

The quality of EIA alternatives assessment in protected areas: A case study of the Kruger National Park

NO Mdungazi

 orcid.org/0000-0002-2907-7373

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Supervisor: Prof. JM Pope

Co-supervisor: Prof. FP Retief

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DEDICATION

For my daughters and granddaughters.

For all the generations of women that came before me, khanimamba.

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ABSTRACT

Keywords: Quality, EIA, Alternatives, Protected areas, Kruger National Park, NEMA

The Kruger National Park is South Africa's largest protected area, spanning two million hectares and is home to over a thousand different bird, mammal, reptile, fish, amphibian, and tree species. National parks attract thousands of visitors each year, making them vulnerable to tourism-related developments. Since protected areas protect huge swaths of biodiversity, as well as social and cultural heritage areas, it is critical that infrastructure and facility developments in these areas extensively consider multiple alternatives. This will ensure that developments are undertaken in a sustainable manner and that they align with the mandate of protected areas.

Six (6) Basic Assessment Reports undertaken between 2015 and 2018, for various developments in the Kruger National Park were selected as case studies for this research. Each Basic Assessment Report included specialist studies and all relevant public participation engagement records. The first two research questions evaluated the extent and quality of alternatives assessment in Environmental Impact Assessments (EIA) undertaken for developments in the Kruger National Park, using the South African National Environmental Management Act (NEMA) EIA regulations, as a tool and to provide criteria. The third research question sought to identify the factors that influence EIA alternatives assessment.

The extent of alternatives assessment in EIA in the Kruger National Park was found to be adequate and the categories of alternatives were generally well assessed in each report. Alternatives categories such as design/layout, the no-go alternative and technology alternatives were well assessed. Alternatives categories such as property/location, operational and activity alternatives were poorly assessed, and this was attributed to these alternatives being evaluated and decided upon, on a strategic level. EIA was therefore unable to inform these alternatives categories.

The quality of the alternatives assessed in these EIA reports was satisfactory with predominantly A grades and B grades. From the findings of these first two research questions, it can be concluded that the quality of EIA alternatives assessment in protected areas is generally satisfactory. However, some alternatives categories, such as operational and activity alternatives, are generally excluded from EIA because these decisions are made at a strategic level prior to EIA.

Due to the small sample size of the EAPs that completed the questionnaire, no conclusive conclusions could be drawn between the EAPs' education and experience and relevant influence

on EIA alternatives assessment. A substantial majority of the responses mentioned project proponents commissioning EIA studies after substantial investment had already been made into their preferred alternative, restricting detailed alternatives assessments to the proponents' preferred alternative.

Specialist assessments recommendations were found to be a factor that positively influenced alternatives assessment and ensured the adoption of layout alternatives with low ecological sensitivities. Public participation was believed to have a minimal influence on major alternatives or to contribute to the development of new ones. The lack of influence of public participation on alternatives assessment is related to the strategic level at which critical project decisions are made and alternatives are assessed, as well as the timing of EIA in the project process, which is frequently too late in the project design.

Future research is needed to determine the quality of SANParks' strategic alternatives assessment when deciding on the types of developments to be undertaken in the park. The results, coupled with the findings of this research, will provide a thorough evaluation of the quality of alternatives assessment for developments in Protected Areas, on both the strategic and EIA levels.

ABBREVIATIONS AND ACRONYMS

| | |
|--------------------|--|
| BAR | Basic Assessment Report |
| BIA | Biodiversity Impact Assessment |
| EAP | Environmental Assessment Practitioner |
| EAPASA | Environmental Assessment Practitioners Association of South Africa |
| EC | European Commission |
| ECA | Environmental Conservation Act |
| EIA | Environmental Impact Assessment |
| EIS | Environmental Impact Statement |
| EMPr | Environmental Management Programme |
| EPWP | Expanded Public Works Programme |
| EU | European Union |
| I&AP | Interested and Affected Party |
| IAIA | International Association for Impact Assessment |
| IAU Oxford-Brookes | Impact Assessment Unit – Oxford Brookes University |
| IFC | International Finance Corporation |
| KNP | Kruger National Park |
| NEMA | National Environmental Management Act |
| NEMBA | National Environmental Management: Biodiversity Act |
| NEMPAA | National Environmental Management Protected Areas Act |
| NEPA | National Environmental Protection Act |
| PP | Public Participation |

| | |
|----------|---|
| PPP | Public Private Partnership |
| RAL | Roads Agency Limpopo |
| S&EIAR | Scoping and Environmental Impact Assessment Report |
| SAIEA | Southern African Institute for Environmental Assessment |
| SANParks | South African National Parks |
| SMME | Small and Medium Enterprises |
| SHE | Safety Health and Environmental |
| UN | United Nations |
| US | United States |

KEY DEFINITIONS

| | |
|-------------------------------------|--|
| Alternative | Possible course of action that would achieve the same goal and fulfil the same need as the original action. |
| Basic Assessment | A type of environmental impact assessment that is carried out for activities that can be easily mitigated and controlled, and is a more limited assessment than a comprehensive Scoping and Environmental Impact Assessment. |
| Biodiversity | The variety of living organisms found in all environments, including terrestrial, marine, and other aquatic habitats, as well as the ecological complexes of which they are a member. |
| Ecological Impact Assessment | A method for defining, quantifying, and assessing the possible impacts of development-related activities on environments, animals, and ecosystems. |
| Environment | The physical, chemical, aesthetic, and cultural properties and conditions of the foregoing that influence human health and wellbeing, including the earth's soil, water, and environment, microorganisms, plants, and animal life; and any part or combination of the latter, and any interrelationships among and between them; and the physical, chemical, aesthetic, and cultural properties and conditions of the foregoing that influence human health and wellbeing. |
| Cape Floristic Region | A floristic area near South Africa's southernmost point. It is the smallest of the world's six recognized floral kingdoms, with over 9,000 vascular plant species, 69 percent of which are endemic, and is a region of extraordinary diversity and endemism. |
| Commercialisation Strategy | A strategy to raise additional funds in order to improve the protection of South Africa's national parks by allowing the private sector to work within national parks, generating income for the parks. |

| | |
|--------------------------------------|--|
| Concession Arrangement | An opportunity to develop and run a tourist facility in a national park, subject to strict rules and regulations. |
| COVID | A severe acute respiratory syndrome first discovered in Wuhan, China that has infected and killed 2.58 million people across the world between December 2019 and March 2021. |
| Critically Endangered Species | An indigenous species that faces a high risk of extinction in the wild in the near future. |
| Fatal Flaw | An activity that has a lot of negative consequences. |
| Magna Carta | One of history's most valuable documents. |
| Peripheral Development Zone | A 2-kilometre buffer along the Kruger National Park boundary approved by the Minister of Environmental Affairs in 2013, which allows for the construction of tourism accommodation of up to 240 beds. |
| Promulgate | After final approval, the formal proclamation or declaration that a new legislative or administrative law has been enacted. |
| Protected Area | A clearly specified geographic area that is proclaimed and managed in accordance with the National Environmental Management: Protected Areas Act and includes the types of protected areas listed in section 9 of the Act. |
| Ratify | Making (a treaty, contract, or agreement) officially binding by signing or giving formal consent to it. |
| Responsible Tourism | Tourism that maximizes benefits to local communities while minimizing negative social and environmental impacts and assisting local people in conserving fragile cultures, ecosystems, and wildlife. |
| Status quo | The current state. |

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CHAPTER 1 INTRODUCTION

1.1 Background

1.1.1 Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a systematic process that examines the consequences of a development in advance. This is done through impact identification, prediction, evaluation, alternatives assessment and the mitigation of foreseen environmental and socio-economic impacts (IAIA, 2009).

EIA was first legislated in the United States National Environmental Policy Act (NEPA) of 1969, which was a result of a culmination of scientists and industry professionals' concerns about the depreciating quality of the environment in light of new technologies and increasing development (Modak & Biswas, 1999). The NEPA is commonly referred to as the 'Magna Carta' of Environmental Law (Donnelly *et al.*, 1998).

Morgan (2012:6) notes that "Environmental Impact Assessment is recognised in multiple international conventions, protocols and agreements". These include conventions, protocols and agreements that are ratified by 191 of the 193 countries that are members of the United Nations. EIA also plays a critical role in international funding, via the International Finance Corporation (IFC), together with multiple funding institutions that have standards in place which require that an EIA is undertaken by funding applicants for developments above \$10 million (US dollars) (Yang, 2008). Projects funded by the IFC, and the World Bank are required to follow the IFC's socio-environmental standards and the World Bank's Safety, Health and Environmental (SHE) guidelines.

The second significant milestone responding to environmental change after the NEPA, was the 1992 UN Declaration that EIA was a National Instrument, under Principle 17 of the United Nations Rio Declaration. It stated that "*Environmental impact assessments, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.*" (United Nations, 1992).

The NEPA (1969) and the 1992 UN Declaration led to the enhancement of EIA legislation in many countries across the world, including South Africa. EIA became mandatory in South Africa in 1997, following the promulgation of the EIA regulations under the Environmental Conservation Act (ECA), 1989 (Sandham *et al.*, 2013), which was repealed and replaced in 2006 by the National Environmental Management Act (NEMA).

1.1.2 EIA in South Africa

The first and sole professional registration authority for Environmental Assessment Practitioners (EAPs) in South Africa is the Environmental Assessment Practitioners Association of South Africa (EAPASA) which was appointed by the Department of Environment, Forestry and Fisheries in 2018. According to EAPASA, EIAs are to be undertaken by independent Registered Environmental Assessment Practitioners as per the Section 24H Registration Authority Regulations of the National Environmental Management Act, 1998. A registered EAP according to the regulations 'means an environmental assessment practitioner who is registered as such by the registration authority appointed in terms of section 24H of the Act; in accordance with prescribed criteria and who holds primary responsibility for planning, management, coordination or review of environmental impact assessments and associated EMPRs' (Department of Environmental Affairs, 2016a:45).

A project proponent or a developer contracts the services of an EAP to carry out the EIA process on their behalf. The findings of the EIA are presented in what is referred to as an EIA Report and submitted to various stakeholders, interested and affected parties and the competent authority, to seek their comments through what is referred to as public participation. The information gathered from the public participation process is incorporated into the EIA report, which is submitted to the competent authority for decision making. If the competent authority is satisfied with the EIA, Environmental Authorisation is granted.

The first National Environmental Management Act (NEMA) EIA regulations were promulgated in 2006 in South Africa, repealing the former Environmental legislation, the Environmental Conservation Act (ECA) EIA regulations. The significant changes in the NEMA included the introduction of the two different assessment processes for EIA. These were namely, Basic Assessment Reports (BARs) and Scoping and Environmental Impact Assessment Reports (S&EIARs) (Sandham *et al.*, 2013).

The Basic Assessment process is undertaken for activities that can be straightforwardly mitigated and managed. The process is shorter than the S&EIAR process which is undertaken for larger developments with high pollution potential, and in which all potential impacts are scoped prior to assessment (Department of Environmental Affairs, 2013).

Four years later, the 2006 NEMA EIA regulations were replaced by the 2010 NEMA EIA regulations which were then replaced by the 2014 NEMA EIA regulations, which were then amended in 2017. The Department of Environment, Forestry and Fisheries (DEFF) in November 2020 proposed a further revision to the 2014 NEMA EIA Regulations, which has not come into

law yet. South Africa to date, has therefore undergone four (4) main EIA regimes in the past fifteen (15) years.

For the purpose of this research, an Environmental Impact Assessment (EIA) will refer to the assessment of environmental impacts through either a Basic Assessment Report (BAR) or a Scoping and Environmental Impact Assessment Report (S&EIAR).

1.1.3 Problem statement and rationale for the study

Protected areas attract thousands of tourists and are therefore vulnerable to tourism-related developments (Wylie *et al.*, 2018). Due to the vast biodiversity and social and cultural heritage safeguarded in protected areas, it is important that infrastructure and facilities development in these areas extensively considers multiple alternatives. This will ensure that the least possible environmental, social and cultural impacts are realised and that developments align with the mandate of protected areas.

