



**TERRESTRIAL BIODIVERSITY ASSESSMENT FOR  
THE PROPOSED MOTUOANE EXPLORATION  
RIGHT 386 EA12/3/386**

**Matjabeng & Moqhaka Local Municipalities,  
Lejweleputswa & Fezile Dabi District Municipalities,  
Free State Province, South Africa**

**02 June 2026**

**Prepared by:**



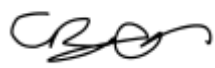
**The Biodiversity Company**

Cell: +27 81 319 1225

Fax: +27 86 527 1965

[info@thebiodiversitycompany.com](mailto:info@thebiodiversitycompany.com)

[www.thebiodiversitycompany.com](http://www.thebiodiversitycompany.com)

<b>Report Name</b>	<b>TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED MOTUOANE EXPLORATION RIGHT 386 EA12/3/386</b>	
<b>Specialist Theme</b>	Terrestrial Biodiversity, Plant and Animal Theme	
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<b>Environmental Assessment Practitioner</b>		
<b>Responsible Specialist</b>	Martinus Erasmus (Pri. Sci. Nat 118630)	
<b>Technical Support</b>	Connor Ryan (Cand 174067)	
<b>Declaration</b>	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, Amended. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>	

## Table of Contents

1	Introduction.....	6
1.1	Background .....	6
1.2	Project Description .....	7
1.3	Scope of Work.....	9
1.4	Assumptions and Limitations .....	9
1.5	Key Legislative Requirements.....	10
2	Fieldwork .....	11
2.1	Biodiversity Field Assessment .....	11
3	Results & Discussion .....	12
3.1	Desktop Baseline .....	12
3.1.1	Ecologically Important Landscape Features .....	12
3.1.2	Flora Assessment.....	20
3.1.3	Fauna Assessment.....	24
3.2	Fieldwork Findings .....	32
3.2.1	Field Assessment.....	32
3.2.2	Flora Assessment.....	40
3.2.3	Fauna Assessment.....	42
3.3	Habitat Assessment .....	44
3.4	Site Ecological Importance.....	46
3.4.1	Screening Tool Comparison.....	50
4	Impact Risk Assessment.....	51
4.1	Biodiversity Risk Assessment .....	51
4.2	Present Impacts to Biodiversity.....	51
4.3	Alternatives Considered .....	51
4.4	Irreplaceable Loss .....	51
4.5	Identification of Additional Potential Impacts .....	54
4.6	Quantitative Impact Assessment.....	55
4.6.1	Construction/Operational Phase .....	56
4.6.2	Closure Phase.....	58
4.7	No-Go Scenario .....	51
5	Conclusion.....	59
5.1	Impact Statement .....	59

5.2	Specialist Opinion .....	59
6	References .....	60
7	Appendix Items.....	62
7.1	Appendix A: Methods .....	62
7.1.1	Desktop Dataset Assessment .....	62
7.1.2	Desktop Flora Assessment .....	63
7.1.3	Desktop Fauna Assessment .....	64
7.1.4	Vegetation & Flora Survey .....	65
7.2	Appendix B: Terrestrial Site Ecological Importance .....	67
7.3	Appendix C: Expected Species Lists .....	72
7.3.1	Expected Flora Species .....	72
7.3.2	Expected Mammal Species.....	78
7.3.3	Expected Reptile Species .....	78
7.3.4	Expected Amphibian Species .....	78
7.3.5	Expected Avifauna Species .....	79
7.4	Appendix D: Specialist Declaration of Independence .....	86
7.5	Appendix E: Specialist CVs.....	87



## List of Tables

Table 1-1	A list of key legislative requirements .....	10
Table 3-1	Summary of relevance of the proposed project to ecologically important landscape features .....	12
Table 3-2	List of Sensitive Species of Conservation Concern that may occur in the PAOI. VU = Vulnerable .....	24
Table 3-3	Threatened mammal species that are expected to occur within the PAOI (NT = Near threatened; VU = Vulnerable). .....	24
Table 3-4	Threatened avifauna species that are expected to occur within the Project Area (LoO=Likelihood of occurrence LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered) .....	25
Table 3-5	Sensitivity summary of the habitat types delineated within the PAOI. ....	32
Table 3-6	Table presenting the alien and invasive species recorded for the PAOI .....	41
Table 3-7	Table presenting the mammal species recorded for the PAOI during the field survey .....	42
Table 3-8	Table presenting the avifauna species recorded for the PAOI during the field survey .....	43
Table 3-9	Table providing descriptions of the habitat types delineated for the PAOI .....	44
Table 3-10	Summary of habitat types delineated within Target areas, Seismic Transects and 500m Buffer .....	46
Table 3-11	Summary of habitat types delineated within Desktop PAOI. ....	48
Table 3-12	Summary of the screening tool vs specialist assigned sensitivities for the Target areas .	50
Table 4-1	Summary of potential impacts to biodiversity associated with the proposed activity .....	54
Table 4-2	Assessment of significance of impacts on the terrestrial fauna and flora associated with the project.....	52
Table 7-1	Summary of Conservation Importance (CI) criteria.....	68
Table 7-2	Summary of Functional Integrity (FI) criteria .....	69
Table 7-3	Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI) .....	69
Table 7-4	Summary of Receptor Resilience (RR) criteria .....	70
Table 7-5	Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI) .....	70
Table 7-6	Guideline for interpreting Site Ecological Importance in the context of proposed activities .....	71

## List of Figures

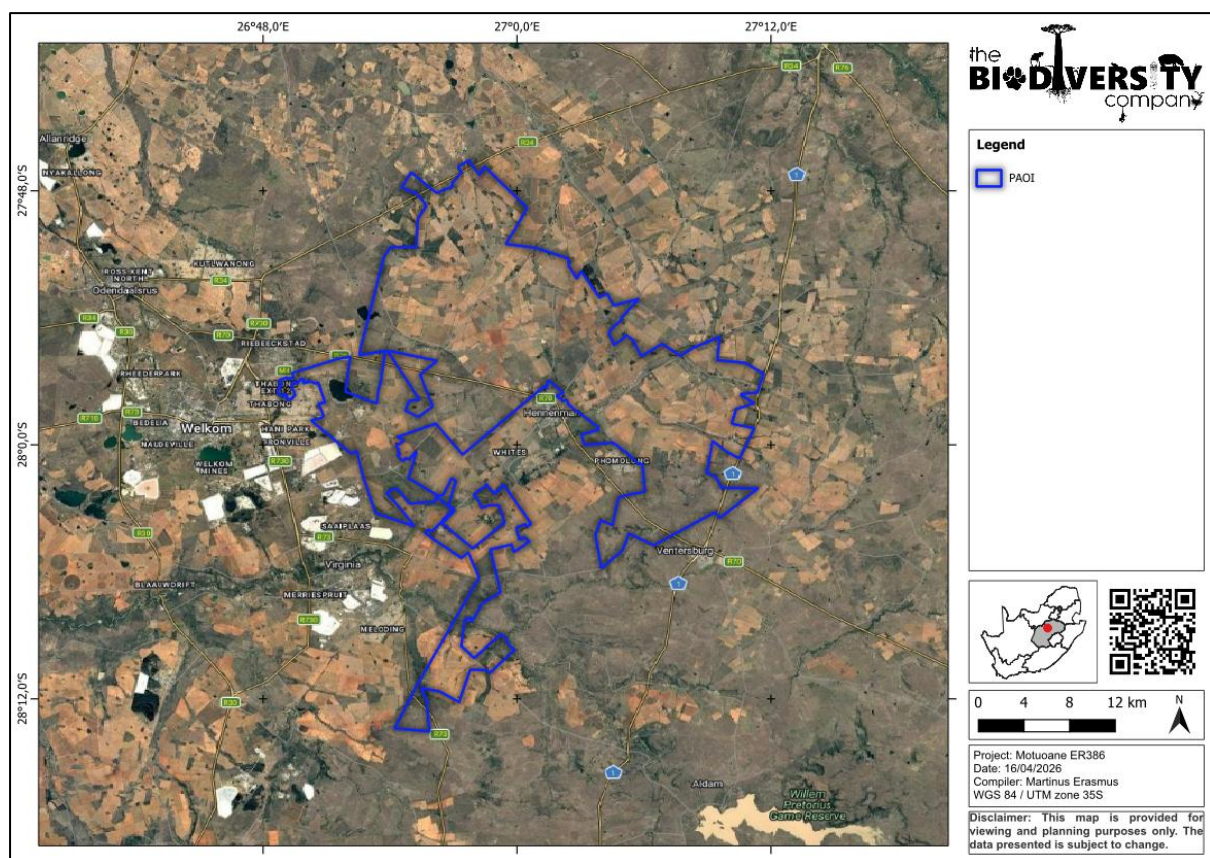
Figure 1-1	Map illustrating the regional context of the PAOI.....	6
Figure 1-2	Map illustrating the proposed Target Areas, Seismic Transects and Project Area of Influence.....	8
Figure 2-1	Map illustrating the field tracks of the field survey of the PAOI.....	11
Figure 3-1	Map illustrating the ecosystem threat status associated with the PAOI .....	13
Figure 3-2	Map illustrating the ecosystem protection level associated with the PAOI .....	14
Figure 3-3	Map illustrating the PAOI in relation to the Free State Terrestrial CBA Plan.....	15
Figure 3-4	Map illustrating the NPAES focus areas and their proximity to the ER32 PAOI.....	16
Figure 3-5	Map illustrating the location of the Protected Areas proximal to the ER32 PAOI .....	17
Figure 3-6	Map illustrating the PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset.....	18
Figure 3-7	Map illustrating the ER32 PAOI in relation to the National Freshwater Ecosystem Priority Area dataset.....	19
Figure 3-8	Map illustrating the vegetation types associated with the PAOI .....	20
Figure 3-9	The Terrestrial Biodiversity Theme sensitivity for the PAOI .....	29
Figure 3-10	The Plant Theme sensitivity for the PAOI.....	30
Figure 3-11	The Animal Theme sensitivity for the PAOI.....	31
Figure 3-12	Desktop Habitats of the PAOI .....	45
Figure 3-13	Site Ecological Importance of the Target areas, Seismic Transects and 500m Buffer.....	47
Figure 3-14	Site Ecological Importance of the Desktop PAOI.....	49
Figure 7-1	Map illustrating extent of area used to obtain the expected flora species list from the iNaturalist database. The yellow dots indicate the approximate location of the PAOI..	64

