in a

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country and region that faces a multitude of socio-economic challenges, as described in Section 2.4.1.

5.3.2 K2C PA managers' perspectives on PAME tools and processes

Questionnaire respondents were asked to score PAME tools from a number of perspectives, including their 'usefulness', on a scale of one (not at all helpful) to five (very helpful). The mean score was 3.88 (sd = 1.05, n = 8), indicating a generally positive view of PAME tools, particularly METT-SA, as the most widely used tool in the landscape. Several interview statements supported this sentiment and highlighted the tool's general availability and utility for making management decisions (Table 1). Questionnaire respondents also scored PAME tools in terms of 'tediousness' on a scale of one (extremely tedious) to five (not at all tedious). The mean score was 3.38 (sd= 1.11, n = 8), indicating that many respondents felt the tools could be improved in this regard. Interviews supported this result in terms of the METT-SA: "*Yes, I did* [find it helpful]*, but to be honest, it's very broad*", with one newly appointed manager who had not yet undertaken the assessment noting that although he thought the METT would be useful to help guide management actions, the lack of capacity in his PA created a barrier: "*Well, I think some of it is very helpful. Maybe some of it, currently, right now, is just not realistic in the sense of capacity*". Finally, questionnaire respondents were asked to choose from several options to describe their perception of the PAME tools they used. Five of eight respondents selected "I like them but I think they can be improved or streamlined" from the presented options. Two respondents selected "I like them", and one selected "I neither like nor dislike them". The need for improvement or streamlining of the tools, particularly METT, was supported by interview statements that highlighted weaknesses in its scope, versatility and potential bias (Table 1). Reference was also made to the need for improved socio-economic

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indicators, which are becoming increasingly important in the K2C region (Table 1). Several interviewees expressed sentiments that METT-SA is being under- or misused in individual PAs or that its use should be underpinned by certain caveats. This opinion came across particularly strongly for provincial PAs.

Table 1: Perspectives on METT gathered during the interview process.

Management Context	Size (small ≤ 15,000 ha, large ≥ 15,000 ha)	Supporting Statement
Positive perspectives		
Private	Large	"*I think the METT is good, I think it definitely is one way of doing it*"
Private	Large	"*I don't think it's that burdensome, unless you're doing everything wrong, then it must feel exhausting*"
Provincial	Large	"*I've practised METT for a very long time in different areas, and I've seen the results*."
Positive but critical perspectives		
Private	Large	"*I think METT is a lot better but I don't think it captures everything that isn't actual obligation*"
Private	Large	"*Yes, I did* [find it helpful], *ja, but to be honest, it's very broad*"
Private	Large	"*I think it's a really good tool if you're willing to look at the scores objectively and go, this is where you're not performing, and this is where you're underperforming*"
Provincial	Large	"*Maybe we can improve it more. More especially when it comes to social aspects of the protected areas*"
Private	Large	"*Well, I think some of it is very helpful. Maybe some of it, currently, right now, is just not realistic in the sense of capacity*"
Critical perspectives		
Private	Large	"*I think at the end of the day, you know, the METT has got its shortfalls*"
Private	Large	"*So we have been using the METT, we've done it here and that, but to be quite honest, you know, it often just sits on a shelf somewhere and we don't - I mean, I don't refer to it as often*"
Provincial	Small and Large	"*METT can work, we know that answer. The reason why it's not working is because it's biased*"

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Provincial	Small and Large	"*…it has become a little bit of a comparison on … which is unfortunate because I don't think it's the right way of using the METT*"
Private	Large	"*I think you have to have an independent running it. You can do it internally as a readiness assessment, maybe, but you need the external*"

Some PA representatives mentioned that they do not use the METT (or other PAME tools) due to time and resource constraints, particularly for smaller, or newer PAs or managers: "*It's a time issue*"; "*The biggest problem with that is getting people to spend money on it, when they're used to getting it for cheap*"; "*it's just too much admin, there should just be more practical stuff happening*"; "*A lot of us that work in the bush are kind of scared of admin*"; "*Is there anything that small reserves- and I'm not talking about like 10 000 hectares, I'm talking about 3- 4000 hectares- there's no tool that we can use for that?*"; "*So if I was to take another month to do something else that's going to compare stuff, there would have to be a massive difference in how we do management to get that done, because I just don't have time*". While scale may be a common problem across M & E tools worldwide, time, money and administrative burden were highlighted as issues that may preclude certain PAs from utilising METT or other PAME tools. This is a reflection of global challenges currently facing PAs, which are expected to increase with the new CBD target (Appleton et al., 2022; Coad et al., 2019; Geldmann et al., 2019), particularly concerning conservation spending, which can be utilised to improve capacity and resources, and has been linked to biodiversity persistence within PAs (Waldron et al., 2017).

However, some interviewees expressed interest, curiosity, or excitement towards using PAME tools, including METT, in the future: "*Absolutely* [would consider using some of these

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tools]. *I would like to start putting EarthRanger*[6] *into place now already*"; "*I think that's excellent… It's coming, it's coming"* (regarding the use of METT in future); "*No, we would use a tool. Because obviously, at the moment, instead of having everything in one place, it takes me days to compare data, it's painful*." In general, while the overall response to PAME tools—METT in particular, but also the GLTFCA Cooperative Agreement reporting template and SMART—was positive, the underlying message was that there is a need for improvement and/or streamlining.

5.3.3 Linking M & E with management actions and outcomes

According to the AM and SAM cycles (Figure 7-9), M & E must be followed by adaptation of actions to ensure that the PA moves continually towards its objectives. Within a PA in K2C, this would mean that once METT-SA (or other PAME tool) has been implemented, a period of review or analysis would follow to compare the results of the assessment with the desired objectives of the PA. METT, and thus METT-SA, is not particularly suited for assessing PA outcomes (Stolton & Dudley, 2016). However, there is a small section in METT-SA which asks seven questions regarding the PA's contribution to economic and social benefits, biodiversity, ecological processes, ecosystem services, land use and water use planning, and cultural heritage. Thus, in the case of PAs that use METT-SA in particular, it would be expected that once the assessment has been completed, if the outcomes scores are not satisfactory, management actions could be adjusted in order to improve the score in the

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[6] (https://www.earthranger.com/, accessed on 20 March 2023)

following assessment (this would also assume that there is understanding, intention and capacity to do so).

Of the eight PAs that indicated the use of a PAME tool, five (62.5%) indicated that they implemented changes to management after using the tool (Figure 20). One manager selected the option, "Sometimes changes are implemented" in the questionnaire and, in his reasoning, noted that he was a new manager who had not yet been in his post after a PAME assessment. The high number of respondents who indicated that they make use of a PAME tool shows that in general, the PAME tools are being utilised to improve management in accordance with the AM cycle. Some managers, in contrast, may see the PAME assessments as a paper or tick-box exercise, as indicated by one interviewee: "*It was just done in totally the incorrect way, and it was just a tick box thing*". This sentiment indicates that the way in which the tools are used is also important. Follow up actions, and the resources to support such actions, are critical elements to successfully implementing the PAME process and increasing effectiveness of these PAs. Some provincial representatives expressed frustration at staff and resource constraints affecting their ability to appropriately implement changes and follow the AM process: "*So the whole system to react is falling apart due to staff shortages and stuff like that*"; "*we need to move fast to take advantage, because a lot of things are changing around the landscape, but we are slowly changing. But that has to do with the issue of organisational challenges-when it comes to budgeting*." South African state-managed PAs lack sufficient resources to ensure effective management, a problem exacerbated by the prevalence of high-priority national issues such as housing, healthcare, education, security, welfare needs and disaster management (Patel et al., 2023). PAs in SA that are managed by provincial or municipal governments are not fulfilling their mandates due to staffing shortfalls, inappropriate financing models, outdated and/or incorrectly implemented management plans, and failing infrastructure (Patel et al., 2023).

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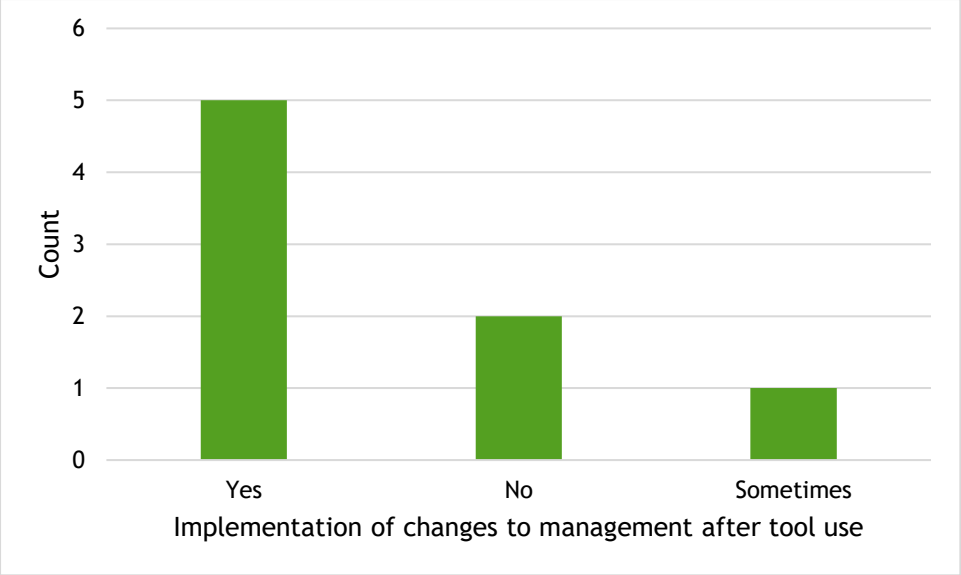

Figure 20: Implementation of changes to management after using a PAME tool (n = 8).

5.4 Summary

These findings indicate that there may be an opportunity to develop a PAME monitoring tool that is more accessible to PAs with fewer resources, i.e., a quicker, simpler, and less resource-intensive tool. Such a tool could potentially be utilised in the early stages of PA establishment and could later be replaced by one of the established tools that evaluate PAME in more detail but requires more time, effort and understanding from the management team. In using any PAME tool, it must always be born in mind that the ultimate goal of such tools (as part of an AM process) is to produce outputs that lead to learning and improved outcomes. The development of a resource-effective tool could be beneficial to other regions, particularly in light of findings indicating that only a small percentage of PAs globally are adequately funded and resourced (Appleton et al., 2022; Coad et al., 2019). This should be underpinned by training and/or facilitative support in order to ensure that maximum benefit is derived from the use of such tools. Training or facilitated sessions may also present an opportunity to increase the collaboration and communication between PAs, a theme which I return to in Chapter 6. There is also a need to continually refine and streamline the tools in use,

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e.g., the METT-SA. It would be beneficial to continue this streamlining process in consultation with the managers and networks or conglomerates (such as provincial networks or the GLTFCA PAs) who are known to utilise these tools. A particular focus on the social–economic elements of the METT-SA, such as the education, awareness and interpretation programme, community liaison structures, gauge of community support, and the economic and social benefit assessment, may improve its usefulness for South African PAs going forward.

The creation or use of PAME tools alone is not enough to improve PAME, and some managers expressed frustration over having the tools to identify challenges but no resources to rectify them: "*the only discouraging part is when you complain about the same thing all over again, that needs funding, and you don't get buy-in or assistance*". This is of particular concern to provincial PAs but applies to many other PAs as well and, to reiterate, is an issue faced by PAs across SA and the globe, not only those in K2C (Appleton et al., 2022; Coad et al., 2019; Patel et al., 2023). This highlights the importance of improving funding and resource availability for PAs alongside the development of M & E techniques. Recent studies quantifying global PA personnel found that numbers fell far short of what is required and suggested that these shortages are a major factor contributing to management effectiveness deficiencies (Appleton et al., 2022; Coad et al., 2019). The studies suggest that if this issue is not adequately addressed, it could compromise progress towards achieving the aims of Target 3 of the GBF (Appleton et al., 2022; Coad et al., 2019). Another study, which examined over 2000 PAs, indicated that less than 25% of PAs reported adequate budget or staff (Coad et al., 2019). A continual lack of resources may lead to continued or intensified habitat loss and degradation within PAs, which are often the last refuge for biodiversity (Jones et al., 2018; Watson et al., 2014). Additionally, it has been shown that increased funding can assist PAs in their mandate to protect biodiversity (Waldron et al., 2017). Therefore, when considering how PAME can be improved, the challenge of under-resourcing cannot be over-emphasised in order

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for managers to be able to enact changes and improvements based on the results of M & E. Furthermore, provincially managed PAs in K2C (and SA in general) are accountable to several tiers of government and may face challenges as a result of this administrative complexity (see Section 2.4.2). PA management is not confined to PA boundaries but requires systemic action to reduce corruption, strengthen law enforcement and improve stakeholder engagement (Geldmann et al., 2019). Issues such as these, where governance systems in highly complex and dynamic systems are not adapted to properly facilitate the AM process, persist throughout the world and create barriers to implementation of AM, including M & E processes (Månsson et al., 2023).

In conclusion, the research indicates that PA managers are largely willing to utilise PAME M & E tools. However, lack of capacity (staff and time) and funding may create barriers to the use of such tools, particularly for those PAs that are small and/or not connected to the BR's core or the GTLFCA, and therefore are not mandated to carry out PAME assessments or supported through the process. GLTFCA PAs that are connected to the KNP, which is the core of K2C, are in general larger, with larger management teams, and increased funding opportunities, and are part of a formal network that not only requires them to undertake METT assessments, but also provides facilitation and support for such processes. More administrative and facilitative support for smaller, disconnected, and newer PAs in the K2C could improve the implementation of M&E in the region, lending further resilience to change.

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CHAPTER 6: COMMUNICATION & COLLABORATION

This research chapter will address the following research sub-questions:

5. How do PA management teams communicate and/or collaborate with other PAs, the K2C NPC and other organisations (i) to improve learning, (ii) concerning M & E of management effectiveness and its tools, and (iii) how does this influence management in the PA?

Through addressing the above questions, the chapter meets the fourth aim of the research, which centres around the occurrence and value of communication relating to AM and PAME in K2C PAs, i.e., the "communicate" step of the AM process (Figure 8). This chapter discusses the findings relevant to the above research questions and should be read alongside Chapters 1- 4 above, to understand the broader contextual and theoretical setting. The findings presented here are drawn mainly from interviews and focus groups (Figure 12).

6.1 Communication and collaboration between PA managers

Communication is defined as "the activity or process of expressing ideas and feelings or of giving people information" (Oxford University Press, 2024). Within K2C PAs, this refers to the exchange of information or learning PA management issues between a PA manager and others in the region. Collaboration is defined as "the act of working with another person or group of people to create or produce something" (Oxford University Press, 2024). In K2C, various collaborations may exist in order to carry out large-scale projects that span more than one PA. For example, PAs may work together to address threats such as rhino poaching or

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invasive alien plants. Connectivity is defined as "the state of being connected; the degree to which two things are connected" (Oxford University Press, 2024). For the purpose of this study, connectivity refers to the amount of communication and collaboration that occurs between PAs and others. Less connected PAs would be less likely to confer with other PAs and organisations regarding management issues. Highly connected PAs would frequently exchange information amongst PAs and other groups, learn from each other, and potentially work together on collaborative ventures.

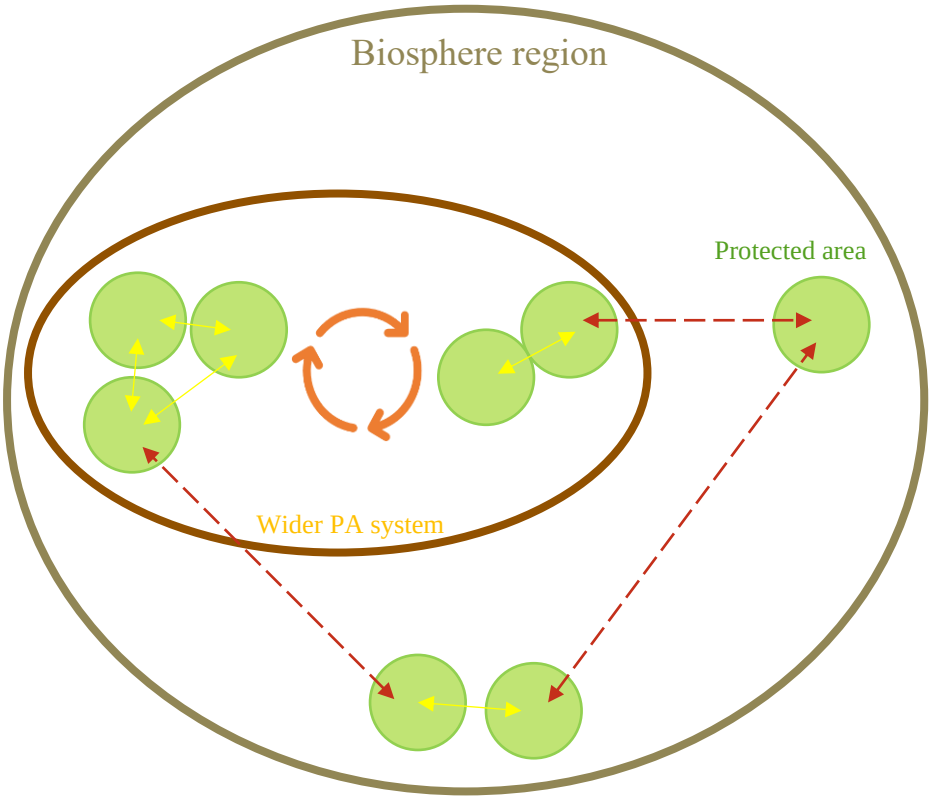

Figure 21: Communication networks present in K2C. Yellow arrows indicate communication between neighbouring PAs, orange arrow indicates communication within wider PA systems (groups of PAs, e.g. GLTFCA reserves), and dashed red arrows indicate potentially broken lines of communication between geographically isolated, smaller or newer PAs in the region.

There are several communication networks within the K2C landscape, in which PAs participate to varying degrees (**Error! Reference source not found.**– yellow and orange a

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rrows). PAs in the region utilise both formal and informal networks. There is a risk that PAs which are isolated from other PAs, or not part of formal PA networks in the region, will be disconnected from the landscape of PA communication (**Error! Reference source not found.** – dashed red arrows). PAs located on the edge of the BR, and which were not part of the GLTFCA core of PAs provided evidence for this phenomenon, as neither noted a flow of communication with other PAs (although both had good working relationships with neighbouring landowners). One of these PA managers made note of a communication network in their area, in which they were the only PA to attend: "*there's a Mountain Eco Watch... It primarily started about water concerns and the change in land use in the area. So there is an effort of bringing different groupings together... One component of that project that they got funding for is the communication within the community within the larger area*". The following communication networks exist in the landscape:

- PAs and neighbouring PAs (where applicable):
    - Formal: Regular meetings to update and share learning (not common, e.g. ecological and security working groups);
    - Informal: communication through email, phone calls or WhatsApp, dependent on good neighbourly relations and often occurring as issues or uncertainty arise;
- PAs and other PAs:
    - Formal: APNR (Associated Private Nature Reserves), GLTFCA, GKEPF (Greater Kruger Environmental Protection Foundation), K2C;
    - Informal: get-togethers, WhatsApp groups;
- PAs and other institutions:
    - Formal: forums and workshops, usually arranged around a specific theme (e.g. fire management); K2C newsletter;
    - Informal: WhatsApp groups.

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During the interviews, it became apparent that informal forms of communication are greatly valued by PA managers in the K2C landscape. Communication channels such as WhatsApp groups, as well as less formal discussion sessions and platforms, were mentioned as good opportunities for learning and networking. More formal means of communication were noted as providing some opportunities for learning (through comparison) and collaboration, but are seen by some managers as being too formal to foster a good learning environment. Participants mentioned that they found value in forums facilitated by outside parties. Nearly all participants of the interviews and focus groups agreed that communication and collaboration is an extremely valuable process, with one participant even commenting on the value of the focus groups themselves to discuss relevant topics: "*We could learn from each other… I would love just to have - take a specific subject, and talk about it like we're doing now, I think this is worth far more than sitting there listening to a lecture. I think you learn a lot more the way you're doing this*". Several participants indicated that communication in the region could be improved in some way, and this will be explored further in the sub-sections below. However, one participant also noted the risks of "too much" communication, indicating that certain information should be kept within the management structures and not shared with a greater audience.

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6.1.1 Communication and collaboration: Learning within an AM framework

This sub-section will focus on the emergent theme of the value of communication and collaboration to foster learning between PA managers in the K2C. Learning is both a vital step and important outcome of a correctly implemented AM process, in order to make progress in management and allow for review and innovation (Fabricius & Cundill, 2014). AM recognises

the inherent uncertainty and feedback loops present in SES such as PAs and BRs (Allen & Garmestani, 2015). AM is sometimes described as "learning through doing"- as such, the learning that occurs throughout the process, and which allows management to adapt, is critical (Allen & Garmestani, 2015). The cyclical AM cycle generally utilised in conservation (Figure 8) contains a "communication" step, wherein lessons from M & E processes are documented and communicated, to create a learning environment and a feedback system that ensures the continuous circular flow of information (Conservation Measures Partnership, 2004; Hockings et al., 2006). Learning plays a key role in both general AM and SAM processes, and the concepts of mutual learning and cooperation are heavily emphasised in the SAM approach (Roux & Foxcroft, 2011; Fabricius & Cundill, 2014). Learning is a continual, dynamic process within complex adaptive systems such as the K2C and its constituent PAs, and occurs over long periods of time within organisations as they move through the various stages of the resilience cycle (Folke et al., 2005; Gunderson & Holling, 2002). Learning occurs differently in different stages of the resilience cycle, and managers can increase their knowledge of PA management through short- and long-term processes (Berkes & Turner, 2006; Fabricius & Cundill, 2014). When a resource crisis or a mistake occurs, PA managers are forced to self-organise, learn and adapt to a potentially new way of management (Berkes & Turner, 2006). On the other hand, conservation knowledge can also develop over time, as people and organisations share their experiences and knowledge of various management practices (Berkes & Turner, 2006). The combination of both these types of learning leads to increased resilience of the SES (the PA, and in this case, K2C) and ability to deal with changes (Berkes & Turner, 2006).