Zubair *et al.* (2011) explained that there will always be pressure for new tourism developments and the principle of sustainable tourism can be applied through EIA into the development planning phase of new tourism developments. The South African National Parks (SANParks), which is the custodian of South Africa's nineteen national parks, describes Responsible Tourism as 'Tourism which respects the natural and cultural environment and contributes to local economic development in an ethical manner. It helps conserve fragile cultures, habitats and species by maximising the benefits to local communities and minimizing social or environmental impacts' (SANParks, n.d:9). Pope *et al.* (2019) in their assessment of the potential contribution of EIA to responsible tourism in the Kruger National Park, concurred with Zubair *et al.* (2011) that EIA has potential as a tool, to advance responsible tourism (also referred to as sustainable tourism) in the development of new tourism infrastructure.

Alternatives assessment in EIAs undertaken for developments in protected areas has not been widely studied in South Africa and internationally, limited literature exists on this topic. Wylie *et al.* (2018) evaluated the quality of EIAs for proposed tourism-related infrastructure in South African protected areas, Huysamen (2019) assessed EIA report Quality for SANParks, and Swanepoel *et al.* (2019) investigated the quality of Biodiversity Impact Assessment inputs in EIAs conducted for areas with high biodiversity, such as the Maputaland-Pondoland-Albany hotspot. The findings of these three bodies of South African research are discussed in more detail in the next chapter.

The focus of this research is the assessment of the extent and quality of alternatives assessment in EIAs undertaken for developments in protected areas, with a specific focus on the Kruger

National Park, using the South African NEMA EIA regulations as an assessment tool and criteria. The research also aims to determine the factors that affect alternatives assessment in these EIAs.

The Kruger National Park is South Africa's largest National Park. It extends over two (2) million hectares and is home to 507 bird species, 147 mammal species, 114 reptile species, 49 fish species, 34 amphibian species and 336 tree species (SANParks, 2020a). In the past ten (10) years, multiple Public Private Partnerships were concluded for the development of various types of tourism infrastructure within the park, in addition to basic park support infrastructure. The Kruger National Park has completed twelve (12) EIA reports in the past eighteen (18) years, that were authorised. Some of these EIA reports form part of the case studies selected for this research.

The aim of the research is to assess the quality of EIA alternatives assessment in EIA reports conducted for developments in Protected Areas, with a specific focus on the Kruger National Park.

To achieve the aim of the research, the following questions will be answered:

1. To what extent are alternatives considered in EIA in the Kruger National Park?
2. What is the quality of the alternatives assessed?
3. What are the factors that affect the quality of the alternatives assessment?

1.2 Structure and outline of the dissertation

This research report consists of five chapters. Chapter 2 provides a review of international and local literature on alternatives assessment in EIA, as well as EIA Review Packages. Chapter 3 explains the research design and the data analysis method. Chapter 4 presents the results of the study and provides a detailed discussion of the findings and relates the findings to relevant literature. Chapter 5 concludes the study and provides recommendations for future research.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The first section of Chapter 2 provides a review of the quality of EIA alternatives assessment in protected areas in South Africa and a review of the quality of alternatives in EIA in general. This enables the identification of the factors that affect alternatives assessment in EIA. The last section of Chapter 2 reviews different EIA review packages to inform the methodology of this research and compares the selected review methodology – the NEMA EIA Regulations, against the Lee and Colley review package.

2.2 Environmental Impact Assessment

The aim of EIA is to assist relevant stakeholders and interested and affected parties understand the environmental impacts of the proposed development at hand, it also aims to assist the EAP and the project proponent to mitigate and manage these identified impacts and lastly, the decision-making authority to make an informed decision when approving the development. EIA identifies all potential risk related to a proposed development and its alternatives, it provides mitigation measures and provides an assessment of the residual impact significance after prescribed mitigation has been applied. Through the public participation process, interested and affected parties and relevant stakeholders and the competent authority, are able to contribute to EIA process and decision making based on an analysis of comprehensive environmental information about the project (Wachemo University, 2021). Through the assessment of alternatives, the EIA process assesses the most sustainable manner of meeting the development need with the least impact to the environment. Alternatives assessment was first required under section 102 of the NEPA (1969), it required that all reports and proposals for actions that significantly affects the quality of the human environment, provide a detailed analysis of alternatives to the proposed action.

2.3 Alternatives assessment

Alternatives assessment in EIA relates to the assessment of different ways of meeting the general purpose of a proposed activity (DEAT, 2006), it is a manner in which the project proponent assesses all feasible approaches for the development of their proposed activity, alternatives assessment is described as the heart of EIA (CEQ, 1978). For the competent authority, alternatives assessment provides an analysis of the environmental impacts of the proposed activity and assists them to authorise the alternative that has net environmental benefits and the least environmental impacts (Glasson et al., 2005).

The EIA should provide a comparison of the environmental impacts of the proposal and its alternatives in a manner that enables interested and affected parties and the decision-making authority to clearly recognize why the chosen proposal is the most preferred environmental option from all the other assessed alternatives (CEQ, 1978). Alternatives assessment in EIA plays a major role in sustainable development because all possible development alternatives are assessed to reach the best possible environmental option with the least environmental impacts. This ensures that developments proceed in a manner that is not detrimental to the environment and will not compromise future generations' ability to meet their own needs, as per the definition of Sustainable Development, in the Brundtland report.

Although alternatives assessment is not strongly enforced in many countries across the world's EIA laws or regulations, it is widely accepted that the assessment of alternatives prior any development is best environmental practice. The UK guidance on Environmental Conservation of 2003 explains "It is widely regarded as good practice to consider alternatives, as it results in a more robust application for planning permission. Also, the nature of certain developments and their location may make the consideration of alternatives a material consideration." (Glasson et al, 2005:98), protected areas, for example, protect vast expanses of biodiversity and are critical for conservation efforts around the world.

2.4 Quality of EIA alternatives assessment in Protected and High Biodiversity Areas, South Africa

The quality of alternatives assessment in EIAs conducted for developments in protected areas has not been researched extensively in South Africa. Research for overall EIA quality for developments conducted in protected areas is available but is limited. As mentioned briefly in the previous chapter, scholars who have undertaken research in South African protected areas EIA quality include; Wylie *et al.* (2018), Huysamen, 2019, Hallatt *et al.* (2015) and Swanepoel *et al.* (2019), who investigated the quality of Biodiversity Impact Assessments as inputs into EIA for the Cape floristic Region, and the Maputaland-Pondoland-Albany Hotspot.

In the study by Wylie *et al.*, 2018 in which they evaluated the quality of EIAs for proposed tourism-related infrastructure in South African protected areas, the overall alternatives assessment quality was satisfactory (A-C). In their research, category C was used as the lowest level of satisfactory assessment (also referred to as borderline), all scores from D – F were regarded as poor.

In Huysamen's (2019) assessment of the quality of EIA for SANParks, the alternatives category received an overall score of 92% (C) which was satisfactory. *Subcategory 3.1.1: Description of alternatives sites* received the lowest grading, a grading of 75% (which is satisfactory),

Subcategory 3.1.2: Description of alternative processes, design and operating conditions and *Subcategory 3.1.3: Rejection of adverse impacts and identification of alternatives* received a 92% grading (which is satisfactory) and lastly, *Subcategory 3.1.4: Comparative assessment of all alternatives identified* received a grading of 88%, which was also satisfactory.

Specialist inputs are supposed to play a critical role in alternatives assessment in EIA, specialist findings should guide the decision of the most environmentally sustainable alternative and development option. In Swanepoel *et al.* (2019)'s investigation of the quality of Biodiversity Impact Assessment (BIA) inputs in EIAs conducted for areas with high biodiversity; namely the Maputaland-Pondoland-Albany hotspot, a review package adapted from the Lee and Colley review package was used. The alternatives categories assessed were as follows:

1. *Inclusion of reasonable alternatives,*
2. *Comparison of alternatives, and*
3. *Identification of best environmental option.*

The alternatives was the least performing category across the categories assessed in the study, it had 54% F grades and none above a C grade. Swanepoel *et al.* (2019) noted that alternatives were described with very little detail, some of the alternatives provided were unrealistic and unfeasible. Inclination towards the preferred alternative was evident in the alternatives assessment.

Prior to Swanepoel *et al.* (2019)'s research, Hallatt *et al.* (2015) undertook an assessment of the quality of BIAs in EIAs in the Cape Floristic Region of South Africa. The Cape Floristic Region of South Africa which was added to the World Heritage List in 2004, due to it being one of the world's 35 biodiversity hotspots (UNESCO, 2021). The alternatives categories assessed were as follows;

1. *Has adequate consideration been given to the identification of reasonable alternatives to minimise the impact of the activity?*
2. *Have alternatives been addressed at a scale and level of detail that enables adequate comparison with the proposed project?*
3. *Has the specialist identified the alternative that is the best environmental option from a biodiversity perspective?*

Hallatt *et al.* (2015)'s findings for the alternatives category were below average, only 27% of the reports had assessed alternatives satisfactorily, a greater percentage of the reports (42%) had an average grading and 31% of the reports had a poor grading. Both BIA research findings showed low alternatives category grades.

2.5 Quality of alternatives assessment in EIA in general

Due to the limited literature in the quality of alternatives assessment in EIAs conducted for developments in protected areas in South Africa, research undertaken on the quality of EIA in general can provide related insight into answering the research questions.

Sandham *et al.*, (2013) sought to determine whether enhanced regulations improved EIA report quality, by reviewing the quality of EIAs from the first two South African EIA legislative regimes, i.e., 1997 and 2006. In the study, an adapted version of the Lee and Colley review package was implemented to review the EIA sample. The results revealed that the overall report quality decreased slightly from the 1997 EIA regime (Sandham *et al.*, 2013). There were however areas of improvement, this was under the alternatives and mitigation aspects category in the 2006 regime.

Kamijo and Huang (2016) provided an analysis of 120 EIARs prepared by the Japan International Cooperation Agency between 2001 and 2012, using the Lee and Colley review package. Their findings were that the assessment of alternatives and public participation were the least performing categories of the assessment. These findings was consistent with the Commission of the European Communities Report, which was completed in 2009, which assessed the effectiveness of the EU EIA directive and found that alternatives assessment was one of the areas of EIA that required improvement (Morgan, 2012).

Consistent with the findings above were Sandham and Pretorius's (2008) findings in their review of EIA reports quality in the North West Province of South Africa. They reviewed 28 EIRs using the Lee and Colley review package and their findings revealed that the identification and evaluation of impacts and alternatives comprised one of the lesser performing categories.

2.6 Factors affecting alternatives assessment

The findings of the alternatives assessment categories in the EIAs undertaken by Wylie *et al.*, 2018 and Huysamen (2019) in protected areas in South Africa showed satisfactory grades, although research done on the quality of EIAs in general in South Africa and across the world showed alternatives assessment as the commonly lowest performing grade. It is therefore important to explore the factors that affect alternatives assessment in EIA.

2.6.1 EAP Competence (Education, Experience, Accreditation)

Sandham *et al.*, 2013 in their study that assessed whether enhanced regulations improved EIA report quality, noted that the potential for the improvement of EIA lies in accreditation and training of the people involved in EIA. Kabir and Momtaz's (2012) findings on the factors affecting the

quality of EISs and EIA practice in Bangladesh noted the absence of accreditation bodies for consultants, as well as the absence of people with EIA expertise.

In an Iranian case study where Khosravi *et al.*, (2019) assessed ways to enhance EIA systems in developing countries with a focus on capacity development in Iran, it was recommended that the training of consultants was required. Weston (2011) recommended that University courses in planning should have a component of EIA, thereby concurring that EIA education was key in improving the quality of EIA.

2.6.2 EIA undertaken too late

Multiple scholars across the world in their assessments of the factors that affect the quality of EIA report quality and alternatives assessment in EIA, mentioned that alternatives assessment was often poor due to the fact that EIA was a once-off activity and not a part of many projects' life cycles (Wood, 2003). Steinemann (2001) noted that by the time EAPs were appointed to undertake EIAs, there were few alternatives available to assess due to the fact that the main decisions on alternatives to meet the project proponent's needs are made at a strategic level, way before an EAP appointment. These decisions are unlikely to consider environmental impacts as their main priorities. Kamijo and Huang (2016) stated that the earliest assessment of alternatives with an EAP would significantly improve EIA.