## 1 Introduction

### 1.1 Background

The Biodiversity Company was appointed to undertake a Terrestrial Biodiversity Assessment for the proposed Motuoane Exploration Right 386 EA12/3/386 application. The proposed project is located over an area of approximately 58 000 ha, covering various farm portions in Welkom near towns of Virginia, Hennenman and Odendaalsrus, Free State Province. The site is located within the Matjhabeng and Mophaka Local Municipalities, Lejweleputswa and Fezile Dabi District Municipalities (Figure 1-1).

The purpose of the specialist studies is to provide relevant input into the impact assessment process and to provide a report for the proposed activities associated with the development. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making as to the ecological viability of the proposed project.



**Figure 1-1** Map illustrating the regional context of the PAOI

## 1.2 Project Description

Exploration Right (ER) 386 represents the consolidation of three previously individual tenures, TCP235, TCP240, and ERA341, which were merged into a single exploration right in 2024. This consolidation streamlines the management and exploration of saleable gases, including but not limited to Methane, Carbon Dioxide, Helium, and Nitrogen. The application for ER386 was submitted to cover all saleable gases within the consolidated area.

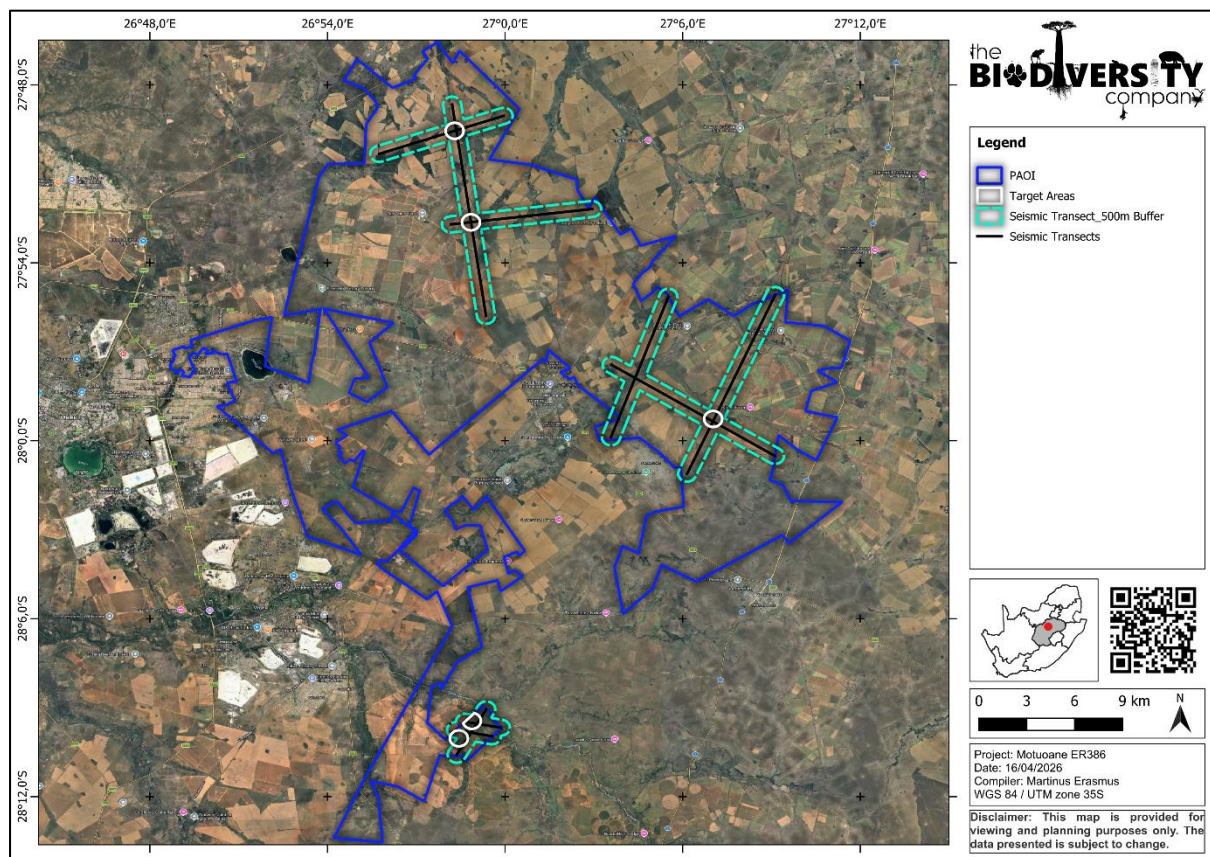
The exploration activities proposed under ER386 include:

- **Identification and Assessment of Existing Blowers:** Locating existing blowers within the exploration right and undertaking well workover and intervention where necessary.
- **Drilling of New Exploration Wells:** Drilling up to 5 new exploration wells at pre-identified or newly identified areas of interest.
- **Establishment of Drilling Pads:** Setting up 50x50 m drilling pads, which will require the clearance of indigenous vegetation.
- **Access Road Construction:** Establishing new temporary gravel access roads, only where necessary, to facilitate exploration activities.
- **Seismic and Magnetotelluric Surveys:** Conducting seismic and/or magnetotelluric surveys across the exploration right, focusing on areas of interest. Motuoane will first review existing seismic data from the Council for Geoscience and the Petroleum Agency. If no suitable data are available, new surveys will be conducted, following environmental protocols and with landowner consent. Preliminary survey transects are proposed to cover just over 70 km, with locations and lengths subject to change as exploration progresses.
- **Vegetation Clearance:** Clearing areas of 300 m<sup>2</sup> or more, and up to 1 hectare or more (but less than 20 hectares), of indigenous vegetation within specified geographical areas to facilitate exploration activities.
- **Gas Composition Analysis:** Performing gas composition analysis on samples from both existing boreholes and newly drilled wells within the exploration right.
- **Site Rehabilitation and Closure:** Rehabilitating all disturbed areas and ensuring the proper closure of blower sites upon completion of activities.



Figure 1-2 illustrates the spatial layout of the Motuoane ER386 project area, highlighting the key project components:

- Desktop PAOI (Project Area of Interest):
  - The area outlined in blue represents the Desktop PAOI, which encompasses the full extent of the exploration right (ER386).
- Seismic Transects and 500m Buffer:
  - The black lines indicate the proposed seismic transects, which are linear survey paths identified for geophysical data collection. Surrounding each transect is a cyan buffer zone representing a 500-meter corridor on either side of the transect.
- Target Areas for Drilling Wells:
  - The white circles and their immediate surroundings mark the primary target areas for exploration drilling.



**Figure 1-2** Map illustrating the proposed Target Areas, Seismic Transects and Project Area of Influence

### 1.3 Scope of Work

The aim of the biodiversity assessment was to provide information to guide the risk of the proposed activity to the current state of the associated ecosystems within the development area. This was achieved through the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the PAOI and surrounding landscape;
- Desktop assessment to compile an expected species list and identify possible Species of Conservation Concern (SCC) that occur within the PAOI and surrounding landscape;
- Field survey to record flora and fauna species, especially Species of Conservation Concern (SCC);
- Determination of the Site Ecological Importance (SEI), also commonly referred to as sensitivity;
- A biodiversity impact assessment; and
- The prescription of mitigation measures for identified risks, including assigning buffer areas, where necessary.

### 1.4 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- It is assumed that all information received from the client/developer is accurate;
- The specialist was not provided with an architectural plan or any engineering drawings with regard to the planned development activities and, as such, the potential impacts arising from these activities may only be assumed based on previous experience;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area (PAOI) was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- This assessment does not consider temporal trends (note that the data collected is, however, considered sufficient to derive a meaningful baseline);
- Whilst every effort was made to cover as much of the PAOI as possible, it is possible that some plant and animal species that are present within the PAOI were not recorded during the field investigations. However, it is the opinion of the specialist that an accurate representative sample of the ecological components considered within this assessment was collected;
  - Only the Target Areas for Drilling Wells were ground truthed.
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.