Several themes concerning learning emerged from the data (Table 2). Many of the study participants expressed positive opinions regarding communication and collaboration in the K2C region, particularly in regard to the learning opportunities that arise from connecting

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managers through communication. This is in line with the theory of "network advantage", whereby connecting people in networks strengthens the capacity for research and communication for all the network's members (Creech & Willard, 2001). It became clear that communication is highly valued by the managers in this landscape, as every single interviewee mentioned its importance or necessity. Several interviewees spoke about the role of communication in learning from each other: "*…listening to how people have approached certain circumstances, and how they went about it, if it worked or not, can add great value to my management*", "*By communicating his experience with us, we could very quickly act on that, and adapt our management*", and for sharing updates with each other: "*So we all try and have a conversation at least once every three months and just update each other as to what's going on*". In line with this, some comments indicated that communication effectively creates learning when it is focussed on a particular subject, such as fire management, species management or important landscape-scale issues: "*It primarily started about water concerns and the change in land use in the area*". Others mentioned that communication between PAs in close geographic proximity or in the same ecosystem can assist in creating context-specific learning that managers can benefit from, as well as being logistically easier to coordinate: "*…they're getting managers from different reserves in the [town] area, one Friday every sort of two months or so. So that we can discuss things, like new techniques, anything somebody might have tried in the last two months, results from previous things that they've tried*". A few participants mentioned the value of connecting experienced managers with less experienced managers to create opportunities for young or new managers to learn from those who have been in the landscape for long periods of time: "*Normally the older guys that have been in the area, in my experience, have done, and paid school fees. And it's always good to pick up on what they've learnt, and seen, and experienced*." One provincial manager mentioned the value he gained in collaborating with managers in private PAs, "*So far, there is big understanding*

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around here, as much as we've got budget challenges, the private people have been very very helpful. So the working relations are very good here", indicating that there may be value in connecting managers of different PA governance types, whether this value comes in the form of learning, or from an opportunity to share resources (where practical and possible). A manager in the parastatal system noted that he had previous experience of communicating with managers in other provinces, and that this formed a valuable learning opportunity: "…*we would have quarterly meetings. And we scheduled them in a different province every quarter… so that all the [department] personnel could get insight into the problems that that province might be having with a specific type of thing*".

Thus, learning does not only need to be a linear process between PA managers, but can extend vertically through provincial and national government systems, particularly in cases where PAs are managed by state organisations, such as LEDET, MTPA, DFFE, or a parastatal entity, as expressed in this statement: "… *once you've been to some of those* [workshops] *on a national level, then you can bring that information back and share it a local level and share it with your managers and with other people working in your sphere*". This transfer of information is consistent with proper implementation of an AM cycle, during which learning should occur over varying lengths of time, and over various scales, for individuals and within organisations (Fabricius & Cundill, 2014).

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*Table 2: Summary of types of communication networks that PAs participate in within the Kruger to Canyons landscape. *Small PAs are those that are less than 15 000 ha in size.*

Examples given	Themes	Supporting statements	Type of PAs*
Between PAs and neighbouring PAs			
Meetings between neighbours	Update, share learning Depends on manager's attitude and accessibility	"So we all try and have a conversation at least once every three months and just update each other as to what's going on. So we try. I mean that's part of what we do. I work quite closely with [neighbouring reserve], so if we try something and it doesn't work, I get together with them and say, listen, it didn't work because of this."	Private, fenced, small
	Share learning	"Otherwise, with [neighbournig reserve], we have- probably every second month- we have a formal sit-down with myself and the manager there, have a formal sit-down… we compare how it works. So his student and my student do the research and then we put it together- how his worked, how mine worked, and which one is better."	Private, fenced, small
General communication, relationship between fenced neighbours	Acknowledge the value	"I know how important it is to also know what your neighbours are doing."	Private, fenced, large
	Not opposed to communication	"It's not that we're against it. It just doesn't happen."	Private, fenced, small
	Discussing a particular subject Value of relationships	"Now, we talk to our neighbours regularly, and I have chatted to them about protected areas"	Private, fenced, small
	Sharing learning in similar ecosystems	"By communicating his experience with us, we could very quickly act on that, and adapt our management plan for that bush clearing. So I think, in terms of collaboration and communication, I think it's very much alive and	Private, fenced, small

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		well, at least for the immediate vicinity. I'm not sure about regional, per say. With adaptive management,	
	Communication is part of adaptive management	comes communication."	
	Too different to gain value	"The way you would manage that side of the road is very different. I mean, you've got an open system. We're a closed system, and our neighbours, except for on one side, are much smaller closed systems without the species diversity and so on, so not really comparable."	Private, fenced, small
	Lack of time for formal meetings	"I haven't had time to go sit and have forums with them, I can assure you. I just pick up the phone and I ask directly if I need something – or email him"	Private, fenced, large
	Value of relationships		
	Value of informal network		
General communication, relationship between neighbours with open boundaries	Collaboration across management types	"So far, there is big understanding around here, as much as we've got budget challenges, the private people have been very very helpful. So the working relations are very good here, that's the only thing that I'm holding on."	Government, dropped fences, large

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Between PAs and other PAs			
GKEPF (Greater Kruger Environmental Protection Foundation)	Positive learning environment Networking opportunity	"…so it's all around the security of the area, and we all do it together, and it's been great. I mean, yesterday's meeting was just- so the networking that you do with colleagues, and finding out what they're doing, and helping each other- it was a great day. So I think that's important- that we use that to also just learn- lessons learnt, to know where you can actually improve. And someone else has got a really great idea, and you share it, so it was good."	Private, fenced, large
	Positive learning environment	"GKEPF is great because there's a bunch of old school security guys sharing lessons learned and no one has much of an issue there, they all just want to look after rhino"	Private, dropped fences, large
GLTFCA (Great Kruger Transfrontier Conservation Area), K2C	Valuable to review progress against one another (referring to METT)	"Exactly and that's where I think initiatives like GLTFCA and K2C are going to come in handy because it also ties in the national parks and the provincial parks, to maybe have a shorter time frame of annual review. You know, when you're sitting in the JMC and everyone's names are up on the board, then it helps."	Private, dropped fences, large
GLTFCA	Lack of learning environment	"We probably don't discuss it enough. When we sit together on so many different forums and we talk about so many different things. At JOC level, and then we join the APNR meetings, offtakes and things like that. I don't think we share enough the lessons learnt specifically around management"	Private, dropped fences, large
	Administrative feel	"JOC, you know with the administrative and sort of bureaucratic feel that comes with having Kruger there, and the JMC chair"	Private, dropped fences, large
	Connecting across management types	"we have got platforms that we sit around for this landscape, where we sit with private nature reserves, Kruger National Park, everyone who's involved"	Government, dropped fences, large

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	Depends on manager's attitude	"So it all depends on the specific reserve manager there. And then some are forced into situations where they have to, like [other reserve in network] is open with the Kruger so there is good communication. Especially with the rangers- between our rangers and the Kruger rangers. And the previous reserve manager that was there also had good communications. So sometimes you are forced into a relationship which you have to adhere to. But it all again comes down to the passion of the reserve manager, and is he really is the right qualified person"	Network of reserves - governing authority
GLTFCA, GEF, provincial meetings	Connecting across provinces Learning through METT	"Actually all platforms that I'm attending- JOC 6, GEF- we are talking METT. Even if we sit with the Limpopo people, METT is there. So it's something that we discuss often. And it's something that's very helpful because when we discuss it on that level, you get to know how other people are doing it on their site. More especially in areas where you might be struggling." "Because when we share information of how you are doing it, you are probably saving costs for someone else. And time as well. Instead of that person trying to find a way, you already have a reference. So you also find out if you are doing something wrong, or you are doing the long route, or you are doing it the wrong way, even though you get to the result. Or you get fresh information on that thing that you are working on"	Government, dropped fences, large
Intra-departmental meetings	Lack of learning environment	"There's nothing like that. They do have a lot of meetings. It all goes about stats… There's nothing, just paper exercises. There's nothing really making impact."	Network of reserves - governing authority
	Forums initiated by outside parties	"So that was initiated by external NGOs or Kruger. Otherwise inside, there's nothing like this. There's no forum that says ok, let's get together and let's teach you how METT works, or what's the purpose of METT."	Network of reserves - governing authority

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Information sharing sessions	Planned but not yet implemented Sharing learning across management types	"what we have planned so far this year is that there will be an information sharing session, because there's also other reserves- private reserves in the area that we looked at their METT and where they do well"	Network of reserves - governing authority
APNR	APNR provides for some level of collaboration Not enough communication in landscape	"I don't think [communication and collaboration] happens enough at all. Guys play their cards very close to their chest, they think, it's my data and I don't want to share it… look, it's an open system, we've got the APNR there, we have these meetings and that, and I think that's where a certain amount of that happens. But I think a lot of people, their data is too precious, they don't want to share it. They've obviously worked hard to get it. But I believe that collectively we could make- you know, maybe someone else think, well, this could actually work, I could change the way I'm doing it. I don't think it happens enough at all."	Private, fenced, large
	APNR provides some connection but could be better Collaboration is important to combat threats	"In the last couple of years, my experience has been that there's a lot more collaboration on data amongst the private reserves. I talk specifically APNR… [ecologist from other PA] is working with our guys, so that we can get more of an APNR picture. I see more and more of it. It could be more… the poaching crisis is an unnatural situation, it's a huge impact on the rhino as a species, and the only way to beat it is to collaborate… part of that is sharing the data."	Private, dropped fences, large
	Effective collaboration depends on commitment from the parties involved	"The cooperative agreement is a fantastic document, and the intentions are really good. My feeling is that only one half of those entities are making an effort to get better at collaboration… you can't expect one half of the parties to collaborate, and improve collaboration with each other, but [another party] is not… the guys that are already working together could work together more, but these guys need to get onto the bus in order to make it really effective."	Private, dropped fences, large

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Working groups	Value of informal discussions	"I think where the forum becomes a little a little less formal, I think it really works"	Private, dropped fences, large
	Value of informal discussions	"I think there's value in having more informal discussions around these things"	Private, dropped fences, large
WhatsApp groups	Value of informal platforms	"we have a conservation think tank WhatsApp group where we share all our stuff and what we're doing"	Private, fenced, small
Between EMs, via WhatsApp	Impact of Covid Share learning from different PAs	"The boys and girls [EMs], they are talking about *mina nyenzani*, what are you doing that side, do you have how many…? You know, they do communicate. But since the issue of the Covid, we never visit, except when they go to the college there."	Private, fenced, small, isolated
Between more experienced managers in area and newer ones	Value of experience	"Normally the older guys that have been in the area, in my experience, have done, and paid school fees. And it's always good to pick up on what they've learnt, and seen, and experienced… listening to how people have approached certain circumstances, and how they went about it, if it worked or not, can add great value to my management."	Private, fenced, small
PA area meeting	Connecting managers in one area Value of informal meetings/ get-together	"[Manager] and [other manager] have started something quite recently, where they're getting managers from different reserves in the [town] area, one Friday every sort of two months or so. So that we can discuss things, like new techniques, anything somebody might have tried in the last two months, results from previous things that they've tried. And that's been going very well… there are ways and means for information to be shared. I think that, especially in this sort of field, it's just about making it less of a meeting and more of a braai."	Private, fenced, small

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Meetings of different stakeholders	Value of informal meetings/ get-togethers in creating relationships	"Veterinarians, helicopter polite, farm managers, even mechanics, all came together… everyone gave their input… I do believe a lot of encounters after something like that went smoother because a lot of the jagged edges were taken off by idle talk. It wasn't a formal thing."	Private, fenced, small
Between PAs and other entities (including K2C)			
EXCO meetings	Learning at provincial level	"But with [management authority], we only sit when we've got an [executive committee] meeting, where we say- this is what's happening in [PA]. And maybe our supervisor will say, what you are doing there, we need to apply it somewhere else in the reserve. But really formally to sit, we are going that direction, all of us. So it's only something that we are doing in [PA] because we have to adapt"	Government, dropped fences, large
Fire protection groups	Discussions with a particular focus	"we had a bit of a fall-out with the local forestry guys about destroying a piece of grassland. But now they are back on board, and we essentially- a representative of [organisation] who also partially represent [other organisation]… I would discuss it with [colleague], and then [colleague] would say, sorry I can't come to that meeting, but my points are x, y, z. And I would convey them. And we'd have a meeting with the so-called fire guys"	Government, managed by volunteers, no fences, small, isolated
Forums- general	In the past, this occurred, but no longer	"We had something like that, but that's many years ago, it may have been in 2014? Where we got everybody together. But since then it hasn't happened"	Government, managed by volunteers, no fences, small, isolated
Mountain Eco Watch forum	Specific focus forum	"It primarily started about water concerns and the change in land use in the area. So there is an effort of bringing different groupings together"	Government, managed by volunteers, no

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			fences, small, isolated
Governing authorities	Looking to them for assistance and to learn Impact of Covid	"No, we speak to MTPA. As I said, we are planning to visit Imamba at Hoedspruit. We are planning to visit some of the reserves of MTPA. We are planning to visit K2C, to go and show us how they work. But because of Covid, everything was stopped."	Private, fenced, small, isolated
Governing authorities, neighbours of differing land uses	Notification of issues	"you've got external stakeholders, so LEDET would want to know what's happening, and the neighbours like the citrus, want to make sure that you don't have too many elephants and that they don't get hungry and they're not going to break through into the citrus farms. Or predators likewise, that the surplus young males that have been chased by the other big lions and therefore go into the neighbours. So there is a neighbour component"	Private, fenced, small
Concerned citizens WhatsApp groups	Lack of communication skills	"But essentially, as volunteers, we are stretched with just your basic tasks. And I'm not particularly good at communicating with the community around us. I wouldn't know how to do that"	Government, managed by volunteers, no fences, small, isolated
Newsletter	Connected to landscape	"we do catch what K2C is doing through the newsletter"	Private, fenced, small, isolated
Internal (between home/ landowners in a reserve)	Cons to communication	"That's always a double-edged sword. We started out with a little newsletter, but eventually I just gave up. It just caused too much trouble, because everything became contested as a result."	Private, fenced, small

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K2C	K2C as a facilitator	"I think that something like K2C could certainly fill a role as a forum, and if you have that, and let's say your management plan is generally within the acceptable parameters to a forum of managers, it does strengthen your role when you go back to your stakeholders."	Private, fenced, small
	K2C as a representative body	"The chances of me writing my opinion is very low, the chances of you writing your opinion is very low, but the chances of us sitting around and having a meeting here and saying, let's get a collective opinion that will be coordinated by K2C, and put in a submission on behalf of x number of managers, is much higher. So there's the formality that can come from those kind of responses."	Private, fenced, small
	K2C as "glue", creating good relationships	"The common denominator in this area would be the K2C. That's the glue that's going to bind us."	Private, fenced, small
PA-Community	Incorporation of indigenous knowledge and local communities	"Communication is very key… especially with community members. We tend to forget about them in instances where there is a nature reserve and then there are communities around. We usually tend to forget about their inputs. We tend to forget that before we put a fence in a nature reserve, that area was managed- possibly well. But we are not getting their inputs in terms of how, traditionally, they used to manage areas. So bringing communities along, or people with indigenous knowledge, along in the processes that we are undertaking is very important. So communication is key, both ways. Scientists with communities, communities with managers."	Network of reserves- governing authority
Managers, land claimants and tour operators in one PA	Without communication, none of the interested parties get what they want	"Communication and collaboration are very important… I'll give an example in an area where there is a claim on it. It's a reserve, there is a claim, and then there's tour operators. If there, there is no communication, you will never work. These three people are interested in different things. That's what is making our land claimants and the management not get along- and the operator… it's three people that have got different interests, but these people don't collaborate… let's see how we work, let's sort out our communication, let's collaborate our	Small, fenced, state-managed

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		ideas. You are collaborating the three different ideas to work together. But because they don't do that, that's why nowadays you'll find a land claim is becoming a mess in nature reserves… communication can be very important in resolving this… You have to collaborate all these different stakeholders, to be able to have proper communication, that the interests of that particular park is protected from all these bodies."	
National biodiversity workshops	Value of forums	"The biggest asset in my work has been the attendance of the national biodiversity workshops every year. Through those workshops, you become aware of what is happening in all spheres of biodiversity conservation management, nationally and sometimes internationally, and how it affects and flows down into your sphere of work. And you become aware of new techniques, new instruments and things being used by people, other scientists. I find it's probably been one of the most advantageous forums that I've been sent to attend. I make certain that as far as I can I try and attend as many of them as I can, because as far as sharing and getting information, that's one of the best places one can go to. Also, working with SANBI [the South African National Biodiversity Institute] once you've been to some of those on a national level, then you can bring that information back and share it a local level and share it with your managers and with other people working in your sphere."	Network of reserves - governing authority
Workshops with a theme	Loss of meetings over time Lack of a coordinator/ facilitator	"We used to have, with the old [Transvaal Provincial Administration] meetings that we had, generally always here at the research centre at Klaserie. And all the conservation guys would come together once in six months, and have a huge meeting. There was presentations of what everyone has been doing, research that's been done, results, a general discussion. And we are trying to revive it, but it's difficult, because everybody has such busy schedules now that you don't get time to do it, unless we have a specific theme… but the thing is, to get a coordinator. Somebody to coordinate and manage and organise it. I think it's sadly lacking. A number of years ago, it was quite easy, we had people motivated to do it. Now it's not happening anymore."	Network of reserves - governing authority

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Meetings with a theme	Less formal, discussion-based workshops/meetings are useful for learning	"We could learn from each other… I would love just to have- take a specific subject, and talk about it like we're doing now, I think this is worth far more than sitting there listening to a lecture. I think you learn a lot more the way you're doing this."	Large, fenced, private
Inter-provincial government department workshops	Workshops no longer implemented	"Up till about 6, 7 years ago, we would have quarterly meetings. And we scheduled them in a different province every quarter… so that all the [department] personnel could get insight into the problems that that province might be having with a specific type of thing… we would discuss these problems, and come up with solutions… everybody comes together and we try and find a solution for what is happening. That has stopped completely and it has left such a huge vacuum."	Network of reserves - governing authority
General communication			
Communication with stakeholders	Accessibility of knowledge	"I think communication is key, and collaboration. Communication is key in terms of sharing knowledge with one another, but not only that- using a language that people can easily understand. So translating all the science into a language that people can actually understand and implement."	Network of reserves - governing authority
	Importance of relationships	"I need to have some sort of relationship with the people that are actually doing the work. That becomes key in terms of actually getting work done. You need to collaborate. Have good relationships in place to make sure that whatever recommendations get implemented."	Network of reserves - governing authority
	Depends on manager's attitude	"we get other ones that is living there and passionate about what they are doing. And those ones are normally connected with – the ones that are passionate and want to do their work are connected with the community around them for all other reasons, and also in terms of co-management, they are very jacked up. Good communication with communities, with researchers, coming up with new ideas, those type of things. And then, unfortunately, on the other side of the scale, you get ones that don't really care"	Network of reserves - governing authority

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Communication by governing authorities	Incentives for communication	"The way the system, the government, the companies- the way they are set up, we are set up to work in silos. I only focus on my job and I report end of the month, end of the financial year, I've done this, there's no requirement… to show that you've actually collaborated where it's necessary."	Network of reserves - governing authority
General	Depends on manager's attitude	"some managers like to keep their stuff very personal, and what they do… and some guys don't share, but it's the way forward"	Private, fenced, small
	Communication and discussion helps to spread learning	"Communication, I think, is key. I think sharing of information is key, because there have been people out there that have tried things and failed, and that information needs to be circulated. Any kinds of discussions is very key."	Private, fenced, small
	Managers value communication, although they may not be good at it	"A communication problem is always solved by more communication, not less communication. The trouble that you find, is that a lot of people who get into this wildlife management thing, is they don't like communicating. So what should happen, and what does happen- they are not anti-communication, they just- "Ah, I'm busy, that's not work, I've got things to do." So communication is always useful. You very seldom will spend an hour in communication with another, or parties, and not learn something."	Private, fenced, small
	Learning from previous experiments	"It's about communication. Because somebody has tried, tested, and probably failed or succeeded, so it's just to find that."	Private, fenced, small

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6.1.2 Communication and collaboration: PAME and PAME tools

The interviews and focus groups revealed that some managers do communicate about management effectiveness (Table 2). Such communication was largely limited to the METT-SA assessment, which all provincially managed PAs in K2C, as well as all GLTFCA PAs in K2C, are obliged to use for reporting purposes within their governance structures. One provincial PA manager noted that such conversations assisted them in finding solutions to common management problems: "*Actually all platforms that I'm attending - JOC 6, GEF - we are talking METT. Even if we sit with the Limpopo people, METT is there. So it's something that we discuss often. And it's something that's very helpful because when we discuss it on that level, you get to know how other people are doing it on their site. More especially in areas where you might be struggling*." In the case of GLTFCA PAs, quarterly Joint Management Committee (JMC) meetings are held to discuss matters relevant to the whole conservation area (pers. comm., K2C management). One of the meetings includes a discussion on the signatory reserves' METT-SA scores, and one manager noted the value of this practice: "*Exactly, and that's where I think initiatives like GLTFCA and K2C are going to come in handy because it also ties in the national parks and the provincial parks, to maybe have a shorter time frame of annual review. You know, when you're sitting in the JMC and everyone's names are up on the board, then it helps*." So, while it is clear that METT-SA is discussed amongst managers, and that those managers find such discussions useful, this is usually in formal meetings, and only by PAs that are obliged to utilise this tool. This includes provincially managed PAs in K2C, as well as all GLTFCA PAs in K2C, who are obliged to use METT-SA for reporting purposes within their governance structures, but some of whom may not find completing the questionnaire helpful, as they are not able to follow-up (see findings in Chapter 5). None of the managers outside the provincial or GLTFCA networks mentioned any discussions about the METT-SA, although several expressed interest in the tool during the interview sessions, and at

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least three interviewees requested a link to the METT-SA framework, as noted in post-interview field notes. None of the managers noted that they communicated with others regarding management effectiveness as a general concept. There were some cases in which managers would discuss findings from vegetation or animal monitoring exercises, which may be seen as an element of management effectiveness (e.g. one manager noted a comparison of vegetation studies with a neighbour, using different management techniques: "*So his student and my student do the research and then we put it together - how his worked, how mine worked, and which one is better*"). There is an opportunity for the METT, and other management effectiveness assessment tools, to provide a platform for managers in the K2C region to share information and learn from each other. Connecting managers to each other through METT-SA also presents opportunities for collaboration, as has been observed within the GLFTCA network already, where collective approaches were used to pool resources, minimise time and reduce costs, leading to optimised efforts and better results (van der Merwe & Batschari, 2021). Improved communication and collaboration around the METT and management effectiveness in general, could lead to an increase in the understanding and use of management effectiveness assessments by some PAs in K2C, thus providing a sound basis from which to improve the effectiveness of PAs in the region going forward. Some PAs may have the resources and capacity to undertake PAME assessments but may not have the knowledge or understanding of the process, whereas other PAs may require additional support (financial or human capital) to undertake these assessments (see Chapter 5 for further discussion on this topic). Collaboration between PA managers could allow for the creation of new knowledge through social learning (Reed et al., 2010) and the distribution of best practices and other knowledge amongst the connected managers (Folke et al., 2005).