2.6.3 Public participation

Kamijo and Huang (2016) explained how public participation has the potential to improve alternatives assessment in EIA. Interested and Affected Parties (I&APs) can contribute local and indigenous knowledge as well as provide a clear picture of the socioeconomics of the proposed development area, which can then provide guidance and enable informed alternatives assessment. Steinemann's (2001) findings from a 2-year study on alternatives assessment in sixty-two (62) EISs in the US did not agree with this and noted that it was 'unlikely that public suggestions will lead to the development and consideration of a new type of alternative' (Steinemann, 2001:16).

Steinemann (2001) went on to explain that public participation has limitations as most I&AP consultations start too late to influence main alternatives and the need for the development. The public are not involved in the alternatives selection and development. However, they are presented with alternatives which were formulated previously, which they have to react to, therefore limiting their possible influence and contributions in shaping alternatives assessment.

2.6.4 Specialist assessments conducted too late

In Swanepoel *et al.*'s (2019)'s findings, specialists also expressed that their involvement was always undertaken, late into the project when the project proponent had already decided on a development plan. This limited their assessments to a particular development type. Specialists couldn't provide input into other alternatives that would be more ecologically suited. Hallatt *et al.* (2015) related the poor grades in the alternatives categories of BIA inputs in EIA to 'The standalone nature of specialist studies'. Specialist assessments are not fully integrated into the EIA to create a comprehensive assessment.

In a study undertaken by Mandelik *et al.* (2005) assessing Ecological Impact Assessment inputs in 52 EISs in Israel, contrary to Hallatt *et al.* (2015) findings, 75% of the EISs mentioned ecological impacts in their motivation for their relevant preferred alternatives. The initial proposed project area extent was also reduced, although it was not specified in the study if this was due to ecological sensitivities identified in the Ecological Impact Assessments.

2.7 EIA Quality Review packages

Multiple review packages have been developed across the world which assess the quality of EIAs/EISs. All these review packages comprise criteria against which the EIAs/EISs can be assessed (Sandham *et al.*, 2020). The section below briefly describes different EIA Quality Review packages across the world, which all contain alternatives as a key component of EIA. These review packages inform the research methodology and provide guidance for answering Research Question 2.

The end of this section provides a comparison of the Lee and Colley review package, which is the most widely used review package across the world and the NEMA EIA Regulations, which has been selected as the review package to answer Research Question 2.

2.7.1 European Commission (EC) Guidelines

The EC EIS Review guidelines were developed to improve the quality of EIS reports developed by EIS Consultants and developers, as well as to assist effective review of these EISs by Competent Authorities and Interested and Affected parties in the European Union Member States and its Accession Countries. The EC EIS Review guideline is described below (European Commission, 2001).

The guidelines make use of a checklist, the checklist has seven main sections, namely:

1. Description of the project.

2. Alternatives.
3. Description of the environment likely to be affected by the project.
4. Description of the likely significant effects of the project.
5. Description of mitigating measures.
6. Non-technical summary.
7. Quality of presentation.

Each of the seven main sections above has subsidiary questions. For each of the subsidiary questions, the reviewer has to firstly make a decision on whether the question is relevant to the project and indicate 'Yes' or "No". The reviewer also has to indicate at the end of each section, if there are any aspects of the project being reviewed which aren't included in the subsidiary questions but are relevant and then add them to the checklist.

Secondly, for the questions above that were indicated as relevant, the reviewer has to decide on if the information requested in the question is provided in the EIS and is adequate for use in decision-making and provide a "Yes" or "No" answer. Thirdly, if the information is inadequate, the reviewer is required to note this and explain what further information is required.

Once the above has been completed for all seven sections, the reviewer can provide an overall appraisal of the EIS by grading the quality of the information in each of the seven sections from A (Very Good) to E (Poor). One grade above the lowest grade of the seven, is allocated as the overall EIS grade.

The guidelines assist environmental consultants and project proponents to compile comprehensive EISs, and to enable the competent authorities and I&APs that review these EISs, to do so objectively with a clear understanding of the relevant development environmental impacts.

2.7.2 IAU Oxford-Brookes University Review Package

The IAU Oxford-Brookes review package was initially developed as part of a research project that assessed the quality of EISs in the mid-90s (Glasson *et al.*, 2012). The review package has a total of ninety-two (92) criteria falling under eight sections. The eight sections are listed below (Almeida *et al.*, 2012):

1. Description of the development.
2. Description of the environment.
3. Scoping, consultation and impact identification.
4. Prediction and evaluation of impacts.

5. Alternatives.
6. Mitigation and monitoring.
7. Non-technical summary.
8. Organization and presentation of information.

The assessment method is described below (Glasson *et al.*, 2012),

Each individual review criterion is graded based on the quality of the related information from A (Well performed) to F (Poorly attempted). An average grade is then allocated for each of the eight sections, these are used to gain an average grade for the EIS. The pass/fail margin is set between Grade C and Grade D, with Grades A – C seen as satisfactory and Grades D – F seen as unsatisfactory.

| | |
|---|---|
| <p>A = indicates that the work has generally been well performed with no important omissions;</p> <p>B = is generally satisfactory and complete with only minor omissions and inadequacies;</p> <p>C = is regarded as just satisfactory despite some omissions or inadequacies;</p> | <p>D = indicates that parts are well attempted but, on the whole, just unsatisfactory because of omissions or inadequacies;</p> <p>E = is not satisfactory, revealing significant omissions or inadequacies;</p> <p>F = is very unsatisfactory with important task(s) poorly done or not attempted.</p> |
|---|---|

Figure 1-1: IAU Oxford Brookes University EIS Review Package (Glasson *et al.*, 2012:375)

The review package ensures reviewer objectivity by making use of two reviewers. The reviewers compare their grades at the end and agree on a specific overall grade.

The guidelines assist environmental consultants and project proponents to compile comprehensive EISs, and to enable the competent authorities and I&APs that review these EISs, to do so objectively with a clear understanding of the relevant development environmental impacts.

2.7.3 Southern African Institute for Environmental Assessment (SAIEA) Review Checklist

The SAIEA review checklist aims to provide the competent authority with the required information to make a decision, as well as to enable stakeholders to provide informed comment. The checklist has eight sections, namely (Department of Environmental Affairs and Tourism, 2004c).

1. Methodology utilized in compiling the EIA report.
2. Description of the project.
3. Assessment of alternatives to the project.
4. Description of the environment.

5. Description of impacts.
6. Consideration of measures to mitigate impacts.
7. Non-technical summary.
8. General approach.

Each section has a set of questions. The first step the reviewer undertakes is determining if the question is relevant for the project. If the question is not relevant for the project, they indicate “No” in the checklist and then proceed to the next question. If it is relevant for the project, they indicate “Yes” and then indicate whether the information provided in the EIA report is either; “Complete”, “Acceptable” or “Inadequate” and then provide a comment.

When all the questions in all the sections have been reviewed, an average judgement is made of each section and an overall report grade is selected from the following criteria:

- Excellent
- Good
- Satisfactory
- Inadequate
- Poor

The reviewer is also required to indicate either “Yes”, “Don’t know” or “No” on five questions on their opinion on the EIA report and the EIA process.

The purpose of the review form is to provide a comprehensive and systematic list of main elements that should be addressed in most EIAs. The form enables EAPs in ensuring that all important aspects of their EIRs are covered, as well as the competent authority in making sound and well-informed EIA decisions (IAIAsa, 2018).

2.7.4 Lee and Colley Review Package

The Lee and Colley review package is an antecedent to multiple EIS review packages that have been developed over the years. It remains the EIS review package of choice for many scholars across the world. Sandham *et al.*, (2013:156) described the Lee and Colley review package as being ‘adaptable, easy to use and also providing a systematic structured and objective approach to quality review’.

The Lee and Colley review package has four main review areas namely (Lee *et al.*, 1999):

- Review Area 1: Description of development environment.
- Review Area 2: Impact identification and evaluation.

- Review Area 3: Alternatives and mitigation.
- Review Area 4: Communication of results.

These are further divided into review area categories and then divided into review areas sub-categories. The Lee and Colley review package uses a four-tiered pyramidal structure of review which starts at the base of the pyramid. At the base of the pyramid is the assessment of the review area's sub-categories. The second level assesses the review area's categories. The third level assesses the review area, and the highest level assesses the overall quality of the EIS.

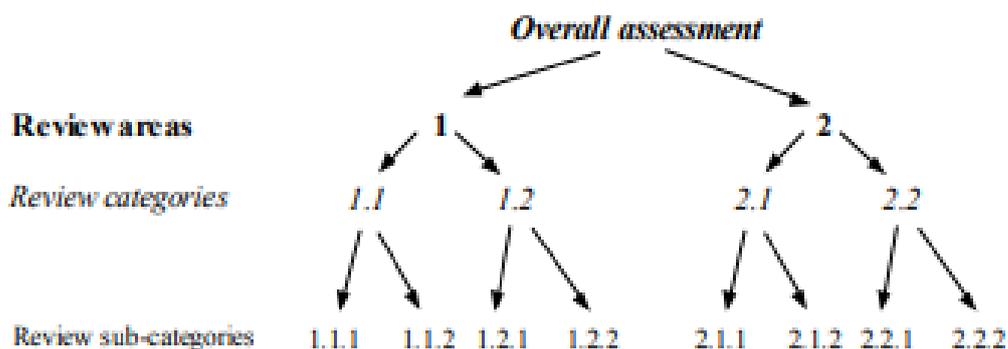


Figure 1-2: Four-tiered pyramidal structure of the Lee & Colley Review Package, (Lee et al., 1999: 33)

Firstly, the reviewer is required to assess each of the sub-categories and allocate the appropriate assessment symbol, based on how the task described in the sub-category has been performed in the EIS. Secondly, the reviewer is required to assess the review category, using the assessments of the sub-categories and all other information from the EIS which is relevant for the assessment of the review category. This is done for all review sub-categories and review categories.

Thirdly, the evaluations of the Review Areas are used to make an assessment of the review area, using the assessments of the review categories and all other information from the EIS which is relevant for the assessment of the review area.

To ensure objectivity, the review package requires two or more reviewers to each provide their own reviews of a report and then collate their scores and re-review them until they arrive at the same score. This ensures objectivity in review (Pöder & Lukki, 2011).

Lastly, when all Review Areas have been assessed, the EIS in its entirety is allocated an assessment symbol. The two reviewers then compare their findings and re-examine differences in their assessment symbols. They then reconcile differences and record their final common scores.

Lee et al., 19991 explain that the package seeks to aid in the evaluation of environmental statements given in response to UK planning legislation requiring environmental assessments to be carried out in compliance with Directive 85/337/EEC. "It is mainly intended for use by the staff of local planning authorities and other competent authorities, developers and consultancies, statutory consultees and non-governmental organisations, and researchers involved in the environmental assessment process".

2.7.5 NEMA EIA Regulations as a review package

The NEMA EIA Regulations provide detailed descriptions of the required information for the different levels of assessment in EIA and can therefore be interpreted as a framework for EIA in South Africa. The regulations are therefore a good foundation for the development of Alternatives Assessment Quality review criteria.

Similarly, Kruger and Chapman (2005) developed an EIA Quality Review Checklist based on the South African NEMA EIA Regulations in their analysis on the Quality Aspects of EIA Reports in the Free State Province of South Africa. The use of the NEMA EIA regulations as alternatives quality assessment criteria will allow the quality of alternatives assessment to be evaluated against what the South African NEMA EIA regulations have prescribed as the requirements for alternatives assessment in EIA.

