A Preliminary Assessment into Perceptions of Accuracy and Utility of the Environmental Impact Assessment Screening Tool, South Africa

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LMBMIC014

Minor dissertation presented

in partial fulfilment of the requirements for the degree of

Master of Philosophy in the Environment, Society and Sustainability

at the University of Cape Town

September 2021

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Declaration

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Abstract

Screening is an essential stage within the environmental impact assessment (EIA) process. In this stage, the type and scale of the environmental assessment are determined based on the potential environmental impacts of a development. The South African Department of Forestry, Fisheries, and the Environment (DFFE) has implemented a national web-based spatial screening tool which became mandatory when applying for environmental authorisation as of October 2019. The screening tool identifies environmental sensitivities and prescribes the relevant specialist assessments associated with a development footprint. Since the introduction of the screening tool, environmental assessment professionals' (EAProfs') perceptions regarding the functioning of the tool remain undetermined. Therefore, this research project aims to undertake a preliminary assessment of EAProfs' perceptions of the screening tool's accuracy and utility. A mixed-methods approach involving interviews and an online survey was used to collect qualitative and quantitative data from EAProfs, respectively. The research findings reveal mixed perceptions of the screening tool but with some more unequivocal findings. The results suggest EAProfs generally do not believe the screening tool accurately assigns sensitivity ratings for the various biodiversity themes. In terms of utility, the research found that EAProfs hold a neutral opinion meaning they do not believe the screening tool is useful or not useful, as per the survey. The interviews revealed that several EAProfs believe that the screening tool increases the time and costs of the EIA process, adding nuance to the survey results. Based on these findings, a recommended solution to the accuracy issues is to implement a specialist feedback loop. Additionally, better communication from the DFFE on the process of assigning sensitivity ratings could also enhance perceptions. A potential way forward is for the screening tool to adopt a less prescriptive and more voluntary approach, as used by CapeFarmMapper and Ireland's Environmental Sensitivity Mapping Webtool. Lastly, this research opens avenues for further work on how the accuracy and utility of the screening tool can be improved.

Keywords: Environmental Impact Assessment (EIA), Screening, National Screening Tool, Perceptions, Accuracy, Utility.

Acknowledgements

I am very grateful to my supervisors Merle Sowman and Kirsten Day, whose guidance and knowledge helped me take this dissertation from an idea formulated during a lecture to a completed research project. Thank you for the informative and supportive feedback throughout the process and invaluable advice during the many online meetings. I am also very grateful to all the Environmental and Geographical Science faculty staff, from whom I have learned so much.

Thank you to my friends and family. I am very grateful for all the support you have given me and for constantly being available for me to reflect ideas with. A special thank you to my family, whom I am deeply appreciative for and without which this would not have been possible.

I would also like to thank the 12 interviewees who gave of their time to discuss the screening tool with me. Your insight and time are greatly appreciated. I would like to thank everyone who took the time to complete the online survey. In addition, I would like to thank the International Association for Impact Assessment in South Africa for distributing my survey to all of their members via email and social media.

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List of Abbreviations and Acronyms

BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
CIPS	Coordinated and Integrated Permitting System
DEAT	Department of Environmental Affairs and Tourism
DEFF	Department of the Environment, Forestry and Fisheries
DFFE	Department of Forestry, Fisheries, and the Environment
DMR	Department of Mineral Resources
EAP	Environmental Assessment Practitioner
EAProf	Environmental Assessment Professional
ECA	Environmental Conservation Act 73 of 1989
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
ESM	Environmental Sensitivity Mapping
GIS	Geographic Information System
I&APs	Interested and Affected Parties
IAIAsa	International Association for Impact Assessment South Africa
IEM	Integrated Environmental Management
NEMA	National Environmental Management Act 107 of 1998
NEPA	National Environmental Policy Act 42 of 1969 United States of America
PV	Photovoltaic
S&EIR	Scoping and Environmental Impact Report
SACNASP	South African Council for Natural Scientific Professions
SADC	Southern African Development Community
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEA	Strategic Environmental Assessment
UCT	University of Cape Town
UK	United Kingdom
UN	United Nations
USA	United States of America

Chapter One: Introduction

1.1 Rationale

Environmental impact assessment (EIA) is a critical tool in project planning and environmental management (Glasson & Therivel, 2013). The use of EIA has been adopted by most countries worldwide, including many less economically developed countries (Wood, 2003). These countries use EIA to predict, assess and evaluate the environmental and social consequences of development proposals prior to decision-making. In South Africa, EIA was first legislated in 1997 and since then several changes to the law and procedural requirements have been made to improve the practice. The recent development of the national screening tool is one such innovation. This research project focuses on the newly introduced screening tool in South Africa. Currently, there is no research into the perceptions of environmental assessment professionals (EAProfs) with regards to the accuracy or utility of the screening tool. In this research, EAProfs include environmental assessment practitioners (EAPs), specialists, the environmental competent authorities and any other professionals working in the environmental assessment field. EAProfs work in environmental assessment with many being experienced in the field. They are thus well placed to assess the screening tool's accuracy and utility. The intention of the research is to undertake a preliminary assessment of EAProfs' perceptions of the screening tool's accuracy and utility. A preliminary assessment was undertaken as no published research has been undertaken on the screening tool as of August 2021. Therefore, this research project sought to undertake the first assessment of perceptions regarding the functioning of the screening tool to identify any areas of success or concern.

Since October 2019, it has become mandatory to apply the screening tool for the proposed development site when applying for environmental authorisation. The timing of this research is important as mandatory use of the screening tool commenced 15 months prior to the initiation of this thesis, allowing for multiple basic assessments (BA) and scoping and environmental impact report (S&EIR) to be conducted and published using the tool. In addition, this time has allowed EAProfs to become familiar with using the screening tool. Since the screening tool has been designed to be used by EAProfs, results on their perceptions will allow designers of the tool, other EAProfs and any interested and affected parties (I&APs) to gain a better understanding on the perceptions of professional users of the screening tool.

It is important to assess perceptions of accuracy and utility because the screening tool is intended to facilitate decisions regarding the scale and level of detail of the screening stage and EIA process. Therefore, the screening tool needs to accurately assign the sensitivity ratings for the relevant environmental themes to guide which studies are required at this early stage of the EIA process. Understanding EAProfs' perceptions of how accurately the screening tool assigns environmental sensitivities for a site, will show how much they trust the outputs of the screening tool. In addition, determining how useful the screening tool is, will provide information on whether EAProfs believe the tool is a beneficial platform that will, in turn, improve the screening stage in South Africa. It is assumed, that in order to improve the effectiveness and efficacy of the screening stage and thus the EIA process in South Africa, the tool must be accurate and utilisable. Without these criteria being met it is difficult to envisage how the tool will add value to the existing EIA procedure.

In addition to assessing perceptions, understanding the purpose of the screening tool is important to gain insight into what the tool aims to achieve with regards to the efficiency and effectiveness of the EIA process in South Africa. According to the Department of Forestry, Fisheries, and the Environment's (DFFE's) website, the screening tool's purpose is to provide maps indicating how sensitive each aspect of the environment is for a proposed development site, and to generate the subsequent report (Department of Forestry, Fisheries and the Environment [DFFE], 2021). Despite the vague purpose of the screening tool, no specific objectives for the tool have been published by the DFFE. Identifying the objectives of the screening tool, as part of this research, will allow EAProfs to gain a better understanding of why the tool was implemented and what it aims to achieve. Assessing perceptions will provide insight into whether EAProfs believe the screening tool is meeting these objectives and thus succeeding in fulfilling what the tool is designed to achieve.

1.2 Aim

Against the backdrop of the rationale, the aim of this research is to undertake a preliminary assessment into the accuracy and utility of the recently introduced screening tool for EIA in South Africa.

1.3 Research questions

In order to fulfil the aim, the following questions will be addressed by the research:

1) What are EAProfs' perceptions of the accuracy of the screening tool's environmental sensitivities?
2) What are EAProfs' perceptions of the screening tool's utility?
3) Is the screening tool meeting its objectives?

1.4 Project structure

The dissertation begins with an introduction to the project which covers the rationale, aim, research questions, ethical considerations, and the assumptions and limitations of the research. The next chapter begins by describing the evolution of environmental legislation internationally and in South Africa. Background to and the process of EIA is described, including the different stages in the EIA process. Information on the purpose and current research on the screening stage in South Africa is then presented, followed by a brief outline of the screening tool. Finally, research into the use of geographic information systems (GIS) in the screening stage of EIA is discussed. The methods that were used to determine the accuracy and utility of the screening tool are then described in Chapter Three. Firstly, the process of preparing, undertaking, and analysing the interviews is explained. Next, the survey design and distribution processes are described, followed by how the survey results were analysed. Since the screening tool is relatively new, part of the research involved an exploration of the intention of the tool and how it works. This process is described in Chapter Four and is based on information gathered from government websites as well as interviews with professionals involved in designing the screening tool. The findings of the research are presented in Chapter Five which is made up of three sections, namely: objectives of the screening tool, survey results and interview findings. Chapter Six discusses the findings of the research in the context of current literature as well as the implications of the findings. The final part of this chapter provides recommendations to improve the accuracy and utility of the screening tool. Lastly, a concluding chapter summarises the findings and makes suggestions about a way forward.

1.5 Ethical considerations

This project was undertaken under COVID-19 lockdown conditions. The research required no field work or face to face contact, limiting the exposure to COVID-19. The research project and methods employed were subject to ethical clearance from the University of Cape Town's (UCT's) Science Faculty Research Ethics Committee. The research performed adhered to the UCT Research Ethics Code for Research Involving Human Participants. This code sets out that the researcher must consider the privacy and confidentiality interests of participants, respect the participants right to withdraw from the research process at any time without penalty and the research should not harm the participants. In addition, research participants were asked to provide voluntary consent to participate in the interview and survey.

1.6 Assumptions and limitations

This research is a preliminary assessment into EAProfs' perceptions of the accuracy and utility of the screening tool. The research does not draw any conclusions on the actual accuracy or utility of the screening tool.

Although carefully considered, only five criteria were used to assess utility of the screening tool. There could be more than five aspects of the screening tool that effect perceptions of utility. Therefore, assumptions were made about what aspects of the screening tool affect the utility. More survey questions could have been asked to assess the perceived accuracy of the screening tool. However, within the scope of a minor dissertation, it was challenging to keep the survey completion time short and ask enough questions to generate good quality data.

There is also the assumption that interviewees and survey participants answered the questions accurately. An additional limitation is that many of the participants in the survey and interviews work in the Western Cape province resulting in geographically skewed results. The interview process highlighted how there might be more negative opinions of the screening tool in the Western Cape compared to the rest of the country, which could cause perceptions to be skewed negatively.

The survey sample size was relatively small. A small sample size is justified since this study is a preliminary assessment into the perceptions of the screening tool's accuracy and utility. The

tool is also new so a number of EAPs may have felt under-qualified to participate on the basis of limited exposure to the tool. Therefore, the survey results might not be representative of the population of current or potential users of the screening tool. However, the perception of each user is important nonetheless, as the screening tool was designed to be used by EAProfs.

Lastly, there is limited research into the screening stage of the EIA process within South Africa and no known published research into the screening tool. This means there is a lack of available literature to develop methodology from and to interpret the findings of this research with. There is, however, extensive research into the origins of environmental management and EIA internationally and within South Africa. Based on the available literature, the legislative context and theoretical overview of this research project is presented in the following chapter.

Chapter Two: Legislative Context and Theoretical Overview

2.1 Introduction

To contextualise the screening tool as a mandatory step in the environmental assessment process, it is necessary to consider the legislative background for EIA from a global and national perspective. This chapter begins by reviewing the evolution of environmental assessment legislation both internationally and in South Africa. The background, purpose, and stages of EIA are explored and relevant literature on the effectiveness of EIA in South Africa reviewed and discussed. Next, a more detailed explanation of the screening stage and how it functions within the EIA process is given based on current research. An introduction to the screening tool is provided which sets the legislative context and briefly describes the purpose and features of the tool. Lastly, an overview of research into the use of GIS in the screening stage of EIA is provided.

2.2 Evolution of environmental legislation

2.2.1 International perspective

Human activity is having a detrimental impact on the environment, leading to ecosystem collapse and species being lost (Intergovernmental Panel on Climate Change, 2014; Millennium Ecosystem Assessment, 2005). Potential solutions to anthropogenic environmental degradation are widely discussed, resulting in the establishment of many practices, standards, and principles aimed at environmental protection and impact management. Over the past sixty years, there has been a marked increase in the global awareness of environmental issues (Aucamp, 2009; Glasson & Therivel, 2013; Lawrence, 1997). The rise of environmental awareness has led to an increasing realisation of the consequences of unsustainable development and brought about new legislation guiding how best to manage the environment. Consequently, environmental legislation has become an essential foundation for an effective EIA process to reduce anthropogenic induced environmental impacts associated with development projects (Wood, 2002).

The first environmental legislation was the National Environmental Policy Act 42 of 1969 (NEPA), passed in the United States of America (USA). The NEPA introduced EIA as a tool for identifying and evaluating environmental impacts associated with development activities. Under the NEPA, EIA refers to a prescribed process that begins with a screening stage, on the basis of which the competent authority will decide whether a basic environmental assessment or a more comprehensive environmental impact statement is required.

Although the USA was the first country to legislate a process for predicting, assessing, and managing impacts, concerns for the environment were not only restricted to the USA. In 1972 the United Nations (UN) Conference on the Human Environment in Stockholm was held where solutions were discussed to the universal issue of environmental degradation (Sohn, 1973). During the conference, EIA was identified to be an essential instrument to promote sustainable development. This conference, together with the promulgation of the NEPA, encouraged many other countries to establish their own EIA legislation (Brown, 1990; Wood, 2003). In the European Union, EIA was first legislated in 1985, fifteen years after the introduction of the NEPA; however, the commencement of the EIA process had begun in 1975 and 1976 in Germany and France, respectively (Aucamp, 2009; Glasson & Therivel, 2013). Between 1983 and 1989, EIA legislation was introduced in Britain, Denmark, The Netherlands, and Switzerland. Given different development trajectories and priorities, the establishment of environmental legislation was more delayed in African countries (Kakonge, 2006). South Africa, Angola, Lesotho, Mauritius, Tanzania, Swaziland, and Zimbabwe only enacted EIA legislation between 1997 and 2004. Despite differences in timing, according to Morgan (2012), 191 out of the 193 countries part of the UN have legislation that mandates EIA as of 2012. The extent and robustness of legislation underpinning EIA has contributed to the assessment tool becoming widely utilised (Jay et al., 2007).

2.2.2 South African perspective

Environmental policy in South Africa has progressively developed through many conferences, councils, and frameworks. An important event in the development of the EIA process in South Africa was the “Shaping our Environment” conference in 1979 (Sowman et al., 1995). At this event, private and public professionals, as well as academics and the public, discussed the merits of the EIA process (Blight, 1980). Following the conference, what was then the Department of Environmental Planning and Energy Affairs, as well as several non-

governmental organisations, continued to advance critical outcomes from the conference related to the EIA process (Blight, 1980). In 1980 the government signalled their intention to legislate the EIA process by releasing a document titled "White Paper on a National Policy Regarding Environmental Conservation". This document did not make the EIA process mandatory but did show that the government recognised the potential value of EIA as a tool for protecting the environment from the negative effects of project development (Sowman et al., 1995). In 1981, the environmental policies in the White Paper were developed further by a Commission of Enquiry. The revised environmental policies led to enacting the Environmental Conservation Act 100 of 1982 (South Africa, 1982). However, this act did not contain any substantive basis for EIA in South Africa.

Only in the 1980s did environmental evaluation procedures begin to be implemented through the formation of the Council for the Environment in 1983 (Sowman et al., 1995). This council established the EIA Committee which was responsible for gathering information on differing EIA procedures globally. The findings from the EIA Committee were published in a document authored by Schweizer (1985). As a consequence of this research, a national workshop was convened in 1985 which included members of the public and private sector. During the workshop, the attendees discussed the need for the EIA process and how it should be adopted (Council for the Environment, 1986). Following the workshop, an interdisciplinary collaboration of researchers was tasked with establishing a philosophy that would support future environmental evaluation procedures in South Africa. After two years of research, the Integrated Environmental Management (IEM) document was released (Council for the Environment, 1989). The concept of IEM underpins the rigorous legislative framework that currently governs EIA in South Africa (Council for the Environment, 1989). IEM was not only concerned with regulating activities but also aimed to integrate biophysical and social concerns into environmental assessment, specifically to cater to the development priorities in the South African milieu (DEAT, 2004; Fuggle & Rabie, 2009; Sowman et al., 1995).

Notwithstanding early attention given to the need for environmental protection, South Africa was slower than many European countries to formally legislate the EIA process (Sowman et al., 1995). In 1989, the new Environment Conservation Act 73 of 1989 (ECA) (South Africa, 1989) was promulgated, replacing its 1982 precedent. The ECA was the first legislation to regulate the harmful impacts of development on the environment through an activity identification and reporting process (Sowman et al., 1995). The notion of screening was

introduced in this first enactment of environmental legislation by the ECA. However, the ECA did not include detailed procedural requirements, but instead specified a short list of 11 activities that would require environmental authorisation prior to commencement. The ECA deemed that these activities had a high probability of causing significant environmental harm. The activities were fairly broad and included but were not limited to transportation, waste disposal, agricultural processes, chemical treatment, and recreation. The ECA was thus more focused on general criteria for managing the environment rather than on the specific scale and detailed nature of activities that affect the environment (Sowman et al., 1995). Despite its generality, the ECA signified a key step in legislating the EIA process, laying the groundwork for further development of the practice, including the progression toward a more comprehensive set of "listed" activities in environmental legislation. As of the 8th of September 1997, the first EIA Regulations (South Africa, 1997) were published under the ECA making EIA a mandatory process for specified activities. In 1998, following the introduction of the Constitution of South Africa (South Africa, 1996), the ECA was replaced by the National Environmental Management Act 107 of 1998 (NEMA) (South Africa, 1998).

The NEMA was a landmark statute, intended to enforce Section 24 of the Constitution, which states that "everyone has the right to an environment that is not harmful to their health or wellbeing and to have the environment protected through reasonable legislative measures" (South Africa, 1996). The NEMA, a far more comprehensive statute compared to the ECA, provides a framework for co-operative governance and management of the environment by guiding decision-making. In addition, the NEMA defines core principles that must inform decision-making, and allows for the enforcement and administration of environmental laws specified in other acts and statutes, such as those referring to water, waste, and pollution for example. The principles of the NEMA originated from the pragmatic approach of IEM, which adopted a broad perspective of environmental management and provided a holistic framework to achieve sustainable development (Fuggle & Rabie, 2009; Sowman et al., 1995).

The government department that administers environmental affairs, according to the NEMA, is the DFFE. This department has undergone restructuring several times since 1994, with fisheries and forestry being joined to agriculture for a period (2010-2018). However, in the recent national government elections in 2018, fisheries and forestry were once again included under the Department of the Environment, Forestry and Fisheries (DEFF) but this name was changed to the DFFE on the 5th of March 2021 (South Africa, 2021). However, environmental

affairs are administered co-operatively by both national and provincial governments, as set out in Schedules 4 and 5 of the Constitution read with Chapter 3 (South Africa, 1996). Section 24 (C) of the NEMA states that the nine provincial government departments are the default decision-making authorities unless otherwise stated (South Africa, 1998). The manifestation of the concurrent competencies for environmental affairs results in the provincial departments making most of the decisions regarding environmental authorisations with the national government making decisions on more strategic or inter-provincial developments.