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6.2 Communication and collaboration: Benefits

As discussed above, communication and collaboration can foster learning and provide opportunities to share resources. This section will elaborate on some of the other themes that emerged from the data (Table 2). First, relationships are a key element to communication. Good relationships help to improve communication, and can lead to more opportunities for collaboration. Several participants indicated that they communicate well with managers who they have good relationships with: "*I work quite closely with* [neighbouring reserve]*, so if we try something and it doesn't work, I get together with them and say, listen, it didn't work because of this*". This emphasises the fact that communication can assist in building, and is strengthened by, good working relationships. This is in line with studies that show the importance of social networks when stakeholder groups work together to tackle natural resource problems (Bodin & Crona, 2009).

Secondly, communication and collaboration are important when addressing threats. In fact, effective collaboration may be the only feasible solution for addressing regional or global-scale environmental issues (Bodin, 2017). One interviewee from the provincial sector mentioned the necessity of good communication with other stakeholders when it comes to navigating land claims, which is a pertinent issue affecting South African PAs: "…*nowadays you'll find a land claim is becoming a mess in nature reserves… communication can be very important in resolving this*". Sadly, in many land claim cases, the relationship between PAs and neighbouring communities are highly strained, sometimes even leading to land invasion and unlawful occupation (Patel et al., 2023). Another participant mentioned the value of communication and collaboration when working on landscape-wide threats (e.g. rhino poaching or invasive species) that affect multiple PAs and other actors within the K2C system: "…*the poaching crisis is an unnatural situation, it's a huge impact on the rhino as a species, and the only way to beat it is to collaborate*". M & E processes such as METT-SA and their

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subsequent workshops have been utilised to identify opportunities for collective action, such as undertaking a landscape-wide cultural heritage survey to address a common gap in the PA's METT scores (van der Merwe et al., 2022).

A third theme centres around the idea of connectivity to the greater system, including other PAs (not just neighbours), the K2C itself, and all the other organisations working in the region. Several participants noted that K2C provides them with an important connection to the greater landscape, even describing the organisation as the glue keeping everyone together: "*The common denominator in this area would be the K2C. That's the glue that's going to bind us*". Somewhat centrally located, in the town of Hoedspruit, and often providing opportunities for learning through symposiums and the dissemination of a quarterly newsletter, the affiliation to K2C is an element that all PAs in the BR have in common. In addition, the K2C facilitates research in the region, and connects researchers to practitioners, allowing PAs opportunities to participate in and gain from research. Affiliation with K2C may provide access to international funding and/or other resources, such as through the Environmental Monitor (EM) programme, whereby the K2C supports the DFFE in placing environmental workers in PAs to assist with daily maintenance activities (pers. comm., K2C management). Thus, the K2C non-profit company is an ideal facilitator and coordinator of communication and collaboration in the landscape.

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6.3 Communication and collaboration: Barriers

While there are established networks of communication in the K2C landscape, there are also several barriers to communication and collaboration between PA managers (Table 2). First, the managers themselves, their geographic location, and their opinions and preferences, may present a barrier in some cases - although this barrier may also be overcome, depending

on the manager's attitude. The degree to which a manager communicates and/or collaborates with their peers is affected by their geographic location and their schedule. Geographically isolated or time constrained managers may not be able to attend meetings or communication sessions as much as others, as expressed by one manager who runs a very small management team: "*I haven't had time to go sit and have forums with them, I can assure you".* These constraints may be tempered by a strong desire to actively participate in a communication network, as witnessed when some of the more remote PA managers decided to attend the focus groups as part of this study. The manager's attitude towards communication and collaboration will influence their level of participation in the network, as noted by several participants, and notably by a provincial department employee: "*But it all again comes down to the passion of the reserve manager, and if he really is the right qualified person*". Passionate managers may be happy to have open communication channels, whereas some managers may not care enough to share information or knowledge, or may be protective of the information they have gathered. Some managers are not skilled communicators, as expressed by one interviewee: "*I'm not particularly good at communicating with the community around us. I wouldn't know how to do that,*" while others may not enjoy communication, and therefore would not prioritise it: "*The trouble that you find, is that a lot of people who get into this wildlife management thing, is they don't like communicating. So what should happen, and what does happen - they are not anti-communication, they just - "Ah, I'm busy, that's not work, I've got things to do*"". Some managers feel that communication may not result in learning, as learning does not always translate across PAs that are very different from each other: "*The way you would manage that side of the road is very different. I mean, you've got an open system. We're a closed system, and our neighbours, except for on one side, are much smaller closed systems without the species diversity and so on, so not really comparable*."

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In cases where management is centrally controlled through an organisation, the organisational-level requirements and culture relating to communication may also present a barrier to communication. Managers who are part of larger managing organisations (i.e. those employed at state-managed PAs) are bound to the guidelines of that organisation, however, that does not always translate to effective communication: "*They do have a lot of meetings. It all goes about stats… There's nothing, just paper exercises. There's nothing really making impact."* These organisations themselves may also fail to properly encourage or incentivise communication and collaboration from their managers. One participant mentioned that government employees are not sufficiently incentivised to develop good communication networks, and thus it does not fall into their top priorities: "*The way the system, the government, the companies - the way they are set up, we are set up to work in silos. I only focus on my job and I report* [at the] *end of the month, end of the financial year, I've done this, there's no requirement… to show that you've actually collaborated where it's necessary*." In order for PAs in this category to fully embrace the AM process, the organisational culture of the state departments should be one of continual learning and engaging with all relevant stakeholders (Stirzaker et al., 2011). As Stirzaker and colleagues (2011) point out, this kind of organisational culture is rare. State departments could improve this culture by referring to collaboration and effective communication with stakeholders within job descriptions and key progress indicators (KPIs). In meetings where the managers of the various PAs within a state network interact, it may be helpful to have an informal discussion session to allow them to share lessons learnt in their PAs. However, it should be noted that state departments in SA, particularly those which manage conservation, are typically under-resourced in terms of both staff and funding, as noted in Chapter 5. K2C may be well-placed to form a collaborative link between different state entities (e.g. between the parastatal management authority of the forest reserves, and LEDET).

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The format of the forums and meetings that do currently occur in the region may create a barrier to communication in some cases. Although there are formal networks present in K2C, the extent to which any of these provide for a learning environment may be questionable. Several participants mentioned that the formal, somewhat bureaucratic setting of some of the meetings that occur within these networks does not necessarily encourage an open learning environment. Furthermore, these networks are only accessible to those within the structured systems (e.g. the APNR network is exclusively made up of APNR PAs). This may result in some PAs, particularly those that are geographically isolated, those whose managers are new or not well-connected in the landscape, or those that are recently designated, being excluded from the network and losing out on opportunities for learning. Such PAs would also be the most likely to gain from learning exchanges, for the same reasons which may have resulted in them not having had many previous opportunities for learning. Communication with these PAs could be improved via increased ties with the K2C, who would be able to invite them to relevant learning sessions, and link them with other managers in similar contexts or facing similar challenges. K2C is in the position to form a "knowledge network" that emphasises joint value creation for all the PAs involved (Creech & Willard, 2001). In some cases, virtual event attendance might be more appropriate and cost-effective.

Communication and collaboration across different stakeholder groups (e.g. between a PA and its surrounding communities) may face a language barrier - both spoken language and scientific language. Although only appearing once in the data, this is most likely due to the fact that this study focussed on PA managers, who are largely English-speaking, and not other stakeholder groups. One participant emphasised the need to ensure that communication is undertaken using language that all stakeholders could understand. The connections between scientists, managers, and communities should be nurtured in order to allow all groups to learn from each other (Stirzaker et al., 2011). In order to manage adaptively, scientists and managers

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must be prepared to learn with and from people who may hold different world views, which challenge their pre-existing knowledge and frames of reference (Stirzaker et al., 2011). In a multistakeholder context such as a BR, successful AM can only arise once all stakeholders see themselves as part of a community, learning from each other through experimenting with management approaches (Stirzaker et al., 2011). Within K2C, stakeholders from different backgrounds, including managers of private PAs as well as community or co-managed PAs, researchers, NGO representatives, and community and industry representatives, need to be encouraged to connect with each other, in order to form collaborative relationships and to learn from each other. The adaptive co-management element of the SAM framework embraced by SANParks underlines the value of co-management in South African PA systems (Roux & Foxcroft, 2011). A facilitative party may be able to nurture such connections, and create learning opportunities between different parties. The inclusion of indigenous knowledge is increasingly becoming a global theme in conservation, as demonstrated by the Kunming-Montreal Biodiversity Framework Target 21 (Convention on Biological Diversity, 2022). In K2C, such knowledge can be gleaned from the communities residing alongside PAs or in important biodiversity conservation areas - for example, the community of Phiring, where K2C has facilitated a community tourism initiative. It is therefore important to connect stakeholders within the communities outside the PAs with PA managers - or at least facilitate the exchange of knowledge between these two groups. While there may be difficulties in integrating traditional and indigenous knowledge into the existing PAME or METT processes, efforts need to be made to ensure that indigenous people are included in PA management, and this should be facilitated by the government or external parties. PA managers, who are already under pressure from restricted resources, and who may lack the communication skills to address the communities, are unlikely to embrace an additional task that requires significant time and effort. The South African government, as a signatory to the Kunming-Montreal Biodiversity

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Framework, has an obligation to work towards achieving those targets, and this could be leveraged to encourage state departments to consider different stakeholder viewpoints. As mentioned above, state departments could include communication and collaboration in their job descriptions and KPIs. This should extend to all stakeholder groups, from scientists to community members.

Several participants mentioned networks and workshops which used to occur in the landscape, or which were supposed to have been started but weren't. One participant noted the impact of the Covid-19 pandemic on such plans. These sentiments underline the need for a committed facilitator who will take charge of the need for increased communication in the K2C, and show long-term dedication to the task.

6.4 Opportunities to improve communication and collaboration

There is an opportunity in the K2C region to expand on the current networks in place in order to improve learning across the landscape, build relationships between PAs and other organisations, and pave the way for future collaboration opportunities. In the knowledge network model, it is noted that most "knowledge networks" are initiated and led by one or two key organisations (Creech & Willard, 2001). Such organisations need to determine the intention of the network, the required partners, and the advantages of creating the network (Creech & Willard, 2001). Patel and colleagues (2023) noted the need for partnerships and collaboration between provincial PAs in SA and other entities (the private sector, surrounding communities, non-government organisations, volunteer organisations, and stakeholders). The broadening of the communication networks would allow for the inclusion of disconnected PAs. Armitage and colleagues (2012) suggest that collaboration and knowledge-sharing by multiple actors may be the best way to achieve the social process and outcomes of learning. Thus, adding more actors to the K2C PA communication and collaboration network may increase learning

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within the PA system, as well as the system's ability to adapt to changes. One study participant noted the need for a communication facilitator in the region: "*Somebody to coordinate and manage and organise it. I think it's sadly lacking*," and several participants noted that they felt K2C could fulfil this role, e.g.: "*I think that something like K2C could certainly fill a role as a forum*." Indeed, unconventional forms of leadership, more focussed on facilitation than control, can be the key to creating an effectively structured communication network that is able to address a broad range of environmental issues (Bodin, 2017). The K2C NPC has deep roots in the landscape, having been a feature in the area for over 20 years. In addition, the K2C NPC works in collaboration with many other organisations in the region, some of whom may have lessons to share with, or to learn from, the PA managers. The organisation's experienced and well-connected team is well placed to increase connectivity between PAs in K2C. The K2C could serve as a bridging organisation, lowering the cost of collaboration and conflict resolution (Folke et al., 2005). NPCs that serve as bridging organisations can strengthen social capital and increase the region's capacity for effective governance by incentivising ecosystem management and providing opportunities for resource or knowledge acquisition (Folke et al., 2005). A communication network that encourages managers to share information and generate a knowledge base, agree on common rules and methods of good practice, align usage of resources, resolve conflicts, and discuss trade-offs, would result in benefits for biodiversity management in the region (Folke et al., 2005). As one participant noted, having a central organisation to collate comments on draft legislation and other environmental issues, would increase the probability of PAs in the region taking part in such initiatives: "*The chances of me writing my opinion is very low, the chances of you writing your opinion is very low, but the chances of us sitting around and having a meeting here and saying, let's get a collective opinion that will be coordinated by K2C, and put in a submission on behalf of x number of managers, is much higher."* In order to maximise the benefits from this expanded network, the

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K2C (or other facilitator) could connect experienced managers with less experienced managers, managers in different provinces with each other, or different PA management types with each other. Diverse participation in complex social-ecological systems can enhance social learning (Schusler et al. 2003).

Learning is also stimulated when managers are exposed to others with different world views which challenge their frames of reference and preexisting knowledge (Stirzaker et al., 2011). Combining local and scientific knowledge can assist systems in coping with change (Folke et al., 2005), and including managers from local backgrounds in these networks may expose others to local knowledge systems, as well as bring about increased awareness of the socio-political context of the region. In the K2C, this could be achieved through connecting managers from privately owned PAs with community managers from co-owned PAs or other kinds of conservation areas (e.g. land managed for conservation and grazing simultaneously), as well as provincial PA managers where possible – undertaking a stakeholder analysis may be useful to identify the range of relevant participants. Furthermore, connecting different management types could increase opportunities for future collaboration, and even possibly the sharing of resources between private PAs and the less financially stable state PAs (Patel et al., 2023, and see Chapter 5). Creating opportunities for collaboration between managers encourages the knowledge generation and dissemination of best practice and other information (Folke et al., 2005; Reed et al., 2010).

Communication could also be increased through the creation of workshops or discussion forums with specific topics in mind: several study participants noted the value of theme-based workshops. In the same way, PAs in similar ecosystem types, or which face similar issues or threats, may be easier to connect. Within these collaborative networks, it is important to note who gets involved, which parties are involved in collaborations, and how parties are tied to ecosystem structures, as this will affect their ability to attend to varying

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environmental issues (Bodin, 2017). For the K2C, this might mean that not all PA managers need to attend all workshops or forums, but may be selected based on underlying similarities or ties to the workshop theme, e.g. PAs through which a certain river system flows facing a pollution problem. In addition, it is still not fully understood whether or not networks suitable for addressing the broad range of environmental problems can be formed and maintained (Bodin, 2017). This may present an additional opportunity for study in the K2C if such networks can be formed and nurtured long-term. A study by Rozylowicz and colleagues (2019) based on Europe's Natura 2000 PA network noted that research focussing on collective action and knowledge sharing is lacking. Their study utilised ecological modelling approaches to identify key PAs for information exchange in the Romanian Natura 2000 network (Rozylowicz et al., 2019). The Natura 2000 study claims that connecting managers in the PA network allows for implementation of innovative conservation approaches, fostering of collective learning and generation of new knowledge, as well as avoidance of ineffective conservation practices (Alexander et al., 2016; Rozylowicz et al., 2019). However, these benefits of connectivity are dependent on the flow of information within governance networks, which should be transparent and inclusive of all the relevant actors (Alexander et al., 2016; Alexander & Armitage, 2015; Bodin, 2017; Rozylowicz et al., 2019). Understanding governance networks can indicate where challenges in the system lie and can assist in the integration of local projects (e.g. conservation projects within one PA) with landscape-scale initiatives (e.g the conservation projects undertaken by K2C itself) (Alexander et al., 2016). In their study, Bodin (2017) cautioned against the assumption that collaboration is the solution to the world's environmental issues, and encouraged deeper engagement with situations in which collaboration is effective, focusing on the type of problem and the characteristics of the ecosystem at stake.

When organising networking and communication opportunities, the facilitator should bear in mind the responses of the study participants regarding the formality and set up of

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workshops. Several participants noted that they learnt more in less formal situations, where they felt more comfortable sharing information. This approach may also facilitate good relationship-building opportunities if managers feel more at ease. It is important to note that the type of social ties that are fostered between collaborators will impact the result of the collaboration (Bodin, 2017). In a study on Ethiopian farmers, it was shown that when social ties were underlain by friendship, the farmers were more likely to share information in an informal manner, and this lead to actual changes in farming habits (Matous & Todo, 2015). The presence of social and informal networks is important when multiple stakeholders work together to tackle environmental issues, and may even be more effective than the existence of formal institutions when it comes to the enforcement of environmental regulations and diffusion of conservation practices (Bodin & Crona, 2009; Matous & Todo, 2015). However, informal social networks do not necessarily result in learning, and the context, network type and environmental issue at stake will influence whether or not knowledge gets diffused through the network (Matous & Todo, 2015).

Finally, there is an opportunity to utilise PAME M & E processes and tools (such as METT) to provide a vehicle in which to widen the PA communication network in K2C. By combining a PAME process with a networking event, the facilitator could not only further the understanding and utilisation of PAME in the region, but also create opportunities for PAs to connect with, and learn from, each other. Global PAME literature reiterates the importance of networking, sharing experiences and learning between PAs (Anthony & Shestackova, 2015; Hockings et al., 2006). This follows the understanding that the PAME process itself, when including a variety of stakeholders and the publishing of results, is of greater importance than the specific methodology chosen (Getzner et al., 2012). If the K2C were to facilitate such an opportunity, this would not only benefit the PAs themselves, but would also assist the BR in reaching its own monitoring, evaluation and conservation effectiveness goals. BRs have a

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mandate to conserve biodiversity, and the effective management of PAs contributes significantly to this goal (Coad et al., 2015). If K2C were to be directly involved in monitoring and evaluating PAME in the majority of the PAs within its boundaries, the organisation would have solid data regarding the effectiveness of biodiversity conservation within its boundaries. This in turn offers increased understanding of the effectiveness of the BR in achieving at least one of the key BR goals. Such understanding contributes to increased long-term sustainability of the BR, as it can assist in highlighting scale mismatches as well as the success and failures of certain management approaches (Ferreira et al., 2018). BRs are also mandated to monitor the implementation of the framework every ten years, through the PR process (UNESCO, 1996). PAME monitoring data could be utilised by the BR in this process (and any other monitoring tool the BR chooses to use) to support its contribution to the biodiversity conservation goal.

6.5 Summary

There are several networks of communication within the K2C landscape, usually built through close geographic proximity (i.e. neighbouring PAs) or formal agreements (e.g. APNR, GLTFCA). Unfortunately, managers from PAs that are geographically isolated or not part of formalised networks may miss out on opportunities for communication and/or learning. The results of this study demonstrate that managers of PAs in the K2C landscape recognise the immense value of communication and shared learning. Many participants noted that communication is key to learning, which they utilise to adapt their own management within their respective PAs.

Communication and collaboration between PAs in K2C face several barriers, but there are also many opportunities to improve communication, thus creating wider, stronger, and more

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effective networks. Expanding the communication network and increasing the "communication connectivity" between PAs will allow PAs which are more isolated or new to the system to be included in the learning processes taking place in K2C. Although research in this area is lacking, a study based on the Natura 2000 network found that increased connection between managers resulted in innovation, learning and knowledge creation (Rozylowicz et al., 2019). Furthermore, the value of "knowledge networks" to create viable change for sustainable development has been recognised as more impactful than anything a single organisation can achieve (Creech & Willard, 2001). Learning is a vital aspect of the AM and SAM processes, and as such, should be encouraged as far as possible in the K2C landscape. A study undertaken on the GLFTCA PAs in K2C noted that fragmentation of the PA network poses a threat to PAME in the region (van der Merwe et al., 2022). The same study noted closer collaboration and increased collective action as key successes gained by the GLTFCA network and its METT project (van der Merwe et al., 2022). Open communication, diverse participation, various knowledge sources, extended engagement and facilitation can encourage social learning (Schusler et al., 2003). The K2C system already contains a diverse set of stakeholders with varying knowledge sources. If the appropriate funding were received, the K2C management team would have an opportunity to utilise its systems and networks already in place to facilitate improved communication and collaboration in the region and increase the connectivity between the PAs in its boundaries. It would be feasible and practical to combine PAME processes with communication and collaboration processes in order to facilitate learning and work towards objectives on both the PA and BR scale.