2.8 Lee and Colley Review Package alternatives assessment vs NEMA EIA Regulations alternatives

The NEMA EIA regulations will be compared to the Lee and Colley review package as it is the most evolved EIA Quality review package and the review package of choice worldwide. As described, there are four (4) review areas in the Lee and Colley review package; alternatives are evaluated in review area 3 (Alternatives and Mitigation). The alternatives sub-categories are listed below:

- 3.1.1 *Alternative sites should have been considered where these are practicable and available to the developer. The main environmental advantages and disadvantages of these should be discussed and the reasons for the final choice given.*
- 3.1.2 *Where available, alternative processes, designs and operating conditions should have been considered at an early stage of project planning and the environmental implications of these investigated and reported, where the proposed project is likely to have significantly adverse environmental impacts.*

- 3.1.3 *If unexpectedly severe adverse impacts are identified during the course of the investigation, which are difficult to mitigate, alternatives rejected in the earlier planning phases should be reappraised.*

These sub-categories are very similar to the categories listed across the South African NEMA EIA regulations for alternatives assessment, which are explained further under the following sub-headings;

2.8.1 Extent comparison

With each regime change, the NEMA EIA regulations have become more detailed and vigorous, and this has applied to alternatives assessment as well. The common definition for 'alternative' has however remained the same, NEMA has six (6) broad definitions of alternatives which are; property/location, activity, design/layout, technology, operational and the no-go alternative.

Lee and Colley 3.1.1 relates to property/location alternatives in the NEMA category of alternatives. Lee and Colley 3.1.2 relates to design/layout alternatives, technology alternatives and operational alternatives in the NEMA category of alternatives. The Lee and Colley review package however does not cover the NEMA activity alternative and the no-go alternative.

2.8.2 Quality comparison

Similarities;

- Lee and Colley and NEMA both require that the advantages and disadvantages of the preferred alternative and the impacts of the other alternatives on the environment be assessed, as well as the motivation for the preferred alternative.
- Lee and Colley and NEMA both require the assessment of the environmental impacts and risks associated with each alternative and a determination of their nature and significance.

Differences;

- NEMA further requires a methodology that shows how the nature significance, consequences, extent, duration and probability of the risks and impacts identified for each alternative have been determined and ranked.

2.8.3 Summary

The Lee and Colley EIA review package covers most of the NEMA EIA Regulations scope for alternatives assessment in EIA. However, it does not have two of the categories of alternatives

described in the NEMA EIA Regulations (Activity and No-go alternative). The Lee and Colley review package also does not have a requirement that the EIA should detail the methodology used to determine and rank the nature, significance consequence, extent, duration and probability or risks and impacts identified for each alternative.

For the above reasons, the content of the Lee and Colley review package is not the most suitable EIA quality review package for this research. The content of the NEMA EIA Regulations is the most suitable review package, as it encompasses the requirements set out and prescribed by NEMA for EIAs, where alternatives assessment is concerned.

The Lee and Colley review package assessment symbols were adopted and were coupled with the NEMA EIA Regulations review package for this research's methodology. The Lee and Colley Review Package Assessment symbols allocate a symbol between A and F. The pass/fail margin is set between C and D. Grades between A – C are satisfactory and Grades between D – F are seen as unsatisfactory.

CHAPTER 3 METHODOLOGY

3.1 Introduction

Chapter Three explains the research design and explains the data analysis method for each of the research questions. The questions are:

1. To what extent are alternatives considered in EIA in the Kruger National Park?
2. What is the quality of the alternatives assessed?
3. What are the factors that affect the quality of the alternatives assessment?

The case studies selected for this research are listed and a background of the Kruger National Park and each case study is provided for context, at the end of this chapter.

3.2 Research design

The research is a small-scale case study research, it was based on six (6) case studies. Due to the small number of case studies, the research can be described as small-scale case study research.

The study made use of a mixed method, the first part of the research design is quantitative and the second part qualitative. To address research question 1, the research assessed the different types of alternatives provided in each report quantitatively and a score for each type of alternative provided, was allocated and all were combined. A score out of 6 was allocated for each report.

To address research question 2, the research assessed the alternatives in each EIA report qualitatively against criteria developed based on the requirements of the NEMA EIA regulations for alternatives assessment in EIA, using a document review process.

To answer research question 3, the study used a questionnaire which was to be completed by the EAPs who conducted the EIA studies, as well as information sourced from relevant public participation sections of the case studies, and SANParks documentation. The results of the questionnaire provided the EAPs opinions on the factors that affect alternatives assessment.

3.3 Case Study Selection

Six (6) Basic Assessment Reports were selected for the research. In each report, the assessment made use of; the main Basic Assessment Report, Specialist Assessment reports and all Public Participation related information. The case study selection was purely based on availability and

access to reports at the time the research was undertaken. The reports were sourced online and from the North West University.

The 2006, 2010 and 2014 NEMA EIA Regulations identified alternatives similarly. The forebear legislation, the Environmental Conservation Act (ECA), Act No. 73 of 1989 EIA Regulations does not have a comprehensive identification of alternatives. The only alternatives it requires assessment of are 'alternative practices'. The four regimes and their respective definitions of alternatives are further explained in the table below:

Table 3-1: Regulation regimes and definitions of alternatives

| <u>Regulations</u> | <u>Alternatives Definition</u> |
|--|--|
| Environment Conservation Act (ECA), Act No. 73 of 1989 | The ECA does not have a definition for alternatives. However, it makes reference for the requirement of the consideration of 'alternative activities'. |
| NEMA 2006 EIA Regulations | <p>"alternatives", in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to –</p> <ul style="list-style-type: none"> (a) the property on which or the location where it is proposed to undertake the activity. (b) the type of activity to be undertaken. (c) the design or layout of the activity. (d) the technology to be used in the activity, and (e) the operational aspects of the activity. |
| NEMA 2010 EIA Regulations | <p>"alternatives", in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to –</p> <ul style="list-style-type: none"> (a) the property on which or location where it is proposed to undertake the activity. (b) the type of activity to be undertake. (c) the design or layout of the activity. (d) the technology to be used in the activity. (e) the operational aspects of the activity; and (f) the option of not implementing the activity. |
| NEMA 2014 EIA Regulations | <p>"alternatives", in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to the —</p> <ul style="list-style-type: none"> (a) property on which or location where the activity is proposed to be undertaken. |

| <u>Regulations</u> | <u>Alternatives Definition</u> |
|--------------------|--|
| | (b) type of activity to be undertaken. (c) design or layout of the activity. (d) technology to be used in the activity; or (e) operational aspects of the activity; and includes the option of not implementing the activity. |

Because of the analytic nature of Research Question 1, which specifies that each EIA report should be evaluated against the six (6) categories of alternatives specified in the EIA Regulations, the EIA reports conducted under the ECA Regulations were excluded from the study as they do not permit this evaluation, due to a lack of the applicable alternative categories mentioned above.

The titles, year of assessment, level of assessment and related EIA regimes of the reports chosen as case studies for this research are listed in the table below.

Table 3-2: EIAs conducted for the Kruger National Park.

| <u>Title</u> | <u>Year</u> | <u>Level of Assessment</u> | <u>EIA Regime</u> |
|--|-------------|----------------------------|-------------------|
| Malelane Safari Lodge | 2015 | Basic Assessment | NEMA 2014 |
| Skukuza Safari Lodge | 2015 | Basic Assessment | NEMA 2014 |
| Lodge expansion and refurbishment of the Singita Sweni Lodge | 2016 | Basic Assessment | NEMA 2014 |
| Shangoni Gate development | 2017 | Basic Assessment | NEMA 2014 |
| Kruger Shalati up-market tourism Accommodation | 2018 | Basic Assessment | NEMA 2014 |
| Phalaborwa Wildlife Activity Hub | 2018 | Basic Assessment | NEMA 2014 |

3.4 NEMA EIA Regulations prescribe requirements for alternatives assessment

The scope and content of what should be included in a Basic Assessment Report, as prescribed by the NEMA EIA Regulations is provided under Appendix 1 of Government Notice No. 982 (as amended on 7 April 2017) is summarised below:

- A description of the process followed to reach the proposed preferred alternative within the site, including details of the environmental attributes of all alternatives considered (geographical, physical, biological, social, economic, heritage and cultural).
- The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts; can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.
- The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.
- The positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

This constitutes the basis for assessing the quality of the alternatives assessment conducted in each case study in this research. In order to be more concise for the context of the research, some requirements were edited/paraphrased, and others were summarized to prevent duplication and repetition.

3.5 Research Question 1: Extent – Assessment of the categories of alternatives assessed in each EIA against the categories of alternatives prescribed in the NEMA EIA regulations

The first step assessed the extent to which alternatives were assessed in each EIA. The following NEMA prescribed alternatives categories were used; Location, Activity, Design, Technology, Operational aspects and the no-go alternative.

Location alternatives relate to alternative geographical locations where the activity can be undertaken. This can include locations with lower ecological sensitivity/vulnerability, or locations with higher socio-economic opportunities, among other development needs.

Activity alternatives refer to alternative activities to meet the project need, for example, investment being made into the development of efficient public transport instead of additional highway constructions. Activity type alternatives are characteristic of the policy planning stage rather than a project level stage.

Design or layout alternatives refer to various positioning alternatives of a proposed development in a manner that ensures the lowest negative impacts. An example may be locating

the development away from the property boundary, that is traversed by a watercourse or has high ecological sensitivity.

Technology alternatives are applicable to activities that use technology, technology alternatives include cleaner technology that consumes less energy and produces low emissions and less waste. An example includes the incorporation of solar panels into new buildings to reduce electricity consumption or supplement electricity supply.

Operational alternatives relate to the operational aspect of the development or activity. Examples include high noise related activities undertaken during the day and not during the night as noise travels faster and further during the night (DEAT, 2004b).

The no-go alternative ‘assumes the activity does not go ahead, implying a continuation of the current situation or the status quo’ (DEA, 2006:7). The no-go alternative serves as the benchmark to which the other alternatives can be evaluated to gauge the amount of net negative and net positive impacts.

The extent, for the purpose of this research refers to the number of different types of alternatives that have been assessed in each EIA report. A numerical score was assigned for each alternative out of a maximum score of six (6). For alternatives which were not applicable to the development, “N/A” was assigned, and the maximum obtainable score adjusted. An example of this is provided in Table 3-3: Alternatives extent assessment criteria, NEMA.

Table 3-3: Alternatives extent assessment criteria, NEMA

| Report Name | (a) Property/Location alternatives | (b) Activity alternative | (c) Design/Layout alternative | (d) Technology alternative | (e) Operational alternative | (f) No-go alternative | Total (max. obtainable score 6) |
|-------------|---------------------------------------|-----------------------------|----------------------------------|-------------------------------|--------------------------------|--------------------------|---------------------------------|
| Abc | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 |

3.6 Research Question 2: Quality - Assessment Criteria 2

The Lee and Colley review package assessment symbols were adopted and were coupled with the NEMA EIA Regulations review package, for the assessment of the second criteria. Due to the absence of a second reviewer, a single reviewer undertook the review.

The assessment methodology used to answer Research Question 2 is the same as the General Logic of Evaluation Methodology described in Fournier (1995). Fournier (1995) described the

General Logic of Evaluation methodology as; ‘a sequence of steps are used to construct and test a claim. This sequence of steps described by Fournier are described below:

- The parameters which merit will be judged against are established (“criteria for merit”).
- Setting and defining how well the evaluant should grade to be considered good, fair or poor.
- Measuring of the performance of the evaluant and rating how well it has performed against the parameters of merit set.
- Summary of the evaluation of the different parts of the evaluants’ data and provision of an overall performance assessment of the whole report.

To answer Research Question 2, each EIA report was assessed against the criteria developed from the NEMA EIA Regulations for alternatives assessment. A grade was assigned for each sub-section of the criteria as addressed in each report. In the end, an overall performance assessment was made of each report based on the grades achieved in each sub-section.

The Lee and Colley review package assessment symbols and explanations were used, each criteria/sub-section assessed was allocated a symbol between A - ‘Relevant tasks are well performed, no important tasks are left incomplete’ and F - ‘Very unsatisfactory, important task(s) poorly done or not attempted’, the assessment symbols are tabled in Table 3-4: Lee and Colley review package assessment symbols and explanations. The pass/fail margin is set between C and D, Grades between A – C are seen as satisfactory and Grades between D – F are seen as unsatisfactory.

For this research study, the alternatives in each EIA report were assessed in a two-tiered pyramidal structure, with the different set criteria/sub-sections at the base of the pyramid. The highest level assessed the overall alternatives assessment in each EIA report.