2.3 Environmental impact assessment (EIA)

2.3.1 Background and purpose

As originally envisaged in the NEPA and practiced the world over, EIA in South Africa is an anticipatory tool with an aim to predict the potential positive and negative environmental impacts of proposed developments (Jay et al., 2007). Under the NEPA, the term EIA referred to the process of assisting decision-making on a project-level and a strategic level (Bina, 2007). As EIA has developed, the assessment practice has shifted focus to almost entirely the project level. In South Africa, only project-level EIA is legislated, with strategic environmental assessment (SEA) being a discretionary tool (Kidd & Retief, 2009). At the project level, the EIA process is methodical, multidisciplinary, and holistic in its approach to identifying potential environmental impacts (Glasson & Therivel, 2013). Specialist assessments are commissioned to investigate the potential social, biological, and physical impacts of a development. Based on the results, the EAP drafts a report which is submitted to the authorities as a basis for decision-making.

Assessing the sensitivity of the development site is key to determining the potential significance of the environmental impacts (Del Campo, 2017). Development on a highly sensitive environment, such as a wetland, will likely have a greater environmental impact than on a less sensitive area such as an abandoned carpark. As part of the EIA, the EAP anticipates and assesses the magnitude, likelihood, and scale of environmental impacts. The EIA process thus allows relevant authorities to consider trade-offs associated with a proposed development which aids in making rational and informed decisions (Glasson & Therivel, 2013). EIA also recommends potential mitigation measures and alternatives to reduce adverse environmental impacts. A comprehensive and well managed EIA means that developers and governments, who may see the EIA as lengthy and costly, can also appreciate the benefits of EIA, as

environmental issues are identified prior to the commencement of the development activity (Glasson & Therivel, 2013). Early identification of environmental problems can prevent a proposed development from stalling during the construction phase, thus leading to fewer cost and time delays (Glasson & Therivel, 2013). The advantages of the EIA process are, however, dependent on the EIA system balancing efficiency whilst simultaneously maintaining comprehensiveness and integrity. Each stage of the EIA process needs to be efficient so as not to hinder development.

2.3.2 Stages in EIA

The EIA process can be divided into six stages, starting from when the development project is initiated to a decision on whether the development is permitted to proceed or not. A diagram of the process is provided in Figure 2.1. In the figure, key stages are outlined by solid lines with explanations of each stage outlined in dashed lines.

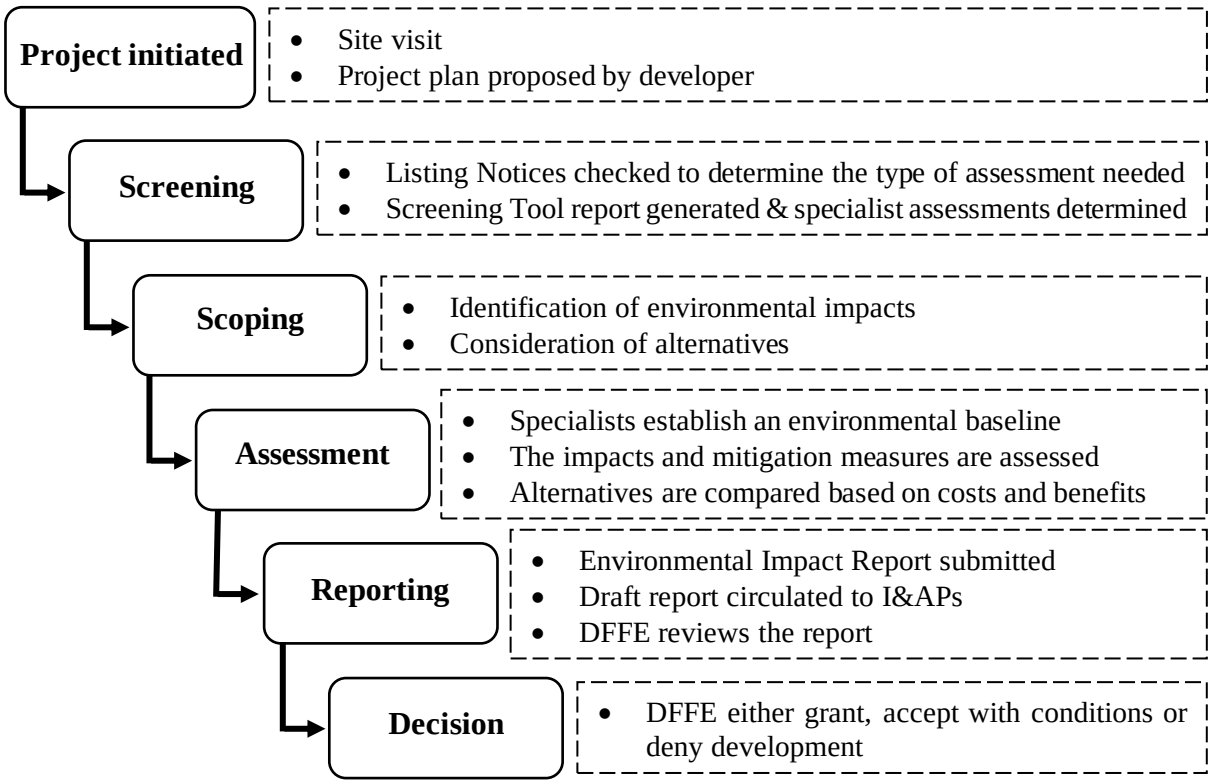


Figure 2.1: Stages in the South African EIA process, adapted from Glasson and Therivel (2013) & Mubanga and Kwarteng (2020).

The developer is the person who initiates the EIA process as they require environmental authorisation. The developer will appoint an EAP who manages each stage of the EIA process.

Throughout the EIA process various stakeholders are involved, including specialists, and the public. Specialists are considered experts in their field and are mainly involved in the assessment stage but may also provide input in the screening stage. I&APs are involved predominantly in the scoping and review stages and represent any members of the public interested or affected by the development. The competent authorities are the members of the government who either grant or deny environmental authorisation for the development, based on the EIA report.

Given that the focus of this research is on the screening stage in the EIA process, the following section will provide more detail about this stage.

2.4 Screening

2.4.1 Background

Screening is the first stage of the EIA process (Figure 2.1) and is critical to determine the need for and the type of environmental assessment to be undertaken (Sadler, 1996; Wood, 2000; Wood & Becker, 2005). As indicated above, screening has been an important stage of EIA in South Africa since the enactment of the ECA. The screening stage ensures only developments with potential significant environmental impacts require an EIA. By screening out certain activities where the consequences are likely to be *des minimus* the competent authorities can focus on the developments with more severe potential environmental impacts. Based on the outcomes of screening, either a BA or a S&EIR is required in South Africa. BAs are required when the development is likely to have less severe environmental consequences and is not as rigorous and time-consuming as the full S&EIR process. If the screening stage concludes that the proposed development is likely to have minimal environmental impacts that are easily mitigable, no environmental assessment is needed.

Many countries rely on a list-based approach as a means of screening (Campion & Essel, 2013; DEAT, 2002; Glasson et al., 2005). Screening in countries such as Egypt, Tunisia, Turkey, India, Ghana, Denmark, the United Kingdom (UK) and South Africa use this list-based approach as a way to try and ensure streamlined and consistent decision-making (George, 2000; Glasson & Therivel, 2013; Nielsen et al., 2005; Rajaram & Das, 2011; Weston, 2011). However, in some countries, such as the former Soviet countries, there is no prescribed screening stage, and the type of EIA conducted is based on the relevant authority's discretion.

Challenges and opportunities associated with activity listings are discussed in more detail below, specifically in relation to the South African approach to screening.

2.4.2 Screening in South Africa

A challenge for South Africa and all developing countries is the need for social and economic development, whilst maintaining the integrity of sensitive ecosystems. An effective screening process attempts to ensure that developments with significant environmental impacts are adequately assessed and unnecessary assessments on developments with negligible environmental impacts are avoided. Effective screening allows for the subsequent EIA process to focus on significant environmental impacts and for sustainable development to proceed (International Association for Impact Assessment [IAIA], 1999; Pinho et al., 2010; Wood, 2002).

Recognising the importance of the screening stage in the EIA process, South Africa has been exploring ways to improve the rigour of this stage. The regulations guiding screening in South Africa have become more detailed and comprehensive since their inception in 1997 under the ECA (Department of Environmental Affairs and Tourism [DEAT], 1998). The early listed activities were vague, did not impose specific thresholds, and lacked designated spatial sensitivities, leading to different interpretations and inconsistent quality of reports (DEAT, 2004; Retief et al., 2011). The broad approach to screening meant many developments triggered the EIA process and that a significant degree of discretion was used by the relevant authorities to make decisions (Van Schalkwyk, 2006). In 2006, the far more detailed EIA Regulations (South Africa, 2006) were promulgated in terms of the NEMA. The listed activities contained detailed descriptions, and the thresholds for environmental impacts became very comprehensive. Subsequent EIA Regulations in 2010, 2014 and 2017 promulgated under the NEMA have increased the number and detail of the listed activities (South Africa, 2010b; South Africa, 2014; South Africa, 2017).

The current EIA Regulations of 2017 include 122 listed activities with many more subcategories under each activity. The listed activities are contained in Listing Notices 1, 2 and 3 (South Africa, 2017). These Listing Notices are used to determine whether a BA, S&EIR or no assessment is needed. If a development falls under a listed activity in Listing Notices 1 or

3, then a BA is triggered. If a development falls under a listed activity in Listing Notice 2, then an S&EIR is triggered.

As alluded to previously, there are benefits and challenges associated with using a list-based approach in the screening stage of EIA. By having lists of activities that require an environmental assessment, developments can be easily screened to determine the type of EIA required. However, a developer could also contrive a development so that it is just below a critical threshold of triggering an EIA. For example, the threshold for a BA is between 1 – 20 hectares of indigenous vegetation cleared according to listed activity 27 in Listing Notice 1. However, there is very little difference in the significance of the environmental impacts between clearing 20 hectares and 21 hectares of indigenous vegetation. In this case, clearing 20 hectares of indigenous vegetation would require a BA whereas 21 hectares would require a S&EIR. In addition, a list-based approach with thresholds focussed on the type and scale of development result in a lack of consideration for the social, physical, or biological environmental sensitivities of the site (Wood & Becker, 2005). Another issue with using a list-based approach is that prescriptive thresholds can take away the discretion from the competent authorities (Pope et al., 2013). Conversely, the listed-based approach provides a more decisive mechanism for determining the type of EIA required, resulting in developers having more certainty when planning around time and costs associated with the EIA for a development. Furthermore, the task of deciding on the type of assessment is rather straightforward for the competent authority, although there is a clause in NEMA that allows the authority to exercise discretion to upgrade a project to S&EIR.

South Africa's listed activities focus predominantly on the type of development. Arguably the primary drawback of this activity-centric approach is the failure to account for different environmental sensitivities. The introduction of Listing Notice 3 in 2010 (South Africa, 2010a) marks an attempt to distinguish different environmental attributes associated with the different provinces of South Africa. Accordingly, each provincial department is given discretion to set thresholds for activities occurring within its provincial boundaries. Although well intentioned, there are limitations as far as incorporating consideration of environmental sensitivities is concerned due to provincial boundaries being a political and not an ecological demarcation. In addition, the environmental attributes included in Listing Notice 3 also use a list-based approach. Therefore, it is not possible for every environmental attribute to be accounted for under the listed attributes.

2.4.3 Status of the screening stage

There is limited published research assessing the screening stage of the EIA process in South Africa. Retief et al. (2011) showed how a change in EIA legislation between 1997 and 2006 had enhanced the screening of developments by reducing the number of EIAs undertaken. A more recent study by Havenga (2018), assessed the screening stage of EIA between 1997 and 2014. This dissertation concluded that the 2014 EIA Regulations improved the effectiveness of the screening stage by reducing the number of EIA applications in the Western Cape. However, Havenga (2018) mentions there are compounding factors which could lead to reduced EIA applications, such as the introduction of application fees and slowed economic growth in South Africa. Marais et al. (2015) inferred that the use of environmental management frameworks (EMFs) aids screening of EIAs by promoting development in areas of low environmental sensitivity, and the need to conduct detailed EIAs only in certain sensitive areas.

A premise for this research is that it is imperative that the screening process in South Africa is effective (George, 2000; Rebelo & Guerreiro, 2017; Retief et al., 2011). Notwithstanding the benefits of a detailed and unequivocal list of defined activities, research has shown that enhanced regulation of the EIA process in South Africa has not improved report quality (Sandham et al., 2013). The results from Sandham et al. (2013) indicate that the EIA process has become overly regulated and would benefit from some of the flexibility and discretion that characterised the early stages of its evolution. There is an additional concern raised by Bond et al. (2014) that streamlining the EIA process may lead to a loss of benefits, such as restricting public involvement.

There are, however, an inordinate number of EIAs being performed in South Africa, which burdens the EIA system (Retief et al., 2011). In addition, there are capacity issues with the competent authorities in South Africa regarding decision-making (DEAT, 2002; Kidd & Retief, 2009). Data released in a review of the EIA process in South Africa by the Department of Environmental Affairs and Tourism (DEAT) showed that South African authorities received an average of 3600 EIA applications per annum under the NEMA regime (DEAT, 2008). The review concluded that the screening stage was not effective enough and, therefore, too many EIAs were being triggered (DEAT, 2008). Unnecessary EIAs place strain on the competent authorities and cost developers more than necessary. According to recent research published by the Department of Environmental Affairs (DEA), the average number of EIA applications

received per annum was 1750 from 2010 to 2018 (Department of Environmental Affairs [DEA], 2018). In comparison, more economically developed countries such as the Netherlands, the UK, Germany, and Australia receive far fewer EIA applications, between 70 and 1000 (Glasson & Therivel, 2013). In addition, the booklet released by DEA highlights how the EIA process in South Africa is time-consuming and has limited effect on the decisions pertaining to the location of developments (DEA, 2018). These factors have contributed to the DFFE's decision to develop and introduce the mandatory web-based geospatial screening tool that is the subject of the empirical component of this research.

2.5 The screening tool

The screening tool is used during the screening stage of an EIA in South Africa to assist in the identification of any environmental sensitivities at a site and areas of special interest. Environmental sensitivities determine how sensitive different aspects of the environment are to development. Areas of special interest include EMFs, industrial development zones, protected areas, critical biodiversity areas or bio-regional plans. Use of the screening tool by EAPs became mandatory in South Africa as of the 4th of October 2019 under Regulation 16(1)(b)(v) of the EIA Regulations of 2014 (South Africa, 2014). The Notice (South Africa, 2019) was published in terms of section 24(5)(h) of the NEMA (South Africa, 1998). The screening tool generates a report which is required during the screening stage of the EIA process in terms of regulations 19 and 21, when applying for environmental authorisation (South Africa, 2014). Accordingly, an EAP is required to use the screening tool and generate the subsequent screening tool report for every project that requires an environmental authorisation. It is important to note that the screening tool is not used to determine whether or not an EIA is required but rather to determine environmental sensitivities of the site once a development triggers a listed activity in the three Listing Notices. Therefore, the screening tool compliments but does not replace the listed activities.

The screening tool is web-enabled and is found on the DFFE website using the following link: https://screening.environment.gov.za/screeningtool. The website is free to access, and the screening tool contains no restrictions to use.

The data in the screening tool draw from national environmental datasets. The intention is to compile and present the datasets on one platform, making the data easily accessible.

Environmental data are the raw facts about environmental attributes such as the number of species present on a site. Environmental information is providing context to the environmental attributes and is derived from the processing of data. The environmental information is presented as a sensitivity rating for a number of specified environmental themes. The sensitivity rating is intended to assist decision-makers to determine how sensitive the receiving environment is and which specialist studies are required. The screening tool also aims to improve the standardisation of reporting in the screening stage by prescribing what is required during the screening stage.

The implementation of the screening tool highlights how the DFFE is trying to improve the screening stage in the EIA process. The DFFE's focus on improving the early stages of the EIA process supports the statement that "…the role of assessment is changing as it moves upstream, targeting the early stages in the design of development proposals, and crucially the processes and contextual factors that shape these proposals" (Bina, 2007:600).

On the screening tool's website, a section providing help for users describes two purposes of the screening tool (DFFE, 2021). The two purposes are to "visualise environmental sensitivities on maps" and to generate a subsequent report (DFFE, 2021). The screening tool is a unique tool in South Africa as it can be used to generate national environmental sensitivity information based on available data. This distinguishes the tool from other GIS based platforms such as CapeFarmMapper. CapeFarmMapper is limited to the Western Cape and contains many environmental datasets relevant to screening such as agricultural areas, protected areas, and vegetation layers. However, CapeFarmMapper does not contain a function where sensitivity ratings can be determine based on the location and type of development. Rather the user determines how sensitive they believe the receiving environment is based on the available data. However, in other countries there are also GIS based tools used to determine environmental sensitivities.

2.6 Using GIS to assess environmental sensitivities

Geography is an important component of EIA practice (Sandham & Retief, 2016) and as technology improves, GIS-based approaches are increasingly being utilised in EIA (Rodriguez-Bachiller & Wood, 2009). GIS technology offers a means to assess spatial datasets and provide useful information on a site (Li et al., 2013). GIS is a system used to manage and analyse spatial

data using a computer (Bonham-Carter, 1994). By managing and analysing spatial data, environmental sensitivities and impacts can be identified.

In Ireland, a web-based tool has been developed called the Environmental Sensitivity Mapping (ESM) Webtool. This tool is designed to generate environmental sensitivity maps to inform the screening and scoping stages of SEAs in Ireland (González Del Campo et al., 2019). However, use of the ESM Webtool is unrestricted and therefore, the tool has also been designed to be applied during EIAs. Over 100 spatial datasets are housed in the tool and are grouped into nine broad themes which include aspects such as cultural heritage, biodiversity, soils, and human health. Each theme has various databases that can be viewed on the map function. A widget is built into the ESM Webtool which allows for a customised map showing selected aspects of the environment. The tool is not mandatory for use and does not include protocols like the screening tool. The user has the discretion to give each environmental aspect a weighting, which determines the relative significance of that environmental aspect compared to the other aspects. In addition, the user can select which datasets apply to their particular case. Based on the weighting and environmental aspects selected, the ESM Webtool models the variables to provide a map of the overall environmental sensitivities from very low to extreme. Findings from stakeholder engagement, via a survey and workshop discussions, showed that the ESM Webtool saves time and cost associated with mapping SEAs. The tool also promotes consistent access to environmental information and transparency in deciding on environmental sensitivities (González Del Campo et al., 2019).

There is research into the development of a specific GIS-based screening tool to be used in Spain. As part of the research, García-Montero et al. (2008) developed a screening tool used during the screening stage of SEAs. The study used criteria to identify areas where proposed road and railway developments had significant environmental impacts. Based on the tool's outputs, the authors suggested that future EIAs undertaken in the areas with potentially significant environmental impacts were likely not to receive environmental authorisation.

Notwithstanding the precedents in Ireland and Spain, there is limited research into the use of GIS technology in the screening stage of EIA. The limited research is despite the apparent suitability of GIS technology to the screening stage. The screening stage is a high-level assessment of the environment and the development, which should suit the capabilities of GIS technology to process large spatial datasets. The screening tool implemented in South Africa

is a unique and progressive use of GIS in the screening stage of EIA. To the authors knowledge, there is no other mandatory GIS-based screening tool specifically aimed at the screening stage of EIA worldwide. There are other GIS tools that have been developed to assess specific aspects in the screening stage, such as noise and ground vibrations (Hamed & Effat, 2007). However, the screening tool remains unique and innovative in its function and therefore presents a unique opportunity for research into user's perceptions of the tool.

Chapter Three: Research Methodology

3.1 Introduction

The following chapter describes the methodology for this research project. A mixed-methods approach was used to collect data on how accurate and useful EAProfs perceive the screening tool to be. The methods included a series of interviews and a survey, both of which are common techniques used in prior research to assess perceptions of various aspects of EIA (Havenga, 2018; Loomis & Dziedzic, 2018; Roos et al., 2020). The first part of this chapter describes the interview process, and the second part focuses on the survey. The interview component of the research was undertaken in three stages: a preparatory stage, the interview process, and an analysis stage. The survey methodology began with designing the survey, distributing the survey, and finally analysing the results.