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CHAPTER 7: IMPROVING MONITORING & EVALUATION

This research chapter will address the last research sub-question:

6. How can current monitoring and evaluation methods be improved and adapted into a general tool applicable to all K2C PAs?

Through addressing the above research questions, the chapter meets the fifth aim of the research, regarding the scope for and development of a cost- and time-effective M & E tool. This chapter discusses the findings relevant to the above research questions and should be read alongside Chapters 1- 5 above, to understand the broader contextual and theoretical setting.

7.1 Current monitoring and evaluation tools and/or methods

According to the findings reported in Chapter 5, the METT-SA Ver. 3 is the most widely used standardised PAME tool in the sampled K2C PAs. Nine of the 18 sampled PAs utilise the METT, and additional PAs in the provincial and GLTFCA networks, although not sampled in this study, are known to use METT as a result of obligatory reporting requirements. Thus, this chapter will focus on the METT-SA going forward, and possible improvements or adaptations which could increase its use and applicability in K2C PAs. The suggested adaptations are likely to make it more useful for other South African PAs that are newly declared or in the process of declaration, or managed by a small team with few resources, and several questions are included to specifically target PAs within BR systems.

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The two other most widely used methods of M & E are formal game counts and vegetation monitoring. As these methods cover only one aspect of PA management respectively and not PAME as a whole, and are addressed to some extent within the METT anyway, discussions on the improvement of such methods are outside of the scope of this study.

7.1.1 Background of the METT

The Management Effectiveness Tracking Tool, or METT, is a scorecard that was developed in order to assess the effectiveness of management of PAs (PAME) and supply reliable and continuous data on the progress of management within a PA over time (Stolton et al., 2019). The results from a METT assessment provide a combined measure of effectiveness across the six components of management (context, planning, inputs, process, outputs, outcomes - see Figure 1), and over 30 parameters (Hockings et al., 2006). The scorecard was required to provide a consistent and replicable reporting system with data and scores that could be tracked over time, be time-effective and easy to complete and understand by practitioners, have four answer options for each question to strengthen the scoring system, and be nested within existing reporting systems (Stolton et al., 2003). The first version of the METT, developed by the WWF and the World Bank, was field-tested in 16 protected areas in 2001, and published in 2002 (Stolton & Dudley, 2016). Since then, it has been revised several times and the fourth revision is currently in use (Stolton et al., 2020). METT has been used in over 2500 PAs all over the world and multiple adaptions having been made for specific countries (including SA) and organisations (Stolton & Dudley, 2016). The METT has become the most widely used PAME tool available (Stolton & Dudley, 2016), due primarily to its ease of use, cost-effectiveness and adaptability (Stolton et al., 2019). In addition, signatories to the CBD have been heavily urged to undertake regular PAME assessments, its use has been promoted

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by The World Bank and WWF, and it has been mandatory for all GEF funded projects since 2002 (Stolton et al., 2019). The METT was designed to track progress at a single site over time and identify areas for improved management, and its main strength is quantifying the effectiveness of management (Stolton & Dudley, 2016). The METT's main weakness is that it does not accurately reflect conservation outcomes (Stolton & Dudley, 2016). Although the METT investigates all six spheres from the effectiveness framework (Figure 1), it is focussed mainly on planning, inputs and processes, and is not detailed enough to provide an accurate evaluation of outcomes (Hockings et al., 2006). In addition, the scoring system is not weighted, despite some elements being more crucial to effectiveness than others, so the overall score from an assessment should be interpreted with care (Hockings et al., 2006). This is a common issue with PAME assessment tools (Anthony & Shestackova, 2015). Unfortunately, many METT users do not apply the METT effectively, focussing on the scores rather than the process or the resultant management actions (Stolton & Dudley, 2016). In order for METT use to result in improved PAME, its developers state that findings from the METT process need to be followed by rectifying management decisions (Stolton & Dudley, 2016). After reviewing the use of METT, Stolton and Dudley identified the following major lessons (2016):

- Self-assessment by practitioners may create bias,
- METT is not suitable to assess biodiversity outcomes,
- Adaptations are common and encouraged,
- Implementation of the assessment should be transparent and include a range of relevant stakeholders,
- Standards for implementation are required to ensure a useful process,
- The score should be utilised to compare progress over time or within a network, and
- Verification of the METT results strengthens its benefits.

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Following these lessons, Stolton and colleagues developed the following best practice guidelines for using METT (2019), which are in line with other international M & E tools for sustainable development such as BellagioSTAMP (SusTainability Assessment and Measurement Principles) (Pintér et al., 2012):

- The implementation of METT must be planned carefully, taking note of previous results (if applicable), time requirements and staff capacities;
- The datasheets, multiple-choice questions and next steps must be completed, with supporting quantitative data where possible;
- The tool should be adapted and translated to suit a particular PA or system, while retaining the basic format;
- The METT assessment needs to be repeated at regular intervals;
- The assessment and its follow-up activities must be undertaken with input from as many relevant stakeholders as possible;
- Use of METT must be underpinned by capacity building and training on its correct implementation;
- METT results should be verified, either by external assessors or by using more detailed assessments and research within the PA or system;
- METT needs to form part of an AM process with clear communication, to ensure that results are shared with relevant stakeholders, and that recommendations are duly implemented; and
- Data from METT should be shared at an appropriate higher level, such as nationally or through the GD-PAME.

As mentioned above, adaptation of the METT is encouraged to ensure that it is suitable for a specific PA or PA system (Stolton & Dudley, 2016). It is recommended that any

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adaptations to the tool retain the basic format and add what is necessary to allow for interpretation within the local context, such as additional instructions or guidelines (Stolton & Dudley, 2016). In addition, the METT can be expanded on by adding questions on specific issues that the original form doesn't deal with, such as climate change, transboundary conservation issues or gender/ racial equity (Stolton & Dudley, 2016).

7.1.2 METT-SA

SA adopted the METT and adapted it to the METT-SA in 2008, with it being intended for use in 230 PAs, assisting the country to meet the CBD Programme of Work on Protected Areas (PoWPA) PAME target at the time (Britton, 2010; Cowan et al., 2010; van der Merwe & Batschari, 2021). In 2012, SA managed to assess 240 provincial PAs across eight of its nine provinces, and in 2017, it developed the current version in use in K2C (METT-SA Ver. 3a) (van der Merwe & Batschari, 2021). The METT-SA is a self-evaluation tool designed to allow PA managers to quickly and easily track trends in management effectiveness over time, and has the following general characteristics (Britton, 2010; Cowan et al., 2010):

- Contains 33 indicators, ten supplementary questions, with indicator questions rephrased for the South African context,
- Includes relevant sections of NEM:PAA and the DEA management plan guidelines,
- Contains an automatically adjustable scoring system on an Excel spreadsheet, grouped according to the AM cycle,
- Presents final score as a percentage of adjusted total, with a maximum total score of 109, and

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- Has been extensively piloted and been shown to be a useful tool, particularly if evaluations are undertaken through discussions by a multidisciplinary group of actors.

The METT-SA was thoroughly tested in both the marine and terrestrial environments, and was proven to be a practical site-specific tool to improve management effectiveness, particularly if the assessment is undertaken in an interactive and consultative manner (Adams & Kawolski, 2021; Britton, 2010; Cowan et al., 2010). The METT-SA is lauded as needing no external expertise, allowing managers to self-evaluate their PA's management effectiveness and create a baseline for uniform reporting going forward (Adams & Kawolski, 2021; Britton, 2010; Cowan et al., 2010). It can also be used as a tool for management when undertaken in an interactive group setting, as it identifies management priorities and the required follow-up actions (Adams & Kawolski, 2021; Britton, 2010; Cowan et al., 2010). Additionally, in Marine Protected Areas (MPAs), the METT-SA is praised as being able to identify urgent management actions required, allowing managers' input in assessment, providing standardised baseline data for management effectiveness of MPAs, and being relatively inexpensive (Adams & Kawolski, 2021). However, the METT-SA has been noted as being a weak measure of the achievement of biodiversity objectives and of outcomes, both of which need to be supported by additional, more detailed assessments (Adams & Kawolski, 2021; Britton, 2010; Cowan et al., 2010). In addition, the METT-SA does not assess or quantify the value of a particular PA to the broader system (Cowan et al., 2010).

The findings reported in Chapter 5 found that many managers felt the METT-SA was too broad and needed to be streamlined for their specific contexts. In MPAs, the METT-SA is noted as unsatisfactorily addressing socio-economic inputs of the MPA or issues related to climate change (Adams & Kawolski, 2021). A lack of socio-economic indicators, including the education, awareness and interpretation programme, community liaison structures, gauge

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of community support, and the economic and social benefit assessment, was reiterated as an issue in the K2C context. Finally, differences in interpretation between assessors in a single MPA may result in discrepancies in scoring (Adams & Kawolski, 2021). The METT-SA was not intended to be used as a measure of staff performance, or to compare one area with another (Britton, 2010; Cowan et al., 2010) and low scores often reflect slow processes rather than the performance of managers (Adams & Kawolski, 2021). Use of METT-SA does not necessarily provide an instant result in terms of improved PAME, as it is more valuable for tracking trends over time. However, this is also sometimes difficult due to changes in the METT template (Adams & Kawolski, 2021).

In their 2010 report, DEA recommended that all South African PAs aim for a minimum score of 67%, preferably 77% where possible, and that provincial management authorities should continually improve management effectiveness of the PAs under their jurisdiction accordingly (Cowan et al., 2010). The same report recommended yearly review of the METT scores, followed by an internal peer review process (Cowan et al., 2010), although another report recommended two to three year intervals (Britton, 2010). Thus, an annual METT-SA assessment became mandatory for all provincial PAs in SA. Unfortunately, lack of staff and budgets, outdated and incorrectly implemented management plans and failing infrastructure precludes many provincially and municipally managed PAs from fulfilling their mandate to protect biodiversity (Patel et al., 2023).

A lack of resources was also described as an issue with the use of METT-SA in K2C, with many managers unable to implement changes after METT scores were received (see Chapter 5). A study examining the effectiveness of provincial reserves in SA found that several PAs with a low effectiveness score included a high number of animals of conservation concern, and that while other reserves scored highly in some aspects of the METT, that did not necessarily translate to sound management on the ground (Patel et al., 2023). The same report

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noted the importance of increased transparency of the METT-SA process and the need for objective and standardised reporting (Patel et al., 2023). These findings indicated that despite the national structure laid out to encourage continual improvement of management effectiveness described above, South African PAs have not necessarily embraced the process fully. A vast number of challenges were identified as impacting management success in provincial PAs, of which funding was the most frequently reported - including lack of funding, budget cuts, mismanagement, and skewed budget allocations that saw up to 90% of a budget allocated to salaries (Patel et al., 2023). These issues are reiterated by the findings in Chapter 5. Staffing was also found to be a significant challenge, with participants in the study describing lack of capacity, lack of skills and experience, lack of dedication and motivation, loss of institutional knowledge, vacant positions and political interference as barriers to provincial PA management (Patel et al., 2023). Lack of operational resources and subsequent poor maintenance of infrastructure, external pressures, poor fencing, strained community relations, inadequate management plans and management systems and lack of support from provincial and national governments were included as additional significant challenges facing effective provincial PA management (Patel et al., 2023). These challenges persist despite the annual completion of METT-SA reports by provincial PA managers.

The provincial conservation authorities active within K2C (LEDET in Limpopo and MTPA in Mpumalanga) are responsible for the management of the provincial PAs, and thus, the mandatory management effectiveness reporting discussed above (Cowan et al., 2010; van der Merwe & Batschari, 2021). These agencies must assess the management effectiveness of the PAs under their jurisdiction using the METT-SA, and report the findings to the DFFE (Cowan et al., 2010; van der Merwe & Batschari, 2021). In addition, several private PAs within K2C have been part of the GEF-5 PA Project, “Improving Management Effectiveness of the Protected Area Network” during which they were required to undertake annual METT

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assessments (K2C, 2023b; van der Merwe & Batschari, 2021). In 2021, the report from the GEF-5 project described the lessons learned from the process: first, the complexity of PA management in SA needs to be considered, and indicators need to be developed accordingly; second, collective efforts allowed for the pooling of resources to deal with certain complicated remedial actions (also noted as a national opportunity in Patel et al., 2023); and furthermore, critical elements which impact other aspects of management need to be identified and prioritised, and external influences need to be better understood (van der Merwe & Batschari, 2021). The study concluded that the uptake of the METT-SA tool by the participating private PAs indicated the enthusiasm for use of the tool, and a desire for wider adoption (van der Merwe & Batschari, 2021). The five-year review of GEF-5 project identified several key successes that PAs had achieved throughout the duration of the project, including more inclusive conservation within the Greater Kruger area, progress towards increased collaboration and collective action, development of new standards and policies, improved legal compliance by PAs, an resilience in the face of the Covid-19 pandemic (van der Merwe et al., 2021). Several threats to improved PAME in GLTFCA PAs were also identified, including external issues, fragmentation of the PA network, cumbersome legal processes, improper PA governance systems, resource limitation, and lack of development within surrounding SES (van der Merwe et al., 2021). Many of these threats, particularly those centred around governance systems, resources, and embedding the PA in its surrounding SES, echo the threats faced by PAs across the country (Patel et al., 2023).

Chapter 5 indicates that there are several PAs within the K2C boundary that are not currently assessing PAME through a standardised tool such as METT-SA. Such PAs, which often have small management teams or single managers, or may not be part of the existing networks in K2C, may benefit from assessing and monitoring their PAME over time. However, such PAs might be constrained by a lack of staff, time, or funding. While METT-SA is noted

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as quick and easy to use, in its current form, it may not be quick or easy enough for the resource-constrained PAs in K2C. Thus, the opportunity exists to develop a simpler, quicker self-evaluation tool for use by small PA management teams (1-3 staff members). In addition, such a tool could exist as a starting point for newly declared PAs, PAs in the process of declaration, or those without a fully developed management plan, and could be used to guide a manager in identifying priorities for the PA. This tool may also serve as a readiness assessment for the PA, which it can utilise for several years until the METT-SA is more feasible to implement.

To this end, this research chapter focuses on the draft stages of development for a new tool aimed at resource-constrained PAs. The tool is based on the METT-SA and has been provisionally named the "Management Effectiveness Evaluation Readiness Tool (MEERA)".

7.2 Recommendation for adoption and adaptation: Management Effectiveness Evaluation Readiness Assessment

7.2.1 Process

As the discussion in Section 7.1 and the findings in Chapter 5 emphasised, the process through which PAME assessment tools are implemented is equally important as the contents. Thus, the process for utilisation of any new tool must be clearly defined.

First, as with METT and most other PAME tools used internationally, capacity building and guidance is optimal for proper implementation of this tool (Stolton et al., 2019). Following the findings from Chapters 5 and 6, it is recommended that the K2C organisation facilitates the initial roll-out of the MEERA tool, which will also provide a platform to create an open communication network with the targeted PAs. Failing that, the tool has been designed to be as simple as possible, and some PAs may be able to implement it with minimal guidance

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(depending on the capabilities of the manager or management team). However, before moving on to the METT-SA, those PAs would also need guidance from K2C or another suitable facilitator. Second, MEERA has been designed as both a readiness assessment and a learning exercise for managers unfamiliar with PAME. The aim of the tool is to encourage managers to start thinking about all the elements of PAME, even those which may not be immediately noted as an objective of the PA or conservation area (e.g. the socio-economic indicators have been expanded on, even though many new PAs may not include socio-economic management objectives to start off with). Finally, as MEERA has been adapted in order to potentially assist new PAs with the creation of a management plan, and based on the definition of management effectiveness as meeting the desired objectives, the tool's first step is to encourage managers to clearly define a set of objectives and indicators for the PA; having a clear and defined purpose may assist new PA managers in fully understanding management effectiveness and the need to continually improve going forward. This is in line with the first principle of BellagioSTAMP that recommends setting a "guiding vision" (Pintér et al., 2012).

Chapter 5 found that many managers found the METT-SA to be improperly implemented, or biased. As MEERA has been designed purely as a readiness tool for individual PAs to assess their readiness to undertake PAME assessments, it is not in any way suited for use to measure employee (manager) performance, or compare PAs to each other. Therefore, it should never be, and is not suited to be, used by governing authorities to indicate PA performance. MEERA should only be used willingly by a manager who wishes to start getting his/her PA up to the national PAME standard, but does not have capacity to undertake the METT-SA. Chapter 5 emphasised that resource constraints such as lack of time, staff or budget prevented some PAs from using METT-SA. MEERA has been designed as a readiness assessment for resource-constrained and newly declared PAs that plan to implement the full METT-SA tool at a later stage in its development. Thus, it intentionally omits many of the

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requirements, as well as the answer options, of the METT-SA to save time, and has not been designed to accurately compare PAs with each other, or to necessarily denote a PA as "effectively managed". A good score would merely indicate that the PA is prepared to undertake a METT-SA assessment. Users should note that, unlike MEERA, METT-SA requires evidence to support all answers in the questionnaire; MEERA should be utilised to prepare for this by implementing processes to collect such evidence, based on the action items and timeframes contained within the results. Due to this requirement, METT-SA would be deemed "stricter" than MEERA, and it should be expected that METT-SA scores will likely be slightly lower than MEERA scores. Following this, since a score of 67% or higher indicates sound management in the METT-SA assessment (Cowan et al., 2010), it is recommended that managers aim for at least 67% overall in the MEERA, in preparation to undertake METT-SA. Alternatively, if managers want to move on to METT-SA before reaching 67% in the MEERA, this should be with the acceptance that their METT-SA score may not reach the "sound management" requirement. The tool must be carried out by the PA manager/management team or a knowledgeable substitute (e.g. if no manager exists, an owner that takes responsibility for most management activities would be suitable), and is designed to be undertaken in 1-3 hours.

The focus of results from this assessment should be the summaries below each question, describing the action items and necessary timelines. As with METT-SA, these sections have been included to guide the next steps forward for management activities. Other important results include the setting of objectives and starting blocks for a management plan.

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7.2.2 Contents

The tool below is based on the METT-SA (Ver. 3) and takes the form of a simple questionnaire of 81 Yes/No questions, which aims to be easily understood and quick to

complete. As with the METT and METT-SA tool, it follows the PAME framework and divides management into six phases: context, planning, inputs, process, outputs and outcomes. Questions with one asterisk have been added and do not appear in the METT-SA multiple choice sections. Questions with two asterisks are simplified sub-questions derived from the METT-SA questions. Many of the questions have been rephrased to simplify the language to make the tool accessible to managers from various educational and vocational backgrounds. In the outcomes section, three questions specific to PAs within K2C (or any BR) have been added. This is to ensure that processes happening at the PA-level speak to processes at the BR-level. Some additional indicators aimed at socio-economic elements of the PA have been added; while it is highly unlikely that the PAs targeted by this tool will have such monitoring programmes in place, these have been included to encourage managers to start thinking about the socio-economic impacts or benefits of their PA and thus create a learning exercise. See Appendix E for the full set of METT-SA questions - excluding macros and cell annotations. In the first section ('Context'), notes in red have been included as an example of what a PA manager would fill out.