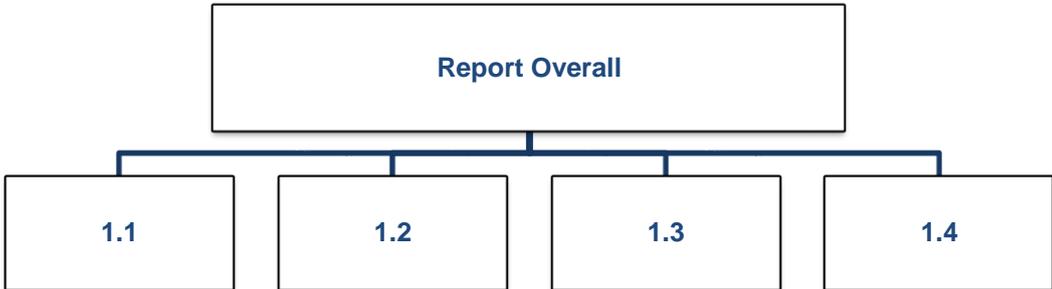


Figure 3-1: Alternatives Assessment Pyramid

The following set of criteria taken from the NEMA EIA Regulations forms the base of the assessment pyramid:

1.1 Description of the process followed, to reach the proposed preferred alternative, including details of the environmental attributes of all the alternatives considered (geographical, physical, biological, social, economic, heritage and cultural).

1.2 The impacts and risks identified for each alternative (nature, significance, consequence, extent, duration, probability of impacts, and the degree to which they can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated).

1.3 The methodology used in determining and ranking of nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.

1.4 The positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected; focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

The set criteria above were assessed in each EIA report and allocated a score, based on the seven Lee and Colley review package assessment symbols below.

Table 3-4: Lee and Colley review package assessment symbols and explanations

| <u>Assessment Symbol</u> | <u>Explanation</u> |
|---------------------------------|--|
| A | Relevant tasks well performed; no important tasks left incomplete. |
| B | Generally satisfactory and complete, only minor omissions and inadequacies. |
| C | Can be considered just satisfactory, despite omissions and/or inadequacies. |
| D | Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies. |
| E | Not satisfactory, significant omissions or inadequacies. |
| F | Very unsatisfactory, important task(s) poorly done or not attempted. |
| N/A | Not applicable. The review topic is not applicable, or it is irrelevant in the context of this statement. |

The overall assessment of an EIA report's project alternatives (highest level of pyramid) was derived from an average of the scores received from the evaluation of the set criteria/sub-sections at the base of the pyramid.

3.6.1 Research Question 3: Factors that affect alternatives assessment

To answer Research Question 3, an online questionnaire link was sent (through an email link) to the EAPs that conducted each of the EIA reports selected for this case study. The questionnaire aimed to gain information on the factors that affect alternatives assessment in EIA from the EAPs perspective and experience. The email questionnaires (included under Annexure A) covered as a basis; the relative experience, qualifications, and professional background of the EAP. These are factors identified by multiple scholars, described in the literature review, that affect the quality of EIA.

The questionnaire also had an open-ended question that enabled the participants to express their perspective and experience on the factors that affect alternatives assessment in EIA. The questionnaires were designed to be anonymous, in order to encourage honesty. Questionnaires were selected because they allow flexibility and enable the selected respondents to complete the questionnaire at a time convenient for them (Kuter & Yilmaz, 2001). With the study undertaken during the Covid pandemic, it was not possible to schedule one on one interviews with the majority of the participants. Relevant public participation sections in the case studies, and SANParks documentation, also provided accurate primary data on some of the factors that affected alternatives assessment.

3.7 Data analysis

For the assessment of Research Question 1, each EIA report was allocated a Microsoft Excel spreadsheet which contained the headings illustrated in Table 3-3: Alternatives extent assessment criteria, NEMA. Points for each alternative were allocated manually in each sheet for each EIA report, and final scores were calculated.

For the assessment of Research Question 2, the reviewer allocated each EIA report a Microsoft Excel sheet which contained the four criteria explained under Figure 3-1: Alternatives Assessment Pyramid. Each heading was assessed according to the relevant information provided in the EIA report and allocated a score between A and F, or N/A, based on the assessment symbols in Table 3-4: Lee and Colley review package assessment symbols and explanations. An average score was then deduced from the scores allocated for each of the four criteria assessed using the excel formula; `=CHAR(ROUND(AVERAGE(IF(ISTEXT(A1:B1),CODE(UPPER(A1:B1))),0))`. The score served as the report's overall score.

For the assessment of Research Question 3, after each respondent had completed their questionnaire, the results were downloaded and recorded in tables manually, using Microsoft Word and Excel, to determine the numbers of responses for each question answered. As obtained

from the EAPs' questionnaires, responses to the open-ended questions were compared and summarized in the results section of this research.

3.8 Background of the Kruger National Park and Summary of Case studies

The Kruger National Park is one of the nineteen national parks under the custodianship of South African National Parks (SANParks, 2020b). The Park borders Zimbabwe in the north and Mozambique to the east. It extends over two (2) million hectares. The west of the park is bordered by public and private nature reserves and village communities (SANParks, 2019).

The Kruger National Park has twelve (12) main rest camps, five (5) bushveld camps, two (2) bush lodges and four (4) satellite camps (SANParks, 2020b). The Kruger National Park attracts many local and international tourists each year. Between March 2018 and March 2019, the park recorded 1 892 128 visitors (SANParks, 2019b).

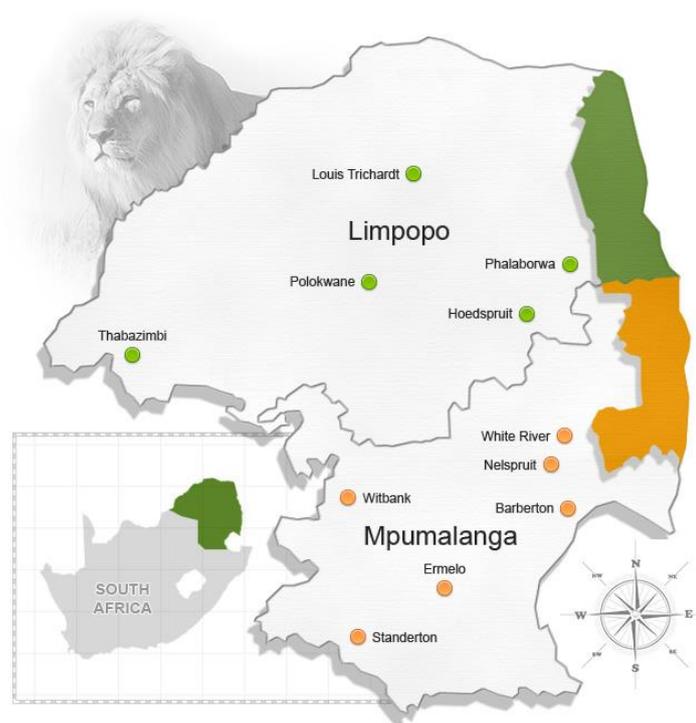


Figure 3-2: Footprint of Kruger National Park (Sleeping Out, 2020)

The rezoning of particularly the southern extent of the Kruger National Park from a restricted development zone to medium and high tourism impact zones in 2012 was attributed to its location in the centre of the Maputo development corridor, which is linked to Mozambique, KwaZulu-Natal and Swaziland. The rezoning was also intended to cater for visitors traveling to the Kruger National Park through the newly built Kruger Mpumalanga International Airport at the time, as well as residents of the growing city of Nelspruit and developments on the southern outskirts of the park, which translates to increasing growth and economic activity (SANParks, 2012).

Equally importantly, the rezoning sought to address post-apartheid socio-economic pressures and provide opportunities for three (3) million previously disadvantaged people in the 181 villages in the region of the Kruger National Park (SANParks, 2012). A Peripheral Development Zone was added to the zonings. It is a 3-kilometre zone which extends outside and 5 kilometres inside the boundary of the park. The Peripheral Development Zone provides opportunity for developments that will provide jobs for the surrounding communities. These include tourist accommodation facilities such as lodges and resorts (SANParks, 2012).

Multiple tourist accommodation developments have since been constructed since the zoning of the Peripheral Development Zone, and the Kruger National Park still continues to develop tourism infrastructure, including; lodges, tented accommodation, conferencing facilities, roads, gates and bridges.

3.8.1 Case studies summary

A summary of each of the case studies (Basic Assessment Reports) selected for this research is provided below, to provide context.

3.8.1.1 Malelane Safari Lodge

The Malelane Safari Lodge is the same tourism development, by the same applicant as the previously proposed Radisson Blue Safari Lodge, whereby the EIA process lapsed and was discontinued. The name of the proposed development was changed and the EIA report was undertaken in 2015 by a different EIA Consulting Company.

Before the initial EIA process, the EIA project was put on tender by SANParks with five site alternatives provided, whereby the winning bidder (developer) had to undertake an internal fatal flaw assessment, based on the sites provided, in order to select their preferred site alternative. The scope of this EIA included the construction of the proposed Safari lodge, a park and ride facility and the upgrading and realignment of a road.

3.8.1.2 Skukuza Safari Lodge

The Skukuza Safari Lodge is a 256-bed lodge in the Skukuza Rest Camp, with luxury suites, family rooms and standard rooms. The facility also has staff accommodation (16 sleeping units, 34 2/3-bedroom units). The EIA application also included the relocation of nearby offices, as well as the upgrade of service infrastructure namely; stormwater, sewer and water treatment, electricity and the reticulation network.

The need for the development was in response to the need for more accommodation for the conference delegates who came to the Skukuza Rest Camp. The delegates sought accommodation that was catered and was more formal than the existing facilities.

3.8.1.3 Lodge expansion and refurbishment of the Singita Sweni Lodge

The Singita Sweni lodge is a 12-bed concession within the Kruger National Park. The project proponent sought to refurbish as well as expand one unit into a Villa (family unit). All development was to remain within the existing lodge footprint. In addition to the refurbishment and expansion of the one unit, the lodge swimming pool was also to be relocated to the front of the lodge.

3.8.1.4 Shangoni Gate development

The Shangoni gate development entailed the construction of a visitor's entrance into the Kruger National Park midway between the existing Pafuri and Phalaborwa gates, and included; a reception area, a 50-kilometre road, three high level bridges, a picnic site, a camping area and a tented accommodation camp. Alternatives assessed included a gate position which links with the planned road developments to be undertaken by Roads Agency Limpopo (RAL), as part of the creation of a tourism corridor in the Limpopo Province.

3.8.1.5 Kruger Shalati up-market tourism Accommodation

The Kruger Shalati development is a Public Private Partnership on the Selati Railway bridge close to the Skukuza Rest Camp. Existing (historic) facilities on the railway included; Selati Restaurant building which was built in the 1980s and housed historic locomotives and carriages, Selati Railway Bridge, a railway line and two guest houses. The facility was to be turned into a fine dining restaurant for guests staying at the facility and a family restaurant for day visitors, as well as an edutainment area. Guests staying at the facility would be catered for in 12 sleeper carriages positioned on the railway bridge.

3.8.1.6 Phalaborwa Wildlife Activity Hub

The Phalaborwa wildlife activity hub is a tourism enhancing project at the SANParks Phalaborwa Gate, commissioned by the Department of Tourism to encourage tourism and to empower local communities in the area. The proposed development comprises; kiosks, restaurants, an information centre, admin offices, braai areas, a 72-bed backpacker facility, bird viewing areas, a rhino orphanage, a tent camping area and other supporting infrastructure.

3.9 Methodological limitations

The methodological limitations for this research are as follows; basic assessments were chosen for the study; basic assessments are not as comprehensive as their Scoping and EIA counterparts. A small number of case studies (EIA reports) was available for the study due to accessibility constraints.

The Kruger National Park representative stated that due to the size of the EIA data files, they could not be transferred over email and needed to be physically collected. At the time the study was conducted, interprovincial travel was prohibited due to the Covid Pandemic, making a trip to collect documentation in the Kruger National Park, difficult. The reports used in the research were limited to those that could be sourced from the North West University and online. This also affected the number of EAPs that could be approached to take part in the survey, this is further explained below.