3.2 Interviews

3.2.1 Preparatory stage

The purpose of the interview process was to gather in-depth and insightful qualitative data on perceptions regarding the accuracy and utility of the screening tool (Rowley, 2012). The process of conducting the interviews was based on current research and best practice techniques (Doody & Noonan, 2013; Jacob & Furgerson, 2012; Rabionet, 2011; Roulston, 2010; Rowley, 2012). Background research and informal engagement with EAPs, specialists and the researcher's supervisors provided guidance on who to interview, what questions would be informative and how best to ask such questions. Questions were generated based on the background research, informal discussions, and recommendations from EAProfs.

Ethical clearance was received from the Faculty of Science Research Ethics Committee at the UCT for the interviews (Appendix 2). A pilot interview was done with a specialist to improve the researcher's interview ability and to identify potential flaws in the interview process (Rabionet, 2011). The pilot interview also allowed the quality and clarity of the questions and the length of the interview to be tested (Jacob & Furgerson, 2012; Kvale & Brinkmann, 2009).

The process of identifying suitable interviewees involved sending 19 emails to potential candidates. Potential candidates were experienced users and designers of the screening tool working in the environmental assessment profession. The emails contained information on the researcher, the study, what the interview would entail and a consent form which participants were asked to complete and sign (Rowley, 2012). The consent form contained information on the research project, the interview process, and it informed participants of their rights to withdrawal and confidentiality. Of the 19 emails sent, 12 responded that they would be willing to be interviewed, three responded that they were not suitable candidates, and four did not respond. Participants who responded to the emails and completed and signed the consent form were then sent an online meeting link via either Zoom or Microsoft Teams for the agreed date.

3.2.2 Interview process

Twelve different interviews were conducted, as recommended by Rowley (2012). The participants of the interviews are shown in Table 3.1. The profession of the interviewees was kept vague on purpose to maintain anonymity. Interviewees who were involved in the design and development of the screening tool are referred to as "screening tool designers". Whilst interviewees who were not involved in designing the screening tool but do use the screening tool as part of their profession are referred to as "users." Each interviewee was given a code and referred to by that code when information was used from their transcript. The professions of each interviewee are also given, which was used to determine their code. EAPs, specialists, government officials and a scientist were all interviewed to understand a diversity of perceptions regarding the screening tool. Each profession and interviewee had a unique set of skills and experience relevant to the screening tool. This approach allowed for a broad range of viewpoints.

Table 3.1: List of 12 interview participants, their professions, and classification as a user or a designer of the screening tool.

Code	Profession	User/ screening tool designer
EAP 1	- EAP - Specialist	User
EAP 2	- EAP - Specialist	User
EAP 3	- EAP - Specialist	User
EAP 4	- EAP - Environmental scientist	User and screening tool designer
EAP 5	- EAP - Environmental scientist	User and screening tool designer
Gov 1	- Government official	User
Gov 2	- Government official	User
Gov 3	- Government official	User
Gov 4	- Government official	screening tool designer
Spec 1	- Specialist	User
Spec 2	- Specialist	User
Sci 1	- Species distribution scientist	screening tool designer

The interviews followed an online semi-structured format (Denzin & Lincoln, 2008). This format was necessary due to the risks posed by face-to-face contact during the COVID-19 pandemic. The semi-structured technique the interviewees to answer specific components about the screening tool whilst also allowing them to bring up topics they thought were relevant.

A script was used for the beginning and end of the interview (Appendix 1), as recommended by Jacob and Furgerson (2012). The interviews began with the researcher explaining the background and purpose of the study and the interviewees' rights. The comprehensive introduction was crucial in creating a comfortable interview environment (Rabionet, 2011). The interviewees were given the opportunity to ask the interviewer any questions before the interview began. Initially, the researcher asked each interviewee basic questions about their job description as well as how often and when they have used the screening tool. The researcher proceeded to ask the interviewees open-ended questions on their perceptions of the screening tool.

Those participants categorised as designers of the screening tool were asked questions focussed on understanding the need and objectives of the tool and the development process. Users of the screening tool were asked questions about their perceptions of the accuracy and utility of the tool. The two interviewees that are both designers and users of the screening tool were initially asked questions about their involvement in designing the screening tool and then questions relating to their perceptions of using the tool. All interviewees were asked to identify any areas of the screening tool they thought could be improved. The middle section of the interview was more of a conversation rather than a structured interview (Brinkmann & Kvale, 2008). However, the interviewer aimed to keep the interview as focussed as possible by using questions to prompt staying on topic (Jacob & Furgerson, 2012). The interviews were kept as short as possible. Most interviews were between 20 – 40 minutes, as recommended by Rowley (2012). If the interview went over 20 minutes, the interviewee was asked if they would like to end the interview. If the participant responded by saying they would be happy to continue, the interview would continue until 40 minutes elapsed. Notes were taken during the interview which allowed the researcher to ask follow-up questions or to ask for clarification on specific points. The interview was recorded, after permission from the interviewee had been given.

3.2.3 Interview analysis

Analyses of the interviews followed an inductive technique termed thematic content analysis, described by Burnard et al. (2008). The thematic content analysis technique originated from grounded theory and allowed for key themes to be drawn out of the interview transcripts (Glaser & Strauss, 1967; Ritchie et al., 2003).

The audio files were uploaded to Microsoft Word, which automatically transcribed the audio to text. Each audio file and the associated text file were then compared to check the accuracy. Any mistakes in the text were corrected to make sure the interviews were transcribed verbatim. Each transcript was read thoroughly by the researcher to become acquainted with the data. The interview data were analysed using QSR International's NVivo 12 software (NVivo 12, 2018). NVivo 12 was used as the software is considered to significantly aid qualitative data analysis (Hilal & Alabri, 2013). The transcriptions were uploaded to the NVivo 12 software. A structured reading process was followed whereby relevant responses were coded according to common themes. Common themes were condensed into key themes and relationships between key themes were coded. Key themes related to one or more of the following subjects: (1) perceptions of the screening tool, (2) the need or objectives of the screening tool, (3) how the screening tool benefitted the interviewees' job, (4) what concerns the interviewees had with the screening tool, and (5) any potential solutions interviewees thought would help or they would like implemented in order to improve aspects of the screening tool. If an interviewee said something that could give away their identity, words or phrases were changed to protect the participant's identity whilst maintaining the same meaning.

The key themes emerging from the interviews were used to create five criteria against which to assess the utility of the screening tool. Each criterion represents an aspect of the screening tool. The criteria cover the entire process of using the screening tool, from assigning sensitivity ratings to the protocols that have been designed to prescribe the specialist assessments required.

3.3 Survey

3.3.1 Survey design

The purpose of the survey was to collect quantitative data on perceptions of the screening tool from a large number of EAProfs. As with the interviews, the perceptions of EAProfs and not

only EAPs was assessed to receive a diversity of users' viewpoints on the screening tool. LimeSurvey was used to construct the online survey. The survey was designed to take approximately 3 to 4 minutes for participants to complete and was sent to two academics in the EIA field as a pilot test. The survey was kept short to encourage participation and to keep participants engaged. LimeSurvey was used due to the website's robust security and privacy policies as recommended by the UCT Faculty of Science Research Ethics Committee. Ethical clearance for the survey was received from the same UCT Ethics Committee (Appendix 2). The initial page, the questions, and the concluding page of the survey are shown in Appendix 3. The initial page explained the background to the project, the participants' rights to withdraw from the survey, and confidentiality. The initial page also contained a voluntary "Next" button that needed to be selected to continue with the survey questions. The survey questions were divided into two groups (Appendix 3).

The first group (Group 1, Appendix 3) contained four compulsory questions. These four questions were designed to gather background information on each participant. Question 4 of Group 1 asked participants to rate how experienced they are with the tool on a scale developed for the survey. The scale response options ranged from "no experience (never used the tool)" to "very experienced (have used the tool 10 times or more)". Since experience can be considered subjective, the number of times a user had used the screening tool was used to standardise each level of experience. Since the screening tool only became mandatory in October 2019, it is reasonable to assume that EAProfs would be "very experienced" if they have used the screening tool ten times or more. In addition, a function was built into the survey so that if a participant had no experience using the screening tool, they would not be able to answer any more questions.

The second group contained eight compulsory questions and one non-compulsory question (Group 2, Appendix 3). The response option for all eight compulsory questions was an adapted five-point Likert agreement scale. The Likert scale, developed by Likert (1932), is used to measure people's attitudes and is a useful way to gauge public opinion (Croasmun & Ostrom, 2011). This approach was chosen because it is a commonly used response option that is easily recognisable, simple, and produces reliable results (Bertram, 2007; Ho, 2017). The Likert agreement scale contains the following response options for participants to choose from: *strongly disagree*, *disagree*, *neutral*, *agree*, *strongly agree*. The simplicity and familiarity of

the Likert scale means that participants can complete the survey quickly, without requiring complex instructions.

Response bias is a known downside in survey data collection research (Furnham, 1986; Ho, 2017; Streiner et al., 2015) and occurs when participants answer a question incorrectly and can cause results to be distorted (Paulhus, 1991). Although this bias cannot be avoided altogether, in order to minimise its occurrence, the questions were formulated to be as clear and unambiguous as possible. Some questions framed the screening tool positively (Questions 1 – 5, Group 2, Appendix 3), whilst others framed the screening tool negatively (Questions 6 – 7, Group 2, Appendix 3) to reduce acquiescence bias. Questions were kept as short and straightforward as possible to maintain the participants' attention and focus. However, for some questions, explanations were added to clarify what was being asked. Statements that mention two topics (double-barrelled statements) and quantitative statements were avoided as recommended by Johns (2010). Making the survey responses anonymous also helped to reduce social desirability bias (Grimm, 2010).

The first question in Group 2 of the survey was intended to quantify participants' perceptions of how accurately the screening tool assigns sensitivities for the biodiversity themes (Appendix 3). It is useful to assess the perceived accuracy of the screening tool as both the sensitivity ratings and associated protocols rely on this output. However, the first question does not necessarily quantify how accurate the data is but instead quantifies participants' perceptions on how accurate the biodiversity sensitivity ratings are. Perceptions on how accurate the biodiversity sensitivity ratings are can provide useful data on how much participants trust the outcomes of the screening tool. The second question of Group 2 is indicative of whether EAProfs prefer the screening tool compared to other environmental information tools such as CapeFarmMapper.

Questions 3 – 7 of Group 2 were designed based on five utility criteria (Appendix 3). The utility criteria were derived from information gathered through interviews and a literature review. The five utility criteria are as follows:

- Comprehensiveness
- Adjusting the site footprint to avoid environmentally sensitive areas
- Protocols help specialists

- Affects cost
- Affects time

The comprehensiveness criterion relates to whether EAProfs believe that the screening tool helps them identify every feature of the site, including sensitive aspects and areas of special interest. If the screening tool provides information that some EAProfs would otherwise not have known about or forgotten to include in a screening report, the screening tool would be successfully improving the comprehensiveness of the screening stage. The criterion referring to the adjustment of the site footprint assesses if EAProfs believe the screening tool helps to adjust the positioning of a development to avoid environmentally sensitive areas. The protocol criterion speaks to the instrumental value of the protocols, even though they are not necessarily part of the screening tool. The protocols are relevant to the research as the screening tool prescribes which protocol applies, based on the assigned environmental sensitivities. The relationship between the protocols and the screening tool is elaborated on in Chapter Four. The last two criteria relating to time and cost are more practically orientated. EAPs and specialists are generally constrained by their clients and by regulated EIA schedules in terms of budget and timing, therefore reducing time and cost would make the screening tool useful to EAProfs.

The last compulsory question (Question 8) in Group 2 was included as an outlier and was not linked to the utility criteria (Appendix 3). Question 8 aimed to assess participants' perceptions on a process to improve the data in the screening tool. The question asked if specialists should be required to submit their environmental information from a site assessment to improve the accuracy of the source data in the screening tool.

At the end of the survey, participants were invited to include any further comments they had about the screening tool (Question 9, Group 2, Appendix 3). Participants could use this part of the survey to highlight anything they thought the survey missed or to provide a more in-depth explanation of their perceptions of the screening tool (O'Cathain & Thomas, 2004).

3.3.2 Distributing the survey

Two mechanisms were used to distribute the survey. Firstly, it was emailed to 12 EAProfs who were also interviewed in this study. Each interviewee was asked to send the survey to any EAProfs they thought would be willing to complete the survey. Secondly, the survey was

distributed nationally with the help of the International Association for Impact Assessment South Africa (IAIAsa). The IAIAsa secretariat sent the survey link to all its members in an e-brief on the 11th of May 2021 (Appendix 4) and posted the link to the IAIAsa Facebook group (Appendix 5) on the same date. The IAIAsa is a national organisation made up of around 1000 members from mainly South Africa but also other Southern African Development Community (SADC) countries. The organisation consists of EAPs, specialists, academics and other EAProfs.

3.3.3 Survey analysis

The survey remained open for 18 days from the 4th of May to the 21st of May. Once closed, the survey data were downloaded from LimeSurvey and imported into Microsoft Excel. Entries where the participants did not complete the survey or were opted out of the survey were deleted. One participant wrote that they were a renewable energy developer but did not select the "Developer" option in the survey. Their response was recategorised from "Other" to a "Developer". Summary tables of responses for the Group 1 questions were calculated using Microsoft Excel. An illustrative pie chart to show the province where participants mainly work was created using Microsoft Excel.

For Group 2, the adapted five-point Likert agreement scale responses were adjusted to numbers (Appendix 3). Responses were scored so that the best accuracy or utility score was five and the lowest was one. Questions that framed the screening tool positively were scored with *strongly agree* as five through to *strongly disagree* with one (Questions 1 – 5, Group 2, Appendix 3). Questions that framed the screening tool negatively were scored oppositely so that *strongly agree* was scored as one and *strongly disagree* was scored as five (Questions 6 & 7, Group 2, Appendix 3). This approach allowed for a statistical analysis of the results.

In order to decide on an approach to the statistical analysis, it was necessary to consider the debate in the literature as to whether Likert questionnaire responses can be considered ordinal or interval data (Carifio & Perla, 2008). This debate has been ongoing for over 60 years (Carifio & Perla, 2008) and the decision is critical as interval and ordinal data are analysed differently. Interval data are parametric, whereas ordinal data are non-parametric. Therefore, the wrong assumptions about the nature of the data could lead to incorrect statistical analysis procedures being used and invalid results. Furthermore, there are two types of Likert data. A single

question is a Likert type item, and a combination of several Likert type items forms a Likert scale (Clason & Dormody, 1994). Several prominent researchers have done extensive studies and concluded that Likert type items are considered ordinal and are thus non-parametric, whereas Likert scales are interval and are thus parametric (Allen & Seaman, 2007; Boone & Boone, 2012; Joshi et al., 2015; Norman, 2010; Sullivan & Artino Jr, 2013).

Based on consensus among these scholars, bar graphs were identified as an appropriate way of plotting Likert type items to show variation (Boone and Boone (2012). Mode and median were used as measures of central tendency for the questions assessing accuracy of the screening tool, preferred source of environmental information and the required submission of specialist information (Question 1, 7 & 8, Group 2, Appendix 3). Mode and median were used as a measure of central tendency because the data from these questions are considered to be ordinal (Boone & Boone, 2012). A diverging stacked bar graph of the perceived utility was created using Microsoft Excel, as used by Sandbrook et al. (2019) and recommended by Robbins and Heiberger (2011), to show distributions. The diverging stacked bar graph is useful to visualise the data from multiple questions. Mean is used as a measure of central tendency for the five combined utility questions as the data are interval (Appendix 3, Group 2, Questions 2 – 6). The mean utility score quantifies participants' perceptions of the screening tool's utility.

3.3.4 Comments

Comments were categorised as information gathered from the comments question of the survey and statements sent to the researcher independently of the survey or interviews. The comments were excluded from the thematic analysis conducted on the interview transcripts. Following the example of Dermo (2009), a selection of comments was chosen and presented. The comments are indicative of a range of opinions offered by the participants about the tool.

Along with the findings on EAProfs' perceptions of the screening tool, the mixed method approach produced unique and unpublished information on how the screening tool works. In the next chapter this new information and current published documents are reviewed as the functioning of the screening tool is explored.

Chapter Four: Exploring the Screening Tool

4.1 Introduction

The screening tool is a recent introduction and has been mandatory for use in South Africa for approximately two years. Therefore, it is important to convey its intended purpose and how it is applied in practice to facilitate the explanation of the findings in Chapter Five. Information was collected on the screening tool by careful reading of the description and instructions on the DFFE website, and by conducting two interviews with EAProfs involved in designing the screening tool. This chapter informs the reader about the motivation for the introduction of the screening tool and information on each step in the process of using the screening tool. A hypothetical example of a Solar photovoltaic (PV) plant development is used to illustrate various critical or complex steps of the screening tool. Critical steps are identified as those that need to be understood to interpret the results.

4.2 Need for the screening tool

The first task was to understand the need for the screening tool and hence an interview was conducted with one of the designers of the screening tool who works for the South African government. The interviewee explained that part of the motivation for developing the screening tool was that EAPs were using different platforms to access environmental information, which meant there was no consistency in the type of environmental information used for project sites when conducting EIAs. The designer said:

> *This EAP will use environmental information from 2004, that EAP [will] use information on biodiversity from the SANBI [South African National Biodiversity Institute] website; others would use information from Google Earth. So, the information base that we were assessing environmental impact assessments on was not the same (Gov 4, 2021).*

The need for the protocols, as a further component of the screening tool was in response to specialist reports not including sufficient or accurate information about how the development will affect particular environmental aspects. The interviewee said, “We see a lot of specialist reports coming in where you're told about the latest research into X, Y and Z … but specific

information on how you are going to affect that species, for example, is not provided" (Gov 4, 2021).

4.3 Screening tool steps

The process of using the screening tool follows the subsequent steps (DFFE, 2021):

Step 1) Accept the disclaimer and click "Next".
Step 2) Select the national sector classification category.
Step 3) Identify the locality of the site.
Step 4) Check the site's environmental sensitivity.
Step 5) Identify locality of the development footprint.
Step 6) Check environmental sensitivity for the development footprint.
Step 7) A report is generated, and protocols prescribed.
Step 8) Report is linked to the coordinated and integrated permitting system (CIPS).

The critical and more complex steps in the screening tool are elaborated on further.

Step 2: Select national sector classification category.

The national sector classification category is selected according to the type of development. All environmental authorisation applications must include the national sector classification category according to Regulation 9 of the EIA Regulations (South Africa, 2014). Depending on which category is selected, various subcategories are presented. The national sector classification category options are as follows (DFFE, 2021):

- Infrastructure
- Utilities infrastructure
- Services
- Mining
- Agriculture, forestry, or fisheries
- Transformation of land
- Any activities within or close to a watercourse
- Any activity in an estuary, on the seashore, in the littoral active zone, or in the sea

- Activity requiring permit or licence in terms of National or Provincial legislation governing the release or generation of emissions
- Activity requiring permit or licence
- Release of Genetically Modified Organisms

The example of a hypothetical Solar PV project would be categorised as "Utilities infrastructure" under the national sector classification system (Figure 4.1). Once all the subcategories have been selected from the drop-down list, the type of assessment methodology is presented. In the Solar PV plant case, the methodology is related to a specific methodology for Solar PV developments. The methodology for a development type determines how the screening tool assigns the sensitivity ratings for the relevant environmental themes.