Context *Status and threats; where are we now?*		
	Yes	No
1. Have at least three clear objectives for the PA been identified and documented?*	Y	
2. Have indicators and measurable targets associated with the above objectives been identified and documented?*		N
3. Is the PA declared in terms of the National Environmental Management: Protected Areas Act?	Y	
4. Is there proof of this declaration on site?**		N

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5. Does the PA have a gazetted constitution or Memorandum of Understanding (MOU)?		N
6. Is there a copy of the constitution or MOU on site?**		N
7. Is the PA fully fenced?	Y	
8. Is the PA mapped in an accessible digital format?	Y	
9. If there are servitudes in the PA, are they documented?		N
10. Is there a list of key species on site, compiled by a biodiversity professional?**	Y	
11. Is there record of habitats and ecosystems on site?**	Y	
12. Is there record of the invasive species found on the site, compiled by a biodiversity professional?**		N
13. Does the PA have a documented heritage survey, undertaken by an accredited heritage practitioner, which records any cultural or heritage assets?		N
14. Has a socio-economic assessment been undertaken and documented for the surrounding properties, communities or local population, including a benefit and risk flow between the PA and the other stakeholders?*		N
15. Has a risk assessment been undertaken for the site?		N
Total:	6	9
Readiness in terms of context: (Total Yes/15 x 100)	40%	

Action items: (Compiled using the items above, where the answer was N)	Timeframes (To be filled in by manager)
• Identify measurable targets and indicators for management objectives	• 1 year
• Proof of declaration on file	• 6 months
• Gazette constitution, save on file	• 1 year
• Document servitudes	• 3 months
• Record invasive species – contact professional	• 2 years

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• Heritage survey • Socio-economic study • Complete risk assessment	• 3 years • 5 years • 6 months

Planning *Where do we want to be, and how will we get there?*		
	Yes	No
1. Is the PA the correct size and shape to achieve all the desired objectives for which the area was set aside?		
2. If the PA is not the correct size or shape, are there plans in place to remedy this (including but not limited to expansion plans, conservatory agreements, fence-dropping agreements)?**		
3. Has a buffer zone been identified around the PA?		
4. Have guidelines for suitable sustainable land uses in the buffer zone been discussed with neighbouring landowners?**		
5. Have agreed-upon guidelines for suitable sustainable land uses in the buffer zone been raised at municipal or landscape level, for inclusion into land use planning documents?**		
6. If feasible, is there a plan for corridors to link the PA with key habitats outside the PA, in order to decrease landscape-scale fragmentation? (Select Y if this has been explored and is not feasible)		
7. Is there a documented management plan for the PA?		
8. Does the management plan address the following aspects: biodiversity, research, cultural heritage, conservation beyond boundaries (including reference to the larger biosphere reserve (BR) system), tourism, social/economic aspects, and management effectiveness?**		
9. Has the management plan been signed off by the provincial conservation authority's Member of the Executive Council (MEC)?**		
10. Has an ecological sensitivity analysis been undertaken on the site in order to plan for tourism or operational infrastructure development?*		

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11. Is there a documented Conservation Development Framework (CDF) based on the sensitivity analysis, which indicates visitor use zones, and positioning and nature of operational and visitor infrastructure?		
12. Is there a documented restoration and rehabilitation plan for degraded areas within the PA?		
13. Is there a documented education and awareness programme to teach neighbouring communities and/or visitors about the PA and its purpose?		
14. Is there a documented socio-economic management plan targeted at including, uplifting, or innovating the surrounding communities or local population, compiled in consultation with a socio-economic specialist?*		
15. If there are significant cultural heritage sites or assets within the PA, are there documented management or collection plans for these sites or assets, compiled by an accredited heritage specialist? (Select Y if an official heritage assessment has proven there to be no significant heritage sites or assets within the PA)		
Total:		
Readiness in terms of planning: (Total Yes/15 x 100)		

Action items: (Compiled using the items above, where the answer was N)	Timeframes (To be filled in by manager)

Inputs *What do we need?*		
	Yes	No

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1. Is relevant research being conducted in order to ensure that management actions are working towards achieving all the set objectives?		
2. Is there a long-term monitoring and evaluation programme that measures the level of achievement of all the PA's objectives, against measured baselines?		
3. Is there enough appropriately qualified and trained staff to meet management needs and ensure that the PA's objectives are met?		
4. Is the operational budget sufficient to meet management needs without external funding or assistance from externally funded projects (e.g Working for Water (WfW), Youth Employment Services (YES))?		
5. Is the operational budget for this specific PA secure and guaranteed for a 3 – 5 year management period?		
6. Is there adequate capital budget for the replacement of equipment, infrastructure and vehicles?		
7. Is the budget effectively managed to meet critical management needs in accordance with the Annual Plan of Operations (APO)?		
8. Is the budget allocated to and managed by the site manager?		
9. Is income generated by the site retained for management of the site?		
10. Does the organisation have the skills and capacity to raise funds or resources from external sources?		
11. Does the PA have the capacity, resources, and support to enforce the Constitution or MOU effectively?		
12. Is there enough equipment for current and anticipated operational management needs?		
13. Is there adequate operational infrastructure to meet current and anticipated management needs?		
14. Is there adequate tourism management infrastructure to manage current and anticipated visitor volumes?		
15. If there is tourist accommodation on site, has it been accredited with a recognised tourism grading standard? (Select Y if no tourist accommodation on site)		

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16. Are there enough suitable vehicles to enable proper management of the site?		
17. Has the site been audited and deemed compliant with the Occupational Health and Safety Act?		
18. Is there a staff housing policy which includes living standards in accordance with South African law?		
Total:		
Readiness in terms of inputs: (Total Yes/18 x 100)		

Action items: (Compiled using the items above, where the answer was N)	Timeframes (To be filled in by manager)

Process *How do we go about management?*		
	Yes	No
1. Is there an APO or annual work plan including set targets and aligned with the budget?		
2. Are the targets of the APO or annual work plan in line with the objectives of the management plan?** (Select N if no APO or annual work plan exists, or if no management plan exists)		
3. Are there documented standard operating procedures that outline best practice methods for key management activities?		
4. Is there effective Human Resource management in the PA, including performance appraisals, staff development, incentives for staff to stay, and proper handover processes?		

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5. Is there enough administrative support to ensure effective management?		
6. Does the information technology system support effective management by ensuring that all relevant data is easily accessible, properly stored, and regularly backed up?		
7. Are operational management equipment, operational infrastructure and operational vehicles being maintained according to a maintenance schedule?		
8. Is tourism infrastructure being maintained according to a maintenance schedule?		
9. Is there insurance in place to ensure replacement of operational assets if loss or damage occurs?		
10. Is the education and awareness programme being implemented?		
11. Is the socio-economic management plan being implemented and monitored?*		
12. Is there a well-represented, functioning, and formalised community liaison forum or advisory committee that contributes to management decisions?		
13. In co-managed areas, is there a formal agreement allowing community partners to have input to management decisions?* (Select Y if PA is not co-managed)		
14. Is there a policy and system guiding and monitoring the sustainable use of biotic and abiotic resources by either outside parties or the organisation itself?		
15. Is there interaction and cooperation between managers and tourism operators to enhance visitor experiences, protect values and resolve conflicts? (Select Y if there is no tourism)		
16. Is there a policy and functional infrastructure in place to guide and ensure management of flammable and non-flammable hazardous substances?		

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17. Are environmentally responsible practices with regards to waste management, procurement, benefit sharing, infrastructure design, and resource use implemented?**		
18. Has the PA been accredited with a recognised green standard? **		
Total:		
Readiness in terms of process: (Total Yes/18 x 100)		

Action items: (Compiled using the items above, where the answer was N)	Timeframes (To be filled in by manager)

Outputs *What did we do and what products or services were procured?*		
	Yes	No
1. Is any potential impact of tourism on sensitive environments fully mitigated by tourism infrastructure? (Select Y if there is no tourism)		
2. Are law enforcement and compliance systems fully implemented and resulting in successful control of legitimate as well as illegitimate resource use and access?		
3. Has effective Human Resource management and staff development resulted in higher productivity and been reflected in performance reviews?		
4. Is the implementation of the management plan linked to the key performance areas of the manager? (Select N if no management plan)		
5. Are members of the surrounding communities involved in supporting and/ or assisting management?		

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Total:		
Readiness in terms of outputs: (Total Yes/5 x 100)		
Action items: (Compiled using the items above, where the answer was N)	Timeframes (To be filled in by manager)	

Outcomes *What did we achieve?*		
	Yes	No
1. Is the PA measurably influencing the local or regional economy?**		
2. Is the PA providing measurable social benefits to the surrounding communities or local population?**		
3. Are heritage assets being effectively managed in order to meet the PA's documented objectives? (Select N if no heritage assessment has taken place, select Y if a heritage assessment has determined that the PA does not contain any significant cultural or heritage assets)		
4. Is the PA's monitoring programme indicating that biological and/or ecological assets are meeting documented objectives, or on track to meet them?		
5. Is management effectively maintaining ecological processes in order to preserve the integrity of ecosystems and biodiversity in the PA?		
6. Is PA management in contact with relevant stakeholders (surrounding industries and/or local and municipal governments) regarding the integration of the PA and its objectives into broader scale land use planning and management?		
7. Is PA management in contact with relevant stakeholders (surrounding industries and/or local and municipal governments) regarding the		

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integration of the PA and its objectives into broader scale water use planning and management?		
8. Does PA management have a good working relationship with the biosphere reserve management team?*		
9. Does a PA representative meet with the biosphere reserve management team and/or other PAs in K2C at least twice a year to discuss regional scale issues and/or learning experiences? This may take the form of symposiums, biosphere-scale research projects, or ordinary meetings.*		
10. Is the PA assisting in fulfilling one or more BR-level objectives (biodiversity conservation, sustainable social-economic society, education and research, or climate change mitigation or adaptation)?*		
Total:		
Readiness in terms of outcomes: (Total Yes/10 x 100)		

Action items: (Compiled using the items above, where the answer was N)	Timeframes (To be filled in by manager)
Total Management Effectiveness Evaluation Readiness: **(Total Yes/81 x 100)**	**___% (if >67%, seek guidance on utilising METT-SA)**

7.3 Recommendations for use

As noted in Section 7.2.1, this tool has been designed as a readiness assessment for the following PAs in SA:

- Conservation areas or farms that would like to be declared as a PA in the future,
- Areas that are in the process of being declared as PAs,
- Newly declared PAs,

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- PAs without management plans, or with poorly constructed, confusing or poorly understood management plans,
- PAs without management plans or institutional knowledge, with a new PA manager,
- Resource-constrained PA managers or management teams with three or fewer people,
- PAs looking to undertake METT-SA but with no prior experience or understanding of PAME assessment tools.

The MEERA has been designed to:

- Be quick to complete (1-3 hours),
- Be easily understood,
- Indicate readiness for METT-SA (or another PAME tool),
- Help managers learn more about PAME requirements,
- Help managers identify main objectives, prepare a management plan and identify priority management actions,
- Strengthen socio-economic elements of the PA and create awareness of the connection, and
- Relate a PA to the BR in which it is found.

This tool has not been designed to:

- Fully and comprehensively assess management effectiveness,
- *Definitely* denote a PA as completely effective,
- Compare PAs against each other, or
- Measure management performance.

It should also be noted that the tool designed in this research is a draft, and should ideally be workshopped with some potential users in order to refine or improve it. It is

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recommended that this tool be implemented first by a suitable facilitator (most likely a BR management team member or suitable external facilitator appointed by the BR) in a group setting, in order to maximise learning and creation of communication networks and collaboration opportunities.

The goal in utilising this tool is to prepare PAs and conservation areas to undertake a full METT-SA assessment in line with national standards. After satisfactory METT-SA results have been achieved, indicating a relatively high level of management effectiveness, it is recommended that a high-level tool such as the IUCN Green List be explored, to ensure the PA is maximising management effectiveness in line with global targets. Finally, to reiterate the findings of Chapter 5, it is also critical to improve funding and resource availability for PAs alongside the development of M & E techniques in order to adequately address PAME and create more effective outcomes (Appleton et al., 2022; Coad et al., 2019).

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CHAPTER 8: RECOMMENDATIONS AND CONCLUSION

This Chapter provides a summary of the major findings from chapters 5 – 7, through the lens of the SES framework and AM theory, with an eye to creating long-term resilience in PAs and BRs, particularly the K2C.

8.1 A summary of recommendations

This research sought to investigate how and to what extent PA management teams in K2C implement AM in the form of PAME, as well as how PAME in K2C can be improved. Chapter 5 reported that several PAs do implement PAME, using the METT-SA, the GLTFCA annual reporting template, SMART, and their own self-designed tools (in one instance). Some PAs implemented M & E of specific aspects of PAME, which was generally confined to biophysical aspects such as game numbers, vegetation, rainfall and climate data. The most widely implemented PAME tool utilised by the study participants was the METT-SA, however, it must be noted that all PAs which implemented this tool are required to do so as a result of legal or contractual obligations (provincial PAs and GLTFCA signatories). Study participants noted that there is a need to streamline the tools in use in K2C, particularly the METT-SA. Areas that required streamlining and improvement included the need for more socio-economic indicators, reduced bias and improved implementation processes. Several study participants do not use any standardised PAME tool, often due to time or resource constraints, but many were curious and willing to learn how to assess PAME in their PAs. Assessing PAME is the first step in improving management effectiveness, and if resources are sufficient, should lead to management actions that bring the PA closer to achieving its desired objectives. Chapter 5 also

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highlighted the opportunity for creation of a more time- and resource-effective PAME tool for resource-constrained PAs in the K2C region. Finally, the lack of funding to action findings brought to light by PAME processes was noted as a critical challenge, particularly in provincially-managed PAs in K2C. PAME processes need to be supported with adequate funding and staff capacity in order to ensure that findings are actioned, and management effectiveness is allowed to improve over time.

Chapter 6 investigated the communication between PAs in K2C, with a focus on learning for AM and the use of PAME tools. The results suggested that although there are some communication networks present in the K2C, there is a need for improved communication between PA managers. Participants were well-aware of the value of communication for learning purposes, as well as to keep each other updated on current activities and create networks for future collaborations. It was observed that communication regarding PAME or the use of METT-SA was limited, mostly confined to purpose-specific meetings set up to discuss such matters. Several participants noted the value in a facilitator to improve communication in the region, and the K2C NPC was suggested as a potentially good fit for such a role. With the findings from Chapters 5 and 6 in mind, there is an opportunity to link PAME and communication through the K2C as a facilitator, creating specific meetings or forums which can widen the use of METT-SA (or another tool), as well as connect managers with each other and create a learning environment. Learning and communication are vital for SAM and overall resilience of individual PAs and the K2C region itself (Allen & Garmestani, 2015; Folke et al., 2010; Roux & Foxcroft, 2011).

Chapter 7 explored the potential adaptation of METT-SA for use by resource-constrained or newly declared PAs without management plans. The proposed MEERA tool was designed to take very little time to complete, being a simple checklist and requiring very little additional training, in order to address the key capacity constraints identified in Chapter

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5. The proposed tool is noted as a readiness assessment, rather than an appropriate tool to accurately measure management effectiveness, or compare PAs against each other.

The following areas have been identified through this research project as opportunities for improvement of PAME in K2C PAs:

Table 3: A summary of opportunities for improvement as identified in this project.

Area	Recommendation
PAME tools	Continual streamlining in consultation with practitioners
	Development of a new tool for resource/capacity-constrained PAs or newly declared PAs
	More focus on the social-economic metrics of the METT-SA
	Supportive training and facilitation for the use of PAME tools
	Support for follow-up management action through improved funding or resource availability
	Structural support for provincial PAs from other levels of government
Communication networks	Connect managers in small, newly declared or geographically isolated PAs to broader networks
	Utilise structures already in place through K2C NPC to connect diverse actors through a communication network
	Utilise the K2C as a facilitator for communication
	Combine PAME processes with communication and collaboration processes
Management evaluation effectiveness readiness assessment	Utilise this simple questionnaire-based tool to assist new PAs, PAs with small management teams, or other conservation areas in the first steps of the PAME process
	Use the tool to expose new managers or managers from non-conservation backgrounds to the PAME process and the national PAME focus
	Use the tool to develop a management plan based on set objectives

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8.2 Research contributions

8.2.1 Social-ecological systems, adaptive management and resilience

K2C, like most BRs, is a complex SES with multiple actors, working at multiple spatial and temporal scales, many of whom are aiming to conserve biodiversity, promote sustainable development, or both (Ferreira et al., 2018). The PAs within the K2C boundary are not only

actors in the BR-level SES, but form their own smaller-scale SES as well (Cumming et al., 2015). PAs in the K2C need to ensure effective biodiversity conservation, while striving to contribute to the communities in which they exist (Cumming et al., 2015). By investigating the use of PAME tools within the PAs in K2C, this research has highlighted the complexity of the K2C system, and shown that there is unlikely to be a "one-size-fits-all" PAME tool that can be utilised across the board in all K2C PAs. The PAs in K2C show vast differences: provincial authority (LEDET vs MTPA), size (from 1000 ha to 60 000 ha) and governance models (private, community or government) are some of the key differences between the PAs. While METT-SA has been adopted by many of the larger, privately owned PAs, as well as government PAs, other PAs have not been able to embrace the tool as yet, and may benefit from utilising a simpler tool such as MEERA (see Chapter 7).

The current success of the K2C and its projects (both ecological and socio-economic in nature), more than 20 years after its conception, indicates that the diversity of PAs in its boundary is likely a benefit. The diversity of different types of PAs within its boundaries should be embraced, and utilised to increase learning opportunities between management teams (see Chapter 6). This study has given a concrete example of the PAME needs of PAs that form SES, with many K2C PAs being directly adjacent or in nearby proximity to human settlements, and several managers indicated the need for improved socio-economic indicators in the METT-SA. The PAs in the K2C need to embrace the socio-ecological nature of their situation in order to support the goals of the BR to benefit both humans and nature. The research also identified various levels of actors that influence the effectiveness of a PA, in line with the SES framework. Provincially-managed PAs noted the challenge of a central budget and the need to adhere to organisational structures, and organisational values were also mentioned with regards to the lack of inclusion of local communities in some of the nationally-managed PAs. This is one

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example of how different levels of actors may create a stumbling block on the road to the overall improvement of PAME in K2C.

PAME assessment is a key activity supporting the AM of PAs. M & E of effectiveness has the potential to identify strengths, weaknesses and priorities of PA management (Coad et al., 2015). This research has highlighted some of the barriers to AM in a complex SES, and has identified several opportunities where AM can be further improved. A major barrier to the proper implementation of the AM model was shown to be resource availability. First, some PAs do not even have the appropriate resources to undertake a PAME assessment and get a feel for the effectiveness of their management approach. Further, many PAs who undertake the assessments are not able to take follow-up actions to remedy problematic areas, due to a lack of budget. This indicates that resource availability (or, more accurately, the lack thereof) is an extremely important factor dictating the extent of implementation of the AM cycle. Worryingly, the lack of resources is not confined to the PAs in this study, but is a notable problem for PAs worldwide (Appleton et al., 2022; Coad et al., 2019; Patel et al., 2023). This research served to reiterate that the communication and learning element of the AM cycle is deeply valued by PA managers working in a complex SES. As mentioned above, the diversity of actors in the system has the potential to provide valuable learning opportunities, and this element of the K2C should be leveraged going forward.

The K2C system is currently in the conservation phase of the resilience cycle, slowly accumulating resources in the form of relationships and trust. K2C has the opportunity to increase the connectedness of the PA managers and create resilience for both the PAs and itself (Gunderson & Holling, 2002). Learning, both long-term and short-term, is a key element in the resilience cycle. There is a great opportunity for the K2C organisation to utilise the METT-SA, and/or the MEERA described in Chapter 7, to create PAME workshops or forums that allow

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PA managers to share experiences, thereby creating knowledge exchange and ultimately fostering resilience for both the PA and the BR.

8.2.2 Connecting biosphere reserves and protected areas

BRs are accurately described as being broad, multi-use landscapes that can encompass different categories of PAs (Bridgewater et al., 1996; IUCN, 1979). BRs play an important role with regards to their constituent PAs, by integrating them with surrounding land uses and ecosystem processes (Bridgewater et al., 1996). In order to do this effectively and ensure the long-term existence of PAs, BR management needs to understand the relationship between the human population and environmental aspects on a regional scale, as well as encourage and facilitate relationships between the various sectors active in the landscape (Bridgewater et al., 1996). In this way, the BR ensures that the PAs are part of the landscape, not solitary islands (Bridgewater et al., 1996). This link is crucial in the K2C, where SA's socio-political past has left the human population vulnerable, and the PAs are a haven for important and irreplaceable biodiversity. In addition, the K2C connects the key water-provisioning areas of the Drakensberg escarpment to the communities and PAs in its boundaries, as well as the GLTFCA, and is therefore a custodian of a vital ecosystem service in the region. By supporting PAME processes that contribute to effectively managed PAs, the K2C in part ensures that PAs continue to protect biodiversity and provide socio-economic benefits to the region. Although the relationship between BRs and PAs is not well-documented or understood, it is critical that the concept of PAs is embedded into the larger context of land-use and policies (Aschenbrand & Michler, 2021). The integrative approach sought by BRs means that they are often caught between the conservation and sustainable development narratives, which are not easy to connect (Aschenbrand & Michler, 2021). However, it is precisely this position which means they are well-placed to integrate conservation narratives into development policies, and vice-

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versa (where appropriate). The success and effectiveness of the BR model is dependent on the scale dynamics and interdependencies of its objectives; unfortunately research into these processes is still in its infancy (Ferreira et al., 2020).

This research underlines a set of recommendations that could be utilised to improve PAME in K2C, as well as in other BRs in SA, Africa and the Global South. Furthermore, many of the recommendations are applicable to other kinds of PA networks, and even individual PAs in some cases (e.g. the MEERA tool). The research therefore focusses on the effectiveness of the biodiversity conservation goal of BRs, and how PAs are (or not) contributing to this in the K2C.

8.2.3 Future research opportunities

Section 8.2.2 above highlights the need for further research on the connection between PAME and BR effectiveness, in order to more clearly articulate and measure the relationship between a BR and the PAs within its boundaries. With the creation of the BREMi tool for BRs (Matar & Anthony, 2022), and the vast availability of PAME tools, there is an opportunity to utilise these methodologies within a BR to determine how the scores correlate to each other, and how the relationship between the PAs and the BR affects the effectiveness of each. Such research may be able to underscore the importance of effective BR management to biodiversity conservation, which may in turn lend further understanding of the importance of the concept in SA and globally. Furthermore, BRs and PAs in SA present unique opportunities to investigate concrete examples of AM in complex SES, due to the country's socio-economic challenges and high levels of biodiversity. There is a unique opportunity to conduct similar research throughout all BR systems in SA, such as those in Gauteng and the Western Cape, which are markedly different settings to each other and to K2C, which may assist in

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determining whether the barriers and opportunities in K2C occur consistently throughout the country.

8.3 Vision

Following this research, it is hoped that the MEERA tool will be developed further, with the input of PA managers and other specialists. Thereafter, the ideal outcome would be the implementation of the MEERA tool in several appropriate PAs across a few South African BRs. For instance, an opportunity exists to roll out the tool in Vhembe BR, another BR in Limpopo Province which is similar to K2C in context, but is currently under threat of mining, and which does not have the same BR management capacity as K2C. If possible, the tool should be implemented over the course of three years, and the readiness score of all the participatory PAs tracked over time, in order to determine whether use of the tool results in increased readiness. Once the MEERA trajectories have been mapped, it would be most interesting to implement the METT-SA in those PAs, to get an indication of their management effectiveness scores. In addition, qualitative input from the managers utilising the tool would be useful to investigate the usefulness of MEERA when preparing for METT. Finally, a comparison of the first round of METT scores between PAs who used MEERA and PAs who did not would further clarify the usefulness of the tool.