## 1.5 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 1-1 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

**Table 1-1 A list of key legislative requirements**

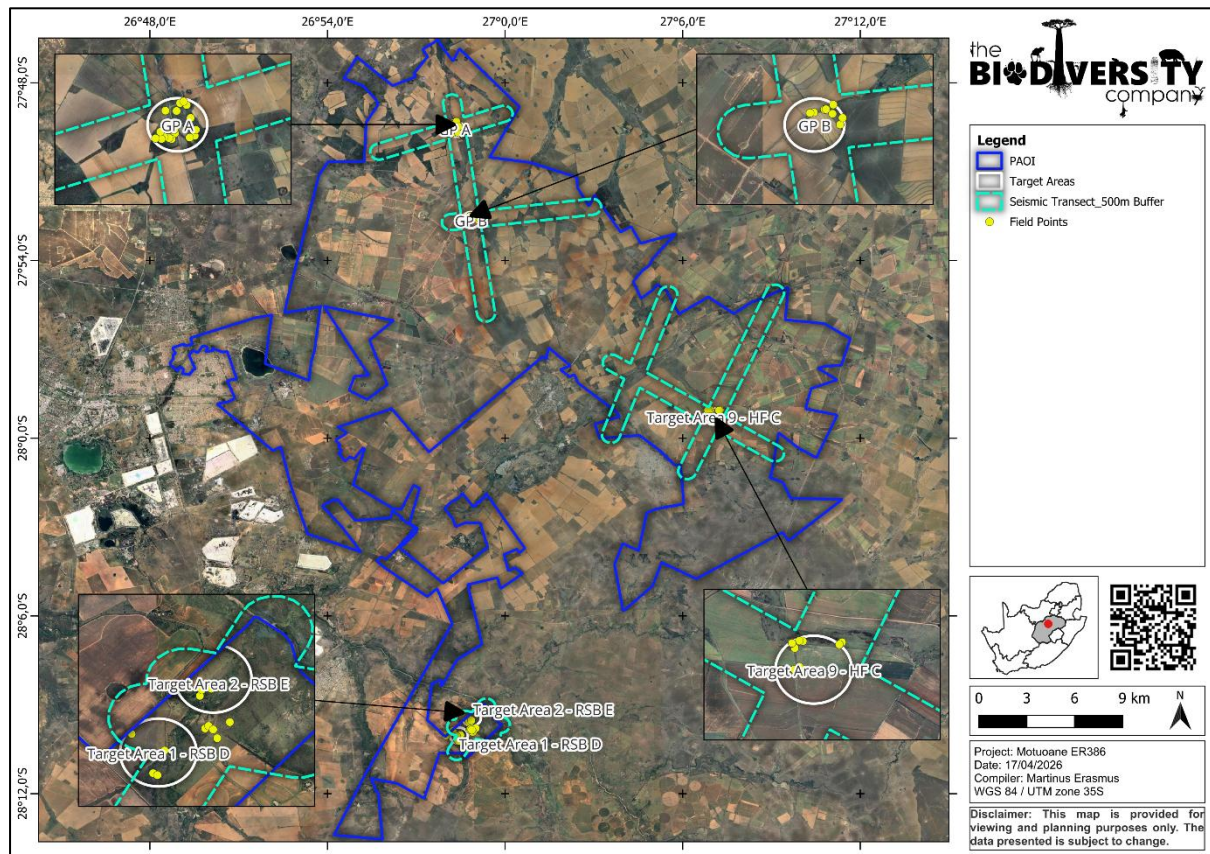
Region	Legislation / Guideline	Comment
<b>National</b>	NEMA	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), Threatened or Protected Species Regulations	The protection of species and ecosystems that warrant protection
	Assessment Protocol (March 2020)	The minimum criteria for reporting.
	Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	NEMWA;	The regulation of waste management to protect the environment.
	NWA	The regulation of water uses.
	GN 1003 of GG 43726 of 18 Sept 2020	The regulation and management of alien invasive species.
<b>Provincial</b>	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	To provide for control over the utilisation of the natural agricultural resources, including the vegetation and the combating of weeds and invader plants.
	Free State Nature Conservation Ordinance 8 of 1969	To provide for the management and conservation of the Province's biophysical environment and protected areas. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.



## 2 Fieldwork

### 2.1 Biodiversity Field Assessment

One (1) wet season field survey was undertaken for the project on the 16<sup>th</sup> to the 19<sup>th</sup> of March 2026 to confirm the presence of SCC, as well as any sensitive habitat features. Effort was made to cover all the different habitat types within the limits of time and access. During the survey, notes were made regarding current impacts, recording of dominant vegetation species and any sensitive or important features (e.g., drainage lines, rock outcrops, termite mounds etc.). Effort was made to cover all the different habitat types, within the limits of time and access (Figure 2-1)



**Figure 2-1** Map illustrating the field tracks of the field survey of the PAOI.



### 3 Results & Discussion

#### 3.1 Desktop Baseline

##### 3.1.1 Ecologically Important Landscape Features

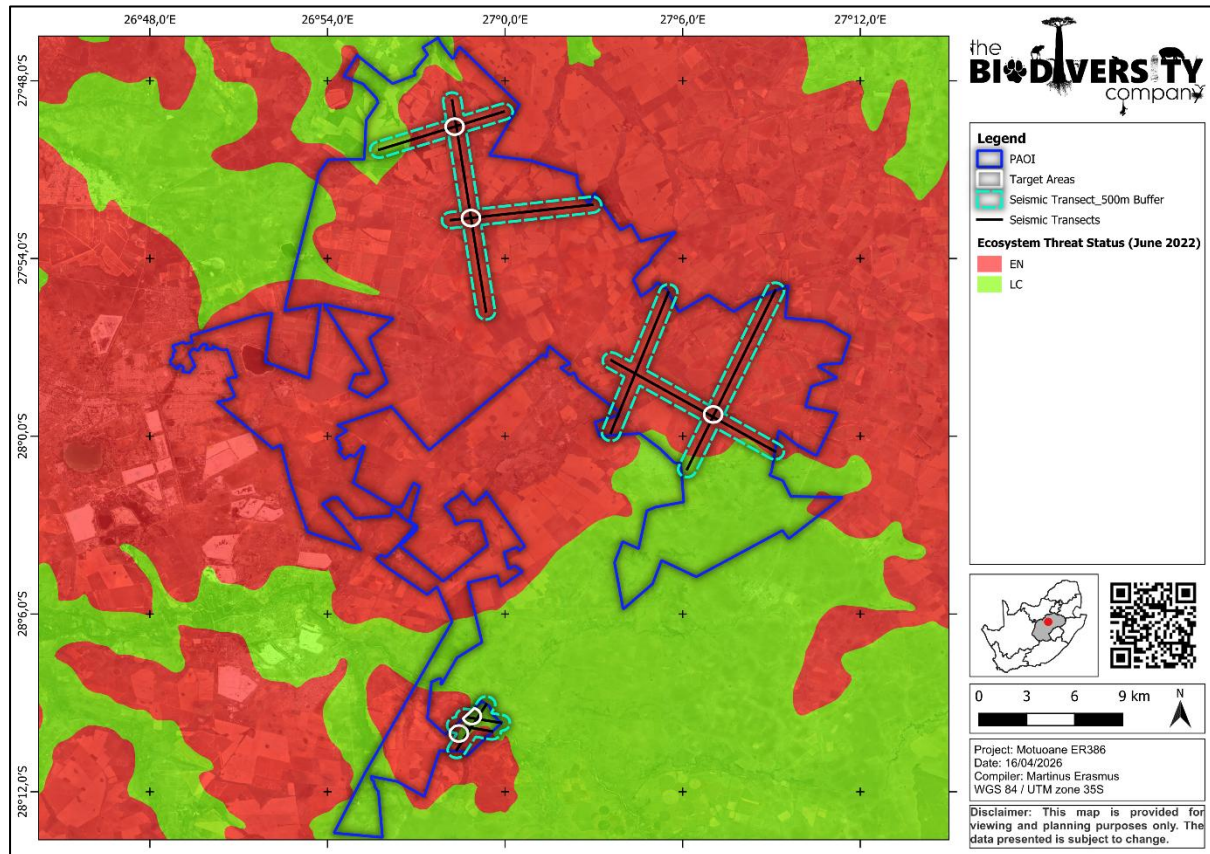
The relevance of the proposed development to ecologically important landscape features are summarised in Table 3-1.

**Table 3-1** *Summary of relevance of the proposed project to ecologically important landscape features*

Desktop Information Considered	Relevance	Reasoning	Section
Ecosystem Threat Status (Red List of Ecosystems (RLE) 2021)	Relevant	PAOI: Overlaps with 'Endangered' and 'Least Concern' ecosystems	3.1.1.1
Ecosystem Protection Level	Relevant	PAOI: Overlaps with 'Not Protected' and 'Poorly Protected' Ecosystems	3.1.1.2
Provincial Conservation Plan	Relevant	PAOI: Overlaps with CBA 1, ESA1, ESA 2, Other Natural Areas and Degraded Areas	3.1.1.3
National Protected Areas Expansion Strategy (NPAES)	Relevant	The PAOI overlaps with NPAES Priority Focus Areas	3.1.1.4
South Africa Protected Areas Database - SAPAD and South Africa Conservation Areas Database - SACAD	Relevant	According to the protected area spatial datasets from SAPAD (2025) and SACAD (2025), the PAOI does overlap with one SAPAD, Thabong Game Ranch (Figure 3-5). Three other SAPADs occur within 5 km.	3.1.1.5
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant	PAOI overlaps with NBA wetlands and Rivers.	3.1.1.6
National Freshwater Ecosystem Priority Area (NFEPA)	Relevant	PAOI overlaps with NFEPA wetlands and Rivers.	3.1.1.7
Strategic Water Source Areas (SWSA)	Irrelevant	Does not overlap with any relevant areas	-
Key Biodiversity Areas (KBA)	Irrelevant	Not within range of any relevant areas	-