Due to the COVID pandemic, physical interviews with the EAPs who undertook the EIA reports was not possible. EAP consultation was brief over telephonic and electronic media due to participants' availability constraints. To accommodate the relevant participant's schedules, an online survey was created, and a link sent to them to complete. The survey had multiple choice questions and open-ended questions for completion. Of the six (6) EAPs selected for the study, only four (4) undertook the survey, therefore providing a small response sample size.

The review of the EIA reports was undertaken by only one reviewer, as opposed to the double reviewer method prescribed in the Lee and Colley review package.

CHAPTER 4 RESULTS & DISCUSSION

4.1 Introduction

Chapter 4 presents the findings of this research. Section 4.2 presents the findings of Research Question 1: Extent, Section 4.3 presents the findings of Research Question 2: Quality Assessment and Section 4.4 presents the findings of Research Question 3: The factors that affect alternatives assessment in EIA were: The first two sections have both graphical presentations and written analyses. The last section provides a collation of the findings of the questionnaires completed by the EAPs, the findings from the relevant public participation sections of the case studies and Kruger National Park documentation, which was presented in a written analysis.

The chapter also provides a discussion of the findings under the summary of each section. The summary links the findings with the relevant literature which supports or contradicts the findings made and attempts to close this gap. The literature is also used to explain and place in context secondary findings that are linked to the research objectives.

4.2 Research Question 1: Extent

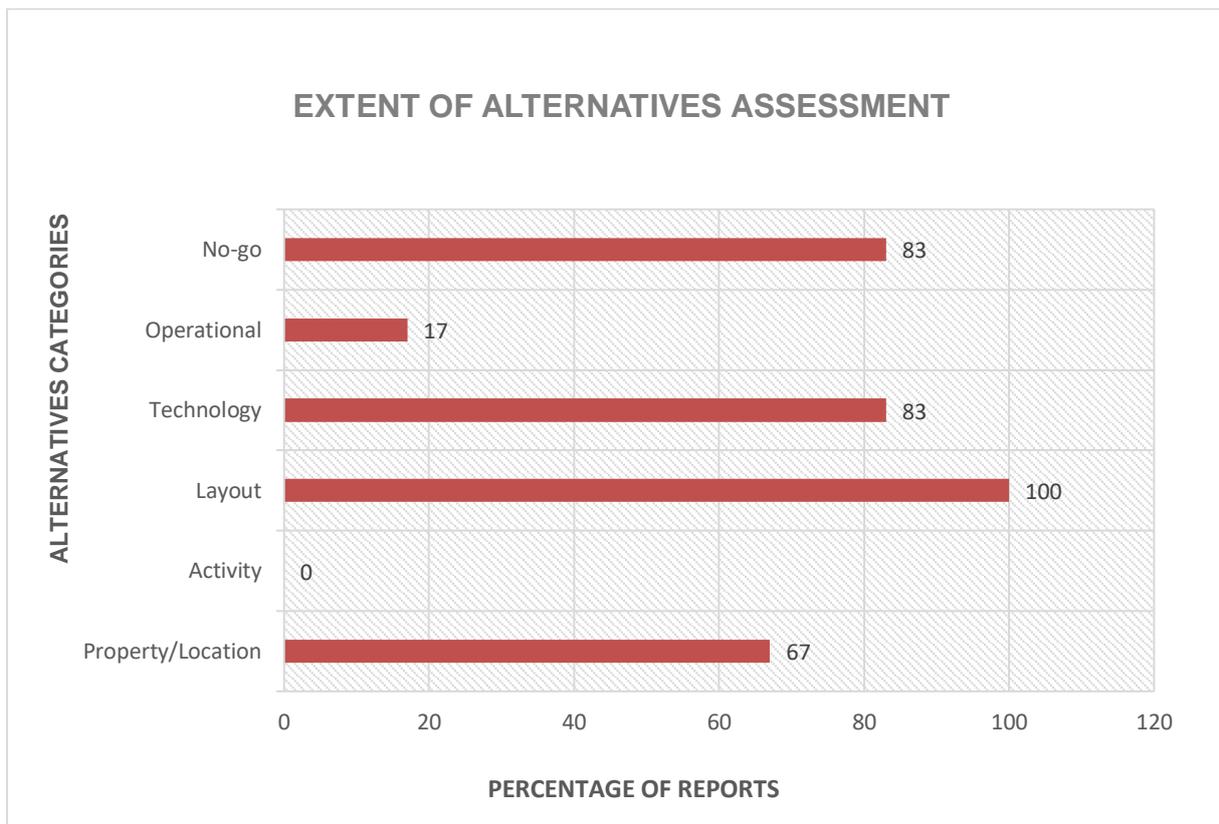
Review Area 1 provides an assessment of the extent to which alternatives were assessed in each EIA report that formed part of this case study. Extent as previously explained refers to; property/location, activity, design/layout, technology, operational and the no-go alternative. The table below illustrates the relevant percentages for alternatives assessment for each alternative category and each report, across the reports assessed.

Table 4-1: EIA reports extent assessment

| Report Name | (a) Property/Loc ation alternatives | (b) Activity alternative | (c) Design/Layout alternative | (d) Technology alternative | (e) Operational alternative | (f) No-go alternative | Total (max. obtainable score 6) | % |
|-------------------------|--|--------------------------------|-------------------------------------|----------------------------------|-----------------------------------|-----------------------------|---------------------------------------|----|
| Malelane | ✓ | x | ✓ | ✓ | x | ✓ | 4 | 67 |
| Singita | N/A | x | ✓ | ✓ | x | ✓ | 3 | 60 |
| Kruger Shalati | N/A | x | ✓ | ✓ | ✓ | ✓ | 4 | 80 |
| Shangoni Gate | ✓ | x | ✓ | ✓ | x | ✓ | 4 | 67 |
| Skukuza Safari Lodge | N/A | x | ✓ | ✓ | x | ✓ | 3 | 60 |
| Phalaborwa | x | x | ✓ | x | x | x | 1 | 17 |

% 67 0 100 83 17 83

Table 4-2: Extent of alternatives assessment across the EIA reports



4.2.1 Location

All the reports provided some level of alternatives assessment. Three (3) of the six (6) reports were for existing developments that were being expanded or refurbished and therefore did not have property/location alternatives. These included; Kruger Shalati Singita Sweni and the Skukuza Safari Lodge. Three (3) of the other reports were for new developments (Shangoni Gate, the Phalaborwa Activity Hub and the Malelane Safari Resort) and they were graded for location alternatives. For the Malelane Safari Resort, a preliminary environmental assessment was undertaken by the project proponent prior to the appointment of the EAP. The findings of the preliminary assessment informed the preferred location presented to the EAP. During the EIA, the EAP only assessed the preselected location alternative in detail, an excerpt from the report is as follows:

“During the project Tender Process, SANParks presented five available sites to prospective tenderers, allowing them to select a site based on their own needs and criteria. The winner of the project tender (and the Applicant for this EA process), Malelane Safari Resort Investments (Pty) Ltd, selected a preferred site based on an internal Fatal Flaw Assessment, which was developed by themselves and conducted for each site. The following section presents a short description of the 5 available sites and a comparative Fatal Flaw Assessment, which illustrates the method used

to identify the most feasible and sustainable site for the proposed lodge. Strategic level input from the Specialist Ecologist and the Geotechnical Engineer was provided at that time and has been included. Please note that this section is for information purposes only, as only the preferred site is being considered in the Basic Assessment.” (Nuleaf Planning, 2015:5).

The Phalaborwa Wildlife Activity Hub did not assess location alternatives, it is assumed that the reason for this is that no alternative site would meet the development need, which was explained as an attempt to uplift the Phalaborwa rural communities. This was explained in the following excerpt:

“SANParks proposes the development of the Phalaborwa Wildlife Activity Hub at the Phalaborwa Entrance Gate within the boundary of the Kruger National Park. The proposed development site is situated on the border fence within the Kruger National Park on the right-hand side as you enter through the Phalaborwa Gate. The proposed project is one of three SANParks enhancing projects earmarked by the Department of Tourism for the 2016/2017 financial year, to ensure tourism attraction and provide job creation for Local Communities. The specific site was chosen due to its close proximity to Phalaborwa, thus eliminating the need for additional guest and staff housing” (Enviroworks, 2018:ii)

Location alternatives was the third highest assessed subcategory out of the six alternatives sub-categories. The common reasons cited for preferred location alternatives across the reports included aesthetics, accessibility, and tourism potential.

4.2.2 Activity

None (0%) of the reports assessed activity alternatives. All the reports that were assessed in this case study had a predefined development activity type and did not provide alternative activity types. Activity alternatives could have been other development types or activities that met the development need identified by the SANParks. This review subcategory was the least assessed and was therefore the least performing.

It should be noted that a majority of the tourism infrastructure in this case study are concessions that the Kruger National Park entered into with private sector operated lodges, as part of their Commercialisation Strategy which started in 2000, in which operators are given the right to build infrastructure within the KNP. Concession arrangements are meant to contribute to the park’s revenue for conservation efforts and to fund socio-economic development activities.

The decision for concessions to construct tourism accommodation facilities is made at a strategic level. The type of development is therefore predetermined before an EAP is appointed to

undertake the EIA process. It is for this reason that for tourism accommodation developments in particular, no activity alternatives are assessed in these EIA reports. For the Shangoni Gate, activity alternatives were also not assessed. The lack of assessment can be linked to the project need which centres around providing easier access for more communities between the Pafuri and Phalaborwa Gates; namely the Giyani and Thohoyandou communities and stimulating the economies around these communities. This was a decision also made by SANParks at strategic level and wasn't open for alternatives assessment at EIA level.

“The rationale behind the new gate is to stimulate socio-economic development among communities in the region and to provide easier access into the park from Giyani and Thohoyandou. Essentially, the proposed development will add a new gate midway between Pafuri Gate and Phalaborwa Gate to the KNP and provide access from the Giyani and Thulamela communities. The proposed development will potentially provide numerous economic possibilities which will mainly benefit the surrounding communities.” (Envirolution 2017:18).

The Phalaborwa Wildlife Activity Hub also did not assess any activity alternatives. The expressed motivation for the Wildlife Activity Hub was linked to SANParks' rural Development Programmes explained in the report, as follows:

“As part of SANParks' support to SMMEs, particularly in rural areas through the implementation of a range of EPWP Programmes, this rural enterprise development continues to be part of the Strategic Plan for the next five years. Further initiatives to stimulate the development of rural enterprises include Wildlife Economy programmes and the development of an Activity Hub at Phalaborwa” (Enviroworks, 2018:ii).

This was also another decision made by SANParks, in collaboration with the Department of Tourism at a strategic level and wasn't open for alternatives assessment at EIA level.

There is an opportunity for SANParks to rethink their concessions and commercialization approach, and to include an assessment of alternatives early in the process in the future to determine if there are any other activity alternatives that will fulfill their financial and commercial objectives. EIA can be used to weigh in on these options.

4.2.3 Design/Layout

All the reports assessed design/layout alternatives. Design/layout alternatives were commonly informed by environmental sensitivities such as soils and sensitive ecosystems. The following excerpt is from the Malelane Safari Resort Report, *“All sensitive sodic soil sites, as well as areas where the Critically Endangered plant species Adenium Swazicum have a very high sensitivity*

rating, and as such, will be avoided and declared as 'no-go' zones during both construction and operational phases. A buffer of 30 meters has been implemented around these sites" (Nuleaf Planning, 2015:119). For the Skukuza lodge, the Staff housing was located on an already developed site "not situated in close proximity to any environmentally sensitive areas" (Exigo, 2014:9). The layout of the overall lodge also took into account protected trees, "The design of the lodge takes into account baobab trees planted in the early 1930s. The lodge was designed around the baobab trees and the trees will become features within the atrium on the inside of the lodge" (Exigo, 2014:9). Design/layout alternatives was the most assessed sub-category across all alternatives sub-categories.