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8.4 Conclusion

BRs, and the PAs at their core, are large and complex SES with multiple stakeholders, as well as external and internal pressures (Cumming et al., 2015). In order for the complexity of PAs and BRs to persist and continue to provide space for biodiversity conservation, learning

and research, sustainable development and climate change adaptation and resilience, they need to embrace an AM process to allow for adaptation and change (Folke et al., 2010, Allen & Garmestani, 2015). PAME tools can support PAs in implementing AM (Coad et al., 2015; Hockings et al., 2006), while BRs can utilise the PR process and the new BREMi tool (Matar & Anthony, 2017; Matar & Anthony, 2022). Using the PAME process effectively can assist PAs in continually working towards improved effectiveness, which is required to ensure sustained protection and conservation of biodiversity (Chape et al., 2005; Coad et al., 2015). PAME evaluation encourages managers to understand their contexts more fully, learn from past management actions, adapt management, address threats and fully understand the management process (Leverington & Hockings, 2004).

This research found that although M & E of PAME does occur within the K2C landscape, there is room for improvement of the tools in use, as well as for wider implementation of PAME evaluation as a practice. In addition, the use of PAME tools must be supported by adequate funding and staff capacity to undertake the requisite changes following PAME results. A new tool to assess PAME in resource-constrained or newly declared PAs is suggested. There is a need to strengthen the communication network amongst many of the PAs in K2C, particularly those which are geographically isolated or not part of the formal GLTFCA or APNR networks. Communication presents an opportunity for learning, which supports the AM process. There is an opportunity to combine the PAME processes with workshops or forums that will allow PA managers to share experiences and learn from each other. The K2C organisation is a cornerstone of the landscape and is ideally placed to champion the improvement of PAME within the BR's boundaries, and potentially combine PAME with learning opportunities. In doing so, the resilience of its PAs will be improved, and thus, its own resilience will also be improved.

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This research sheds understanding as to the implementation of PAME and AM within a South African BR, and thus provides a concrete example of the extent to which AM is undertaken, and what barriers implementation faces, in a complex SES which needs to balance human needs and nature. The research also proposes a new adaptation to the METT-SA tool, which, if utilised, should improve the implementation of PAME within K2C.

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APPENDIX A

Online Questionnaire

Protected Area Management Effectiveness in Kruger to Canyons Biosphere Region: Online Questionnaire

Start of Block: Introduction

Introduction Thank you for your willingness to contribute time to my research on Protected Area Management Effectiveness in K2C. The following questionnaire should take you approximately 10 – 15 minutes and includes questions on the background of your Protected Area, management planning, use of adaptive management, and the monitoring/evaluation of management effectiveness.

Responses collected from this questionnaire will be anonymised: no individual or organisation names will be published in any research document originating from these data. This research is being conducted with approval according to Central European University's ethics requirements.

All participants will be receiving a summary of the findings of this research (please let me know via email if you do NOT want to be provided with this summary document).

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Please do not hesitate to contact me if you have any questions or follow-up thoughts:

Georgina Wilson

Wilson_georgina@phd.ceu.edu

PhD Candidate Department of Environmental Sciences & Policy

Central European University

End of Block: Introduction

Start of Block: 1. Background Data

1.1 Name of Protected Area:

_____

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1.2 Position:

- ○ Protected Area Manager/ Warden (1)
- ○ Section Manager (2)
- ○ Part of Protected Area Management Team (3)
- ○ External Consultant (4)
- ○ Other (please specify) (5)

_____

1.3 This Protected Area falls into:

- ○ Limpopo Province (1)
- ○ Mpumalanga Province (2)
- ○ Both Limpopo & Mpumalanga Provinces (3)

1.4 Size of Protected Area you manage (in hectares):

_____

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1.5 If your managed Protected Area is part of a larger Protected Area, what is the total size of the larger Protected Area (in hectares)?

- ○ Not Applicable (1)
- ○ Size in hectares: (2) _____

1.6 Designation status of Protected Area:

- ○ Not designated (1)
- ○ In process of being designated (application to MEC has been submitted) (2)
- ○ In process of being designated (documents are being prepared) (3)
- ○ Designated (please specify designation/s, relevant Act/s and years of designation/s) (4) _____

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1.7 The ownership structure of Protected Area could best be described as:

○ Government (1)

○ Private: single owner (2)

○ Private: multiple owners (3)

○ Community (Community Property Association) (4)

○ Community, co-owned (please specify type of co-ownership entity, e.g. Non-Profit Organisation, government agency, private organisation) (5)

_____

○ Other (please specify) (9)

_____

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1.8 The governance/ management structure of this Protected Area could best be described as:

- ○ National: South African National Parks (SANParks) (1)
- ○ Provincial: Mpumalanga Tourism and Parks Agency (MTPA) (2)
- ○ Provincial: Limpopo Economic Development, Environment and Tourism (LEDET) (3)
- ○ Private (4)
- ○ Community (5)
- ○ Co-management (please specify type of co-management entity) (6)

_____

- ○ Other (please specify) (7)

_____

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1.9 The management authority of the Protected Area is:

- ○ South African National Parks (SANParks) (1)
- ○ Mpumalanga Tourism and Parks Agency (MTPA) (2)
- ○ Limpopo Economic Development, Environment and Tourism (LEDET) (3)
- ○ Executive Committee (ExCo) (4)
- ○ Board of Directors (BOD) (5)
- ○ Community Property Association (CPA) (6)
- ○ Manager/warden/management team, sub-contracted by ExCo, BOD or CPA (7)
- ○ Other (please specify) (8)

_____

1.10 Besides the Kruger to Canyons Biosphere Region, what other landscape agreements/international designations is your Protected Area part of? E.g. Greater Limpopo Transfrontier Conservation Area (GLTFCA) / Associated Private Nature Reserves (APNR)

_____

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1.11 What best describes the main land use/s surrounding the Protected Area (multiple answers possible)?

- ☐ Conservation land use (1)
- ☐ Agriculture (3)
- ☐ Forestry (4)
- ☐ Rural development (5)
- ☐ Semi-urban development (6)
- ☐ Mining (7)
- ☐ Other (please specify) (8)

_____

End of Block: 1. Background Data

Start of Block: 2. Management Planning

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2.1 Does your Protected Area have a written management plan?

- ○ No (1)
- ○ Yes (2)

Skip To: 2.6 If Does your Protected Area have a written management plan? = No

2.2 Date (year only) of original formalisation of management plan for the Protected Area:

_____

2.3 Date/s (year/s only) of revision of management plan, if applicable:

_____

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2.4 Has the management plan been signed off by the relevant authority (e.g. National Department or provincial conservation authority)?

- ○ Yes (1)
- ○ No (please explain why not) (2)

_____

2.5 Does the Protected Area's management plan refer to "effective" management, specifically?

- ○ Yes (1)
- ○ No (2)

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2.6 If no management plan, does the Protected Area have another form of guiding document?

E.g. Memorandum of Understanding (MoU), Constitution

- ○ No, no form of guiding document (1)
- ○ Yes (please specify) (2)

_____

- ○ Not applicable, the Protected Area has a management plan (3)

End of Block: 2. Management Planning

Start of Block: 3. Objectives

3.1 Does the management plan/other document have stated objectives?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Block If Does the management plan/other document have stated objectives? = No

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3.2 Please select the categories below that apply to your Protected Area's documented objectives (select all applicable):

☐ Biodiversity protection and conservation (1)

☐ Habitat protection and conservation (2)

☐ Endangered species protection and conservation (3)

☐ Ecosystem service protection/ provision (4)

☐ Community development through job provision (5)

☐ Community development through funding and/or provision of other resources (e.g. food, water, etc.) (6)

☐ Community development through education and training (7)

☐ Other forms of community development (please specify) (8)

_____

☐ Research facilitation: biodiversity-related (9)

☐ Research-facilitation: community development-related (10)

☐ Research-facilitation: implementation of the biosphere model/ social-ecological systems (11)

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☐ Research facilitation: climate change (12)

☐ Climate change mitigation/ adaptation (13)

☐ Other (14) _____

End of Block: 3. Objectives

Start of Block: 4. Adaptive Management

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4.1 Do you implement adaptive management in your Protected Area?

○ No. I do not know what that is (1)

○ No. I know what that is but we do not implement it (2)

○ Somewhat. We do not specifically implement it, but I think it is inherent in our management practices (3)

○ Yes. We say that we implement it, but I am not sure as to the extent that we do so in practice (4)

○ Yes. We definitely implement an adaptive management process, inclusive of review of outcomes and new scientific research when planning for the next phase of management (5)

○ None of the above (please explain) (15)

_____

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4.2 Is an adaptive management approach described in your Protected Area's management plan?

- ○ No (1)
- ○ Yes (2)
- ○ Not applicable- no management plan (3)

End of Block: 4. Adaptive Management

Start of Block: 5. Protected Area Management Effectiveness

5.1 Do you plan for monitoring and/or evaluation of management effectiveness of the Protected Area?

- ○ Yes (1)
- ○ No (2)

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5.2 Do you implement Protected Area Management Effectiveness (PAME) monitoring and/ or evaluation?

- ○ Yes (1)
- ○ No (2)

5.3 What methods do you use to monitor and/ or evaluate Protected Area Management Effectiveness (PAME), excluding standardised PAME tools?

- ○ None (1)
- ○ I use the following methods: (2)

_____

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5.3 Do you use a standardised PAME (Protected Area Management Effectiveness) tool such as METT (Management Effectiveness Tracking Tool), or a tool of your own creation to help you monitor or evaluate management effectiveness?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Block If Do you use a standardised PAME (Protected Area Management Effectiveness) tool such as METT (Manag... = No

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6.1 Please select any of the tools below that you utilise to monitor/ evaluate effectiveness of your Protected Area (please select all applicable):

☐ METT-SA (Management Effectiveness Tracking Tool- South Africa) (1)

☐ RAPPAM (Rapid Assessment and Prioritisation of Protected Area Management) (2)

☐ Modified Threat Reduction Assessment (3)

☐ IMET (Integrated Management Effectiveness Tool) (4)

☐ IBA (Birdlife Important Bird Areas) (5)

☐ SMART (Spatial Monitoring and Reporting Tool) (6)

☐ Cooperative Agreement Terms of Reference Monitoring and Evaluation Tool (7)

☐ Balance Scorecard (8)

☐ Other standardised tool (please specify) (9)

_____

☐ Tool of own creation (please specify) (10)

_____

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6.2 Please give your reason for using the standardised PAME tool/s you selected above:

_____

6.3 If your reasoning above was because the use of a particular tool is a formal requirement (e.g. due to an Agreement), would you still use it if it were *not* a requirement?

- ○ Yes (4)
- ○ No (5)
- ○ Yes, but only applicable to the following tool/s from my selection: (6)

_____

- ○ Not Applicable (none of the tools I selected are used due to a requirement) (3)

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6.4 Do you implement changes to management of your Protected Area after using any of the tools discussed above?

- ○ Yes (1)
- ○ No (3)
- ○ Sometimes (please explain) (2)

_____

6.5 Do you communicate with other Protected Area managers in the Kruger to Canyons Biosphere Region network regarding use of PAME (Protected Area Management Effectiveness) tools?

- ○ Yes (please describe the process briefly): (1)

_____

- ○ No (3)

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6.6 Do you communicate with other Protected Area managers in the Kruger to Canyons Biosphere Region network regarding PAME (Protected Area Management Effectiveness) improvements, following the use of the PAME tools?

- ○ Yes (please describe the process briefly): (1)

  _____

- ○ No (3)

6.7 In your experience, how helpful do you find PAME (Protected Area Management Effectiveness) tools in general, on a scale of 1 - 5 (1= not at all helpful; 5= very helpful)

	1	2	3	4	5
Helpful: ()					

6.8 In your experience, how tedious do you find PAME (Protected Area Management Effectiveness) tools in general, on a scale of 1 - 5 (1= extremely tedious; 5= not at all tedious)

1 2 3 4 5

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Tedious: ()	

6.9 What is your perception of these PAME (Protected Area Management Effectiveness) tools in general?

- ○ I like them (1)
- ○ I like them but I think they can be improved or streamlined (2)
- ○ I neither like nor dislike them (3)
- ○ I dislike them but I don't know of a better way to monitor/evaluate PAME (4)
- ○ I dislike them and I feel there are better ways of monitoring/evaluating PAME (5)

End of Block: 5. Protected Area Management Effectiveness

Start of Block: 6. General

6.1 Do you have a suggestion/some suggestions for a better way of monitoring and evaluating Protected Area Management Effectiveness in order to continually improve the Protected Area network's effectiveness?

_____

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6.2 Do you think there is the potential for research on Protected Area Management Effectiveness (PAME) that would assist you in monitoring or evaluating effectiveness?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Block If Do you think there is the potential for research on Protected Area Management Effectiveness (PAME... = No

6.3 What kind of research on Protected Area Management Effectiveness would you find helpful to assist you in monitoring or evaluating the effectiveness of your Protected Area?

_____

End of Block: 6. General

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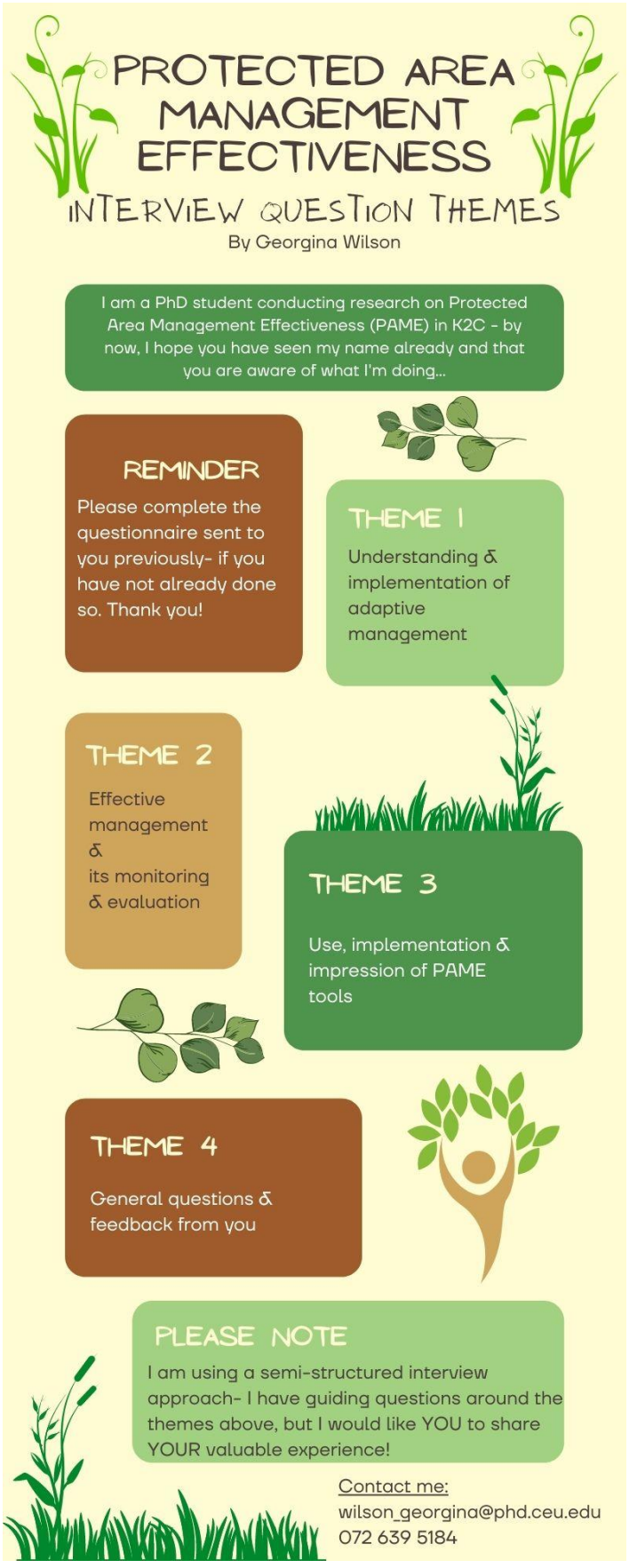
APPENDIX B

Interview Infographic



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APPENDIX C

Interview Protocol

PAME in K2C

Interview Protocol

Introduction:

I am investigating the use of various methods and tools used to monitor or evaluate a PA's effectiveness in relation to its goals and objectives. All PAs within K2C will be investigated, in order to gather evidence of the variation in tools or methods. My aim is to investigate the various means of monitoring and evaluating PA management effectiveness in order to improve on the current tools or develop a tool that is easy to use and cost effective. The goal is to make tracking PA management effectiveness as easy and cost effective as possible, to assist PA managers. I am an independent researcher with Central European University in partnership with the K2C NPC. I am not affiliated with any PA within K2C. This research will form part of my PhD and I am hear to listen and learn from managers who work within this region.

Ethics:

All personal information will be kept confidential and anonymous. No individual or organisation names will be published in the dissertation or any other report or article that arises from the research. Names will be coded, with codebook and data stored in separate, password-protected locations.

Permission to record this interview? All interviews will be transcribed and the recordings will be deleted.

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Interview Questions: MAIN

Adaptive management:

1. What would you define as adaptive management?
2. Do you think you implement this in your PA? If yes **(Ref: questionnaire response)**
    a. How do you implement it?
    b. What kind of data feed into management planning?
    c. Do you make changes to management practice after reviewing the data above?
    d. Do you undertake discussion sessions or workshops with your team to review this data and tweak management practice? Who is involved? How often does it happen? Who makes the final decision?
    e. Do you discuss learnings from this process with other PAs in the network (formal or informal?)

Monitoring and evaluation of management effectiveness:

3. What would you consider effective management of your PA? Why do you say that?
4. Do you plan to monitor or evaluate effectiveness (in management plan/ AoP)? **(Ref: questionnaire response)**
5. Do you monitor or evaluate management effectiveness of your reserve(s)- or how else do you know if the PA is being managed effectively/ not? **(Ref: questionnaire response)**
6. How do you monitor or evaluate effectiveness? **(Ref: questionnaire response)**

PAME tools

7. Do you utilise any PAME tools, such as METT, RAPPAM, SMART or Modified Threat Reduction Assessment? If yes: **(Ref: questionnaire response)**
    a. Who undertakes these, and how often?
    b. What happens to the information you collect?
    c. Why do you do this?
    d. Are you mandated to undertake PAME assessments? By who? What tools are you required to use? What happens to this information after you submit it?
    e. When you are required to undertake a PAME assessment, do you feel pressured to answer in a specific way? Is there an incentive to either under or over score your PA?
    f. Do you feel you have enough information to confidently complete the current PAME tools?
    g. Do you use the information collected in PAME assessments to make changes to management in the PA? If so, how?
    h. Do you work with other PAs to undertake or understand PAME, host training workshops, or any other collaborative effort?
    i. Are any current PAME assessments (or parts thereof) redundant or irrelevant?

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Conclusion:

8. Have you considered how monitoring and evaluation of effectiveness in your PA could be improved? Please explain.
9. Do you think that PAME and its evaluation is an important issue in PAs? Why or why not?
10. What sort of research on PA management effectiveness would you find helpful, useful or interesting? **(Remove if Q-aire sent first)**

Not part of interview:

Could I please have access to current and previous management plans or draft plans?

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APPENDIX D

CEU Research Ethics Checklist

Checklist on Ethical Issues in Research

This checklist is intended as a guide for CEU students/researchers in planning, designing and carrying research, and for applying approval to the Ethical Research Committee. The numbers in brackets indicate the relevant section of the Guidelines on Ethical Research. In case applying for approval from the Ethical Research Committee, provide explanatory answers that enable the Committee to assess whether the Guidelines were followed.

A. General information

1. Project name/Title of thesis/dissertation:
Protected Area Management Effectiveness in Kruger to Canyons Biosphere Region, South Africa
2. Name(s) of Applicant(s):
Georgina Wilson
3. Contact information of applicants:
Wilson_georgina@phd.ceu.edu
4. Department/Research Center:
Department of Environmental Sciences and Policy
5. Research Supervisor (if applicable):
Prof Brandon Anthony
6. Supervisor's contact information:
anthonyb@ceu.edu
7. Date by which a decision on this application is required in order that the project can proceed as planned, if approval is required:
01/09/2021
8. Expected date of completion:
31/08/2023

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9. Abstract of the project/thesis/dissertation:
Protected Areas (PAs) are considered one of the most successful methods of conserving biodiversity in the face of widespread and unrelenting threats. However, biodiversity loss continues despite the increase in the number and spatial extent of PAs and sometimes, even within these. In order for PAs to result in real protection and conservation of biodiversity, they need to be effective. Protected Area Management Effectiveness (PAME) is defined as the extent to which a protected area is being managed so as to protect its values and achieve its goals and objectives (Hockings et al., 2006). PAME assessment tools have come to the forefront of conservation research as time- and cost-effective measures of the success of PAs (Anthony, 2014). It is currently unknown as to which tools or methods PA management teams within Kruger to Canyons Biosphere Region (K2C) are utilising to monitor and evaluate their management effectiveness, how effective these tools or methods are at improving management techniques or what impacts the use of these tools or methods have on the greater system of the biosphere region (BR). PA effectiveness is an important element of biodiversity conservation and greater understanding as to the situation in K2C is required. This information will be useful, not only for K2C, but for other South African and African BRs in a similar context. This study will also contribute further understanding to the effectiveness of the BR model, social-ecological systems (SES), and adaptive management (AM).

B. Funding

10. Sources, researchers' and their organisation's financial interests and ethical issues in case of external funding:
NA

C. Participants

11. Does the study involve human subjects, and how? [Who will participate in the research? How will the subject/respondent group be chosen, what sampling techniques will be deployed? In which ways the participants will be involved? (2.1)
Yes, managers or management representatives from PAs in K2C will be part of focus groups and one-on-one interviews.
12. Are there potential benefits and hazards for the participants? [Are there risks to the subject entailed by involvement in the research? Have procedures been established for the care and protection of subjects? Will the participants be informed of possible risks and hazards?] (2.2 – 3.4)
Yes. Hazards: sharing of information, loss of confidentiality and repercussions to jobs. Benefits: improved knowledge and tools for management. Subjects will be appraised of risks and benefits through a confidentiality agreement at the beginning of focus groups or interviews. Subjects' names and places of employment will be given pseudonyms in the dissertation as well as any published works.