### 3.1.1.1 Red List of Ecosystems

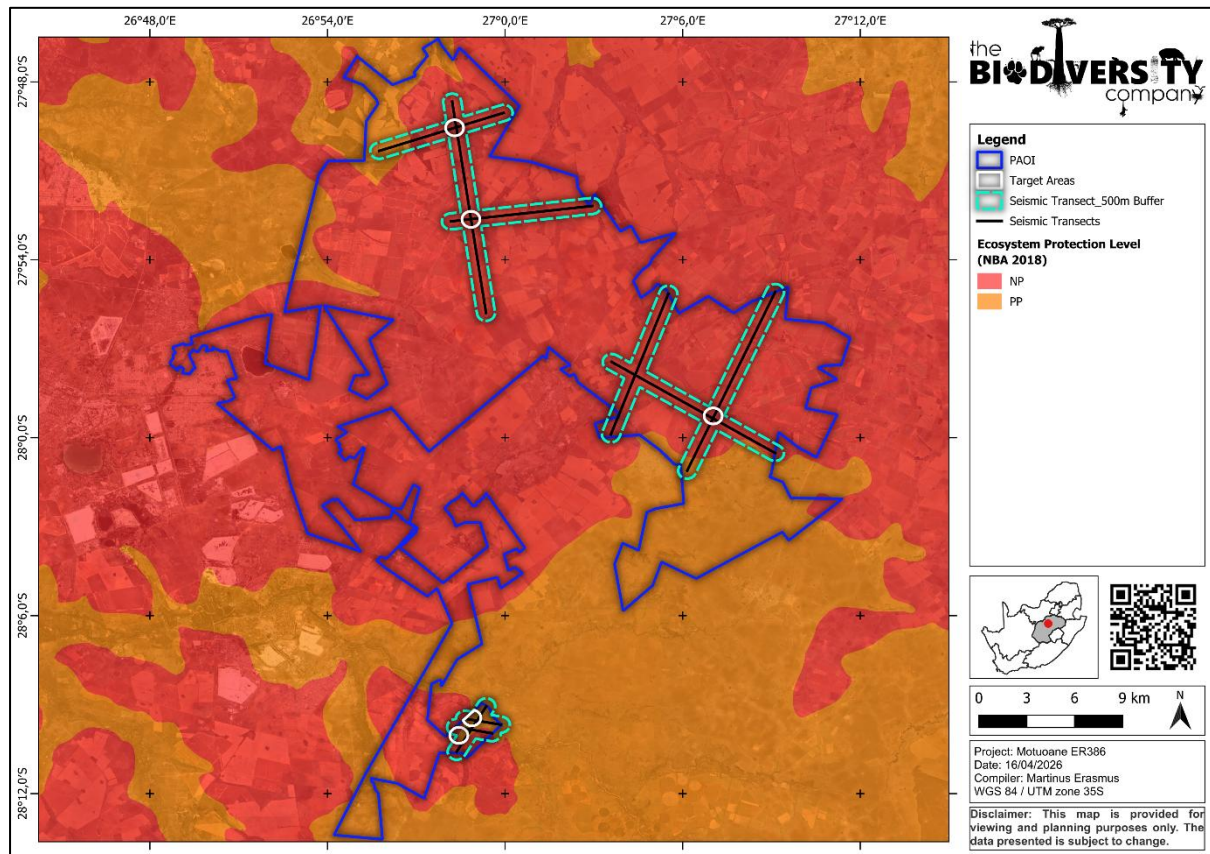
The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the Red List of Ecosystems dataset (Skowno & Monyeke, 2021) the PAOI overlaps with an EN and LC ecosystem (Figure 3-1).



**Figure 3-1** Map illustrating the ecosystem threat status associated with the PAOI

### 3.1.1.2 Ecosystem Protection Level

Indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The ER32 PAOI overlaps with a NP and PP ecosystem (Figure 3-2).

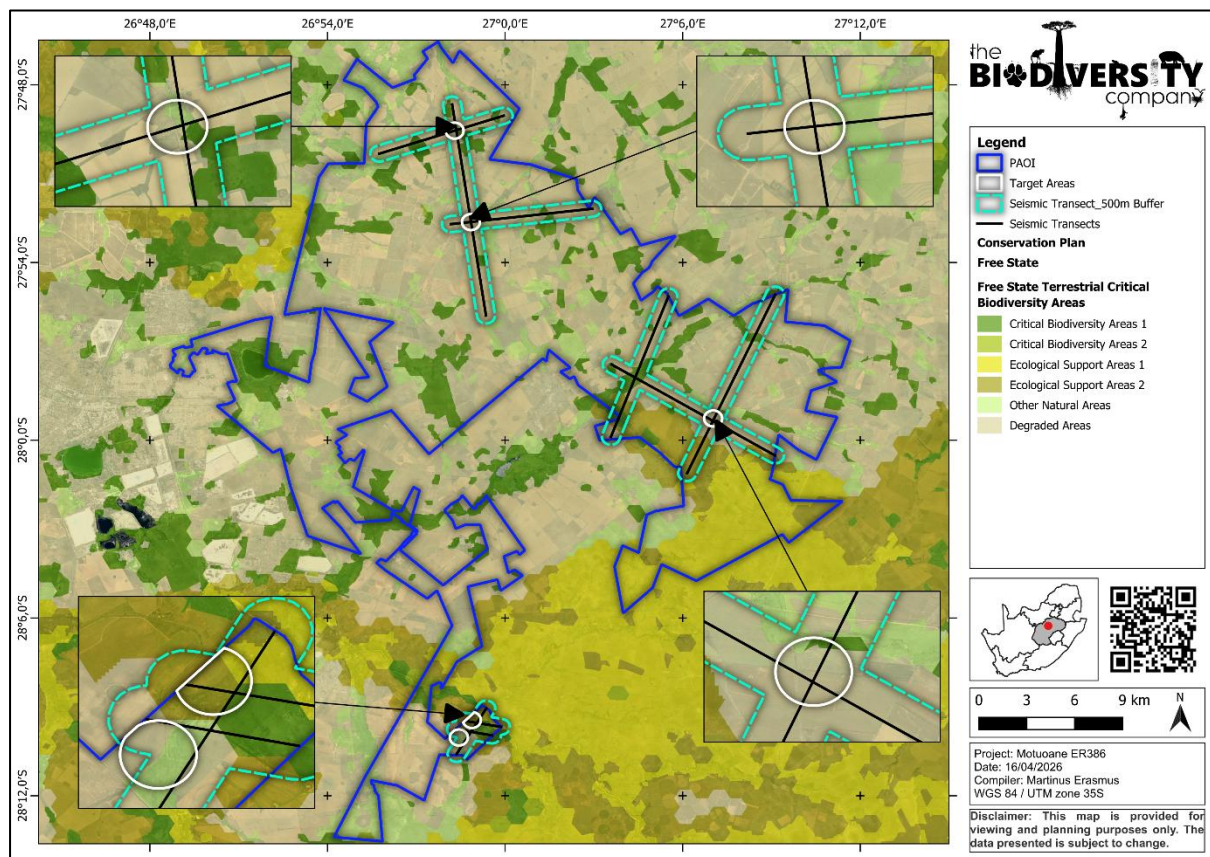


**Figure 3-2** Map illustrating the ecosystem protection level associated with the PAOI



### 3.1.1.3 Provincial Conservation Plan

The Free State Department of Environment and Nature Conservation has developed the CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The identification of Critical Biodiversity Areas was undertaken using a Systematic Conservation Planning approach. Available data on biodiversity features (incorporating both pattern and process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated. The Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province. According to the Free State conservation plan the PAOI overlaps with CBA 1, ESA 1, ESA 2, Other Natural Areas and Degraded Areas (Figure 3-3).