4.2.4 Technology

Technology alternatives were the second most assessed sub-category of alternatives (five out of six reports assessed technology alternatives). The Phalaborwa Activity Hub was the only report that did not assess technology alternatives. Technology alternatives assessed across the reports were either about the Eskom electrical supply, going off-grid and using Photovoltaic power, or hybrid approaches. Other technology alternatives included the use of water recycling systems to minimise water wastage. At the Singita Sweni Lodge for example, the pools were fitted with low power use filters and water recycling systems (EMROSS Consulting, 2016). An electric locomotive system was chosen over a manual pulley/cable transporting system for the railway carriages at Kruger Shalati, in line with railway safety standards (EMROSS Consulting, 2018).

4.2.5 Operational

After activity alternatives, operational alternatives were the least assessed subcategory. Only one of the six reports assessed operational alternatives. This was the Kruger Shalati which had two operational alternatives for the refurbished railway carriages accommodating overnight guests. One alternative was to *"Keep them at the purpose build station at the Selati Restaurant during the day and then be moved out onto the bridge for the night, using a pulley/cable system"* (EMROSS Consulting, 2018:22) and the other was: *"The railway carriages be permanently positioned on the bridge. Access to the carriages for overnight guests and staff will be via the existing 'pump trolley with an electric motor'"* (EMROSS Consulting, 2018:24).

The lack of operation alternatives in the other reports can be attributed to similar reasons, such as the lack of activity alternatives, in the sense that the operational activities are predetermined by the project proponent. They therefore cannot be altered during the EIA stage of the project.

4.2.6 No-go

The no-go alternative was also the second highest assessed alternative (five of six reports). Only the Phalaborwa Wildlife Activity Hub did not assess the no-go alternative. This is despite the no-go alternative being mandatory for assessment, as per the NEMA EIA regulations.

4.2.7 Summary

The results from the Extent of Alternatives Assessment across the reports can be described as adequate, the categories of alternatives were generally well assessed in each report. An overall evaluation of the six alternatives categories (Property/Location alternatives, the Activity alternative, the Design/Layout alternative, the Technology alternative, the Operational alternative, and the No-go alternative) across the reports yielded adequate results.

Design/Layout, Technology and the No-go alternative were the highest assessed alternatives. Location, operational and activity alternatives were not assessed as satisfactorily as the previous three. In six out of six of the reports, the activity alternative was not assessed at all. Activity alternatives refer to alternative activities to meet the project need. Steinemann (2001) noted that activity alternatives are characteristic of the policy planning stage and not so much the project level stage, which was true for the developments in the case study. The majority of the developments that were assessed in the reports that formed part of the case study were concessions that the Kruger National Park entered into with private sector operated lodges (SANParks, 2020b), That therefore explains why the alternatives above could not be fully assessed.

For the Malelane Hotel development, during the advertising of the PPP opportunity, SANParks had development specifications which laid out the type of hotel development they required. The winner of the project tender (Malelane Safari Resort Investments (Pty) Ltd) then undertook an internal Fatal Flaw Assessment to select a site on which the proposed development would be undertaken. In the review of alternatives assessment in EISs in the US, Steinemann (2001) explained how screening assessments had the potential to be arbitrary and removed alternatives before they could be assessed in great detail.

Technology alternatives were mainly either Eskom power supply or Solar Power, the EAPs motivated for the applicant's relevant preferred alternative, according to the proposed development's design and needs. Electrical motors over Manual pulley systems were another technology option assessed in the Kruger Shalati report and the safest alternative was chosen.

The No-go alternative assessed the status quo conditions of all the areas proposed for development motivation against the no-go alternative across the reports related to loss of a revenue generation opportunity for the Kruger National Park; as well as employment opportunities which would not be realised if the developments did not go ahead. The loss of environmentally sensitive habitats was mentioned briefly across all the reports, and it was motivated that mitigation measures would be applied.

Location alternatives, operational alternatives and activity alternatives were in the bottom three of the alternatives assessed. These are alternatives that in multiple developments are decided upon in the project planning phase. There is little influence that the EIA can have; especially in instances where the applicant has limited location alternatives and there exist no operational alternatives because the development has been designed to serve a certain function. Activity alternatives as previously explained, are impossible to explore at the EIA stage as they are assessed and picked by SANParks before the EIA process even begins.

Layout and Activity alternatives may be at either end of the level of assessment spectrum, the former being the most assessed and the latter being the least assessed. This is consistent with Steinemann's (2001:6) findings that 'alternative designs over alternative approaches dominate the alternatives assessed in EIS'. Steinemann (2001) went on to explain that the reason for this was because EIA was undertaken too far into the project planning phase to consider 'strategic' alternatives.

One of the EAPs who took part in this study stated that; "EIA is a reactive planning tool which is implemented when proposed developments have been conceptualised already and in some instances, investment has already been put into the proposed development". It is therefore impossible for EIA to introduce or implement activity alternatives in these types of developments.

4.3 Research Question 2: The Quality of Alternatives Assessment

The quality of the reports was assessed against the criteria shown in Table 3-1. Three of six of the reports achieved an A quality grading, two of six of the reports received a B quality grading and one of the six reports received a D quality grading, as tabled below.

Table 4-3: Quality of Alternatives Assessment

| No. | Sub-category | Malelane Safari Resort | Singita Sweni | Kruger Shalati | Shangoni Gate | Skukuza Safari Lodge | Phalaborwa Wildlife Activity Hub |
|-----|---|------------------------|---------------|----------------|---------------|----------------------|----------------------------------|
| 1 | Description of process followed to reach preferred alternative, incl. details of environmental attributes of all alternatives considered (geographic, physical, biological, social, economic, heritage + cultural). | A | B | D | A | B | A |
| 2 | Impacts and risks identified for each alternative nature, significance, consequence, extent, duration, probability, degree they can be reversed, may cause irreplaceable loss of resources. | B | B | B | B | F | A |
| 3 | The methodology used in determining and ranking of nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives. | A | B | A | A | F | A |
| 4 | Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected. | A | B | A | A | D | A |

Average Score

A

B

B

A

D

A

A break-down assessment of each of the relevant alternatives sub-categories is provided below:

4.3.1 Sub-category 1: Description of the process followed to reach the proposed preferred alternative

Three out of the six reports (50%) received an A quality grade for this sub-category, they succinctly detailed the process used to arrive at the preferred alternative. The preferred alternative refers to a combination of:

- the property/location selected,
- the layout within the selected property/location,
- the relevant technology alternative, and
- the operational alternative (where applicable).

As required by EIA regulations, the reports detailed the environmental attributes of all the other alternatives considered and reasoned how the preferred alternative was best geographically, physically, biologically, socially, economically, and in terms of relevant heritage and culture.

The preferred alternatives commonly cited the following geographical, physical, biological and heritage and cultural attributes; being situated in areas outside watercourse buffer areas and providing minimal disturbance to ecologically and archaeologically sensitive areas. Social attributes included exclusivity and tourism potential. The Shangoni Gate development also cited an economical attribute which was that the gate had been planned and budgeted for by Roads Agency Limpopo (RAL), in their financial year.

One out of six reports (Kruger Shalati) received a D quality grade. This report did not fully describe the process followed to reach the preferred alternative. Two out of the six reports received a B quality grade, and they had only minor omissions and inadequacies.

4.3.2 Sub-category 2: Impacts and risks identified for each alternative

One out of six (10%) of the reports received an A quality grade for this sub-category, four out of six reports (80%) received a B quality grading, and one out of six reports (10%) received a F grading for this subcategory. These reports identified the nature, significance, consequence, extent, duration and probability of impacts linked to each alternative considered but neglected to address the degree to which they could be reversed, which may cause irreplaceable loss of resources that could be avoided, managed or mitigated.

4.3.3 Sub- category 3: The methodology used in determining and ranking of nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.

Four out of six reports (67%) received an A quality grading for this sub-category. The reports used a similar methodology to rank the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives, with a rating scale of either 0 - 5 or 0 - 10. One out of six reports (10%) received a B grading for this sub-category and one out of six reports (10%) received a F grading.

4.3.4 Sub-category 4: Positive and Negative impacts that the proposed activity and alternatives would have on the environment and on the community that may be affected; focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

Four out of six reports (67%) received an A quality grading for this sub-category. Positive impacts commonly across the reports referred to socio-economic factors, skills development and local economy stimulation for the communities wherein the developments would be undertaken. Negative impacts referred to mostly ecological impacts. One out of six reports (10%) received a B grading for this sub-category and one out of six reports (10%) received a D grading.

4.3.5 Summary

The overall results from the Quality of Alternatives Assessment across the reports could be described as generally satisfactory. 50% of the reports received an A grading and 33% of the reports received a B grading. Only 17% of the reports received a D grading which could be attributed to relevant omissions and inadequacies in the reports.

Generally, a high percentage (85%) of the reports provided a strong motivation for the preferred alternative. Some reports provided very weak alternatives which would not be feasible under any circumstances – this enabled the ‘preferred alternative’ to emerge as the best alternative amongst all the other alternatives that were provided and assessed. One such alternatives was the third technology alternative for the Malelane Safari Lodge which proposed Eskom power as an electrical source of power for the lodge. This required that the electrical cable from the main station be buried under the Crocodile River to reach the site. Such an alternative would have an immense environmental impact and would not be feasible. It was also evident that most EIAs placed a lot of focus on the preferred alternative in terms of specialist studies and general information. In the absence of the same level of detail about the other alternatives, the preferred

alternative came through as the best possible alternative for the development. Steinemann (2001) explained that this limited the EIAs ability to assess trade-offs between the different alternatives.

In the Shangoni Gate Development, the preferred location alternative was influenced by it being linked to a road network which had been planned and would be funded by Roads Agency Limpopo (RAL). The motivation for the preferred location alternative taken from the EIA is as follows:

'One must take note that RAL has already put forward a budget and planning for the current and next financial year, based on the Entrance Gate (Preferred Alternative) position. If the Entrance Gate (Preferred Alternative) position is not selected by SANParks then the opportunity to have the tourism corridor road developments commissioned by RAL will cease due to the fact that any other position is not in line with RAL's current planning and budget and would therefore result in the high likelihood of not being included in the short to medium term budget and plans of RAL, as they have other regions to develop in the province' (Envirolution, 2017:121).

The EIA reported no fatal flaws on this preferred site alternative. It is however interesting that the decisions made by external organisations (RAL tourism corridor road development) had the potential to influence the alternatives assessment. It cannot be confirmed if the applicant would have abandoned this location alternative and thus have missed out on the opportunity to be a part of this planned tourism corridor, if the EIA had found this location alternative not to be the best environmental option.

In the EIAs description of the path followed to reach the preferred alternative, similarly to the motivation for the preferred alternative, the reports positioned the preferred alternatives to look better than the rest of the alternatives, which made them come across as highly unrealistic and unfeasible.

The impacts and risks for each alternative were satisfactorily assessed. The nature, significance, consequence, extent, duration and probability of impacts for each alternative were assessed in a majority of the reports. However, many reports neglected to assess the degree to which the impacts could have been reversed, thus preventing irreplaceable loss of resources by avoiding, managing or mitigating them. This assessment would provide a comprehensive assessment of all alternatives presented and determine their relevant environmental sensitivity over the other alternatives assessed.

The methodology used to rank the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives was similar across many of the reports and was completed satisfactorily, with the exception of a few reports. A satisfactory number of reports (71%) provided an assessment of the positive and

negative impacts associated with each alternative. Most of the alternatives had the same or similar negative and positive impacts. Some preferred alternatives were displayed to have a lot of positive impacts, but the reports were silent on the positive impacts of the other alternatives assessed.

4.4 Review Area 3: Factors that affect the quality of the alternatives assessment?

A questionnaire was developed and sent as an electronic link to the EAPs that undertook the EIAs that formed part of the case study. The questionnaire had a 67% response rate. Of the six (6) EAPs selected for the study, only four (4) completed the questionnaire. The questionnaire sought to determine a link between the quality of the alternatives assessment and EAP competence.

Under EAP competence, the following information was assessed:

- The education level of EAP that undertook the EIA.
- Years of experience of EAP.
- EAP Registration with an accredited body.

The questionnaire also sought to determine the EAPs' opinion on some of the factors that affected alternatives assessment in EIA. This was done by means of an open-ended question at the end of the questionnaire.