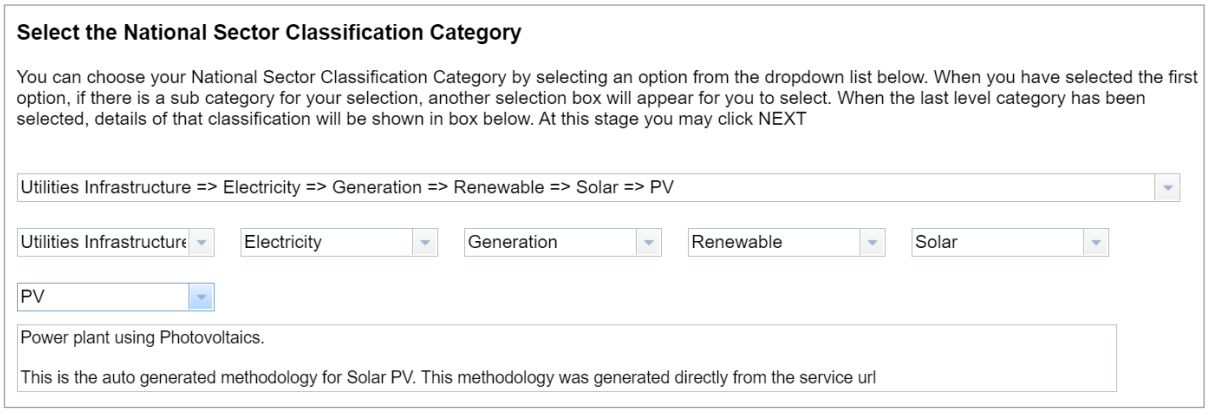


Figure 4.1: The selection of a national sector classification category, using a hypothetical example of a Solar PV project (DFFE, 2021).

Step 3: Identify locality of the site.

Once the national sector classification category page has been completed, users are taken to a page to identify the site (Figure 4.2). On the left is the layers window where different spatial data can be selected, distances measured, and users can add their data into the screening tool. The central window shows the map where the selected layers appear. On the far right is the window which is used to identify a site.

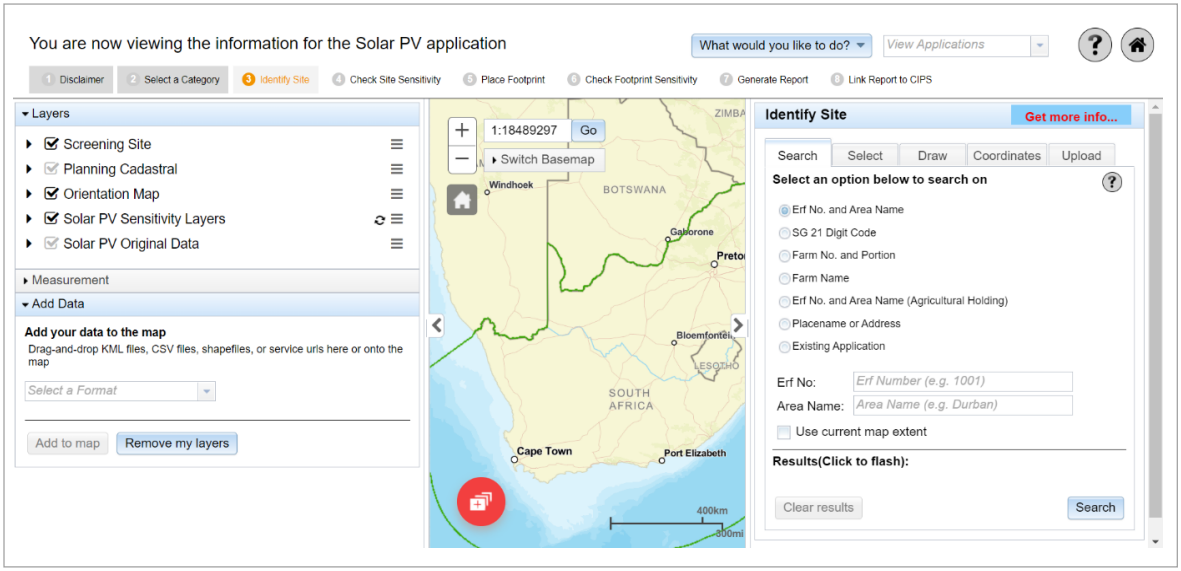


Figure 4.2: The page where the site is identified (DFFE, 2021).

Step 4: Check the site's environmental sensitivity.

Once the site area has been selected, the site's environmental sensitivities are determined by the screening tool. The screening tool identifies the spatial datasets with which the site area overlaps. The check site sensitivity window on the right-hand side prompts the relevant environmental themes to be selected. The map window then displays the selected environmental theme and the subsequent sensitivity rating. For example, Figure 4.3 shows the sensitivities in respect of the agricultural theme for the hypothetical solar PV plant. The screening tool identifies which environmental themes are sensitive to the development based on the position and the type of development. The environmental sensitivities for the site can then be determined by generating a report for the site. A development footprint can also be placed within the site area. By adjusting the footprint, developers can ideally avoid environmentally sensitive areas as far as possible and thus reduce the impacts of the development on the environment.

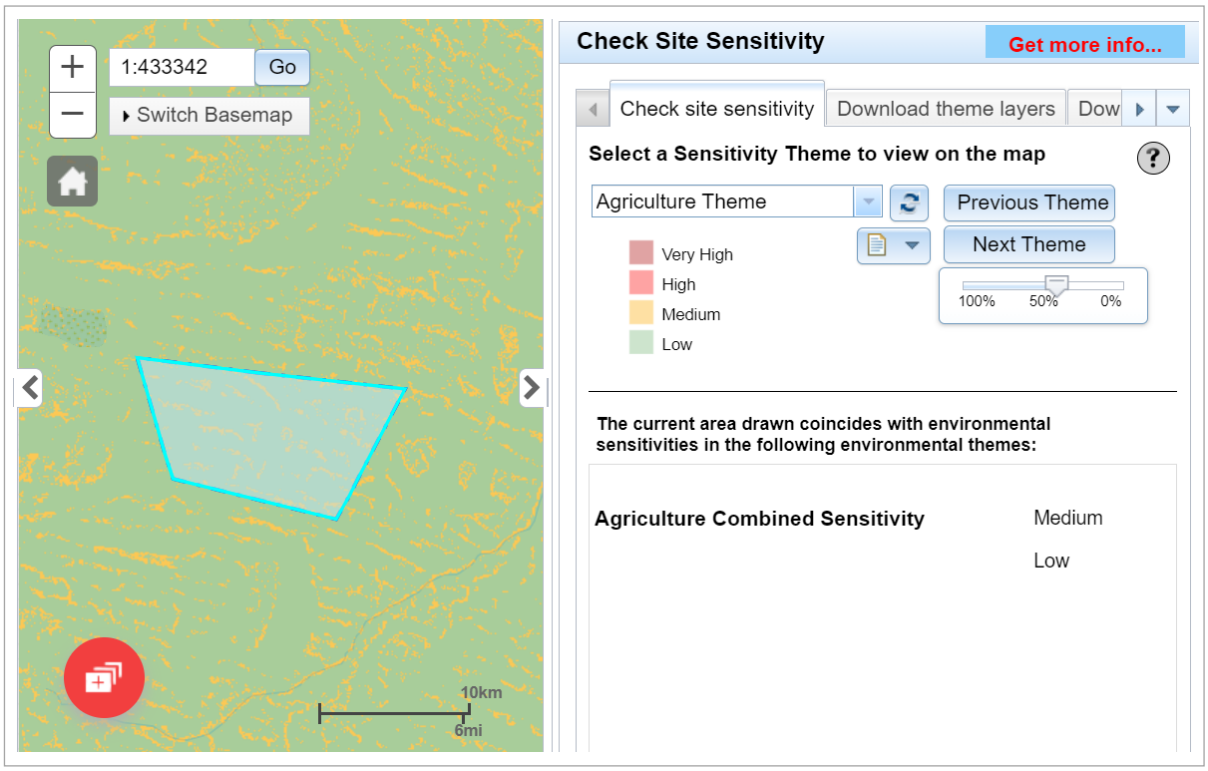


Figure 4.3: The step where the site sensitivity is checked (DFFE, 2021).

The screening tool is designed to use environmental themes to quantify the environmental sensitivities of the proposed site. There are nine main environmental themes used for assessing the environmental impacts associated with a development. The main environmental themes are as follows:

1. Agriculture
2. Archaeological and cultural heritage
3. Civil aviation
4. Defence
5. Palaeontology
6. Plant species*
7. Animal species*
8. Aquatic biodiversity*
9. Terrestrial biodiversity*

* Biodiversity themes

For each environmental theme, the site is scored as one of four sensitivity ratings: very high sensitivity, high sensitivity, medium sensitivity, and low sensitivity. The classification is based on unique criteria for each environmental theme. For example, if the solar PV plant was in an area that has no natural habitat and there are suspected to be no species of conservation concern (SCC), then the site is considered to have a low sensitivity rating for the plant species theme (Figure 4.4). However, if the proposed site for the Solar PV plant, supports important habitat for a species with a range of less than 10km^2, then the site will be classified as having a very high sensitivity rating for the plant species theme, as depicted in Figure 4.4.

VERY HIGH SENSITIVITY RATING – for terrestrial plant species:

1. Critical Habitat for range restricted species[4] of conservation concern that have a global range of less than 10 km^2.
2. SCC listed on the IUCN Red List of Threatened Species[5] or on South Africa's National Red List website[6] as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare[7].
3. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle.
4. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species.

These areas are irreplaceable in terms of SCC.

HIGH SENSITIVITY RATING – for terrestrial plant species:

1. Confirmed habitat for SCC.
2. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria.

These areas are unsuitable for development due to a very likely impact on SCC.

MEDIUM SENSITIVITY RATING – for terrestrial plant species:

1. Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model[14].
2. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.

LOW SENSITIVITY RATING – for terrestrial plant species:

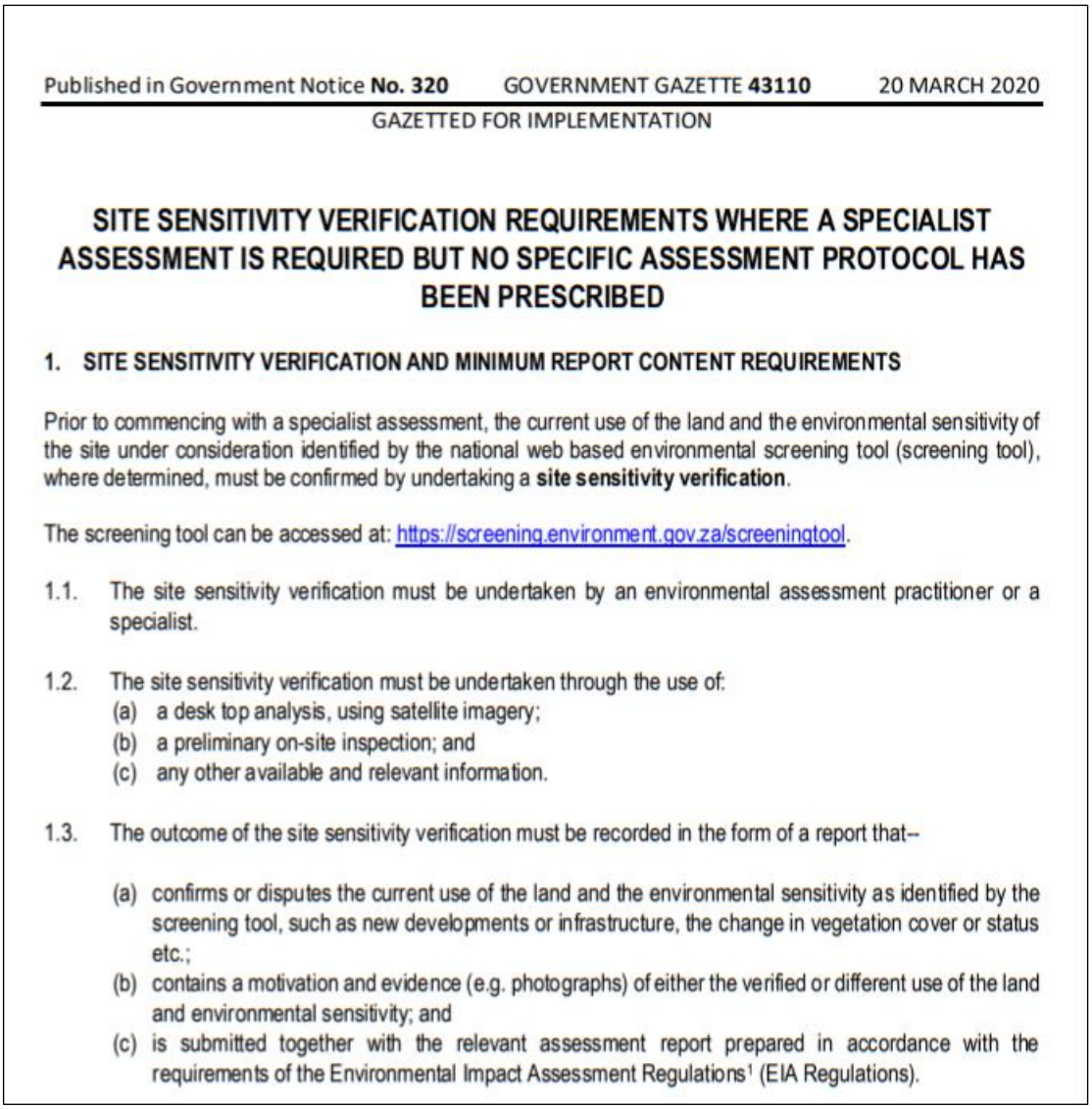
1. Areas where no natural habitat remains.
2. Natural areas where there is no suspected occurrence of SCC.

Figure 4.4: The different criteria used to assign a sensitivity rating to the plant species theme (South Africa, 2020b).

Step 7: A report is generated, and protocols prescribed

A screening tool report can be generated by the user after either the site sensitivities or the footprint sensitivities are checked. The report includes maps of the area, the site sensitivity ratings for each environmental theme, as well as links to the relevant protocols. The protocols have been developed to be used in conjunction with the Screening tool. Every environmental theme's protocol states that a site sensitivity verification must be undertaken by the EAP (if they have the relevant expertise) or by a relevant registered specialist as shown in Figure 4.5 (South Africa, 2020a). The site sensitivity verification needs to include (a) a desktop analysis and (b) a preliminary on-site inspection to check whether the screening tool is accurate or not in its assignment of the sensitivity rating. The outcome of the site sensitivity verification must be recorded in a report and contain a motivation, with evidence, that either confirms or disputes the environmental sensitivity rating assigned by the screening tool (South Africa, 2020a).

For the hypothetical Solar PV development, the agricultural, terrestrial biodiversity, aquatic biodiversity, civil aviation, defence, plant species, and animal species themes all have specific and more detailed protocols. These protocols prescribe the same site sensitivity verification process, but then, in addition, more detailed specialist assessments are also required depending on the site sensitivity verification outcome. For example, if the plant species theme has a very high or a high sensitivity rating, a specialist needs to compile a comprehensive terrestrial plant species specialist assessment report. If the plant species theme has a low sensitivity rating, then a less detailed terrestrial plant species compliance statement is required. The protocols set out precisely who should be responsible for producing this statement, how the assessment should be done, and the minimum requirements for the report (South Africa, 2020b). The sensitivity rating assigned by the screening tool determines the type of assessment report required, unless the site sensitivity verification concludes that the site has a lower sensitivity than assigned by the screening tool. It is important to note that the screening tool does not negate the need for ground-truthing of the environmental sensitivities. Each protocol prescribes that a specialist must go to the site and either confirm or modify the sensitivity rating. Therefore, the screening tool is intended to guide the environmental sensitivities for a development, rather than provide a definitive representation of actual site conditions.



Published in Government Notice **No. 320** GOVERNMENT GAZETTE **43110** 20 MARCH 2020
GAZETTED FOR IMPLEMENTATION

SITE SENSITIVITY VERIFICATION REQUIREMENTS WHERE A SPECIALIST ASSESSMENT IS REQUIRED BUT NO SPECIFIC ASSESSMENT PROTOCOL HAS BEEN PRESCRIBED

1. SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web based environmental screening tool (screening tool), where determined, must be confirmed by undertaking a **site sensitivity verification**.

The screening tool can be accessed at: https://screening.environment.gov.za/screeningtool.

1.1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.

1.2. The site sensitivity verification must be undertaken through the use of:
(a) a desk top analysis, using satellite imagery;
(b) a preliminary on-site inspection; and
(c) any other available and relevant information.

1.3. The outcome of the site sensitivity verification must be recorded in the form of a report that--

(a) confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
(c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations[1] (EIA Regulations).

Figure 4.5: The site sensitivity verification process as included in all environmental theme protocols (South Africa, 2020a).

4.4 The process of determining species distributions

There is limited information available online about the source data and the process of assigning sensitivity ratings for the different environmental themes used in the screening tool. By way of an example, the process of determining the distributions of animal species was elaborated on by a scientist who helped develop the biodiversity data in the screening tool. The example also shows the inherent uncertainty in the sensitivity ratings assigned by the screening tool. Firstly, the scientist explained the process behind collecting occurrence data. The scientist said, "You take all of the occurrence data that you can get, so that's sightings, museum records, anything that can match an individual sighting with an accurate GPS record (Sci, 2021)". After collecting

occurrence data, environmental data were collated, which are then used in the species distribution modelling process. The scientist continues by saying:

> *We then take environmental data, so remotely sensed data as well as vegetation layers and variables and landscape layers that represent climatic data, and we stack all of those together and then use a model to overlay the occurrence points onto all of those layers. Then essentially [we] use the model to characterise a niche based on habitat preferences and the presence of species across these different gradients of the environmental predictors (Sci, 2021).*

The scientist goes on to explain how the model is used to determine a binary presence or absence layer based on the information they collected. The scientist said they determine,

> *…a zero to one probability map across the study area to say OK, what is the probability…that this is suitable habitat for a species? And then we apply a threshold to that probability surface, which then turns it into a binary surface which is basically presence or absence, and that is what goes into the screening tool, is a map saying, does the model on average predict that a species would be present or absent in this area (Sci, 2021)?*

The scientist provides an informal disclaimer about the resolution of the data and highlights the importance of ground-truthing the site.

> *There's no way the model can account for incredibly fine-scale habitat characteristics. There's no way that the model can absorb all of the complexity that structures ecological communities and so affects their presence or absence on the ground. It's supposed to be a guiding principle, and there are provisions in the protocols, the species protocols, to say look if you get there on the ground and it's a completely trashed piece of habitat, then that's fine, report that, and you don't have to then go through all of the steps of getting specialists or whatever (Sci, 2021).*

The scientist also emphasises the effort that has gone into making sure the species distribution models are accurate by saying, “We've gone through extreme lengths to filter the data to make sure that the data that we are working with is of the highest quality that is available” (Sci, 2021).

The explanations of the process of applying the screening tool and assigning sensitivity ratings for the animal species theme provide the context against which the results of the empirical research component can be interpreted in the next chapter.

Chapter Five: Findings

5.1 Introduction

This chapter presents the findings of the research project and is divided into three sections. Section one clarifies the objectives of the screening tool by drawing on information provided by a designer of the tool. Section two explores the results of the survey. The survey collected empirical data on the background of participants, and the participants' perceptions regarding the accuracy and utility of the screening tool. Findings from the voluntary comments section in the survey are then examined. Section three presents the qualitative data collected during interviews with users of the screening tool under three themes: perceptions of accuracy and perceptions of utility of the screening tool, and preferred source of environmental information. The first two themes also include recommendations on techniques to improve EAProfs' perceptions of the accuracy and utility of the screening tool.

5.2 Objectives of the screening tool

There is no information available in official documents from the DFFE regarding the objectives of the screening tool. Therefore, to understand the specific objectives an interview with a designer of the screening tool, Gov 4, was conducted. The designer identified six objectives, which are presented below.