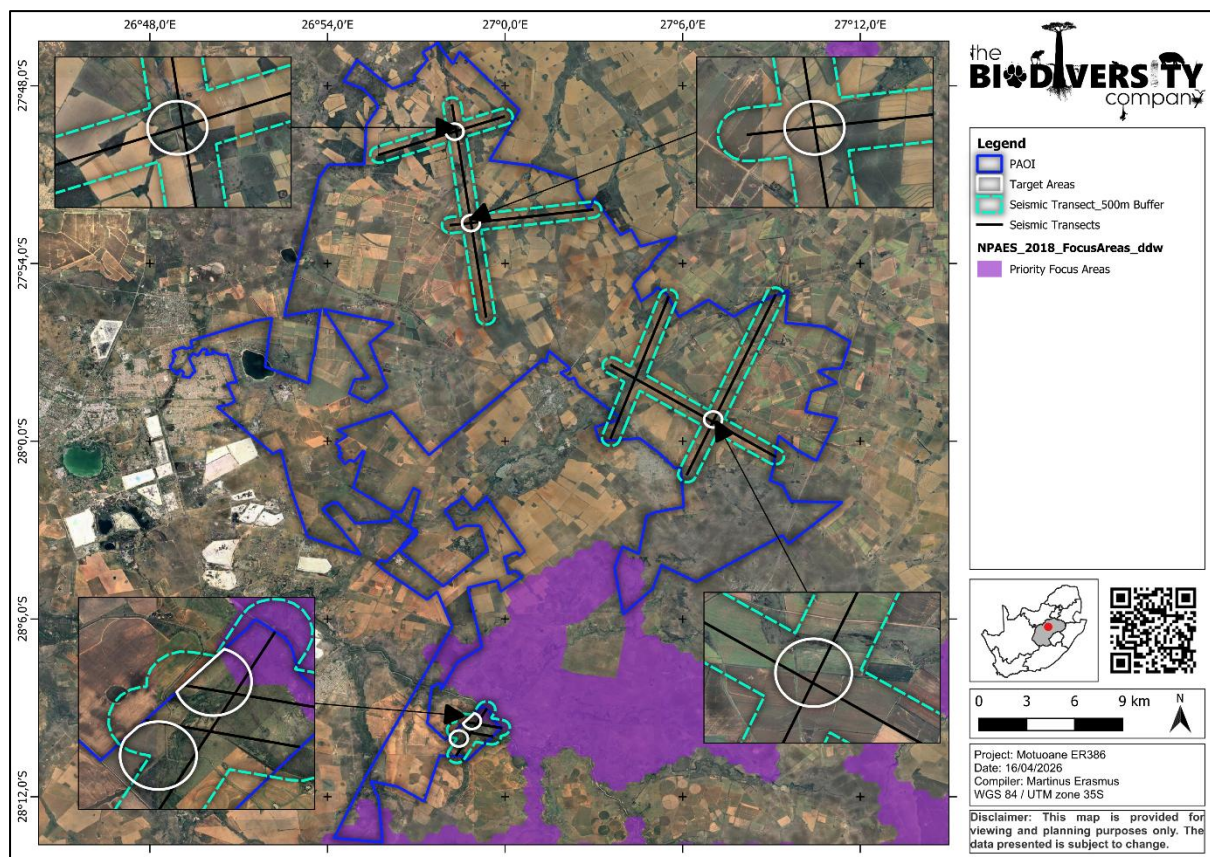


**Figure 3-3** Map illustrating the PAOI in relation to the Free State Terrestrial CBA Plan

### 3.1.1.4 NPAES

The Department of Environmental Affairs (now the Department of Forestry, Fisheries and the Environment) led the development of the National Protected Areas Expansion Strategy (NPAES) in consultation with the protected area agencies and other key private and public sector stakeholders. The need for the development of the NPAES was established in the National Biodiversity Framework in 2009 (DFFE, 2022b).

South Africa's protected area network currently falls far short of representing all ecosystems and maintaining healthy functioning ecological processes. In this context, the goal of the NPAES is to achieve cost effective protected area expansion, thus enabling better ecosystem representation, ecological sustainability, and resilience to climate change. A comprehensive set of priority areas was compiled based on the priorities identified by provincial and other agencies in their respective protected area expansion strategies. These focus areas are generally large, intact and unfragmented and are, therefore, of high importance for biodiversity, climate resilience and freshwater protection (DFFE, 2022b). The PAOI does overlap with NPAES (Figure 3-4).

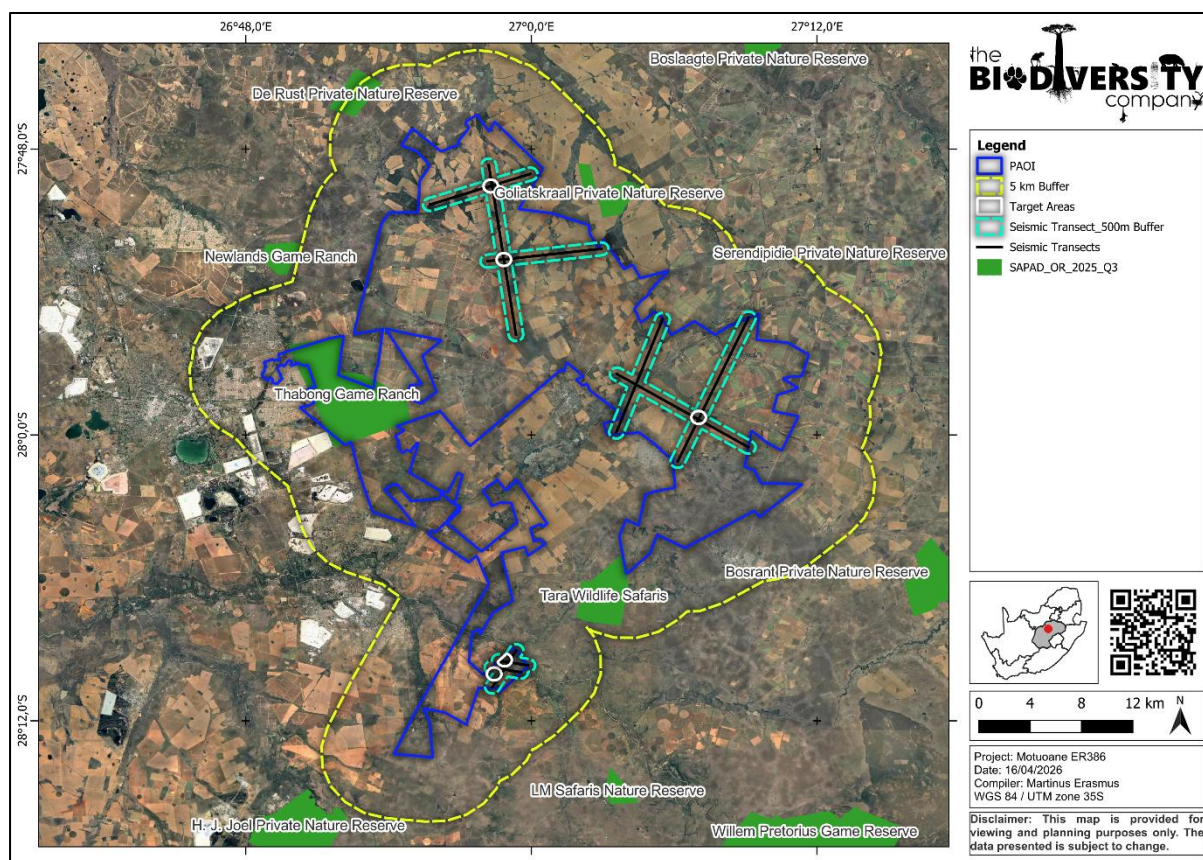


**Figure 3-4** Map illustrating the NPAES focus areas and their proximity to the ER32 PAOI



### 3.1.1.5 Protected Areas

According to the protected area spatial datasets from SAPAD (2025) and SACAD (2025), the PAOI does overlap with one SAPAD, Thabong Game Ranch (Figure 3-5). Three other SAPADs occur within 5 km.



**Figure 3-5** Map illustrating the location of the Protected Areas proximal to the ER32 PAOI

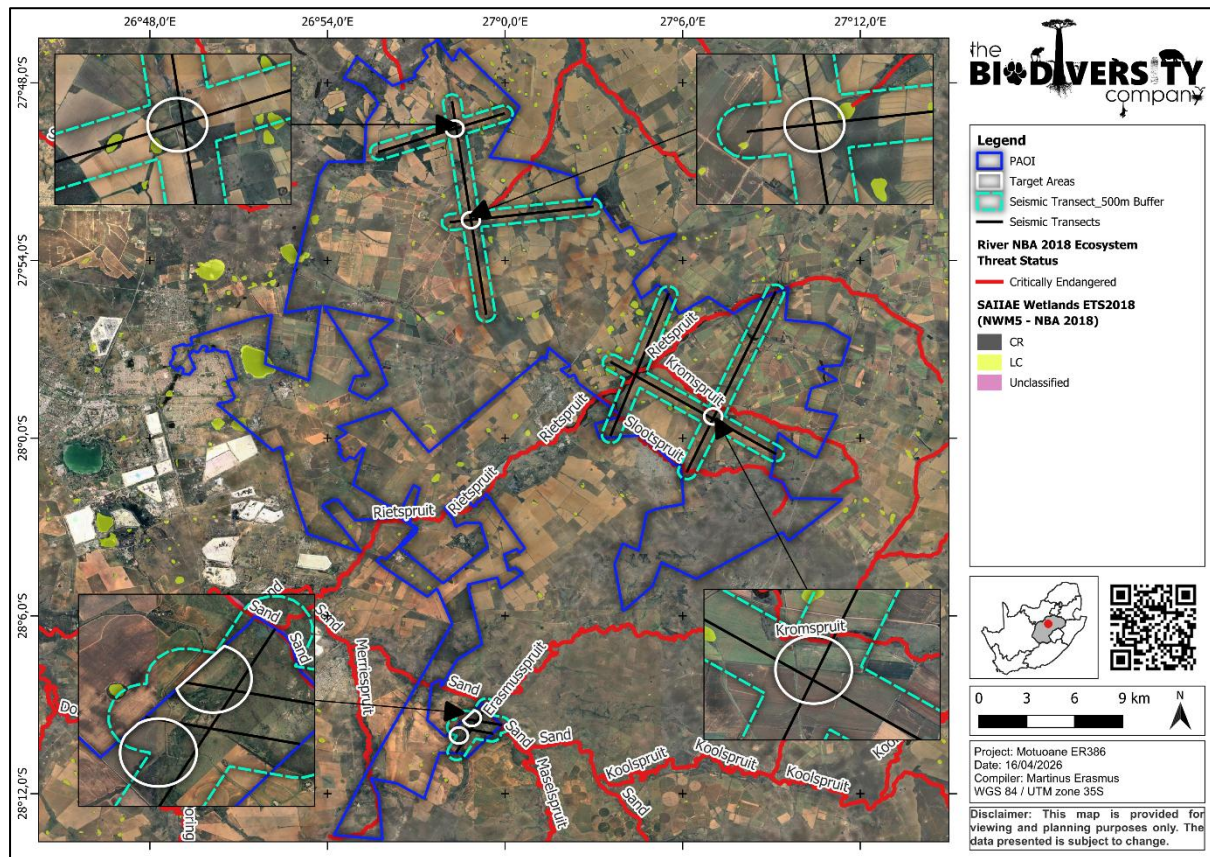
### 3.1.1.6 South African Inventory of Inland Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA in 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as ‘threatened’ (Van Deventer *et al.*, 2019; Skowno *et al.*, 2019).