4.4.1 EAP Education, Experience and Professional Body Registration

Two of four of the EAPs who responded to the questionnaire indicated that they had an Honours qualification, one had a Master's qualification and one had a degree at the time of undertaking the EIAs. One of the five EAPs had between 4- and 6-years working experience, one of four EAPs had 8 – 10 years working experience and two of four of the EAPs had above 10 years working experience as an EAP. Three of four of the EAPs were registered with an environmental professional body at the time of undertaking the EIAs.

4.4.2 EIA and Specialist Assessment Timing

The EAPs described the project proponent as another factor that affected alternatives assessment in EIA. Most project proponents left the EIA process for last in their project planning. The need for an EIA and the relevant appointment of an EAP to undertake the EIA process is always done after significant investigation has been done into the proponent's preferred design and specifications of the project. One of the EAP responses was: *“Often the developer decides on a preferred site, layout or design before the EAP is appointed. The key is to involve the EAP*

as soon as possible in the process. Often the architects/engineers had already prepared all their plans and designs by the time the EAP became involved and by then a lot of time and money has already been spent and it is difficult to convince the project team to change their decision if the most environmentally sustainable alternative was not chosen.”

It is the EAPs opinion that the project proponent is therefore not open to looking at other feasible alternatives as often they have already decided on a preferred alternative and assessing other alternatives they had not budgeted for often attracts a cost implication.

Other EAPs described the EIA process as a responsive planning tool, which served to merely get the project proponent Environmental Authorisation to implement their preferred development, they explained that therefore an alternatives assessment could not make much of a contribution to a responsive planning tool, *“An EIA is a reactive planning tool, most often used as a means to an end, i.e. to obtain authorisation for a proposed development. Development initiatives that trigger the need for an EIA are usually conceived by a developer with a clear end in mind and to force an alternative assessment process into a reactive assessment can prove challenging.”*

Evidence of the late timing of the EIA process was seen in the relevant SANParks Request for Proposals (RFP) for proposed Public Private Partnerships (PPP), such as the Malelane Hotel Development PPP Request for Proposals (SANParks, 2009). During the proposal submission stage, the RFP required that the bidders include a ‘detailed development and design plan for the development site, based on the minimum development specifications to be adhered to for the hotel and expressed that an EIA was to be undertaken by the successful bidder after entering into the PPP agreement with SANParks. Bidders therefore went into the PPP agreement with a specific design in mind with a relevant budget projection estimate, all prior to the EIA process. This was also prior to relevant extensive specialist assessments.

4.4.3 Public participation and I&APs influence on alternatives assessment

It was administratively impossible to interview the I&APs who were active in the various public participation processes, to gain insights on their influence on alternatives assessment. The relevant public participation documentation (I&AP written comments, stakeholder meeting conversations and responses) from the case studies were relied on to provide candid primary information concerning the relevant influence that the public participation processes (and I&APs) had on alternatives assessment. Public participation was undertaken for all the developments in the case studies, by various types of stakeholders, including the general public, traditional authorities, entrepreneurs and government officials who communicated with the EAPs and SANParks officials at relevant stakeholder meetings and through written communication. In a typical Basic Assessment process under the NEMA EIA regulations, the public are afforded a

minimum of three opportunities to contribute to all aspects of the EIA phase, including decision-making, these are primarily;

- During notification by the EAP and relevant stakeholder engagement meetings, if available.
- From draft reports circulated for public comment.
- During the appeal period after the Environmental Authorisation has been approved.

The main I&AP engagement on alternatives in the case studies assessed is summarised below.

During one of the stakeholder engagements meetings for the Malelane Safari Resort, I&APs questioned SANParks' decision to construct hotel accommodation in the Kruger National Park, the EAP expressed that the decision was a strategic decision made by SANParks and "*The role of the EIA process is not to interrogate the strategic level decision. The strategic decision undertaken by SANParks precedes the EIA process and the EIA process has no power to influence this strategic decision whatsoever. It is important to separate issues relating to the strategic decision from issues relating to the EIA process*" (Nuleaf Planning, 2015:53-54).

In the stakeholder engagement meeting for the Phalaborwa Activity Hub, I&APs made contributions towards additional functions that the hub should incorporate i.e. linking the hub with the adjacent golf course, adding walking trails and sometimes offering free entry for guests staying at surrounding guesthouses, to boost local tourism accommodation. SANParks expressed that some such initiatives were not feasible at that stage and could be relooked at and further considered at a later stage. Other contributions included increasing the footprint of the swimming pool in the hub to accommodate more people. that suggestion was accepted by SANParks.

4.4.4 Summary

EAP education, experience and professional registration (competence)

The results of the study showed that a majority (75%) of the EAPs that undertook the EIAs that formed part of the case study possessed post graduate qualifications and had over 8 years' experience, this showed that they were competent. A majority (75%) of the EAPs were registered with some form of professional environmental body. Due to the small sample size, no conclusive conclusions could be drawn from the data.

EIA and Specialist Assessment Timing

The EAPs opinion on factors that affect alternatives assessment in EIA were consistent with the findings of multiple scholars, Wood (2003) mentioned that alternatives assessment was

sometimes poor due to the fact that EIA was not a part of many projects' life cycles. Steinemann (2001) noted that by the time EAPs are appointed for the EIA, there are few alternatives that are available to assess because of decisions that were made previously at strategic level, which did not consider environmental impacts as one of their main priorities.

EAPs expressed that the project proponent was not open to significant alternatives assessment that was different from their preferred alternative, Steinemann (2001) explained this by saying that it was because the applicant had already committed resources to the project before the EAP was appointed to start the EIA process.

Relating to specialist assessments, in Swanepoel *et al.*'s (2019) findings, specialists expressed that the project proponent and the EAP often did not accept alternatives proposed by the specialists in the EIA process. The alternatives were considered unnecessary as the applicant had preferred specifications for the proposed development. This led to another question; Can specialist assessments affect alternatives assessment? In this current study, evidence exists of layout alternatives that were informed by environmental sensitivities determined in specialist assessments such as soils, sensitive biodiversity areas and watercourses. The preferred layouts were those that did not infringe on these sensitive ecosystems.

Public Participation and I&AP Involvement

Kamijo and Huang (2016) noted that public participation could improve alternatives assessment as interested and affected parties could contribute local and indigenous knowledge, as well as applying a socioeconomic strategy to the proposed development area, which could further guide and provide informed alternatives assessment. Steinemann, (2001:16) stated that '*It is unlikely that public suggestions will lead to the development and consideration of a new type of alternative*'. Public participation has limitations due to the fact that most I&AP consultations start too late into the project's timeline to influence the main alternatives and the need for the development.

In this study, both the above findings hold truth. In the Malelane Safari Resort development EIA, I&APs were informed that the decision to construct a hotel development in the Kruger National Park was a strategic decision that had been undertaken by SANParks prior to the EIA process, I&APs should not confuse SANParks strategic decisions with the EIA process. It could be argued that I&APs therefore have no influence on the larger decisions and alternatives assessments undertaken by SANParks on a strategic level. In line with Kamijo and Huang's (2016) findings, during the Phalaborwa Wildlife activity hub stakeholder engagement, stakeholders made suggestions on the size of the planned infrastructure in the hub such as increasing the size of the swimming pool on the facility, which was accepted by SANParks. SANParks response to the

suggestions to open up the hub to the adjacent golf course, as well as the addition of walking trails was that it was not feasible at the time and would be reconsidered at a later stage. It is unknown if these I&AP suggestions will be considered by SANParks and incorporated into the Hub. This case study further confirms the argument made from the Malelane Safari Resort above, that I&APs participation in EIA processes has little influence on EIA processes and alternatives assessment. I&APs cannot influence strategic decisions. The most they can influence are small negligible infrastructural specifications such as the footprint of a swimming pool.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Results & analysis

To answer the first research question, 'To what extent are alternatives considered in EIA in the Kruger National Park?', the extent of alternatives assessment in EIA in the Kruger National Park was found to be adequate. The categories of alternatives were generally well assessed in each report. Alternatives categories such as design/layout, the no-go alternative and technology alternatives are well assessed. Alternatives categories such as property/location, operational and activity alternatives are poorly assessed and therefore brought the average down for this section of the assessment. This was found to be so because these alternatives are assessed and determined on a strategic level and cannot be decided on an EIA level, EIA was therefore unable to fully assess and inform these alternatives categories.

To answer the second research question, 'What is the quality of the alternatives assessed?', the quality of the alternatives assessed in these EIA reports is satisfactory with predominantly A grades and B grades occurring. From the findings of these first two research questions, it can be concluded that the quality of EIA alternatives assessment in protected areas is generally satisfactory when certain alternative categories such as operational and activity alternatives are removed from an assessment due to EIA not being an appropriate tool for their assessment, as they are decided upon on a strategic level, prior to EIA implementation.

Due to the small sample size, a conclusive conclusion could not be drawn on if EAP education, experience and professional accreditation influenced the quality of alternatives assessment in these case studies.

Other factors that the study found to influence alternatives assessment negatively included the timing of EIA in the project timeline. Project proponents commissioned EIA studies when significant investment had already been made into their preferred alternative; therefore limiting comprehensive alternatives assessments to their preferred alternative. Specialist assessment recommendations were found to be a factor that affected alternatives assessment positively and ensured the adoption of layout alternatives with low ecological sensitivities. Lastly, public participation as per Steinemann's (2001) findings, was not able to significantly influence alternatives or lead to new alternatives, I&APs could only influence inconsequential alternatives. This ties in with the strategic level at which important project decision-making and alternatives assessment is undertaken, as well as with the timing in which EAPs are involved in project process, which is often too late into the project design.

5.2 Recommendations and areas of future research

Future research should assess the quality of alternatives assessment undertaken by SANParks at strategic level when deciding on the; property/location where the activity is proposed to be undertaken, the type of activity to be undertaken, the design/layout of the activity, the technology to be used in the activity and the operational aspects of the activity - for developments to be undertaken in the Parks. The findings, combined with this study, will provide a comprehensive assessment of alternatives assessment for developments in Protected Areas on both strategic level and EIA level.

There is also an opportunity for SANParks to rethink their concessions and commercialization approach, and to include an assessment of alternatives early in the process in the future to determine if there are any other activity alternatives that will fulfill their financial and commercial objectives. EIA can be used to weigh in on these options.

EIAs for developments in protected areas should be evaluated more rigorously than standard EIAs due to the high level of biodiversity and sensitivity. As part of NEMA, a framework for protected places should be created, with specific requirements such as a full investigation of alternatives and external review depending on the type of application. This will ensure that this component of EIA is better assessed, and that greater focus can be paid to alternative assessment training, a section of EIA which has been reported to be poor around the world.

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ANNEXURE A

EIA Alternatives Assessment in protected areas: A case study of the Kruger National Park.

1. What was your highest qualification level when you undertook this EIA process?

- Matric
- Diploma
- Degree
- Honours/BTech
- Masters

2. How many years of work experience did you have when you undertook this EIA process?

- 1 - 2 years
- 2 - 4 years
- 4 - 6 years
- 6 - 8 years
- 8 - 10 years
- more than 10 years

3. Were you registered with any environmental professional body during the time of the EIA process?

Yes

No

4. How would you describe the Developer's involvement in the alternatives assessment phase of the EIA process?

Not involved - It was solely upto the EAP to determine alternatives.

Moderate involvement.

Highly involved - Developer worked with EAP to determine alternatives.

Other (please specify)

5. How would you describe SANParks' involvement in the alternatives assessment phase of the EIA process?

Not involved - it was solely upto the EAP and Developer to determine alternatives.

Moderate involvement.

Highly involved - SANParks worked the with EAP and the Developer to determine alternatives.

Other (please specify)

6. Indicate the alternatives that the Developer proposed at the start of the EIA process. (*Select multiple*)

Location alternatives

Development type alternatives

Design layout alternatives

Technology alternatives

Operational alternatives

No-go option alternatives

7. Was the Developer receptive to the alternatives proposed by the EAP?

Yes

No

Other (please specify)

8. Did the Competent Authority authorise the Applicant's preferred alternative?

Yes

No

9. In your opinion, was the most environmentally sustainable alternative authorised?

Yes

No

Other (please specify)

10. In your opinion, what are some of the factors that affect alternatives assessment in EIA, in general.

Done