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13. Does the research involve any risks or pose danger to the researcher(s)? [If yes, what procedures will be adopted to minimize the risks? Have the health and safety guidelines relevant to the area and character of the research been consulted and implemented?] (4)
No.
14. Will all procedures ensuring that consent is informed be followed? [Including the possibility for withdrawing consent] (5.1)
Yes.
15. Are the recruitment procedures well planned, and risks of coercion considered? [Is there any sense in which subjects might be "obliged" to participate – or are volunteers being recruited? Does the participation of research involve financial or other remuneration?] (5.2)
Yes, all participation will be voluntary and no remuneration will be provided.
16. Does the research involve incompetent adults, children or contexts where obtaining consent is impossible (i.e. public context, groups)? [Which "consent"-procedures will be applied instead?] (5.3 – 5.5)
No.
17. Does the research involve deception? [This will not be applicable to many studies. In case deception of participants is involved: how is the impossibility to employ alternative non-deceiving method of research justified? How is the deception integral to the viability of research? Will debriefing be employed and how will the participant's reactions influence the use of the data obtained?] (5.6 – 6)
No.
18. Will confidentiality and anonymity be secured?(8)
Yes.
19. Will data protection and storage requirements be followed? (8)
Yes.
20. Are there any plans for future use of the data beyond those already described?
No.

D. Other Aspects:

21. Dissemination of findings: [What is the anticipated use of the data, forms of publication and dissemination of findings etc? In areas where information is jointly owned by participants as co-researchers attention should be paid to how they want to use the data.]
Findings will be published in a PhD dissertation, and will be provided to K2C management for their professional use. Some subsets of the findings may be published in scientific journals.

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22. Have you considered how to ensure that ethics considerations are reviewed as the project proceeds? [This is particularly relevant for projects that go on over a longer time period.]
Yes. Ethics considerations will be continually reviewed during the data gathering period through feedback from participants, if applicable.
23. Is there any other information, which you think would be relevant to the reviewers', or your own, consideration of the ethical issues raised in this documentation?
No.

DECLARATION
The information supplied above is to the best of my knowledge and belief accurate.

Signature of Applicant: 

Date: 20 August 2021

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APPENDIX E

METT-SA Version 3

*Please note that the METT-SA Ver. 3 was designed to function as an Excel spreadsheet with added macros and cell notes. These will not be visible in this copy of the tool.

Verification	
Name and designations of person responsible for the assessment	
Names and designations of team involved in the assessment	
Date of assessment	

Verification: I declare hereby that the ratings provided in this assessment are accurate to the best of my knowledge and are the result of interacting with all relative role players and that all supporting documentation was examined and filed for verification whenever needed and that due process was followed

Designation	**Name**	**Contact details**	**Signature**
Person leading the assessment process			
Site Manager			
District/Regional/Park Ecologist			
Supervisor			

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DATA SHEET. Attach separate sheet if space is too limited.

Official name of site		**Area(ha)**	
Management Authority		**Legal designation**	
National Biome (see insert)		**Any additional designation e.g., World Heritage, Ramsar etc.**	
List primary biodiversity and cultural attributes (values) as listed in the management plan, which underlie the purpose of the protection of the site.			
1		**2**	
3		**4**	
5		**6**	
7		**8**	
List high level site objectives as listed in the management plan			
1		**2**	
3		**4**	
5		**6**	
7		**8**	
List critical management activities required to meet the site objectives as listed above			
1		**2**	

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3		**4**	
5		**6**	
7		**8**	

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1: Context: Where are we now? The legal, physical, biological, cultural and heritage context of the site.						
Indicators **Questions**	**Answers** **(Select & score one of the following answers in each section that most closely fits your site)**	**Value**	**Rating**	**Comments & verification** (Justify your selection and/or comment on current situation. Also make a note of the assumptions made. Where necessary provide verification for your score)	**Next steps** (Identify actions to improve the score by next evaluation)	**Evidence produced** (List the evidence that you have used to verify your score)
1.1 Legal status Does the site have secure permanent conservation/ heritage legal status in terms of relevant legislation?	The site has no secure permanent conservation/ heritage legal status in terms of relevant legislation.	0				
	Some but not all properties managed as part of the site have been declared.	1				
	All properties managed as part of the site have been declared but not all title deeds have been endorsed yet.	2				
	All properties managed as part of the site have been declared and all title deeds have been endorsed.	3				
1.2. Internal rules Does the site have internal rules in terms of relevant legislation?	Internal rules for controlling use & activities in the site have been gazetted. For MPAs the use zoning with defined rules for each zone has been gazetted.	1				

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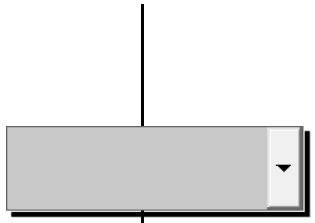
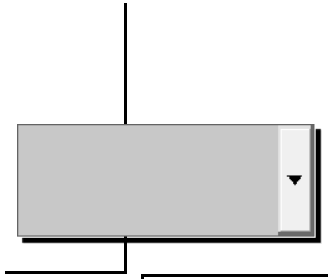
1.3. Boundary demarcation Is the boundary made known through relevant demarcation?	The boundary of the site is not known by the management authority or local residents/neighbouring land users.	0			
	The boundary of the site is known by the management authority, but as it is not appropriately demarcated it is not known by local residents/neighbouring land users.	1			
	The boundary of the site is known by the management authority and demarcated to the extent that it is known by local residents/neighbouring land users.	2			
	The boundary of the site is known by the management authority, fully demarcated and is thus known by the local residents/neighbouring land users and the public.	3			
1.3.1 Boundary deviations Where applicable have all boundary deviations been recorded? **NA where there are no deviations.**	All boundary deviations have been recorded in a legally binding document.	1			
1.3.2 Servitude register Has a register of all servitudes and the conditions relating thereto been compiled? **NA**	A register of all servitudes and the conditions relating thereto has been compiled.	1			
1.4 Biodiversity knowledge and understanding Does the site have enough information and understanding thereof that	No information is available on key species, habitats, ecosystems and invasive species of the site to inform management of biodiversity objectives.	0			
	Information on key species, habitats, ecosystems and invasive species of the site is not sufficient to support the achievement of biodiversity objectives.	1			

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informs and supports achieving specific objectives which have been set in the management plan?	Information and the understanding thereof concerning key species, habitats, ecosystems and invasive species of the site is sufficient to support the achievement of biodiversity objectives, but additional information is in the process of being compiled.	2				
	Information and the understanding thereof concerning key species, habitats, ecosystems and invasive species of the site as compiled by scientific services supports the achievement of all biodiversity objectives.	3				
1.5 Cultural heritage knowledge Does the site have enough information and understanding of cultural heritage resources to manage them? **NA if a survey by an accredited heritage practitioner has shown that there are no cultural heritage assets.**	No cultural heritage survey has been undertaken.	0				
	An informal cultural heritage survey has identified heritage assets, but further investigation by an accredited heritage practitioner is required.	1				
	A formal cultural heritage survey by an accredited heritage practitioner has identified heritage resources and values.	2				
	A formal cultural heritage survey by an accredited heritage practitioner has identified heritage resources and values and has been verified by the South African Heritage Resource Authority (SAHRA) or the relevant provincial authority and is included in the management plan.	3				
1.5.1 Format of data Is the data for 1.4 and 1.5 in a readily accessible and understandable format to facilitate decision making by the site manager?	All data for 1.4 and 1.5 are in a readily accessible and understandable format to facilitate decision making by the site manager.	1				

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1.6 Risk assessment Has a risk or similar assessment been conducted for the site?	A full risk or similar assessment, covering inter alia biodiversity, financial management, human resources, tourism, pressures & threats has been undertaken for the site within the time period required by the organisation that informs management planning.	1			

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2: Planning: Where do we want to be? All aspects of broad planning which set the longer term vision and objectives for the site						
Indicators **Questions**	**Answers** *(Select & score <u>one</u> of the following answers in each section that most closely fits your PA)*	**Value**	**Rating**	**Comments & verification** (Justify your selection and/or comment on current situation. Also make a note of the assumptions made. Where necessary provide verification for your score)	**Next steps** (Identify actions to improve the score by next evaluation)	**Evidence produced** (List the evidence that you have used to verify your score)
2.1. Design Is the size and shape of the site adequate to achieve the conservation mandate?	Inadequacies in design mean that achieving major conservation objectives is not possible.	0				
	Although there are inadequacies in the design, these inadequacies have been addressed by setting objectives accordingly, but more still needs to be done.	1				
	To a large extent, mitigating measures compensate for inadequacies in size and shape so that conservation objectives can be met.	2				
	The size and shape of the site is adequate in design to fully achieve the conservation objectives.	3				

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2.1.1 Expansion plan Where applicable, has an expansion plan been set out? **NA**	A site expansion plan has been set out in line with expansion strategy for the organisation.	1				
2.1.2. Delineation of a zone of influence Has a zone of influence based on influences and sensitivity been defined surrounding the site?	No zone of influence has been established.	0				
	No zone of influence has been established, but the desktop delineation is complete and compatible land uses have been identified.	1				
	The zone of influence has been clearly delineated and discussions have been held with neighbouring landowners and have been documented.	2				
	The zone of influence and applicable buffering mechanisms have been clearly defined and guidelines for suitable land uses have been provided to be discussed between site management and neighbouring land owners for input into the municipal IDP, catchment and river plans.	3				
2.1.3 Corridor management **NA**	There is a plan for the management of corridors linking the site to key habitats outside of the site thereby mitigating fragmentation.	1				
2.2 Management plan Is there an approved management plan as required by the	There is no management plan with measureable objectives for the site.	0				
	A management plan with measureable objectives is being prepared or has been prepared.	1				

EUDL Collection

relevant legislation?	An updated management plan with measureable objectives approved by the Minister/MEC (as applicable) exists.	2				
	An updated, integrated management plan with measurable objectives and covering all aspects of site management (see insert) is approved by the Minister/MEC (as applicable) .	3				
2.2.1 Conservation Development Framework (CDF) Is there a zoning system based on a sensitivity analysis in place indicating visitor use zones, and positioning and nature of operational and visitor infrastructure? **NA for MPAs**	An approved CDF based on a sensitivity analysis exists.	1				
2.3 Education, awareness and interpretation programme Does the management plan include an education, awareness and interpretation programme to create awareness of the values of the site?	No education, awareness and interpretation programme is in place at site level.	0				
	An education, awareness and interpretation programme for the site exists but is not yet approved or has not been updated.	1				
	There is an approved and updated education, awareness and interpretation programme for the site.	2				
	There is an approved and updated education, awareness and interpretation programme for the site and it is fully integrated into the management plan.	3				

CEDeTD collection

2.4 Management plans for significant cultural heritage assets Have site specific cultural heritage management plans been compiled for assets of significance? **NA if no cultural heritage sites have been identified as part of 1.5. Also not appliable to MPAs.**	Significant cultural heritage sites have been identified but there are no site management plans.	0				
	Informal site management plans have been drawn up for significant cultural heritage sites identified	1				
	Formal site management plans for significant cultural heritage sites have been drawn up by an accredited heritage practitioner.	2				
	Formal site management plans for all significant cultural heritage sites have been drawn up by an accredited heritage practitioner and approved if applicable by SAHRA or the relevant provincial heritage authority.	3				
2.5 Biodiversity management plan for cultural heritage sites with biodiversity values Is there a comprehensive plan dealing will all aspects of biodiversity? **NA for all sites except cultural heritage sites with biodiversity values.**	There is a comprehensive biodiversity management plan.	1				

CEU eTD Collection

2.6 Restoration of degraded areas Is there a plan for the rehabilitation of degraded areas in the site?**NA for sites where no degradation has occurred.**	There is a plan for addressing degraded areas within the site.	1				
2.7 Collections management / curatorship of heritage artefacts Is there a collections management plan that makes adequate provision for curatorship, repository and management of fossils and artefacts? **NA for MPAs and cultural heritage sites.**	The collections management plan has been developed and is fully implemented.	1				

CEU eTD Collection

3: Inputs: What do we need? Allocation of resources and the establishment of information generating programmes

Indicators **Questions**	**Answers** **(Select & score one of the following answers in each section that most closely fits your site)**	**Value**	**Rating**	**Comments & verification** (Justify your selection and or comment on current situation. Also make a note of the assumptions made. Where necessary provide verification for your score)	**Next steps** (Identify actions to improve the score by next evaluation)	**Evidence produced** (List the evidence that you have used to verify your score)
3.1. Management research programme Are research projects relevant to achieving the set management objectives of the site?	Research needs have not been identified nor is any management focussed research work taking place.	0				
	Research needs have been identified, but current research is not relevant to achieving the management objectives.	1				
	Research needs have been identified, but only critical management objective orientated research is being done.	2				
	Research needs have been identified and projects relevant to all management needs are being undertaken, enabling the monitoring of results of management actions against set objectives.	3				

TEEB Data Collection

3.1.1 Monitoring and evaluation programme Is there an active long term monitoring and evaluation programme that measures the level of achievement of objectives against set baselines?	Monitoring needs have not been identified, nor is any monitoring work taking place.	0				
	Monitoring needs have been identified, but other than for *ad hoc* observation, no monitoring is carried out.	1				
	Monitoring needs have been identified, but only monitoring of critical management objectives is being done.	2				
	There is an established monitoring and evaluation programme which is fully implemented with site management participation and is used to guide adaptive management.	3				
3.1.2 Relationship with researchers Is there a sound working relationship and regular communication with researchers?	There is an established working relationship with researchers and regular liaison leads to research results feeding into management decisions.	1				
3.2. Human resource capacity Is human resource capacity adequate to carry out management objectives?	There is no human resource capacity.	0				
	There is an approved staff organogram but human resource capacity is not sufficient i.e. organogram is not sufficient or some posts are unfunded or vacant.	1				
	The approved organogram reflects the actual needs of management for achieving only critical management objectives and the human resource capacity meets the approved levels.	2				
	The approved organogram reflects the actual needs of management for effectively achieving all management objectives and the human resource capacity meets the approved levels.	3				
3.3 Adequacy of operational budget **Is the operational budget allocated by the**	There is no operational budget for the site or no budget directly allocated to it.	0				
	The allocated operational budget is inadequate.	1				

CEU eTD Collection

management authority to the site adequate?	There is a budget for regular operations, but many innovations and initiatives are reliant on external funding.	2				
	The available budget is sufficient and meets the full management needs of the site without external funding.	3				
3.4 Security of operational budgetIs there a secure budget specific to the site?	There is no secure operational budget.	0				
	There is an operational budget, but it is only available on an ad hoc basis or the budget is not specific to the site which must depend on an allocation of funds from a centralised budget.	1				
	An operational budget, specific to the site, is secure and guaranteed on an annual cycle.	2				
	An operational budget, specific to the site, is secure and is guaranteed on a 3-5 year cycle.	3				
3.4.1 Capital budget Has the capital budget required for replacing operational equipment, infrastructure and vehicles been provided?	Adequate capital budget is available for the replacement of equipment, infrastructure and vehicles.	1				
3.4.2 Budget management Is the budget effectively managed to meet critical management needs in accordance with the annual plan of operations (APO)?	Budget management is excellent and all management goals are met	1				

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3.4.3 Delegation of management of budget Is the budget allocated to and managed by the site manager?	The site manager is responsible and accountable for budget management.	1				
3.5 Income Is income generated by the site retained within the organisation for site management? **NA if no income is derived.**	Although fees are theoretically applied, there is no collection.	0				
	Income is derived, but it goes to a budget outside the organisation and is not used for site management.	1				
	Income is derived, but it goes to a central budget within the organisation and is not directly used for the management of the site	2				
	Income is retained within the organisation and is used solely for site management.	3				
3.5.1 Fund raising Does the organisation have the skills and capacity to raise external sources of funding?	There are skills and capacity in the organisation to raise external sources of funding for specific projects.	1				
3.6. Law enforcement capacity and capability **Has the site the capacity/resources/support to enforce internal rules/regulations effectively?**	There is no capacity/resources/support to enforce (arrest & prosecute) rules/regulations.	0				
	There are major deficiencies in capacity/resources/support to enforce internal rules/regulations (e.g. lack of skills, no patrol budget).	1				
	The capacity/resources/support to enforce rules/regulations are acceptable, but some deficiencies are evident.	2				
	The capacity/resources/support to enforce rules/regulations are excellent.	3				

Guidance Collection

3.7 Adequacy of operational equipment Is equipment required for operational management purposes optimal?	There is no operational equipment for management needs.	0				
	Operational equipment is inadequate for management needs.	1				
	Operational equipment is adequate for current management needs.	2				
	Operational equipment is optimal for current and future anticipated management needs.	3				
3.7.1 Adequacy of operational infrastructure Is infrastructure required for operational management purposes (excluding tourism/visitor facilities) optimal? **NA for sites that have no infrastructure as they are managed from a central depot.**	There is no operational infrastructure for management needs.	0				
	Operational infrastructure is inadequate for management needs.	1				
	Operational infrastructure is adequate for current management needs.	2				
	Operational infrastructure is optimal for current and future anticipated management needs.	3				
3.8 Adequacy of tourism infrastructure Is infrastructure required for tourism management purposes optimal? **NA if there is no tourism or for MPAs.**	There is no tourism infrastructure despite the identified need.	0				
	Tourism infrastructure is inadequate to manage the current volume of visitors.	1				
	Tourism infrastructure is adequate to manage the current volume of visitors.	2				
	Tourism infrastructure is optimal to manage the current and anticipated future volume of visitors.	3				

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3.8.1 Tourism grading Has accommodation been accredited with a recognised tourism grading standard? **NA if there is no accommodation.**	Accommodation has been accredited with a recognised tourism grading standard.	1				
3.9 Adequacy of transport fleet Are there adequate numbers and range of vehicles (including boats, aircraft etc.) to meet management needs?	There is no fleet available despite the identified need.	0				
	Vehicles are available but the number and/or type are unsuitable and inadequate for management needs.	1				
	There are sufficient suitable vehicles available to carry out critical management activities.	2				
	The fleet is totally appropriate and sufficient for all management needs.	3				
3.10 Health and safety Is the site compliant with the Occupational Health and Safety Act?	An audit has certified that site management complies with and implements the Occupational Health and Safety Act.	1				
3.11 Staff housing Is there a policy with standards for staff housing?	There is a policy with standards for staff housing.	1				

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4: Process : How do we go about it? Key management actions and practices						
Indicators **Questions**	**Answers** **(Select & score one of the following answers in each section that most closely fits your site)**	Value	**Rating**	**Comments & verification** (Justify your selection and or comment on current situation. Also make a note of the assumptions made. Where necessary provide verification for your score)	**Next steps** (Identify actions to improve the score by the next evaluation)	**Evidence produced** (List the evidence that you have used to verify your score)
4.1 Annual plan of operation (APO) Is there an APO or annual work plan with set targets linked to the management plan taking into account the approved site budget?	No approved/standardised APO exists.	0				
	An APO exists but activities are not linked the to the management plan targets for the site.	1				
	An APO exists and actions are linked to the management plan targets for the site.	2				
	An approved APO exists and actions are linked to the management plan targets for the site.	3				
4.2 Standard operating procedures Are there standard operating procedures that are regularly updated to define best practice methods for identified management activities?	There are no standard operating procedures.	0				
	Some standard operating procedures are in place and are being implemented.	1				
	Standard operating procedures pertaining to critical management activities are in place and are being	2				

GLOBTD Collection

	implemented and updated. Other procedures are being designed.					
	Relevant standard operating procedures pertaining to all management activities are in place and are regularly updated to ensure best practice.	3				
4.3 Human resource management systems Is an effective human resource (HR) management system including staff development in place?	There are no HR management and staff development systems.	0				
	HR management and staff development systems are poor and constrain effectiveness.	1				
	HR management and staff development systems are adequate and contribute to management effectiveness.	2				
	HR management and staff development systems are excellent and fully support management effectiveness.	3				
4.4 Administrative support systems Are the administrative systems (excluding HR management) supportive of effective management?	There are no administrative support systems.	0				
	Administrative support systems are poor and constrain effectiveness.	1				
	Administrative support systems are adequate and contribute to management effectiveness.	2				
	Administrative support systems are excellent and fully support management effectiveness.	3				
4.5 Information technology systems Do the information technology systems including data back up systems, support effective site management?	Information technology systems are not in place and this significantly undermines management effectiveness.	0				
	Information technology systems are poor and limit management effectiveness.	1				
	Information technology systems are adequate and contribute to management effectiveness.	2				

For Deportation

	Information technology systems are excellent and fully support management effectiveness. All electronic data are backed up on a routine basis, stored according to organisational standards and are easy to access.	3				
4.6 Maintenance of operational equipment Is operational management equipment being adequately maintained and meeting standards of a maintenance schedule?	No maintenance of operational equipment is taking place.	0				
	There is no maintenance schedule, but ad hoc maintenance is taking place.	1				
	There is a maintenance schedule and all critical operational equipment is being maintained and meeting set standards.	2				
	There is a maintenance schedule and all operational equipment is being maintained and meeting the set standards.	3				
4.6.1 Maintenance of operational infrastructure Is operational infrastructure adequately maintained and meeting standards of a maintenance schedule?	No operational infrastructure maintenance is taking place.	0				
	There is no maintenance schedule, but some ad hoc maintenance is taking place.	1				
	There is a maintenance schedule and all critical operational infrastructure is being maintained and meeting set standards.	2				
	There is a maintenance schedule and all operational infrastructure is being maintained and meeting the set standards.	3				
4.6.2: Maintenance of transport fleet Is the transport fleet being adequately maintained and meeting standards of a maintenance schedule?	There is no maintenance taking place.	0				
	There is a no maintenance schedule, but ad hoc maintenance is taking place.	1				
	There is a maintenance schedule and all critical assets of the transport fleet are being maintained and meeting set standards.	2				