Several wetlands were identified within the PAOI by means of the SAIIAE dataset (Figure 3-6). These wetlands mainly consist of isolated depressions scattered throughout the PAOI, with few floodplain and valley-bottom wetlands coinciding with the major stream paths in the northeastern PAOI. Main rivers identified within the PAOI according to the dataset was the Merriespruit, Sand River, Erasmusspruit, Rietspruit, Kromspruit, Slootpsruit, and tributary to the Middelspruit.

The depression wetlands were classified as “Least Concern” and “Poorly Protected” with regard to Ecosystem Threat Status, and Ecosystem Protection Level, respectively. Furthermore, the valley-bottom and floodplain systems were classified as “Critically Endangered” and “Not Protected”.

All identified rivers were classified as “Critically Endangered” and were dominantly “Not Protected” with a few systems being classified as “Poorly Protected”.

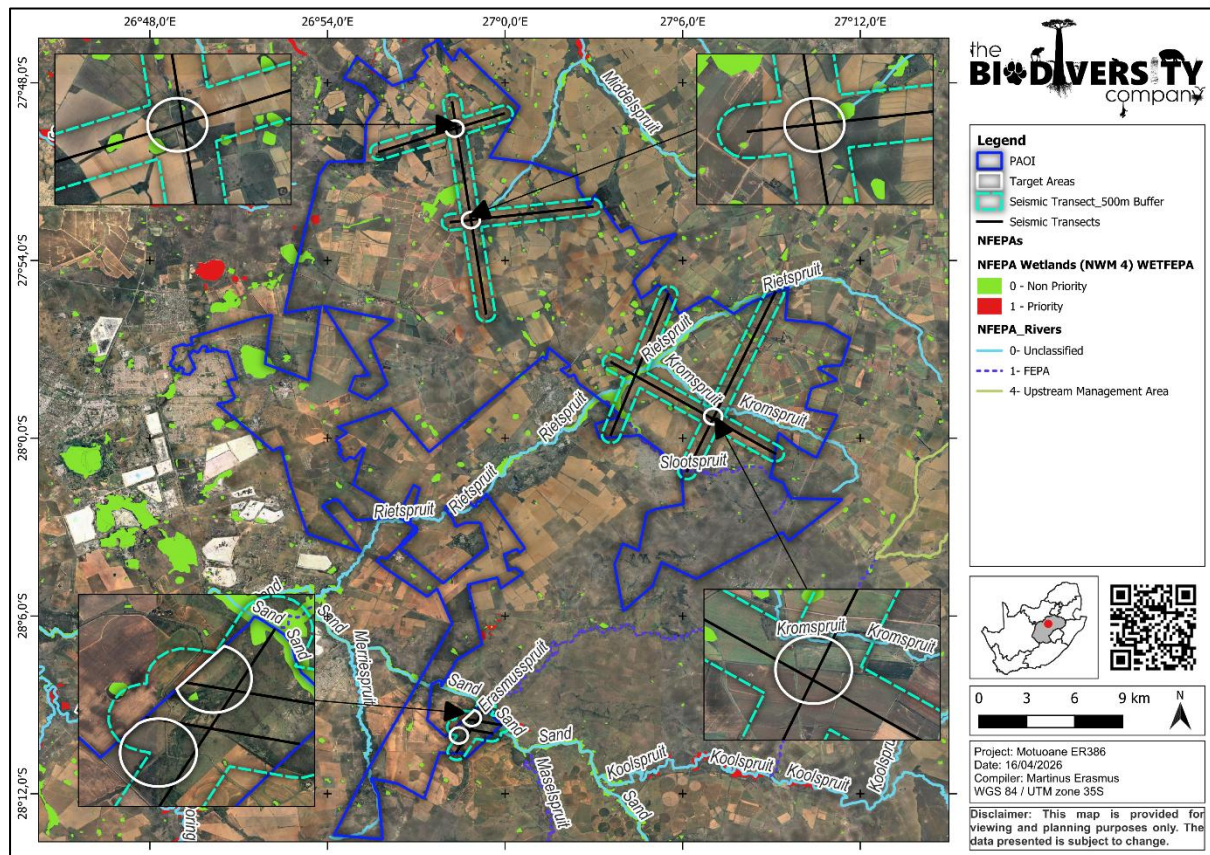


**Figure 3-6** Map illustrating the PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset



### 3.1.1.7 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.*, 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.*, 2011). Several wetlands were identified within the PAOI, consisting mainly of depression wetlands with few valley-bottom and floodplain systems located within the major stream paths (Figure 3-5). Furthermore, several rivers were identified which coincide with the identified features from the SAIIAE dataset. Only three wetlands were identified to be “Priority” ecosystems, and these features occur on the edges of PAOI and not within the Target Areas or 500 m Buffer of the Seismic transects. The remaining wetlands were classified as “Non-Priority” ecosystems. (Figure 3-7)



**Figure 3-7** Map illustrating the ER32 PAOI in relation to the National Freshwater Ecosystem Priority Area dataset



### 3.1.2 Flora Assessment

This section is divided into a description of the vegetation type expected under natural conditions and the expected flora species.

#### 3.1.2.1 Vegetation Type

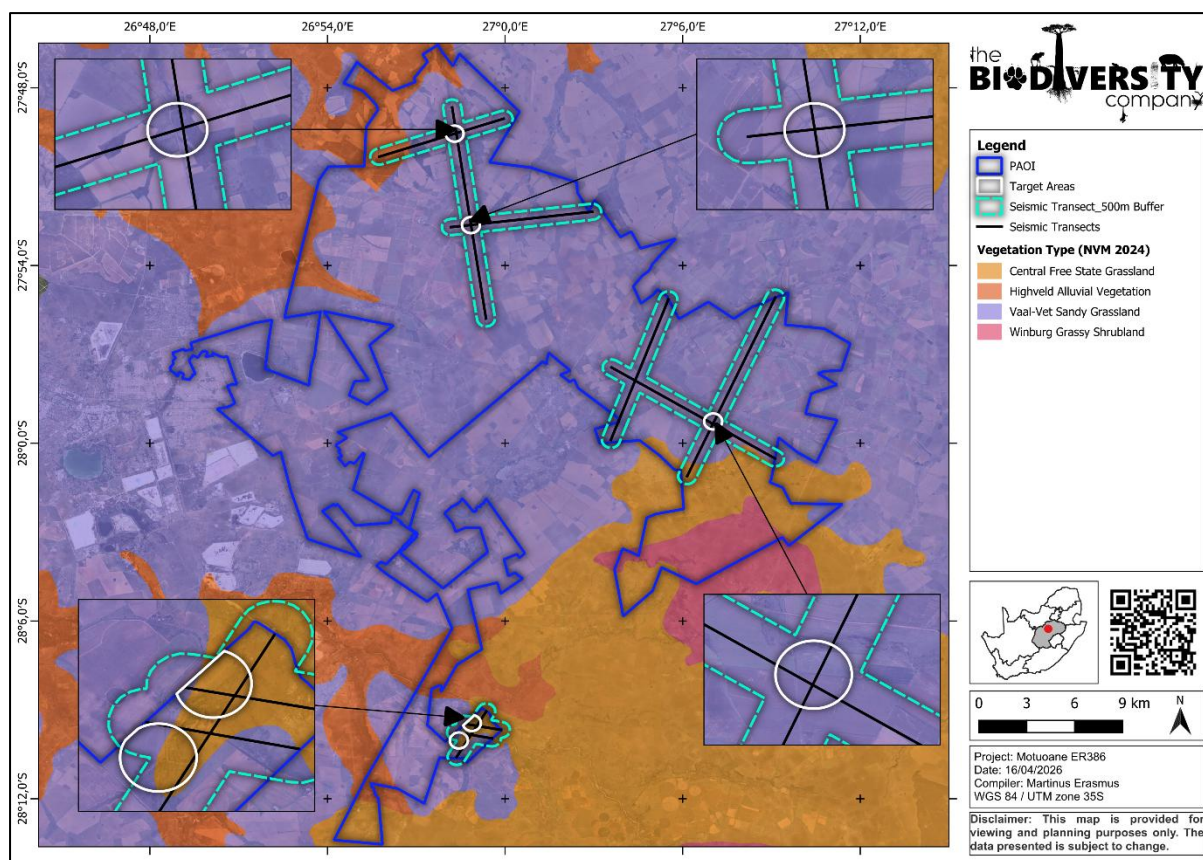
The PAOI is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

- Seasonal precipitation; and
- The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found mainly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

According to SANBI (2018) the PAOI is situated in the Vaal-Vet Sandy Grassland, Central Free State Grassland, Highveld Alluvia Vegetation and the Winburg Grassy Shrubland vegetation types (Figure 3-8). These are all members of the Dry Highveld Grassland Bioregion.