Improve comprehensiveness (1)

The first objective of the screening tool was to improve comprehensiveness of the screening stage by providing unlimited access to all relevant existing national environmental information. The screening tool designer stated, "We wanted to make sure that everybody [all EAProfs] starts with the same baseline" (Gov 4, 2021). In conjunction with improving comprehensiveness, the screening tool aims to "provide a platform where all environmental information is collated" (Gov 4, 2021). The screening tool also identifies areas of special interest such as protected areas as well as "priority zones, development zones, corridors, and standards" (Gov 4, 2021). The interviewee commented that "There is linking to all the documents that you would need so you don't have to go and find these documents on the Internet" (Gov 4, 2021).

Environmental sensitivity information (2)

Apart from providing a central platform for environmental data, the screening tool assigns sensitivities based on the available data. The interviewee said, “We wanted to be able to screen for environmental sensitivities" (Gov 4, 2021). Thus, the assignment of sensitivities means the screening tool not only provides data but also information relevant to the EIA. EAPs are consequently informed as to which specialist studies are required. The interviewee said in this regard: "It's a very transparent way of actually getting to the studies that you will then do in the detailed work" (Gov 4, 2021).

Protocols help specialists and EAPs (3)

The screening tool is supported by the protocols which are described in Chapter Four. The objective of the protocols is to make sure the correct specialist assessments are prescribed and that each specialist report is consistent and contains the necessary information about relevant environmental aspects of the site. The interviewee stated that “The protocols are also there to make sure that you [the EAP or specialist] do what you need to do, so focus on the sensitivities that are there and don't focus on sensitivities that are not there” (Gov 4, 2021).

Adjust site footprint (4)

From a project planning perspective, the screening tool allows the developer and EAP to manipulate the footprint of either the development or the site to avoid environmentally sensitive areas. By avoiding environmentally sensitive areas fewer specialist assessments should be required. The interviewee stated that:

> *You can then move your actual footprint, and again it's an ability to implement the mitigation hierarchy because the screening tool allows you to manipulate your footing. The developer can utilise the screening tool to identify where things would be more difficult for them and therefore which sites they could actually prefer to use (Gov 4, 2021).*

By adjusting the site's footprint, the screening tool aims to ensure development occurs in an area where the environmental impact will be minimised.

Reduce cost of EIA process (5)

Furthermore, the screening tool designer identified reducing costs incurred to the developer as an objective of the screening tool. According to the interviewee, the developer can “identify

right up front which of those sites would be more sensitive from an environmental point of view and therefore cost them more money to develop" (Gov 4, 2021).

Reduce time to undertake EIA (6)

From a practical perspective, the screening tool is meant to reduce the time it takes to complete an EIA. The screening tool's protocols are very prescriptive in what specialists are required to do as part of a specialist assessment. In this regard, the interviewee said:

> *So instead of spending three weeks doing an assessment, you'd spend maybe a day or two doing a site verification and then you would be able to submit to the Department [of Forestry, Fisheries and the Environment] a compliance statement that basically says a professional person who's qualified to do that work has gone out, they've checked it, they've confirmed that it is low sensitivity for that species, and therefore they're not going to be doing a full impact assessment on that (Gov 4, 2021).*

In addition, the screening tool is intended to streamline the EIA process and save time by encouraging avoidance of highly sensitive sites, which reduces the number of full specialist assessments required. The interviewee explained the rationale for this approach:

> *You're trying to detract development away from your highly sensitive areas to your low sensitivity areas where the process is much easier. So, you're not doing less than what you should be doing, but also not doing more than what you should be doing (Gov 4, 2021).*

5.3 Survey results

5.3.1 Profile of survey participants

The survey elicited a total of 40 complete responses from EAProfs working in South Africa. The majority of the participants, 27 out of 40, categorised their job title as being an EAP (Table 4.1). Out of the 40 participants, nine were specialists. Three participants indicated that they work as an EAP and as a specialist. A total of five participants indicated that they work as a GIS specialist. Three provincial government officials responded to the survey, but no national government officials or local government officials completed the survey. Three developers answered the survey. Since the survey was set up so that participants could select more than one profession, the total number of responses for profession was 48. The response rate to the

survey is unknown as the survey was anonymous, and it is unclear how many people received the survey.

Of the 40 participants, 35% had between 11 - 15 years of experience, and 27.5% had 20 years or more of experience in the environmental field (Table 4.1). Twenty percent of the participants fell into the least experienced category of between 0 – 5 years of experience in the environmental field. The majority of the participants who responded to the survey had 11 years or more of experience in the environmental field (67.5%). Regarding the screening tool, half of participants said they are very experienced (50%, Table 4.1). Of the 40 participants, 40% said they are experienced using the screening tool. Only 10% of participants said that they are quite experienced with using the screening tool.

The greatest percentage of participants in the survey work mainly in the Western Cape province (Figure 5.1, n = 17, 42%). The Northern Cape province had the second-highest response rate, with 17% of the participants working mainly in this province (Figure 5.1, n = 7). The Gauteng, Eastern Cape, and Kwa-Zulu Natal provinces had response rates of 15%, 13%, and 8% respectively (Figure 5.1). Only one participant each work mainly in the Free State and North-West provinces. There were no responses from participants who work mainly in the Limpopo or Mpumalanga provinces.

Table 4.1: Background information on the participants to the survey.

Question	Response options	Frequency	Percentage
What is your job title?	Environmental assessment practitioner (EAP)	27	67.5%
	Specialist	9	22.5%
	Developer	3	7.5%
	National government official	0	0%
	Provincial government official	3	7.5%
	Local government official	0	0%
	GIS specialist	5	12.5%
	(Other) Sub-consultant EAP	1	2.5%
How many years of experience do you have in the environmental field?	0 – 5 years	8	20.0%
	6 – 10 years	5	12.5%
	11 – 15 years	14	35.0%
	16 – 20 years	2	5.0%
	20 + years	11	27.5%
How experienced are you with using the DEFF screening tool?	Quite experienced	4	10.0%
	Experienced	16	40.0%
	Very experienced	20	50.0%

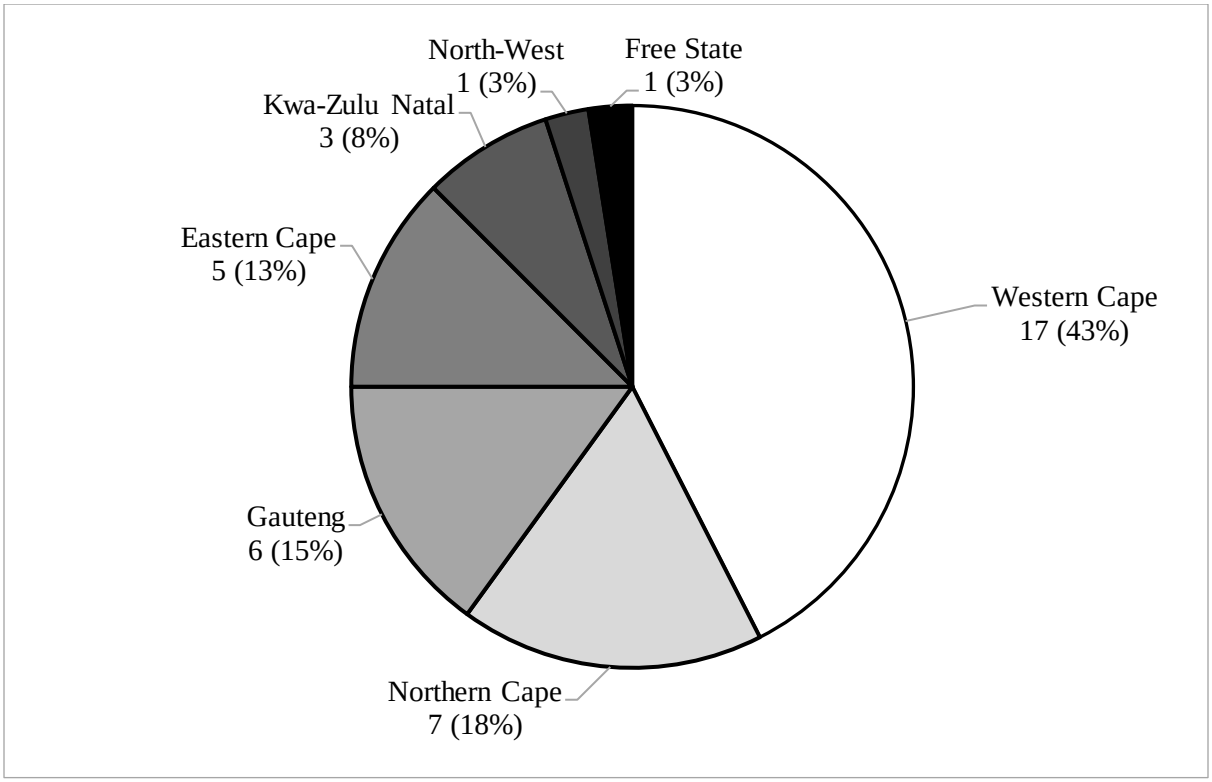


Figure 5.1: The province where participants mainly work. The frequency is shown, with the percentage in brackets (n = 40).

5.3.2 Perceptions of accuracy

Perceptions of accuracy were explored by posing the statement that "The screening tool accurately assigns sensitivities for the various biodiversity themes". Most EAProfs disagreed that the screening tool accurately assigns sensitivities for the various biodiversity themes, given the modal response score to this statement was two. The median score was also two for the above statement. In addition, Figure 5.2 shows how the responses were skewed to the *disagree* option which has a far greater response than any other option.

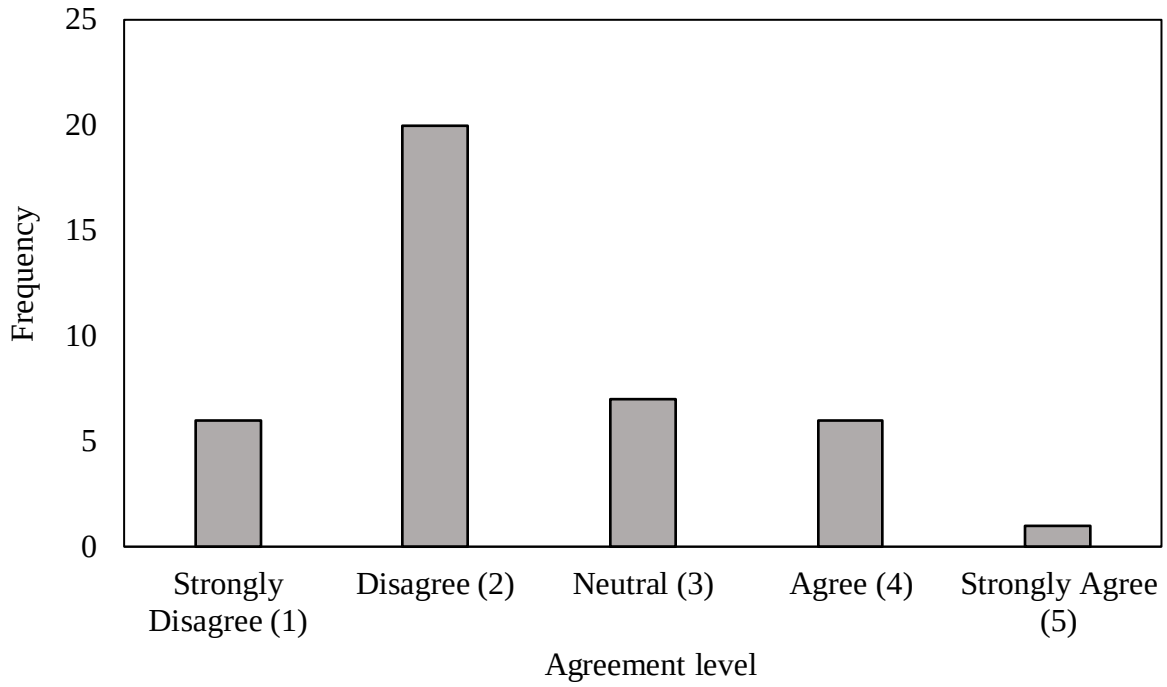


Figure 5.2: The number of survey participants that selected each agreement level when presented with the statement that the screening tool accurately assigns sensitivities for the various biodiversity themes (n = 40). The number assigned to each category is in brackets.

Most EAProfs *strongly agree* that specialists should be required to submit environmental information from a site assessment to improve the accuracy of the source data in the screening tool, given the modal response score was five (Figure 5.3). The median score was four. Figure 5.3 shows that the most selected categories were in order of *strongly agree*, *agree*, and *neutral*. The lowest response option was *disagree*, followed by *strongly disagree* (Figure 5.3).

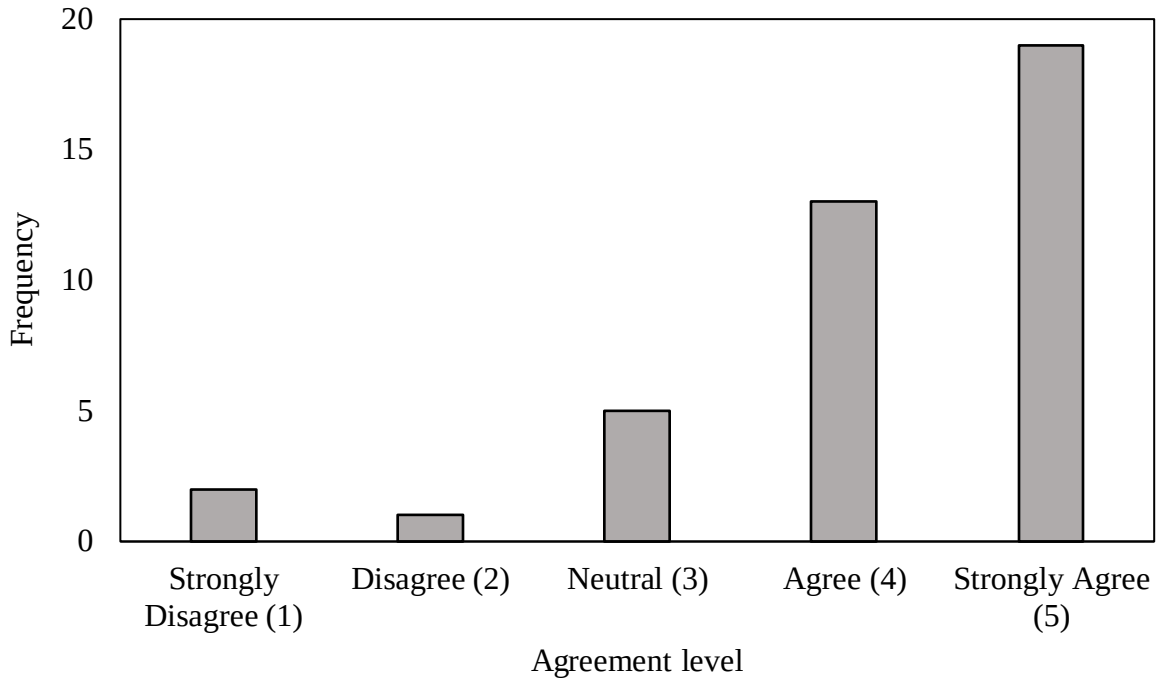


Figure 5.3: The number of survey participants that selected each agreement level when presented with the statement that specialists should be required to submit environmental information from a site assessment (n = 40). The number assigned to each category is in brackets.

5.3.3 Perceptions of utility

The overall utility score is 2.8 as shown by Table 4.2. Dermo (2009) considers all scores between 2.75 and 3.25 as *neutral*. Therefore, the analysis of the data suggests that EAProfs are *neutral* regarding the utility of the screening tool. The standard deviation is low, showing there is little variation in the data (SD = 0.08, Table 4.2).

Table 4.2: Descriptive statistics for the screening tool's overall utility score.

	Mean	Standard deviation
Utility	2.8	0.08

Figure 5.4 shows the distributions of each response option for the five utility criteria. The survey results show that EAProfs believe the screening tool adds time and costs to the EIA process (Figure 5.4). The highest overall agreement (*agree* + *strongly agree*) was shown for

the statement that the screening tool costs developers more as they have to pay for unnecessary studies to be done, with 58% of EAProfs selecting either *agree* or *strongly agree*. The second utility statement, that the screening tool adds more time to the EIA process, showed 53% of participant were in overall agreement with the statement.

The third statement refers to enhancing the comprehensiveness of the EIA process. In this regard, EAProfs perceive that the screening tool adds to the comprehensiveness of the screening stage (Figure 5.4). The survey showed that 50% of participants were in overall agreement with the statement that the screening tool improves the comprehensiveness of the screening stage. For this statement regarding the comprehensiveness, 28% showed overall disagreement, with 30% of EAProfs selecting *neutral*.

The fourth statement that the screening protocols help specialists perform assessment work by prescribing what is required produced mixed results with 43% showing overall disagreement, and 40% showing overall agreement to the statement (Figure 5.4).

The fifth statement that the screening tool is useful to adjust the site footprint to avoid environmentally sensitive areas had 45% of EAProfs showing overall agreement (Figure 5.4). However, the highest percentage of EAProfs selected *neutral* regarding the above statement (30%) out of all the utility statements.

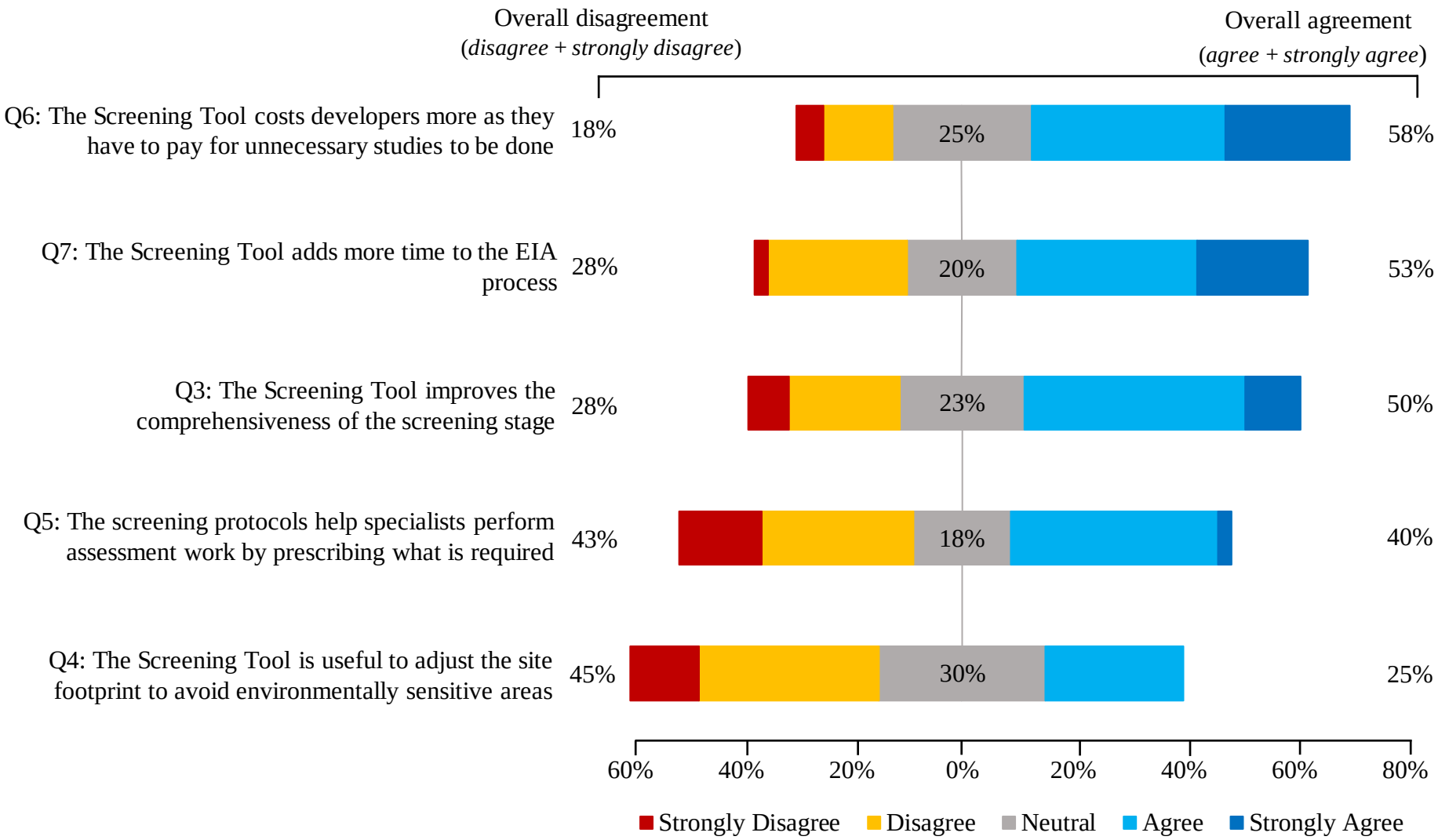


Figure 5.4: The perceptions of survey participants on the five screening tool utility criteria questions. The statements are ordered according to the overall agreement percentage (*agree + strongly agree*).