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	There is a maintenance schedule and the entire transport fleet is being maintained and meeting the set standards.	3				
4.7 Maintenance of tourism infrastructure Is the tourism infrastructure being maintained and meeting standards of a maintenance schedule? **NA if there is no tourism infrastruture.**	There is no maintenance or upgrading of tourism infrastructure taking place.	0				
	There is no maintenance schedule, but ad hoc maintenance is taking place.	1				
	There is a maintenance schedule and all critical tourism infrastructure is being maintained and meeting set standards.	2				
	There is a maintenance schedule and all tourism infrastructure is being maintained and meeting the set standards.	3				
4.8 Insurance Is there adequate insurance in place to ensure replacement of operational equipment, infrastructure and vehicles if loss/damage occurs? **NA for non-statutory government organisations.**	All operational equipment, infrastructure and vehicles are covered by adequate insurance.	1				
4.9 Implementation of education, awareness and interpretation programme Is the education, awareness and interpretation programme being implemented?	There is no education, awareness and interpretation taking place.	0				
	There is limited ad hoc implementation of the education, awareness and interpretation programme.	1				
	The education, awareness and interpretation programme is being implemented.	2				

COUNTDOWN

	The education, awareness and interpretation programme is fully linked to the objectives and needs of the site and is being fully implemented.	3				
4.10 Public relations and communication programme Is there a public relations and communication programme that informs a wide range of audiences including internal staff?	There is no public relations and communication programme.	0				
	There is some ad hoc public relations and communication.	1				
	There is a formal public relations and communication programme.	2				
	There is a wide ranging multi media public relations and communication programme keeping the general public and internal role players informed of important aspects of the site.	3				
4.11 Community liaison structure Is there a functioning and formalised community liaison structure of local representatives and specialists that provides input to site management?	A well represented functioning and formalised community liaison structure contributes significantly to the management/development of the site.	1				
4.12 Sustainable extractive use Does your organisation have a policy and system for the sustainable use of biotic and abiotic resources? **NA to Special Nature Reserves or where the CMA has a policy on non extractive use.**	Management guidelines for the sustainable extractive use of biotic and abiotic resources that apply to both the organisation and outside sites are in place. These guidelines are legally compliant and respond to the ecological sensitivity of the site.	1				

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4.13 Management of hazardous substances Is there a formal programme with functional infrastructure for the management of hazardous substances (flammable and non-flammable)?	A formal legally compliant programme with functional infrastructure for the management of hazardous substances (flammable and non-flammable) is in place.	1				
4.14 Community Partners In co-management and restitutional areas, is there a formalised co-management agreement that allows community partners to have input to management decisions? **NA: only applicable to co-management areas.**	There is a formal representative structure for community partners to participate in decision making according to a legally binding co-management agreement.	1				
4.15 Commercial tourism Is there an appropriate level of interaction and cooperation with tour operators and concessionaires? **NA: if there is no tourism.**	There is excellent interaction and co-operation between managers and tourism operators/concessionaires to enhance visitor experiences, protect values and resolve conflicts.	1				

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4.16 Environmentally responsible practice Are environmentally responsible practices applied? **NA: if there is no development e.g. Special Nature Reserve.**	There are no environmentally responsible practices in place.	0				
	Planning for instituting environmentally responsible practices has commenced.	1				
	Some environmentally responsible practices have commenced and plans exist to implement all aspects of environmentally responsible practice.	2				
	The site has been accredited with a recognised green standard.	3				

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5: Outputs: What were the results? Key products, services and implementation actions						
Indicators **Questions**	**Answers (Select & score one of the following answers in each section that most closely fits your site)**	**Value**	**Rating**	**Comments & verification** (Justify your selection and or comment on current situation. Also make a note of the assumptions made. Where necessary provide verification for your score)	**Next steps** (Identify actions to improve the score by next evaluation)	**Evidence produced** (List the evidence that you have used to verify your score)
5.1. Tourism infrastructure Does tourism infrastructure mitigate visitor impacts? **NA if there are no tourism facilites**	Visitor impacts are resulting in severe degradation of the environment leading to loss of biodiversity.	**0**				
	Visitor impacts are not mitigated by the design of the tourism infrastructure which could result in degradation of the environment.	**1**				
	Visitor impacts which could result from current levels of visitation are fully mitigated by the design of the tourism infrastructure.	**2**				
	Visitor impacts which could result from current and anticipated levels of visitation are fully mitigated by the design of the tourism infrastructure.	**3**				

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5.2 Functioning of law enforcement and compliance systems Are the available management mechanisms working to control legitimate and illegitimate resource use and access?	There are no protection systems or mechanisms for controlling legitimate and illegitimate access or activities in the site.	**0**				
	Protection systems or mechanisms for controlling legitimate and illegitimate access or activities in the site exist, but they are inadequate or are not being implemented.	**1**				
	Protection systems or mechanisms for controlling current levels of legitimate and illegitimate access or activities in the site are being implemented and there is a level of success	**2**				
	Protection systems or mechanisms for controlling current and anticipated levels of legitimate and illegitimate access or activities in the site are fully implemented. The success has been verified by a relevant site integrity audit.	**3**				
5.2.1 Integrated compliance plan Does the site have an integrated compliance plan?	There is an integrated compliance plan addressing all aspects of law enforcement and compliance that incorporates raising awareness, improving relationships and cooperation with local communities, law enforcement agencies, the judiciary and other roleplayers.	1				
5.3 Staff development and productivity Has the effective management and training of staff in line with management objectives resulted in higher productivity?	Staff lack the basic skills to effectively achieve their productivity targets or no productivity targets have been set.	**0**				
	Basic training has improved productivity and effectiveness, but further development is required to meet productivity targets as indicated in staff performance reviews.	**1**				
	Staff productivity is meeting productivity targets as indicated in staff performance reviews.	**2**				
	Staff are well skilled for their duties and staff productivity targets are often exceeded as indicated in staff performance reviews.	**3**				

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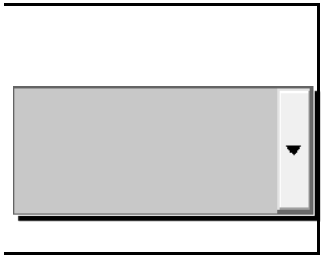
5.4 Linking of management plan to key performance areas Is the implementation of the management plan linked to the key performance areas of the site manager?	The implementation of the management plan is linked to the key performance areas of the site manager.	**1**				
5.5 Community support Are members of the community involved in supporting and assisting site management?	There is antagonism towards the site.	0				
	There is no antagonism towards the site, but little actual support or assistance.	1				
	Community members assist and support the site with some site management tasks, fundraising, and provision of information.	2				
	There are a wide range of projects supported by communtity members that assist and support site management and contribute significantly to increased site management effectiveness.	3				

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6: Outcomes: What did we achieve? Results or consequences measured against the set objectives and values.						
Indicators **Questions**	**Answers** **(Select & score one of the following answers in each section that most closely fits your site)**	**Value**	**Rating**	**Comments & verification** (Justify your selection and/or comment on current situation. Also make a note of the assumptions made. Where necessary provide verification for your score)	**Next steps** (Identify actions to improve the score by next evaluation)	**Evidence produced** (List the evidence that you have used to verify your score)
6.1 Economic and social benefit assessment Is the site influencing the local or regional economy and providing measurable social benefits to communities?	The impact of the site on the local or regional economy or provision of social benefits to communities has not been assessed.	0				
	The existence of the site has neither damaged nor benefited the local or regional economy, but has created some employment opportunities for communities.	1				
	An assessment has shown that there is some flow of broader economic and social benefits to local communities from the existence of the site.	2				
	A formal review/audit has shown that the site delivers quantifiable long term stimuli to the regional (and possibly the national) economy and delivers a broad range of long term quantifiable community benefits that improve the livelihood strategies and resilience in the lives of communities.	3				
6.2 Achievement of biodiversity targets	Biodiversity targets have not been set.	0				

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Are the biodiversity assets and values being managed as best possible to targets to meet objectives as set in the management plan using the latest available information and knowledge?	Biodiversity targets have been set and are being partially met .	1				
	All critical biodiversity targets are being met or are on track to being met .	2				
	A structured and scientific biodiversity condition assessment as part of the monitoring programmes has shown that the management of biodiversity is meeting all set targets.	3				
6.3 Ecological processes Does site management effectively maintain the ecological processes critical for the achievement of biodiversity targets?	Ecological processes are not being maintained with the result that ecological integrity and biodiversity are being compromised.	0				
	Ecological processes are only partially maintained with some ecological integrity and biodiversity being compromised.	1				
	Ecological processes are being adequately maintained/augmented by process simulation. Biodiversity is not being compromised.	2				
	A scientifically based assessment has shown that ecological processes are being effectively maintained/augmented with the result that ecological integrity and biodiversity are not being compromised.	3				
6.4 Ecosystem services Is the site management maintaining critical ecological processes that deliver services to	Ecological processes and systems are not being maintained resulting in no ecosystem service benefits to the site and neighbouring land users/communities.	0				
	Ecological processes and systems are being partially maintained resulting in the provision of limited ecosystem service benefits to the site and neighbouring land users/communities.	1				
	Ecological processes and systems are being adequately maintained resulting in the provision of ecosystem service benefits to the site and neighbouring land users/communities.	2				

EU Core Collection

surrounding communities?	A structured and scientific measurement and monitoring system has shown that ecological processes and systems are being effectively maintained resulting in the provision of ecosystem service benefits to the site and neighbouring land users/communities.	3				
6.5 Land use planning and management outside of the site Do the land use planning and management practices of surrounding areas support biodiversity objectives of the site?	Land use planning does not take into account the needs of the site and is detrimental to the site.	0				
	Land use planning does not take the needs of the site into account, but it is not detrimental to the site.	1				
	Land use planning partially takes the long term needs of the site into account. There is some cooperation from industries such as agriculture, forestry and mining.	2				
	There is a bilateral relationship between any relevant biodiversity plan and/or the applicable aspects of the IDP of the local municipality and the planning and management of the site. There is formal agreement with industries within the zone of influence.	3				
6.6 Water use planning and management operations influencing the site Does water use planning and management take cognisance of the site and the achievement of the site objectives? **NA**	Water use planning and the water needs in terms of quantity and quality are detrimental to the site.	0				
	Water use management exercises in the buffer zone/planning domain do not provide the water needs of the site, but it is not detrimental to the site.	1				
	Water use planning and management partially takes into account the long term needs of the site.	2				
	Catchment and river plans and water management fully take the water needs of the site into account and the water quality meets required standards as set out by the relevant authority.	3				

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6.7 Cultural heritage condition assessment Are the heritage assets and values being managed consistent to objectives? **NA if no cultural heritage assets have been identified in 1.5**	No cultural heritage assessment has taken place.	0				
	Some cultural heritage assets and values are being maintained as required in the management plan or heritage management plan.	1				
	Cultural heritage assets and values are being are being managed as required in the management plan or heritage management plan.	2				
	A structured assessment conducted by an accredited heritage practitioner, has shown that the management of cultural heritage assets and values are meeting the set management objectives.	3				

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-	Name of site assessed		
#			
1: CONTEXT		**VALUE**	**Rating**
1.1	Legal status	3	
1.2	Internal rules	1	
1.3	Boundary demarcation	3	
1.3.1	Boundary deviations	1	
1.3.2	Servitude register	1	
1.4	Biodiversity knowledge and understanding	3	
1.5	Cultural heritage knowledge	3	
1.5.1	Format of data	1	
1.6	Risk assessment	1	
2: PLANNING			
2.1	Design	3	
2.1.1	Expansion plan	1	
2.1.2	Delineation of a zone of influence	3	
2.1.3	Corridor management	1	
2.2	Management plan	3	
2.2.1	Conservation development framework (CDF)	1	
2.3	Education, awareness and interpretation programme	3	
2.4	Management plans for significant cultural heritage assets	3	
2.5	Biodiversity management plan for cultural heritage sites with biodiversity values	1	
2.6	Restoration of degraded areas	1	
2.7	Collections management / curatorship of heritage artefacts	1	
3: INPUTS			
3.1	Management research programme	3	
3.1.1	Monitoring and evaluation programme	3	

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3.1.2	Relationship with researchers	1		
3.2	Human resource capacity	3		
3.3	Adequacy of operational budget	3		
3.4	Security of operational budget	3		
3.4.1	Capital budget	1		
3.4.2	Budget management	1		
3.4.3	Delegation of management of budget	1		
3.5	Income	3		
3.5.1	Fund raising	1		
3.6	Law enforcement capacity and capability	3		
3.7	Adequacy of operational equipment	3		
3.7.1	Adequacy of operational infrastructure	3		
3.8	Adequacy of tourism infrastructure	3		
3.8.1	Tourism grading	1		
3.9	Adequacy of transport fleet	3		
3.10	Health and safety	1		
3.11	Staff housing	1		
4:PROCESS				
4.1	Annual plan of operation (APO)	3		
4.2	Standard operating procedures	3		
4.3	Human resource management systems	3		
4.4	Administrative support systems	3		
4.5	Information technology systems	3		
4.6	Maintenance of operational equipment	3		
4.6.1	Maintenance of operational infrastructure	3		
4.6.2	Maintenance of transport fleet	3		
4.7	Maintenance of tourism infrastructure	3		
4.8	Insurance	1		
4.9	Implementation of education, awareness and interpretation Programme	3		
4.10	Public relations and communication programme	3		

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4.11	Community liaison structure	1		
4.12	Sustainable extractive use	1		
4.13	Management of hazardous substances	1		
4.14	Community partners	1		
4.15	Commercial tourism	1		
4.16	Environmentally responsible practice	3		
5: OUTPUTS				
5.1	Tourism infrastructure	3		
5.2	Functioning of law enforcement and compliance systems	3		
5.2.1	Integrated compliance plan	1		
5.3	Staff development and productivity	3		
5.4	Linking of management plan to key performance areas	1		
5.5	Community support	3		
6: OUTCOMES				
6.1	Economic and social benefit assessment	3		
6.2	Achievement of biodiversity targets	3		
6.3	Ecological processes	3		
6.4	Ecosystem services	3		**% Total**
6.5	Land use planning and management outside the site	3		
6.6	Water use planning and management operations influencing the site	3		
6.7	Cultural heritage condition assessment	3		
Total		**156**	**0**	**0.00**

This assessment is not a measure of the site manager's performance, but it is rather a reflection on the organisation's proficiency in site management.

The end result is in fact an index and not a score, it gives an indication of where improvements have been made from the previous assessment and where further improvements are required. Thus calculation of regional, organistional and averages should be used with extreme caution.

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Management sphere	Indicators	Value	Rating (as %)
Legal context This relates to the legal status of the site in terms of relevant legislation, the presence of site specific rules, adequacy of boundary demarcation and the recording of boundary deviations and servitudes.	1.1 Legal status	3	
	1.2 Internal rules	1	
	1.3 Boundary demarcation	3	
	1.3.1 Boundary deviations	1	
	1.3.2 Servitude register	1	
	Total	**9**	**0.00**
Conservation beyond boundaries The inclusion of habitats critical for ecological integrity either by site expansion or by the creation of corridors and applying the principles of "conservation beyond boundaries".	2.1 Design	3	
	2.1.1 Expansion plan	1	
	2.1.2 Delineation of a zone of influence	3	
	2.1.3 Corridor management plan	1	
	Total	**8**	**0.00**
Integrated management planning A site specific, updated and approved management plan with set measurable objectives is fully integrated with subsidiary management plans. Threats and risks have been identified and mitigating actions noted. The annual plan of operation (APO) is developed from the integrated management plan and is linked to available budget. Principles of adaptive management are being applied.	1.6 Risk assessment	1	
	2.2 Management plan	3	
	2.1.2 Delineation of a zone of influence	3	
	2.1.3 Corridor management plan	1	
	2.2.1 Conservation development framework (CDF)	1	
	2.4 Management plans for significant cultural heritage assets	3	
	2.5 Biodiversity management plans for cultural heritage sites with biodiversity values	1	
	2.6 Restoration of degraded areas	1	
	3.1 Management research programme	3	
	3.1.1 Monitoring and evaluation programme	3	
	4.1 Annual plan of operation (APO)	3	
	4.2 Standard operating procedures	3	
	5.2.1 Integrated compliance plan	1	
	5.4 Linking of management plan to key performance areas	1	

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	Total	**28**	**0.00**
Organizational structure and procedures Organisational structures and procedures contribute to management effectiveness.	4.2 Standard operating procedures	3	
	4.3 HR management systems	3	
	4.4 Administrative support systems	3	
	4.5 Information technology systems	3	
	Total	**12**	**0.00**
Financial management An adequate, secure, accessible and well managed budget ensures funds are allocated to priority areas.	3.3 Adequacy of operational budget	3	
	3.4 Security of operational budget	3	
	3.4.1 Capital budget	1	
	3.4.2 Budget management	1	
	3.4.3 Delegation of management of budget	1	
	3.5 Income	3	
	3.5.1 Fund raising	1	
	Total	**13**	**0.00**
Human resource management Staff capacity, capability and support directly contributes to management effectiveness.	3.2 Human resource capacity	3	
	3.10 Health and safety	1	
	3.11 Staff housing	1	
	4.13 Management of hazardous substances	1	
	4.3 HR management systems	3	
	5.3 Staff development and productivity	3	
	5.4 Linking of management plan to key performance areas	1	
	Total 12	**13**	**0.00**
Biodiversity resource management Biodiversity assets are known and understood. External influences are identified and actions taken to mitigate these. The setting of targets and development of environmentally responsible management programmes contributes to biodiversity targets being met, ecological processes being maintained and the delivery of ecosystem services.	1.4. Biodiversity knowledge and understanding	3	
	1.5.1 Format of data	1	
	1.6 Risk assessment	1	
	2.6 Restoration of degraded areas	1	
	3.1 Management research programme	3	
	3.1.1 Monitoring and evaluation programme	3	

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	3.1.2 Relationship with researchers	1	
	4.12 Sustainable extractive use	1	
	4.13 Management of hazardous substances	1	
	4.16 Environmentally responsible practice	3	
	5.1 Tourism infrastructure (mitigating impacts)	3	
	6.2 Achievement of biodiversity targets	3	
	6.3 Ecological processes	3	
	6.5 Land use planning and management outside of the site	3	
	6.6 Water use planning and management operations influencing the site	3	
	6.4 Ecosystem services	3	
	Total	**36**	**0.00**
Cultural heritage resource management The cultural heritage assets are known and understood. Targets and procedures are set for achieving these targets. External influences are identified and actions taken to manage these. Public appreciation of and access to cultural heritage assets is planned and managed.	1.5 Cultural heritage knowledge	3	
	1.5.1 Format of data	1	
	2.4 Management plans for significant cultural heritage assets	3	
	2.5 Biodiversity management plans for cultural heritage sites with biodiversity values	1	
	2.7 Collections management/curatorship of heritage artifacts	1	
	6.7 Cultural heritage condition assessment	3	
	Total	**12**	**0.00**
Operational equipment and infrastructure (excluding visitor facilities) Equipment is adequate and suitable for operational needs. Equipment is correctly maintained. Infrastructure is adequate and suitable for operational needs. Facilities are regularly maintained according to a schedule.	3.7 Adequacy of operational equipment	3	
	3.7.1 Adequacy of operational infrastructure	3	
	3.9 Adequacy of transport fleet	3	
	4.6 Maintenance of operational equipment	3	
	4.6.1 Maintenance of operational infrastructure	3	
	4.6.2 Maintenance of transport fleet	3	
	4.8 Insurance	1	
	Total	**19**	**0.00**
	1.2 Internal rules	1	

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Compliance There is sufficient staff capacity and capability to effectively control both legal and illegal access to the site and its resources. A comprehensive compliance plan ensures an integrated approach to law enforcement.	3.6 Law enforcement capacity and capability	3	
	4.10. Public relations and communication programme	3	
	5.2 Functioning of law enforcement and compliance systems	3	
	5.2.1 Integrated compliance plan	1	
	Total	**11**	**0.00**
Public education and awareness An effective education and awareness approach should reach a range of clearly defined target audiences and speak to the values of the protected area.	2.3 Education, awareness and interpretation programme	3	
	4.9 Implementation of education, awareness and interpretation programme	3	
	4.10 Public relations and communication programme	3	
	Total	**9**	**0.00**
Socio-economic Focused interaction with communities should be aimed at developing positive relations resulting in support for the protected area. Sustainable economic benefits should also be delivered to communities. Consistent involvement of stakeholders is an indication of the level of support.	4.10. Public relations and communication programme	3	
	4.14. Community partners (only where applicable)	1	
	4.11 Community liaison structure	1	
	4.15 Commercial tourism	1	
	5.5 Community support	3	
	6.1 Economic and social benefit assessment	3	
	Total	**12**	**0.00**
Tourism Well maintained visitor facilities situated and built in accordance with responsible tourism practices are adequate to ensure mitigation of possible impacts on the environment.	2.2.1 Conservation development framework (CDF)	1	
	3.8 Adequacy of tourism infrastructure	3	
	3.8.1 Tourism grading	1	
	3.10 Health and safety	1	
	4.13 Management of hazardous substances	1	
	4.7 Maintenance of tourism infrastructure	3	
	4.8 Insurance	1	
	4.15 Commercial tourism	1	
	4.16 Environmentally responsible practice	3	
	5.1 Tourism nfrastructure (mitigating impacts)	3	
	Total	**18**	**0.00**

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