**Figure 3-8** Map illustrating the vegetation types associated with the PAOI

### 3.1.2.1.1 Vaal-Vet Sandy Grassland

The Vaal-Vet Sandy Grassland is found within the North-West and Free State Provinces. It spans south of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. The altitude ranges from 1220 – 1560 meters, generally between 1260 -1360 meters. The landscape is plains-dominated with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element.

#### Important Plant Taxa

**Graminoids:** *Antheophora pubescens* (d), *Aristida congesta* (d), *Chloris virgata* (d), *Cymbopogon caesius* (d), *Cynodon dactylon* (d), *Digitaria argyrograpta* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. lehmanniana* (d), *E. plana* (d), *E. trichophora* (d), *Heteropogon contortus* (d), *Panicum gilvum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tragus berteronianus* (d), *Brachiaria serrata*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis curvula*, *E. obtusa*, *E. superba*, *Panicum coloratum*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*.

**Herbs:** *Stachys spathulata* (d), *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespitium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*.

**Geophytic Herbs:** *Bulbine narcissifolia*, *Ledebouria marginata*.

**Succulent Herb:** *Tripteris aghillana* var. *integrifolia*.

**Low Shrubs:** *Felicia muricata* (d), *Pentzia globosa* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *H. paronychioides*, *Ziziphus zeyheriana*.

#### Conservation Status of the Vegetation Type

The Vaal-Vet Sandy Grassland is classified as Endangered, with a national conservation target of 24%. A small extent is conserved in statutory areas such as the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves. More than 63% of this vegetation type has been transformed due to strong grazing pressure from sheep and cattle as well as cultivation (Mucina & Rutherford, 2006).

### 3.1.2.1.2 Central Free State Grassland

The Central Free State Grassland is found within the Free State and marginally into the Gauteng Provinces. It spans from around Sasolburg in the north to Dewetsdorp in the south. Other major settlements located within this unit include Kroonstad, Ventersburg, Steynsrus, Winburg, Lindley and Edenville. The altitude ranges from 1300 – 11640 meters, generally between 1400 -1460 meters. The landscape is made up of undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats.

#### Important Plant Taxa

**Graminoids:** *Aristida adscensionis* (d), *A. congesta* (d), *Cynodon dactylon* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *Panicum coloratum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Agrostis lachnantha*, *Andropogon appendiculatus*, *Aristida bipartita*, *A. canescens*, *Cymbopogon pospischilii*, *Cynodon transvaalensis*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis lehmanniana*, *E. micrantha*, *E. obtusa*, *E. racemosa*, *E. trichophora*, *Heteropogon contortus*, *Microchloa caffra*, *Setaria incrassata*, *Sporobolus discosporus*.

**Herbs:** *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Crabbea acaulis*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Hibiscus pusillus*, *Pseudognaphalium luteo-album*, *Salvia stenophylla*, *Selago densiflora*, *Sonchus dregeanus*.

**Geophytic Herbs:** *Oxalis depressa*, *Raphionacme dyeri*.

**Succulent Herb:** *Tripteris aghillana* var. *integrifolia*.

**Low Shrubs:** *Felicia muricata* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Melolobium candicans*, *Pentzia globosa*.

### Conservation Status of the Vegetation Type

The Central Free State Grassland is classified as Vulnerable, with a national conservation target of 24%. A small extent is conserved in statutory areas such as the Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves as well as some protection in private nature reserves. Almost a quarter of the area has been transformed either for cultivation or by building of dams (Allemanskraal, Erfenis, Groothoek, Koppies, Kroonstad, Lace Mine, Rustfontein and Weltevrede). No serious infestation by alien flora has been observed, but encroachment of dwarf karoo shrubs becomes a problem in the degraded southern parts of this vegetation unit (Mucina & Rutherford, 2006).

#### 3.1.2.1.3 Highveld Alluvial Vegetation

The Highveld Alluvial Vegetation occurs in the Free State, Mpumalanga and Gauteng provinces. It is made up of alluvial drainage lines and floodplains along rivers embedded within the Grassland Biome and marginal (eastern) units of the Kalahari (Savanna Biome), such as along upper Riet, Harts, upper Modder, upper Caledon, Vet, Sand, Vals, Wilge, Mooi, middle and upper Vaal Rivers etc. and their numerous tributaries. The altitude ranges from 1000 -1500 meters.

#### Important Plant Taxa

**Small Trees:** *Vachellia karroo* (d), *Salix mucronata* subsp. *mucronata* (d), *S. mucronata* subsp. *woodii* (d, within subescarpment grasslands of KwaZulu-Natal), *Ziziphus mucronata* (d), *Celtis africana*, *Searsia lancea*.

**Tall Shrubs:** *Gymnosporia buxifolia* (d), *Searsia pyroides* (d), *Diospyros lycioides*, *Ehretia rigida*, *Grewia flava*. **Low Shrubs:** *Asparagus laricinus* (d), *A. suaveolens* (d).

**Woody Climber:** *Clematis brachiata*.

**Succulent Shrub:** *Lycium hirsutum* (d). **Graminoids:** *Setaria verticillata* (d), *Panicum maximum*.

**Herb:** *Pollichia campestris*.

**Reed beds:** *Phragmites australis* (d).

**Low Shrubs:** *Gomphocarpus fruticosus* (d), *Felicia muricata*. **Succulent Shrub:** *Salsola rabieana*.

**Graminoids:** *Agrostis lachnantha* (d), *Andropogon eucomus* (d), *Chloris virgata* (d), *Cynodon dactylon* (d), *Eragrostis plana* (d), *Hemarthria altissima* (d), *Imperata cylindrica* (d), *Ischaemum fasciculatum* (d), *Miscanthus junceus* (d), *Paspalum distichum* (d), *Andropogon appendiculatus*, *Brachiaria marlothii*, *Cyperus denudatus*, *C. longus*, *Echinochloa holubii*, *Eragrostis obtusa*, *E. porosa*, *Fimbristylis ferruginea*, *Panicum coloratum*, *Pycnus mundii*, *Sporobolus africanus*, *S. fimbriatus*, *Themeda triandra*, *Urochloa panicoides*.

**Herbs:** *Persicaria lapathifolia* (d), *Alternanthera sessilis*, *Barleria macrostegia*, *Corchorus asplenifolius*, *Equisetum ramosissimum*, *Galium capense*, *Hibiscus pusillus*, *Lobelia angolensis*, *Nidorella resedifolia*, *Persicaria amphibia*, *P. hystricula*, *Pseudognaphalium oligandrum*, *Pulicaria scabra*, *Rorippa fluviatilis* var. *fluviatilis*, *Senecio inornatus*, *Stachys hyssopoides*, *Vahlia capensis*.

**Geophytic Herbs:** *Crinum bulbispermum*, *Haplocarpha lyrata*.

### Conservation Status of the Vegetation Type

The Highveld Alluvia Vegetation is of Least Concern, with a national conservation target of 31%. Neary 10% is statutorily conserved in the Barberspan (a Ramsar site), Bloemhof Dam, Christiana, Faan Meintjes, Sandveld, Schoonspruit, Soetdoring and Wolwespruit Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams (Bloemhof, Erfenis, Krugersdrif, Mockes and Vaalharts Dams).

#### 3.1.2.1.4 Windburg Grassy Shrubland

The Windburg Grassy Shrubland is located primarily in the Free State Province. There are a series of larger patches between Trompsburg through Bloemfontein and Winburg to Ventersburg. The altitude ranges from 1,300 to 1,660 meters, predominantly between 1,360 and 1,440 meters. The landscape features solitary hills, slopes and escarpments of mesas creating a mosaic of habitats ranging from open grassland to shrubland (Mucina & Rutherford, 2006).

### Important Plant Taxa

**Graminoids:** *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Cymbopogon pospischilii* (d), *Cynodon dactylon* (d), *C. incompletus* (d), *Eragrostis chloromelas* (d), *E. lehmanniana* (d), *E. micrantha* (d), *E. obtusa* (d), *E. trichophora* (d), *Eustachys paspaloides* (d), *Heteropogon contortus* (d), *Panicum stapfianum* (d), *Setaria lindenberghiana* (d), *S. sphacelata* (d), *Sporobolus fimbriatus* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Digitaria argyrograptus*, *Elionurus muticus*, *Enneapogon scoparius*, *Eragrostis plana*, *E. superba*, *Tragus berteronianus*, *T. racemosus*, *Triraphis andropogonoides*.

**Small Trees:** *Vachellia karroo*, *Celtis africana*, *Cussonia paniculata*, *Pittosporum viridiflorum*, *Searsia lancea*, *Scolopia zeyheri*, *Ziziphus mucronata*.

**Tall Shrubs:** *Buddleja saligna* (d), *Euclea crispa* subsp. *ovata* (d), *Gymnosporia polyacantha* (d), *Olea europaea* subsp. *africana* (d), *Rhus burchellii* (d), *R. erosa* (d), *Diospyros lycioides* subsp. *lycioides*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Tarchonanthus camphoratus*.

**Herbs:** *Berkheya onopordifolia* var. *onopordifolia*, *Hermannia coccocarpa*, *Indigofera alternans*, *Mohria caffrorum*, *Pupalia lappacea*, *Salvia repens*

**Low Shrubs:** *Helichrysum dregeanum* (d), *Pentzia globosa* (d), *Anthospermum rigidum* subsp. *pumilum*, *Asparagus cooperi*, *A. laricinus*, *Berkheya annectens*, *Chrysocoma ciliata*, *Clutia pulchella*, *Euryops empetrifolius*, *Felicia filifolia* subsp. *filifolia*, *F. muricata*, *Nenax microphylla*, *Osyris lanceolata*, *Rosenia humilis*, *Selago saxatilis*, *Solanum tomentosum* var. *coccineum*.