5.3.4 Preferred source of environmental information

The use of the screening tool in preference to other sources of environmental data was assessed by the statement: “The screening tool is your preferred source of environmental information for a site”. The modal and median scores for this statement were both two. Therefore, the most commonly selected level of agreement by participants was *disagree* (Figure 5.5).

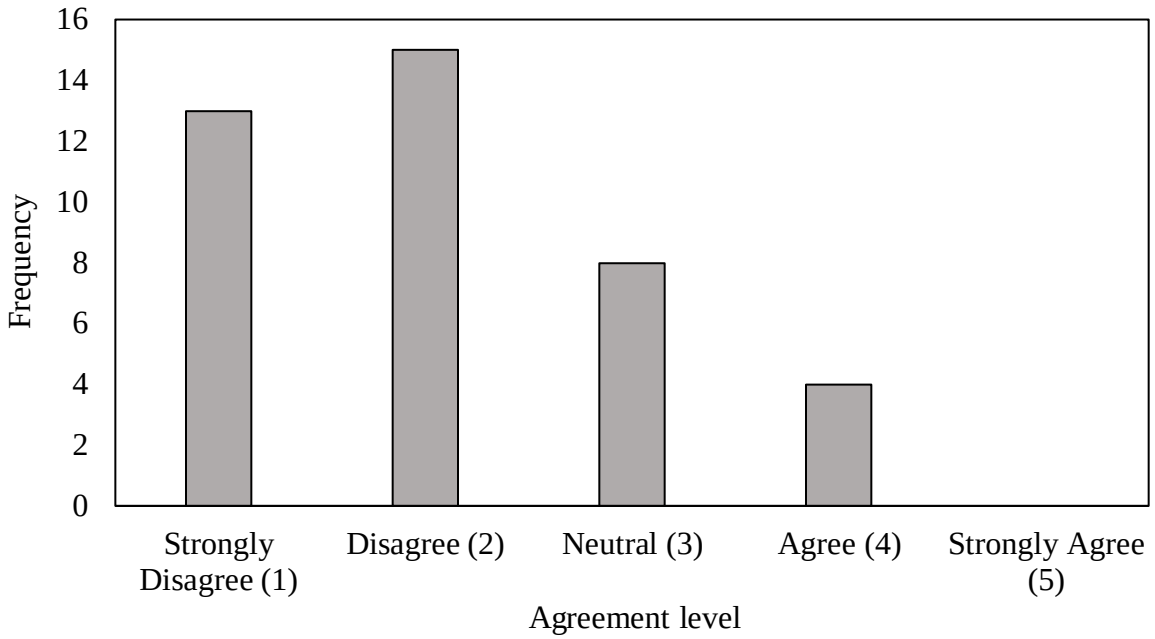


Figure 5.5: The number of survey participants that selected each agreement level when presented with the statement that the screening tool is your preferred source of environmental information for a site (n = 40). The number assigned to each category is in brackets.

5.3.5 Comments on the accuracy and utility of the screening tool

Comments provided by EAProfs revealed a diversity of opinions about the screening tool (Table 4.3). A participant indicated that the screening tool is suitable for a preliminary “high level” assessment at the beginning of the EIA process, and another commented that the “bird and plant information is rather robust”. One comment mentioned that EAPs and specialists are unsure about "how much detail must go into site sensitivity verification and motivations for exclusion of specialist studies.” Another comment criticised the national sector classification step at the beginning of the screening tool for not aligning with the NEMA listed activities. A commenter stated that they believe the archaeology, cultural heritage and palaeontology themes are very inaccurate. Another negative comment focused on the added time and costs to the EIA process by saying, “the screening tool is often flawed in its sensitivity assessments which

requires additional specialist input according to the protocol, adding greater cost and time to the EIA process". A comment mentioned that a specialist feedback loop should be created to ensure the utility of the screening tool. However, the difficulty in how to start and operate a specialist feedback loop of information was also highlighted. It should be noted that the comments included in Table 4.3 were chosen because they represent a diversity of opinions and are not reflective of sample sizes in each category.

Table 4.3: Quotations taken from comments received during the research process.

Strengths	Weaknesses	Improvement
The Screening Tool is a good initial tool for site screening and identification at a high level.	There are uncertainties amongst EAPs and specialists about how much detail must go into site sensitivity verification and motivations for the exclusion of specialist studies.	Unless the Screening Tool data can be regularly i.e. annually updated with specialist data generated through EIAs and BAs, the tool will become useless and render the online screening process redundant.
Birds and plants information is rather robust.	There are (sic) a disjunct between the Listed Activities in the NEMA EIA regulations and the tool's Sector Classification.	
The concept of a Screening Tool is a sound one.	I am a heritage specialist and the information in the DEFF Screening Tool pertaining to archaeology, cultural heritage and palaeontology is GROSSLY INACCURATE.	It would be useful for specialists to place their findings into the system in order to update its accuracy however, how would this be facilitated?
	We have zero use for the ST.	
	The Screening Tool is often flawed in its' sensitivity assessments which require additional specialist input according to the protocol, adding greater cost and time to the EIA process.	
	The real need for the Screening Tool was never properly motivated by the DFFE.	
	The Screening Tool…would work well if one can count on the accuracy of the sensitivity data presented.	

5.4 Findings from in-depth interviews

5.4.1 Perceptions of accuracy

Inaccurate data

Inaccuracies concerning both the source data and the sensitivity ratings were two prominent concerns reflected in the interview findings. Eight interviewees also expressed doubt over the accuracy of the source data (EAP 2; 3; 4; 5; Gov 1; 3; Spec 1; 2). One EAP referred to the source data by saying, "I don't think it's accurate enough," (EAP 2, 2021) whilst another EAP and environmental scientist said, when referring to issues they had with the screening tool, there are "some inaccuracies in the data" (EAP 4, 2021). One specialist believes that the data are inaccurate because of "a combination of the input spatial layers being too broad and in addition, the finer scale detailed information is not accurate" (Spec 1, 2021). There were also concerns expressed by two interviewees that some of the data are out of date (EAP 4; Gov 1). One of the interviewees said, "the problem we have with the screening tool is sometimes it's based on five, sometimes 10 years old information" (Gov 1, 2021). A government official also had reservations about the accuracy saying they would trust the screening tool's outputs more "if somebody can find a way to assure us that the data is accurate, and you know it's been updated often" (Gov 3, 2021).

Inaccurate sensitivities

Seven interviewees raised inaccurate sensitivity ratings as an issue with the screening tool (EAP 2; 4; 5 Gov 1; 2; 3; Spec 2). Two themes that were identified as having accuracies issues were the civil aviation and defence themes. Three interviewees mentioned that the sensitivities in the civil aviation theme are inaccurate (EAP 5; Gov 1, 2) and two interviewees mentioned that the defence theme also had accuracy issues (Gov 1; 2). One interviewee said that "the most useless sensitivities I've come across thus far is (sic) the defence one and the civil [aviation] one" (Gov 2, 2021). Three government officials said they believe the agricultural theme is inaccurate (Gov 1; 2; 3). An interviewee said, referring to an area of infilled land, "it kicked out this agricultural assessment and all sorts of other things which is like obviously *(sic)*, it's crazy" (Gov 3, 2021). One specialist said that they had found the archaeology theme sensitivity to be inaccurate and said, "that is probably the theme that tends to get thrown out the most. We bring in an archaeologist, and the archaeologist says no, there is no archaeological sensitivity

on site. I think this [the archaeology theme] is where the database is probably the weakest (Spec 2, 2021).

Finally, three interviewees mentioned that they have found the screening tool's assignment of sensitivities is often too conservative (Spec 2; Gov 1; 3). By conservative, the interviewees are implying that when the screening tool assigns sensitivities incorrectly, the sensitivity ratings are often higher than in reality at the site. One EAP said:

> *It tends to be on the cautious side, though. If it's going to be an error, it's generally going to pick up a species or a wetland or archaeological sensitivity that isn't there rather than the other way around. So there, refinement is definitely necessary (Spec 2, 2021).*

Data are accurate

Three interviewees mentioned that they thought the screening tool's source data are good enough (Spec 2; 5; Sci 1). Two interviewees stated that the data in the screening tool are generally the best data available in South Africa (Spec 2; EAP 5). A specialist said when referring to the screening tool's datasets, "I believe they reflect by and large the best information that we have at this point in time at a national level" (Spec 2, 2021). One specialist highlighted that they believe the plant species layer is accurate by saying, "I know the plant layer is good" (Sci 1, 2021).

Suggested improvements

Six interviewees said they believe implementing a specialist feedback loop is a good idea to improve the accuracy of the source data (EAP 4; 5; Gov 3; 4; Sci 1; Spec 1). An EAP highlighted what the specialist feedback loop could involve by saying, "since 2019, all of these specialists have been running the tool and then going on site to verify and to say this is actually what's on the ground or whatever, but there's no feedback loop of when I've done my specialist study and I've actually said, hey, this is a car park and it's not a critical biodiversity area" (EAP 4, 2021). The EAP goes on to mention that using a specialist feedback loop not only improves the accuracy but also the value of the tool:

> *…the actual feedback of data, I think that's the major improvement. Yeah, so that is going to be critical for like its value, not just to increase the value of the tool. The actual data needs to be really accurate (EAP 4, 2021).*

An interviewee involved in designing the screening tool said that the specialist feedback loop is a really useful way to ground truth the data on a large scale:

> *We can't ground truth every single piece of land across the country like it's not possible, but like the fact that it is completely unsuitable habitat. If we could get that information then we could update our models and update our predictions to say like OK, this species there is definitely no way it would be recorded here, or people looked, and it wasn't recorded here, and the next time you know someone needs to go, it won't be flagged as very high sensitivity (Sci 1, 2021).*

Interviewees have raised many questions on the practicality of a specialist feedback loop system and how it would work. An interviewee said:

> *How do people go about collecting the data in the field? How much extra effort would it be to upload it [the data] to some kind of like system? And what is the feasibility of getting that system running (Sci 1, 2021)?*

A specialist also expressed concern that specialists are not willing to upload their data to a database, "because we've tried this so many times; to try and get people to voluntarily submit their information as consultants. We [specialists] are notoriously bad at sharing information" (Spec 1, 2021). The specialist continues, "There's (sic) certain things that you need to sign off on when you're doing EIAs as a specialist, I think one of the things should be submitting your spatial data. I think it should be mandatory" (Spec 1, 2021). Another interviewee, who helped design the screening tool, was hesitant as to whether DFFE or the South African National Biodiversity Institute (SANBI) should oversee the specialist feedback loop and suggested a different approach:

> *So, if it's going to work, it's got to be definitely a public-private like partnership. You can leverage SANBIs, you know, web infrastructures and stuff, but to develop this, it would have to be an NGO or someone who has funding to do it because it's difficult. It's like getting people to submit data in standardised ways…it's also about vetting the data. It's about database management (Sci 1, 2021).*

This interviewee also suggested that developing an app would help make uploading the data more manageable and improve standardisation. They proposed outsourcing "people like a developer and then a team of people to build an app and get people using it" (Sci 1, 2021).

There is, however, a clear lack of consensus about which organisation should store and manage the data. Three interviewees said that specialists should submit their data to the data custodians instead of DFFE (EAP 4, Gov 4, Spec 1). A designer of the screening tool said that the process for changing data in the tool needs to go to the data custodians first: "so for example if somebody comes and says, well, this agricultural data is not correct, we cannot change that data, but we can inform the Department of Agriculture that in this area, their data could be verified and could be improved" (Gov 4, 2021). However, another interviewee raised a concern that the data custodians have different processes of updating data. The interviewee said, "some of it [the data] comes from SAEON, some of it [the data] comes from the SANBI and they've all got different mandates and different timeframes at which they are updating or adding new data" (EAP 5, 2021).

A designer of the screening tool suggested that there should be better communication from the SANBI and the DFFE regarding how much effort is put into making sure the data are accurate as well as how to interpret the data. The interviewee referred to EAProfs' perception of the source data being inaccurate:

> *Part of that, I think, then rests on a communication aspect from SANBI and DEFF's side to… educate people about the data. Just providing more context to the data behind [the] screening tool and telling the EAPs like this is how we've done it; this is how we want you to use the tool and interpret the data (Sci 1, 2021).*

A designer of the screening tool elaborated on what the environmental information displays by saying, "What people don't also realize is that the models produced comes with a confidence interval… there is no way to convey that uncertainty in the screening tool and that that is one of the problems" (Spec 1, 2021).

Finally, a specialist stressed the potential of the screening tool by saying:

I think it's a great idea, and it's just at the moment, it's not accurate enough for me to have high confidence in the output. Absolutely yes, it [the screening tool] can be improved, and I can see going forward that it's going to become a great tool in our toolbox (Spec 1, 2021).

Accuracy affecting utility

Five interviewees raised concerns that inaccurate assignment of sensitivities and source data affects the utility of the screening tool (EAP 2; 3; 4; Gov 1; Spec 1). In their opinion, inaccurate sensitivities add additional time to the EIA process, negatively affecting the user's ability to adjust the site footprint to avoid environmentally sensitive areas, which means that the implementation of the protocols becomes problematic. An interviewee said that the inaccuracy of the screening tool has caused them to do more work. The interviewee said, "the layers are not a true reflection of what's happening on the ground, so that's why we need extra work in terms of the site sensitivity verification reports" (Gov 1, 2021). The ability to move the site footprint around is also affected by the inaccuracy of the data. One interviewee said the following when asked why they do not use the screening tool to adjust the site footprint:

I think that has to do maybe with just the accuracy of the data. So, if you know that, it could be like a little bit shaky. You know, like if the data is just a bit old or whatever it is, you'd actually want to physically go on the ground to make sure of it. It's telling you something is sensitive, but the data is from five years ago (EAP 4, 2021).

In addition, inaccurate sensitivities result in EAProfs having low confidence in the screening tool's output and this then affects their perception of the protocols. An EAP and a specialist both said that the protocols cause concerns amongst users because of the inaccuracy of the source data (Spec 1, EAP 2). The specialist said:

The actual protocol is where an environmental assessment practitioner can, based on the screening tool, decide whether there's a wetland or a River or not. I think it [the protocol] is problematic until the map is sufficiently accurate (Spec 1, 2021).

5.4.2 Perceptions of utility

Comprehensiveness

There was a strong consensus amongst EAProfs interviewed that the screening tool enhances the comprehensiveness of the screening stage. A total of nine interviewees indicated that the

screening tool had helped improve the screening stage's comprehensiveness (EAP 1; 2; 3; 4; 5; Gov 1; 2; 3; Spec 2). A specialist said, "I think particularly coming from the screenings I have worked on, it definitely pulls out themes I would not have thought of" (Spec 2, 2021). Whilst referring to the specialist studies that the screening tool prescribes, the specialist continued to say that "the scientific robustness of what you are bringing out into the EIA is significantly improved by the screening tool" (Spec 2, 2021).

Five interviewees expressed the view that the screening tool is useful for initial identification of what is on the site and which specialist studies are required (EAP 2; 4; Gov 1; 3; Spec 2). A government official said, "It [the screening tool] provides you with all the aspects or issues that are involved with that specific application and then by using those aspects or impacts it will then generate what specialist studies need to be done" (Gov 1, 2021). One EAP agreed, saying that, "I like that I can go online, and I can have like an initial flag of what could possibly be on site" (EAP 4, 2021). Another government official said the screening tool benefits their job as it makes it easier for them to decide which specialist studies are required (Gov 3). The government official said, "it's [the screening tool] saying to the developer and the EAP listen you've got to do for example, social economic assessments and things like that. It makes it easier for us at least" (Gov 3, 2021).

Three interviewees indicated that the screening tool helps them identify environmental aspects they might not have thought of before (EAP 1; Spec 2; Gov 2). A specialist summarised how they thought the screening tool helps improve comprehensiveness:

> *There may be individual species and things like that I don't know about, and I don't know to bring a specialist in on. Particularly if I am working outside of areas I have worked in before. So that I find useful…when it comes to the archaeology theme and various other bits and pieces, civil aviation, and things like that. I wouldn't necessarily, as an ecologist, know to bring those things in. I think that that helps a lot. It is definitely a lot more comprehensive and sort of uniform and reasonable in terms of its approach to what themes actually get picked for screening and further assessment. I think that is really useful (Spec 2, 2021).*

In addition, the screening tool appears to help EAPs develop a more accurate initial cost breakdown for developers, and helps government officials justify their requirements in respect of what specialist studies need to be undertaken. An EAP said, "it has some value when the

client questions why… you need to appoint all these specialists, then if you have something to go to the client to say look, this is a mandatory tool" (EAP 2, 2021). A government official said that the screening tool makes their work easier:

> *Now we can also say that was identified in the screening report. What it does now is provide the basis because this is the nature of the development that you are proposing; these are the specialist assessments that are recommended by the screening tool report. It now obviously puts the onus on the EAP to explain why if they are not going to go ahead and do those assessments (Gov 3, 2021).*

Two interviewees said they found the screening tool useful because the screening tool is open access (EAP 4; 5). One interviewee said, "I think it's useful as a kind of an open-source visual tool that anybody can use, as long as you've got Internet of course and a computer" (EAP 5, 2021). In addition, three interviewees said they found the screening tool made data access more convenient (EAP 3; 5; Spec 1). One interviewee said: "I wouldn't say that there is any additional value added, apart from being able to use a lot of databases in one tool" (EAP 3, 2021).

Lastly, there was one specialist who was of the opinion that the screening tool does not improve comprehensiveness. The specialist expressed concern that if EAPs and specialists only use the screening tool, they may miss some environmental aspects. The specialist said, "if EAP's are making decisions based on the screening tool some things might be falling between, you know, falling through" (Spec 1, 2021).

Adjusting development footprint

Three EAPs interviewed said that the screening tool is not useful for adjusting the development footprint on the site (EAP 2; 4; 5). None of the interviewees thought that the screening tool is useful to adjust the development footprint. According to one interviewee, "developers already come with the footprint, and then they say this is where you want to develop; so, tell us what's there" (EAP 4, 2021). Developers may not use the screening tool to adjust the development footprint because when a project costs a lot, the developer would rather have their preferred site. The added cost associated with the ideal site is preferable to using the screening tool to adjust the development footprint to a less desirable site – as one EAP points out:

> *The developer has got like a 10-hectare site, and seven hectares is sensitive, and he wants to develop 5 hectares of that site. The value of that extra three hectares into the sensitive area far exceeds the cost of the EIA. So, he's going to say I don't mind; I'll trigger a NEMA listed activity, we will go with the EIA (EAP 2, 2021).*

Another possible reason may be that the screening tool's data resolution is not good enough to make fine-scale footprint adjustments. An EAP said, “it really does come down to absolute micro siting so the scale of the tool and the scale of where exactly that development is going, isn't really compatible” (EAP 5, 2021).

Protocols

Four interviewees highlighted that EAProfs and the competent authorities lack the discretion to make decisions (EAP 1; 2; Gov 1; 3). As one EAP points out, “that's really again what this tool is promoting; further check listing and less critical thinking on the part of the professional” (EAP 2, 2021). An EAP complained that "the biggest things that one has to confront these days as an EAP, is the state that doesn't recognise the possibility of independent ethical action; everything has to be guided, controlled, regulated” (EAP 1, 2021). Two other interviewees agreed that the screening process was becoming over-regulated (EAP 2; Gov 1). A government official indicated that this also applies to them as decision-makers by saying, “discretion has been taken away from authorities” (Gov 1, 2021). Another government official mentions how important it is for them to have the discretion to make decisions regarding which assessments are unnecessary by saying the following regarding a development, “We obviously at least had the discretion to go like, listen, we know the site is 100% in an urban area. At least we have the discretion to say you do not need to do, you know, to undertake those studies as recommended by the screening tool report” (Gov 3, 2021).

Three interviewees said they were having problems with the site sensitivity verification process due to the lack of a clear procedure and limited transparency about how the sensitivity ratings are determined (EAP 2; Gov 1; 2). An EAP stated that they do not know how the environmental sensitivities are assigned. Without knowing how the sensitivities are assigned, the EAP does not know how to verify the sensitivities on site. The EAP said that “there is no guidance as to how one defines sensitivity…we are asked to verify the sensitivity, but we don’t know the methodology that generates the sensitivity, the methodology needs to be given to the industry” (EAP 2, 2021). Sometimes it is clear that the sensitivity rating for a particular environmental

theme is incorrect, but as one government official said, the EAPs "don't know how to motivate properly for us to exclude a certain sensitivity" (Gov 2, 2021). An EAP offered a solution to the difficulties faced by EAPs when verifying sensitivities by suggesting, "there needs to be a process for this as it is a procedural deviation…it tells me that there should be a decision-making process aligned to that" (EAP 2, 2021).

An interviewee mentioned that the protocols have limitations regarding the amount of work EAPs and specialists have to do when the site has a low sensitivity (Gov 2). An interviewee elaborates on how the protocols are inadequate by using the civil aviation theme as an example: "so say for civil aviation, if its low [sensitivity rating], you don't need an assessment…why must you even go and do the investigation" (Gov 2, 2021). The interviewee continued by saying, "instead of you as the practitioner going to the site, taking photos, and following the protocols…the screening tool should have a mechanism in it where if the sensitivity is low, it's not applicable" (Gov 2, 2021).

Effect on cost and time

Eight interviewees mentioned that they believe the screening tool adds time or cost to the EIA process (EAP 1; 2; 3; 4; 5; Gov 1; Spec 1; 2). One specialist said, "If the objective [of the screening tool] is to save time and cost then currently, I don't think it's really saving that" (Spec 1, 2021), whilst another government official said, "It is making EIAs more costly and more time consuming" (Gov 1, 2021). A possible reason why the screening tool is increasing the time and costs of the EIA process is due to the inaccuracies of the environmental sensitivities. As one EAP said:

> *It [the screening tool] says it's a high aquatic sensitivity, so you have to go through this verification and then the only way you can verify from a wetland perspective is for a wetland specialist to go to site with an auger and do a whole lot of trial pits to confirm that there's no wetland. That would never have happened if there would be no screening tool and I've gone to that site, and I can see there's no wetland here, we don't need to worry about that, so that's an added cost and a whole lot of steps that precede us getting an application underway that were unnecessary (EAP 2, 2021).*

As the above statement indicates, EAPs have to spend more time visiting sites and justifying why specialist studies are not required. One interviewee said, "a lot of time goes into motivating

why you don't need to do a civil aviation assessment for an underground cable, for instance" (EAP 5, 2021). Another way the screening tool is adding time is that the tool itself is slow, and it takes time to generate the screening report. Three interviewees (EAP 1; 4; Spec 2) mentioned that they believe the screening tool is slow, with EAP 4 (2021) saying "I don't know if there was like too many data sets on the actual tool that was making it really, really slow".

However, another interviewee said that the screening tool had streamlined their work because previously, EAProfs would have to use various sources to get all the environmental information they needed which has time and cost implications. The interviewee said:

> *We have to go on to the CSIR datasets and… try to be like OK, this is what you're doing, and these are the specialist studies you need to do. So, I think it's helped streamline in that they put everything on one platform… That's been its value (EAP 4, 2021).*

Suggested Improvements

In addition to the recommendations for a specialist feedback loop and improved communication, as discussed in Section 5.4.1, interviewees identified other ways in which the tool may be improved in relation to its utility. Two interviewees said that improvements should be made to the national sector classification categories (EAP 2; Spec 1). One proposed a better alignment between the triggers of an EIA under the NEMA listed activities and the national sector classification categories in the screening tool. The interviewee said,

> *You can't choose residential on the screening tool… you could choose the option of, you know, development close to a wetland or river and but that's kind of different. It's throwing in that as an option, which is not a sector that's actually a trigger…it's a kind of a mix of triggers and sectors (Spec 1, 2021).*

An EAP suggested making application of the screening tool optional, allowing for a more manual selection of what environmental themes the screening tool analyses in relation to the footprint. The EAP suggests:

> *Couldn't you present the screening tool using the same approach as CapeFarmMapper? Where there is far more flexibility. Where you can maybe have a checklist of stuff that you should be looking out for but then the machine doesn't do it for you, you decide what the machine does*

for you. So, you can work in a far more selective, far more focused, far more efficient way (EAP 1, 2021).

Another EAP suggested that the screening tool should only be made mandatory for the mining industry, where the scale of the operation is far greater and more suited to the strengths of the screening tool. This EAP said, "the issues are all quite different" and recommends that for extractive industries "there needs to be a whole different approach to the sector, you know and maybe you need to have screening tools and things there where you…make it mandatory" (EAP 2, 2021).

On a more practical level, an EAP suggested that there should be an "undo function" written into the screening tool to prevent users from having to restart the screening tool process if they make a mistake. The EAP said they would like to have "an undo function because sometimes you get to a point and then it hangs, and you can't just go back one step" (EAP 3, 2021).

5.4.2 Preferred source of environmental information

Four interviewees said that the screening tool was not their preferred source of environmental information (EAP 1; 2; Spec 1; Gov 3). Three interviewees said they would prefer to use CapeFarmMapper when working in the Western Cape province (EAP 1; 2; Gov 3). Another EAP said, when referring to how they get the environment data, "I've got most of the relevant BGIS [biodiversity geographic information system] layers on my computer. I'm not really good with GIS, but at least I can select the right layers… and you know I can interrogate them" (EAP 1, 2021).

Since the screening tool is newly introduced, the findings presented in Chapter Five provide insightful information on EAProfs' perceptions of the screening tool. In the following chapter, the importance and implications of these findings are discussed in the context of current literature.

Chapter Six: Discussion

6.1 Introduction

This research project sought to explore EAProfs' perceptions of the screening tool. The research questions were thus: (1) what are EAProfs' perceptions of the accuracy of the screening tool in terms of environmental sensitivities? (2) What are EAProfs' perceptions of the utility of the screening tool? (3) Is the screening tool meeting its objectives? The discussion chapter is divided into four sections. The first section briefly discusses the reasons for implementing the screening tool and its objectives. The next section focusses on the diversity of perceptions regarding the accuracy and utility of the screening tool. Each significant finding and the associated implications are discussed in relation to previous research. Whilst examining the accuracy and utility of the screening tool, the extent to which EAProfs believe the tool is meeting its objectives is considered. The final section offers recommendations to improve the screening tool's utility and accuracy.

6.2 Intentions of the screening tool

The timing of the screening tool's introduction coincided with a review of EIA in South Africa, the results of which were released by the DEA in 2018. The review booklet highlighted the time-consuming nature of the EIA process and that EIAs rarely influence the location of the development (DEA, 2018). Furthermore, in an interview for this research, a designer of the screening tool identified the need to standardise access to environmental information used by EAProfs. As demonstrated by this published and anecdotal evidence, there was a need for the implementation of a technique to improve the screening stage in South Africa.

An objective of the screening tool is to improve the comprehensiveness of the screening stage by providing a platform that identifies all the relevant environmental sensitivities and areas of specialist interest based on the type and location of the development. The screening tool also aims to accurately inform the user of the sensitivity ratings for the different aspects of the environment. In addition, a designer of the screening tool noted that specialist assessments for EIAs did not contain the required information, such as the impact of a development on the species present on the site. To address the issue, a series of protocols, associated with the

screening tool, have been introduced to help EAPs decide which specialist studies are required and to help specialists undertake assessments by prescribing what is needed in each specialist report. The screening tool is designed to allow the user to adjust the development footprint to avoid environmentally sensitive areas. Lastly, an objective of the screening tool is to reduce the cost and time associated with undertaking an EIA. The intentions of the screening tool are sound in principle, as they aim to improve the screening stage and the EIA process in South Africa.

As has been established in the literature, the need for an effective screening stage in South Africa is essential to contribute to an overall effective EIA process (Retief et al., 2011). Ineffective screening can lead to unnecessary EIAs being undertaken, putting undue pressure on the competent authorities, and increasing costs and time associated with developments (DEAT, 2008; Glasson & Therivel, 2013). However, there appears to be a disjunct between the intentions of the designers and how users experience the application of the screening tool. Despite good intentions, the findings of this research suggest that EAProfs' perceptions on the screening tool are mostly negative.

6.3 Perceptions on accuracy and utility of screening tool

6.3.1 Inaccurate environmental sensitivities

The majority of EAProfs interviewed indicated that they do not trust the environmental sensitivities determined by the screening tool as they perceive the sensitivities to be inaccurate. This finding is relevant to research question one and indicates that most participants in this research do not believe the screening tool meets its objective to identify the sensitivities of the different environmental themes. The result is significant because the functioning of the screening tool relies on the accurate assignment of environmental sensitivities. The screening tool is meant to identify environmental sensitivities, which can be used to prescribe specialist assessments. Accordingly, the screening stage of the EIA process is intended to help identify potentially significant environmental impacts for further investigation (Wood & Becker, 2005). Determining the environmental sensitivities of a site to understand the potential environmental impacts of a development is fundamental to the practice of EIA (Del Campo, 2017). Without accurate knowledge of the sensitivities of the site in the earliest stage of the EIA, it is difficult for an EAP or specialist to proceed in determining the overall environmental impacts of a development.

The interviewees perceive the civil aviation, archaeology, cultural heritage, and palaeontology themes to be the most inaccurate, whilst the survey results showed that EAProfs believe the biodiversity themes are particularly problematic. The perceived lack of accuracy of the environmental themes has implications for the levels of trust in the outcomes of the screening tool. The survey result is particularly concerning as the competent authorities believe that the primary function of EIA is to protect biodiversity (Roos et al., 2020). If EAProfs do not trust the biodiversity sensitivity maps produced by the screening tool, the environmental themes may not effectively assist EAProfs in deciding on which biodiversity-related specialist assessments are required. Research has shown that the quality of biodiversity impact assessments in EIA are generally good due to the effective South African Council for Natural Scientific Professions (SACNASP) registration process (Hallatt et al., 2015; Swanepoel et al., 2019). This raises the question of whether there is a need for the screening tool to improve the quality of biodiversity impact assessments. The inaccuracies identified may cause the quality of biodiversity impact assessments in South Africa to decrease.

There are two possible explanations for this negative perception of environmental sensitivities assigned by the screening tool. Firstly, EAProfs interviewed believe there are issues with the accuracy of the screening tool's source data, due to the data not being up to date. The environment is constantly changing and if environmental data are outdated, there is an increased chance that the tool will not produce the correct sensitivity ratings. The second possible explanation is that the process of determining the sensitivities for each environmental theme is problematic. The data may be accurate, but the methods used to analyse the data layers and determine the sensitivities may be flawed. The survey results suggesting poor accuracy of the biodiversity sensitivities do not distinguish between accuracy issues in the source data or in the process of assigning the sensitivity ratings.

Interviewees revealed that when the screening tool incorrectly assigns sensitivities, the sensitivities are generally conservative. A conservative assignment of sensitivities occurs when the screening tool determines that the environmental theme is more sensitive than it is in reality. Therefore, when the screening tool is inaccurate, the environmental sensitivities assigned by the screening tool are more likely to be higher than what occurs at the site. This finding was expected because by overestimating the sensitivity ratings, the screening tool ensures no sensitive environmental aspects are missed.

Despite these concerns, the result does not necessarily mean that the sensitivities determined by the screening tool are in fact, inaccurate. The results represent the perceptions of EAProfs and cannot be used to make conclusions about the actual accuracy of the sensitivity ratings. National spatial data on environmental themes can never be completely accurate as this would require specialists to ground-truth every environmental theme across South Africa and update this information on a regular basis. However, the screening tool is designed to be used by EAProfs and thus needs to guarantee a level of accuracy to instil confidence in the sensitivity ratings. If professional users of the screening tool believe that the screening tool assigns environmental sensitivities inaccurately, then improvements are necessary.

6.3.2 Screening tool improves scientific robustness

Based on perceptions of EAProfs, improving comprehensiveness of the screening stage is the main strength of the screening tool, thus meeting the screening tool's first objective. This finding also shows that the screening tool addresses the need for a standardised environmental information platform. By providing an easily accessible database of environmental information, EAProfs can be more confident that all the relevant aspects of the environment are considered. The implication of this finding is that EAProfs believe that the screening tool strengthens the scientific robustness of the screening stage.

Perceptions regarding improved comprehensiveness is a surprising finding as, despite EAProfs perceiving the sensitivity ratings to be inaccurate, they still believe the screening tool identifies relevant environmental aspects they might have missed. A possible explanation for the disparity between perceptions around the comprehensiveness and accuracy is because the environmental sensitivities assigned by the screening tool are perceived to be conservative. Prior to the implementation of the screening tool, EAProfs had to rely on preliminary information from disparate sources to make a discretionary decision about which specialist studies were required. There was no clear process or standardised data sources, which could have resulted in some EAPs missing particular environmental sensitivities present on a site. However, assigning environmental themes to be more sensitive than they are on-site means the screening tool prescribes the necessary specialist studies required, thereby ensuring a more thorough approach.

Another possible reason for the perceived improvement in comprehensiveness could be because the screening tool identifies relevant areas of special interest that EAProfs might not have known existed for a particular site. Prior to the screening tool, there was no central database for identifying EMFs, industrial development zones, protected areas, critical biodiversity areas or bio-regional plans in the different provinces of South Africa. However, now the screening tool prescribes precisely which areas of special interest are relevant to the site. Furthermore, by identifying areas of special interest, the screening tool could facilitate the improvement of report quality as the relevant EMFs are shown for a site. As the literature has indicated, EMFs are a potential solution to improve EIA report quality in South Africa (Marais et al., 2015; Retief et al., 2011).

By prescribing which specialist studies are required, there is less reliance on the competencies of the competent authorities. An assumption made in the South African EIA process, as identified by Alberts et al. (2020), is that EAPs, specialists and the competent authorities are sufficiently skilled to carry out the EIA process, from inception to a final decision. However, research has shown that there are capacity issues in the competent authorities in South Africa (Kidd & Retief, 2009). The screening tool helps to address the capacity issues, by placing less onus on the competent authorities through prescribing the sensitivity ratings and required specialist assessments. The screening tool helps to address these issues by requiring case officers to spend less time adjudicating the screening stage. However, by prescribing which specialist studies are required, the screening tool may also cause the screening stage to become overregulated and unwieldly. Pope et al. (2013) describe an issue with increased regulation by saying that unnecessary protocols could cause the EIA process to become a "licensing exercise with negligible discretionary decision-making opportunities".

6.3.3 Diverse opinions on discretion

In general terms, the prescriptive protocols are designed to make the EIA process more objective, taking discretion away from EAPs, specialists and the competent authorities. Despite a need for objectivity, as indicated previously, Sandham et al. (2013) have argued that increased regulation could reduce report quality. As already indicated, prior to the screening tool being implemented, there was no set procedure for EAPs deciding on the environmental sensitivities for a site and which specialist studies were required. The lack of prescribed procedures meant EAPs used their discretion to decide which specialists to appoint based on their personal

assessment of the site's environmental sensitivities. In addition, the competent authorities had a discretionary duty to decide whether the correct specialist assessments were included when reviewing the EIA report. The specialists who undertook the assessments also had discretion to include what they deemed necessary in the specialist assessment report. Use of the screening tool is now mandated to determine the environmental sensitivities, and the associated protocols prescribe which specialist studies are required. It is now the EAPs responsibility to agree with or dispute the screening tool's findings in the site sensitivity verification process. However, the competent authorities still need to exercise a measure of discretion in this regard. Based on a site sensitivity verification submitted, the competent authorities can still adjudicate whether the EAP has made a justifiable decision in relation to which specialist assessments are required. In this way, EAPs and the competent authorities can ensure unnecessary specialist assessments are kept to a minimum.

However, an interesting and somewhat contradictory finding was that EAProfs also believe the site sensitivity verification process is not clear enough to allow EAPs or specialists to justify an effective change in environmental sensitivity ratings. This finding is despite EAProfs believing the protocols are too prescriptive. They believe the site sensitivity verification process does not contain enough information on what is required for a specialist to dispute the environmental sensitivities assigned by the screening tool. In addition, there is also no clearly defined decision-making process for the competent authorities to follow when deciding on a disputed environmental sensitivity rating.

6.3.4 Reasons for limited utility of the screening tool

The survey results, supported by the interviewees' opinions, show that EAProfs do not believe the screening tool is useful, however they also do not believe the screening tool is not useful, a finding that is relevant to research question two. Factors that could be causing EAProfs to have poor perceptions of the screening tool's utility, as identified in the interviews, are that the screening tool adds time and cost to the EIA process, the protocols are considered to be ineffective, and EAProfs do not use the screening tool to adjust the site footprint. EAProfs believe a reason behind why the screening tool adds time and cost to the EIA process is because the source data and environmental sensitivities are not accurate. The implications of the screening tool not being perceived as useful are discussed in the subsequent paragraphs.

EAProfs believe that the screening tool adds cost and time to the EIA process. Therefore, the screening tool is not meeting its objectives of reducing the time taken to undertake an EIA and decreasing costs of the EIA process. Given that most EAProfs charge developers based on time spent working on an EIA, there is a close association between the time and cost variables. Two principles of EIA best practice dictate that the EIA process should be efficient and cost-effective (IAIA, 1999). Research has shown that EIAs in South African protected areas (Alberts et al., 2021) and in the Free State, Northern Cape, and North West provinces (Retief & Chabalala, 2009) cost more compared to international averages. Since the EIA process is already considered to be costly and time-consuming by developers, the screening tool is further exacerbating this perception (DEA, 2018; Glasson & Therivel, 2013). Retief and Chabalala (2009) have argued that EIAs on small-scale developments cost disproportionately more than larger developments. EIAs for small-scale developments could be particularly negatively affected by the screening tool as these developments often do not have a large budget for the EIA. By adding cost and time to the EIA process, the implementation of the screening tool could dissuade small-scale investment and hinder development in South Africa.

This research shows that EAProfs believe the inaccurate sensitivities and prescriptive protocols are the reason why the screening tool adds time and cost to the EIA process. Since the screening tool is perceived as being conservative in its assignment of environmental sensitivities, unnecessary specialist assessments are likely being prescribed. The screening tool's protocols define which specialist studies are required based on the type of development and the environmental sensitivities at the site. The prescriptive nature of determining specialist studies is intended to reduce the time and cost spent undertaking unnecessary specialist assessments. However, the assignment of sensitivities is not accurate enough, resulting in additional specialist assessments and costing the developers more in terms of both time and money.

Lastly, a key objective of the screening tool is to implement the mitigation hierarchy by allowing developers to avoid environmentally sensitive areas on a site. However, the screening tool fails to meet this objective as EAProfs believe the screening tool is not useful to adjust the development footprint. A lack of influence over the location of a development is an identified shortcoming of the South African EIA process (DEA, 2018), something EAProfs believe the screening tool is not solving. The first step in the mitigation hierarchy is to avoid causing detrimental environmental impacts. Avoidance is often seen as the most critical step to mitigate environmental impacts (Ekstrom et al., 2015). The screening tool is intended to allow users to

identify the sensitive areas on a site and then alter the development footprint to avoid these areas. However, EAProfs provide two reasons why they believe the screening tool is not useful for adjusting the site footprint. Firstly, the developer is already paying for an EIA to be undertaken at a particular locality that they perceive as desirable for a range of reasons – these could relate to where resources and amenities occur on the site, or to feasibility of alternative sites. Therefore, the developer may opt to spend more money on additional specialist assessments if that means the development is placed in the ideal location. In addition, the resolution of the source data is not good enough for a user of the screening tool to make small scale adjustments to the site location to avoid environmentally sensitive areas. Poor resolution of environmental data is an issue in relation to environmental sensitivities in the ESM Webtool developed in Ireland, as described in Chapter 2 (González Del Campo et al., 2019). Arguably, a more effective approach to adjust the development footprint in South Africa is for the EAP to make fine-scale adjustments whilst on-site.

6.4 Improvements to the screening tool

An issue with the screening tool, as identified in this research, is that EAProfs preferred to use CapeFarmMapper or SANBI's BGIS as their primary source of environmental information. This result implies that EAProfs are more likely to use other environmental platforms to gather environmental information, thus highlighting the need to improve the screening tool. Possible reasons why other environmental information platforms are preferred could be due to the screening tool's perceived lack of utility and poor accuracy, EAProfs preferring the familiarity of other tools, or EAProfs preferring the greater discretion afforded by CapeFarmMapper and SANBI's BGIS. In the remainder of this chapter, several recommendations are offered based on the findings of the research. These recommendations aim to address specific aspects of the screening tool which EAProfs believe should be improved.

6.4.1 Improving perceptions regarding accuracy

Specialist feedback loop

The results of the interviews showed that EAProfs believe that a specialist feedback loop would improve the accuracy of the source data by transferring up to date, ground-truthed data back into the screening tool. A specialist feedback loop would involve creating a platform for data collected during specialist assessments that processes the data and transfers it back into the screening tool. Ground-truthed data are high resolution and therefore the specialist feedback

loop will facilitate the input of accurate, fine-scaled environmental data for the different environmental themes. A specialist feedback loop would also result in this high-resolution data being quickly entered into the screening tool, allowing the screening tool designers to update the data regularly. The specialist feedback loop could ensure that the data in the screening tool reflect the latest ground-truthed environmental information in South Africa. In addition, new data collected by scientists could be verified against an existing database of specialist studies from completed EIA reports.

One potential limitation of implementing the specialist feedback loop is the perceived lack of willingness by specialists to share the environmental information that they have gathered at their clients' expense. However, the survey results show that EAProfs believe that specialists should be required to submit environmental information for a site. Therefore, a lack of willingness by specialists to share their environmental information should not be regarded as a significant obstacle. It should also be possible to require that developers agree to this contribution to the knowledge base as part of their contractual arrangements with the EAP.

To ensure that the specialist feedback loop is effective, there would need to be a set of guidelines dictating a procedure that specialists are required to follow when ground-truthing a site. The guidelines should also prescribe a standard formatting type for the environmental information. A designer of the screening tool suggests an app as a possible solution to allow for the quick and standardised submission of environmental information. The app could be downloaded by specialists and used to submit their findings. Alternatively, a suggestion from the authors of this research is to make all EIAs housed in a public central database. From this database, the DFFE could extract the sensitivity rating information from the specialist assessments to feedback into the screening tool. This sensitivity information could be used to update the screening tool's sensitivity ratings for that location. This would mean only the sensitivity rating for an environmental theme and not the data collected by the specialist would be included in the screening tool, limiting the applicability of the rating across different development types.

Better communication

Better communication and more transparency from DFFE could improve perceptions of EAProfs regarding the accuracy of environmental sensitivities assigned by the screening tool.

DFFE should provide clear and open communication to inform EAProfs about the source of the environmental data and the process of ensuring the assigned sensitivities are as accurate as possible for each environmental theme. Information also needs to be given to users about when and how the data are updated. In addition, DFFE should communicate the uncertainty and assumptions used to model sensitivities for the different environmental themes. The need for improved communication regarding uncertainty and assumptions in data is not unique to South Africa or the screening tool. In Norway, Tenney et al. (2006) showed that transparency needs to be maintained regarding uncertainty and assumptions in source data used in EIAs. However, the information on the uncertainties in the biodiversity data are given by the SANBI (von Staden et al., 2018), and therefore for the biodiversity themes, the onus lies on EAProfs to engage more with the metadata presented in respect of this source data.

The thorough process undertaken to model species' distributions, as explained by the specialist in Chapter Two, should be shared with users of the screening tool. Research by Marais et al. (2015) showed that poor communication of the process used to determine sensitivities is also an issue identified in South African EMFs. By explaining the processes that produced the screening tool's environmental themes, EAProfs can be better equipped to interpret the data. Data are also never perfect, and the environmental information in the screening tool is produced using a confidence interval. There is currently no option to view the measure of uncertainty in the screening tool. Therefore, good communication about the uncertainty in the environmental themes is imperative. Clear communication is also needed from DFFE about the need for and objectives of the screening tool, both of which have been identified in this research project in Chapter Four.

6.4.2 Application of the screening tool

The research highlighted concerns with the national sector classification categories as interviewees believed there is a mix of triggers for an environmental assessment under the three NEMA Listing Notices and sectors under the national sector classification categories. Two dropdown lists could be created for users to complete on the initial page of the screening tool. The first dropdown list could contain all the national sector classification categories that a development could fall under. The second dropdown list could contain all the NEMA listed activities which would trigger an EIA. Adding two separate lists would avoid confusion about what to select under the current national sector classification categories. In addition, by

collecting information on developments triggering the NEMA listed activities, the DFFE can maintain a database of potential developments under each listed activity. The database could be used to aid the assessment of cumulative impacts of multiple developments in an area. In this regard, Pope et al. (2013) have indicated that assessing the cumulative environmental impacts of developments is a critical issue in the EIA process.

Another suggestion is to make the screening tool voluntary for use except for mining related EIAs. The Department of Mineral Resources (DMR) and not the DFFE grant environmental authorisation in respect of mining related EIAs. Therefore, by being mandatory the DMR would be required to consider all aspects of the environment. Mines generally have large budgets and thus can afford the added costs associated with the screening tool being mandatory for this sector. In addition, Sandham et al. (2008) have indicated that there are weaknesses in determining environmental impacts in mining related EIA reports. Mining projects in South Africa are known to cause significant environmental degradation on a large scale through processes such as acid mine drainage (Ochieng et al., 2010). Ensuring the EIA for a potential mine is comprehensive and considers every aspect of the environment is imperative.

Lastly, having used the tool with a hypothetical example, the researcher agrees with the suggestion made by one EAProf that there should also be an 'undo' function built into the screening tool, which would allow users to remove an action they had performed.

The improvements to the screening tool presented are drawn from the ideas of EAProfs. It is recommended that DFFE implement these improvements to enhance the perceptions of EAProfs regarding accuracy and utility of the screening tool. The next and final section offers concluding remarks on the key findings and implications of the research as well as suggestions for a way forward.

Chapter Seven: Conclusion

7.1 Project conclusions

The DFFE are constantly trying to improve the screening stage, as it is critical to avoiding unnecessary EIAs being undertaken. However, research shows there is a need to improve the effectiveness of the screening stage in South Africa (Retief et al., 2011). The screening tool was introduced in an attempt to standardise access to environmental information and streamline the screening stage in the South African EIA process. Given the recent introduction of the screening tool, perceptions of its accuracy and utility are yet to be assessed. This preliminary assessment sought to understand EAProfs perceptions of how trustworthy they believe the screening tool's environmental sensitivity ratings are, how useful they believe the tool is and whether they believe the tool is meeting its objectives.

EAProfs believe the sensitivity ratings for the biodiversity themes as well as the archaeology, civil aviation, cultural heritage, and palaeontology themes are not accurate. This result implies that EAProfs who use the screening tool do not trust these sensitivity ratings assigned by the tool. EAProfs' perceptions regarding the utility of the screening tool are diverse as they believe the screening tool improves the scientific robustness of the screening stage by identifying relevant environmental sensitivities and areas of special interest. However, they also believe the screening tool adds cost and time to the EIA process due to the conservative assignment of sensitivity ratings, resulting in unnecessary specialist assessments being prescribed. Furthermore, EAProfs hold diverse opinions regarding the level of discretion afforded in the screening stage, with interviewees perceiving the screening tool reduces discretion whilst also saying there needs to be increased regulation for the site sensitivity verification process. This research does not make any conclusions on the actual accuracy or utility of the screening tool but rather demonstrates the opinions of professional users of the tool.

According to EAProfs' perceptions, the screening tool is meeting only one of its objectives which is to improve the comprehensiveness of the screening stage. EAProfs believe the screening tool does not reduce the cost and time of the EIA process and is not useful to adjust the site footprint. It is unclear from the findings of this research if EAProfs believe the protocols help specialists perform specialist work. EAProfs believe the screening tool only meets one of

its objectives, highlighting the negative perceptions held by professional users of the tool. This predominantly negative perception of the screening tool is emphasised by EAProfs preference for using other environmental information platforms such as CapeFarmMapper or the SANBI's BGIS. This finding could be due to the screening tool being a recent introduction, poor perceptions of accuracy and utility of the tool or the greater degree of discretion allowed when using the other environmental information platforms.

It is recommended that a specialist feedback loop be implemented to improve the accuracy of the screening tool's source data. The specialist feedback loop would allow for ground truthed and up to date data to be uploaded into the screening tool. In addition, improved communication is required from the DFFE with regards to how the sensitivity ratings are assigned by the screening tool and the inherent uncertainty in the assigned sensitivity ratings.

7.2 Suggestions for a way forward

In addition to the conclusions that have emanated from the findings of the research, some further general suggestions are made below particularly in relation to additional investigations that could contribute to improving perceptions of accuracy and utility of the Screening tool.

Firstly, research is required into which environmental themes need the most improvement in terms of accuracy. This research identified perceived accuracy issues with the civil aviation, archaeology, cultural heritage, and palaeontology themes as well as the biodiversity related themes. Research in this regard, could be done by analysing EIA reports conducted since the screening tool became mandatory in October 2019. The assignment of environmental sensitivities in the specialist assessment from the EIA cases could be compared with the screening tool report. The assumption would be that the specialist assessments are accurate and, therefore, if there is a difference in sensitivity, the screening tool's assigned sensitivity ratings are inaccurate.

Second, further research could be undertaken into the feasibility of implementing the specialist feedback loop. Although it seems an obvious way of improving the tool, there are uncertainties that need to be considered. The uncertainties relate to which organisation should manage the processing of the specialist data, how the submission of the data should be standardised, how the data should be processed to be entered into the screening tool, and whether the specialist

feedback loop will improve the quality of the source data. As this research has shown, EAProfs are unsure whether DFFE or the data custodians should process the data. Specialists may use different techniques to collect data and may use the data to generate different environmental information. This environmental information may be stored using different formats or programs. Therefore, future research should seek innovative solutions to allow for the entering of data in useable formats.

Third, based on the survey and interview results, further research is needed to determine whether the protocols help specialists by prescribing how to undertake a specialist assessment and what to include in the specialist assessment report. In addition, there needs to be a clear decision-making procedure which the competent authorities can follow when deciding whether to accept a disputed environmental sensitivity rating determined by a site sensitivity verification.

Finally, precedents for similar tools could be examined in terms of what advantages they offer. An example is the ESM Webtool used in Ireland and CapeFarmMapper in the Western Cape of South Africa, both of which have been referred to in this research project. The ESM Webtool is set up in a similar way to the screening tool in that it uses spatial datasets to determine environmental sensitivities for a site, but it also gives the user more discretion. Research has shown that the Webtool reduces the time and cost of mapping SEAs, which is a perceived weakness of the screening tool (González Del Campo et al., 2019). It must be acknowledged that the screening tool and the ESM Webtool are designed for different environmental assessment techniques, EIA, and SEA, respectively. However, both tools function in similar ways and are designed to identify environmental sensitivities. Further research is needed to determine whether adopting a similar approach to the ESM Webtool would improve perceptions of the screening tool's accuracy and utility.

The findings have shown there is a need to improve EAProfs' perceptions regarding the accuracy and utility of the screening tool. Through the recommended improvements and suggestions for a way forward, this research project has presented unique and important opportunities to improve perceptions of the screening tool. In addition, these opportunities are also aimed at improving the functioning of the screening tool to enable it to become as accurate and useful as possible. By making the recommended adjusts, the screening tool could become

a critical tool in the effective functioning of the screening stage and of the rest of the EIA process in South Africa.

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Appendices

Appendix 1. Interview script

Generic Beginning:

Hello, thank you for agreeing to participate in this discussion with me. It is greatly appreciated. This interview should take between 15 – 20mins. Just a reminder that your participation is completely voluntary, and you may withdraw at any time. Audio is being recorded to collate the information gathered. The information collected is confidential and you will remain anonymous.

Please feel free to stop me if you have any questions.

Who I am:

Michael Lambrecht, contact information on email, MPhil in EGS department at UCT. I am passionate about working towards protecting the environment and hope to work in the EIA field when I graduate. I am based on Cape Town.

My project:

Title – A Preliminary Assessment into the Accuracy and Utility of the DEFF screening tool, South Africa

Rationale – Since the introduction of the screening tool in October 2019, the accuracy and utility remain untested. Results on how accurate and useful the tool is will allow EAProfs and the relevant authorities to evaluate the tool and its contribution (or the extent that it can add value) to the EIA process. In addition, this information could potentially help to identify aspects that need to be relooked at or improved, should this be required.

Why I am interviewing you:

I am interviewing you today to gain information on your opinion of how useful and accurate you, as somebody who works in the EIA profession, think the screening tool is.

Initial questions:

Do you have any questions before we get started?

What is your job title or description?

Designers of the screening tool:

Can you explain your role in designing the screening tool?

Can you explain the process behind how the screening tool was developed?

Users of the screening tool:

Can you explain how and when you have used the screening tool as part of your job?

Are there any ways in which the screening tool has helped or benefitted your work in any way?

Are there any faults in the screening tool or areas which can be improved?

Generic ending:

Do you have any other comments/suggestions/questions?

Thank you very much for your time.

Appendix 2. Ethical Clearance

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

Faculty of Science
University of Cape Town
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South Africa 7701

E-mail: melissa.densmore@uct.ac.za
Tel: 021 650-9111

22 April 2021

Mr Michael Lambrecht
Environmental and Geographical Science

A Preliminary Investigation into the Accuracy and Utility of the DEFF Screening Tool, South Africa

Dear Mr Michael Lambrecht

I am pleased to inform you that the Faculty of Science Research Ethics Committee has approved the above-named application for research ethics clearance, subject to the conditions listed below.

- We recommend that the collection of emails for feedback be put into a separate survey linked at the end of the survey so that the email addresses are not directly associated with the data.
- Clearance has NOT been given for in-person fieldwork activities.
- Restrictions on involving human participants in research must be adhered to, given current concerns about the spread of Covid-19. Please ensure that you are aware of and comply with UCT policy on this, as communicated by management.
- Implement the measures described in your application to ensure that the process of your research is ethically sound; and
- Uphold ethical principles throughout all stages of the research, responding appropriately to unanticipated issues: please contact me if you need advice on ethical issues that arise.

Your approval code is: **FSREC 019 – 2021 (Amendment)**

I wish you success in your research.

Yours sincerely

Dr Melissa Densmore
Acting Chair: Faculty of Science Research Ethics Committee

Cc: Prof Merle Sowman (supervisor)

Appendix 3. Format of the Survey

Front page

My name is Michael Lambrecht, and I am currently researching the accuracy and utility of the recently introduced DEFF screening tool. As part of my research, I am investigating how environmental assessment professionals working in South Africa perceive the screening tool. This survey should take between 3 - 4 minutes. All responses are anonymous and will be kept confidential. You may withdraw at any time. Should you want to withdraw your data from the study after submitting please send an email to LMBMIC014@myuct.ac.za. Your participation is greatly appreciated.

By clicking 'Next' to proceed with the survey, you agree to participate in this research study.

Group 1: Background

1. What is your job title? (multiple choice)
    - Question type: Multiple choice
    - Response options: Environmental assessment practitioner (EAP), Specialist, Developer, National Government Official, Provincial Government Official, Local Government Official, GIS Specialist, and Other.

* If "Other" Then:

    It appears your job title was not listed. You can elaborate below on what your job title is.
    - Question type: Long free text
    - Response type: Written by participant

2. Which province is your work mainly based in?
    - Question type: List (dropdown)
    - Response options: Eastern Cape, Free State, Gauteng, Kwa-Zulu Natal, Limpopo, Mpumalanga, Northern Cape, North-West, and Western Cape.

3. How many years of experience do you have in the environmental field?
    - Question type: List (dropdown)
    - Response options: 0 – 5 years, 6 – 10 years, 11 – 15 years, 16 – 20 years, 20+ years.

4. How experienced are you with using the DEFF screening tool?
    - Question type: List (dropdown)
    - Response options: Not experienced (never used the tool), Quite experienced (have only used the tool once or twice), Experienced (have used the tool several times), and Very experienced (have used the tool more than 10 times).

* If "Not experienced (never used the tool)" Then:

It appears that you have never used the screening tool before. We have therefore opted you out of the survey. Thank you for your time. If this was a mistake, click the 'Previous' button below to continue with the survey. If you have any comments, you can leave them below.

- Question type: Long free text
- Response options: Written by participant

Group 2: Perceptions

For the each of the following statements choose which option best reflects your opinion.

1. The screening tool accurately assigns sensitivities for the various biodiversity themes.
    - Question type: List (radio)
    - Response options: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

2. The screening tool is your preferred source of environmental information for a site.
    - Question type: List (radio)
    - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

3. The screening tool improves the comprehensiveness of the screening stage (i.e., the tool helps you to identify unknown environmental sensitivities, EMFs, development zones, bio-regional plans, or protected areas).
    - Question type: List (radio)
    - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

4. The screening tool is useful to adjust the site footprint to avoid environmentally sensitive areas.
    - Question type: List (radio)
    - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

5. The screening protocols help specialists perform assessment work by prescribing what is required.
   - Question type: List (radio)
   - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

6. The screening tool costs developers more as they have to pay for unnecessary studies to be done.
   - Question type: List (radio)
   - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

7. The screening tool adds more time to the EIA process.
   - Question type: List (radio)
   - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

8. Specialists should be required to submit environmental information from a site assessment to improve the accuracy of the source data in the screening tool.
   - Question type: List (radio)
   - Response type: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, *Strongly Agree*.

9. Do you have any further comments? (not compulsory)
   Question type: Long free text
   Response type: Written by participant.

Final page

Thank you for participating in this survey. Your contribution is greatly appreciated. If you have any questions, feel free to email me at LMBMIC014@myuct.ac.za. If you would like a copy of the research emailed to you once it has been completed, please click the link below:

https://limesurvey.uct.ac.za/index.php/617823?lang=en

Appendix 4. Survey distributed by the IAIAsa via email

7. Student Research Assistance Required Perceptions of the DEFF Screening Tool

Michael Lambrecht a student (IAIAsa Membership No 6716) at the University of Cape Town is conducting his research project around perceptions of the DEFF Screening Tool.

Interested Members are invited to share their perceptions via the survey link.

Here is a link to the survey:
https://limesurvey.uct.ac.za/index.php/326272?lang=en

Ethical clearance from UCT attached.

Appendix 5. IAIAsa Facebook post distributing the survey