### Conservation Status of the Vegetation Type

The Winburg Grassy Shrubland is classified as Least Threatened, with a national conservation target of 28%. A small extent is conserved in statutory areas such as the Willem Pretorius Nature Reserve. Around 10% of this vegetation type has been transformed due to urban expansion and cultivation (Mucina & Rutherford, 2006).



### 3.1.2.2 Expected Flora Species

The POSA database indicates that 243 species of plants are expected to occur within the PAOI, of which 215 are indigenous (Full list in Appendix C). The POSA database does not indicate the likely presence of any SCC, similarly, the DFFE Screening Tool does not list any flora SCC

### 3.1.3 Fauna Assessment

#### 3.1.3.1 Sensitive Species

Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. Such species have had their names obscured and are listed as sensitive plant unique number/sensitive animal unique number. As per the best practise guideline that accompanies the protocol and screening tool, **the name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain**. It should be referred to as *sensitive plant* or *sensitive animal* and its threat status may be included, e.g. *critically endangered sensitive plant* or *endangered sensitive animal*.

One (1) sensitive animal species was listed by the screening tool and can be seen presented in Table 3-2.

**Table 3-2** *List of Sensitive Species of Conservation Concern that may occur in the PAOI. VU = Vulnerable*

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence	Reason
			Regional	Global		
<i>Sensitive Species 15</i>	-	Medium	VU	VU	High	Suitable habitat and distribution.

#### 3.1.3.2 Mammals

The iNaturalist database lists eleven (11) mammal species that could be expected to occur within the area (Full list in Appendix C). Excluding large mammal species that are normally restricted to protected areas, one (1) SCC is likely to occur in the PAOI. One (1) additional species (two in total) is listed as sensitive according to the DFFE screening tool (Table 3-3).

**Table 3-3** *Threatened mammal species that are expected to occur within the PAOI (NT = Near threatened; VU = Vulnerable).*

Scientific Name	Common Name	Regional	Global	Screening Tool Sensitivity	Likelihood of Occurrence	Reason
<i>Aonyx capensis</i>	Cape clawless otter	NT	NT	-	Medium	Suitable habitat and distribution; adaptable species
<i>Hydricotis maculicollis</i>	Spotted-necked Otter	VU	NT	Medium	Medium	Limited suitable habitat; presence of disturbance

***Aonyx capensis*** (Cape clawless otter) are predominantly aquatic and seldom found far from water. Freshwater is an essential habitat requirement, and they only occur in marine habitats where there is access to fresh water (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), *A. capensis* populations are decreasing due to the threats of habitat loss, domestic and urban wastewater pollution as well as illegal hunting. Although the species is cryptic and therefore not often seen, there is suitable habitat in the PAOI and therefore the likelihood of occurrence is rated as medium.

***Hydricotis maculicollis*** (Spotted-necked Otter) inhabits freshwater habitats where water is un-silted, unpolluted, and rich in small to medium sized fishes (IUCN, 2017). Suitable habitat may be available in

river and wetland areas within the PAOI; however, these resources have likely been modified to some extent, resulting in a moderate likelihood of occurrence.

### 3.1.3.3 Herpetofauna

Based on the iNaturalist database, fourteen (14) reptile species are expected to occur within the area, none of which are classified as SCC (Full list in Appendix C).

Based on the iNaturalist database five (5) amphibian species have the potential to occur in the PAOI (Full list in Appendix C). One (1) of the expected species is an SCC. No additional amphibian SCC were listed by the screening tool.

Scientific Name	Common Name	Regional	Global	Screening Tool Sensitivity	Likelihood of Occurrence	Reason
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	NT	LC	-	Moderate	Suitable habitat may occur on site, and it is an adaptable species

### 3.1.3.4 Avifauna

SABAP2 data indicate that 286 avifauna species are expected for the PAOI and surrounding areas (Full list in Appendix C). Of these 286 avifauna species, 37 are considered SCC Table 3-4). The likelihood of occurrence within the PAOI are included here. The DEA screening tool lists three (3) high sensitivity species and one (1) medium sensitivity species. Some of the species are discussed in below.

**Table 3-4** *Threatened avifauna species that are expected to occur within the Project Area (LoO=Likelihood of occurrence LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered)*

Common Name	Scientific Name	Regional	Global	Screening Tool	LoO
African Darter	<i>Anhinga rufa</i>	NT	LC		High
African Marsh Harrier	<i>Circus ranivorus</i>	VU	LC		Moderate
Black Stork	<i>Ciconia nigra</i>	EN	LC		Low
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	NT	LC		High
Black-winged Kite	<i>Elanus caeruleus</i>	NT	LC		High
Black-winged Pratincole	<i>Glareola nordmanni</i>	LC	NT		Moderate
Blue Korhaan	<i>Eupodotis caerulea</i>	VU	NT		High
Cape Shoveler	<i>Spatula smithii</i>	NT	LC		High
Caspian Tern	<i>Hydropogon caspia</i>	VU	LC	High	Low
Chestnut-banded Plover	<i>Charadrius pallidus</i>	VU	LC		Moderate
Curlew Sandpiper	<i>Calidris ferruginea</i>	VU	VU		Moderate
European Roller	<i>Coracias garrulus</i>	NT	LC		Low
Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>	NT	LC		Moderate
Great Crested Grebe	<i>Podiceps cristatus</i>	VU	LC		High
Great Egret	<i>Ardea alba</i>	NT	LC		Moderate
Greater Flamingo	<i>Phoenicopterus roseus</i>	NT	LC		High
Grey Plover	<i>Pluvialis squatarola</i>	NT	VU		Low
Hamerkop	<i>Scopus umbretta</i>	NT	LC		Moderate
Kittlitz's Plover	<i>Charadrius pecuarius</i>	NT	LC		High
Knob-billed Duck	<i>Sarkidiornis melanotos</i>	NT	LC		Low

Lanner Falcon	<i>Falco biarmicus</i>	NT	LC		High
Lesser Flamingo	<i>Phoeniconaias minor</i>	VU	NT		High
Lesser Kestrel	<i>Falco naumanni</i>	VU	LC		High
Maccoa Duck	<i>Oxyura maccoa</i>	VU	EN		High
Marsh Owl	<i>Asio capensis</i>	NT	LC		High
Martial Eagle	<i>Polemaetus bellicosus</i>	EN	EN		Low
Melodious Lark	<i>Mirafr cheniana</i>	NT	LC		Moderate
Red-billed Teal	<i>Anas erythrorhyncha</i>	NT	LC		High
Red-footed Falcon	<i>Falco vespertinus</i>	VU	VU		Low
Secretarybird	<i>Sagittarius serpentarius</i>	VU	EN	High	High
Southern Bald Ibis	<i>Geronticus calvus</i>	NT	NT		Low
Southern Pochard	<i>Netta erythrophthalma</i>	NT	LC		High
Tawny Eagle	<i>Aquila rapax</i>	EN	VU		Low
White-backed Duck	<i>Thalassornis leuconotus</i>	NT	LC		Moderate
Yellow-billed Duck	<i>Anas undulata</i>	NT	LC		High
Yellow-billed Egret	<i>Ardea brachyrhyncha</i>	NT	LC		High
Yellow-billed Stork	<i>Mycteria ibis</i>	VU	LC	High	Moderate

**Circus ranivorus** (African Marsh Harrier) is listed as EN in South Africa (IUCN, 2026). This species has an extremely large distributional range in sub-equatorial Africa. South African populations of this species are declining due to the degradation of wetland habitats, loss of habitat through over-grazing and human disturbance and possibly, poisoning owing to over-use of pesticides (IUCN, 2017). This species breeds in wetlands and forages primarily over reeds which may be present surrounding water resources within the PAOI.

**Glareola nordmanni** (Black-winged Pratincole) is a migratory species which is listed as NT both globally and regionally. This species has a very large range, breeding mostly in Europe and Russia, before migrating to southern Africa. Overall population declines of approximately 20% for this species are suspected (IUCN, 2017). This species generally occurs near water and damp meadows, or marshes overgrown with dense grass, which may be present within the PAOI. Due to its migratory nature, this species will only be present in South Africa for a few months during the year and will not breed locally.

**Eupodotis caerulescens** (Blue Korhaan) is endemic to South Africa and Lesotho and occurs in grassveld usually over 1 500 m above sea level, preferring open, fairly short grassland and a mixture of grassland and karoo dwarf-shrubland within 1 km of water, with termite mounds and few or no trees (BirdLife International, 2017). The total global population is estimated to number between 12 000-15 000 individuals, equivalent to 8 000-10 000 mature individuals, with a decreasing population trend. The main threat is intensive agriculture, especially within the east of its range. The grasslands present within the PAOI may be suitable for this species to occur in.

**Calidris ferruginea** (Curlew Sandpiper) is migratory species which breeds on slightly elevated areas in the lowlands of the high Arctic and may be seen in parts of South Africa during winter. During winter, the species occurs at the coast, but also inland on the muddy edges of marshes, large rivers and lakes (both saline and freshwater), irrigated land, flooded areas, dams and saltpans (IUCN, 2017). The marshes and wetlands within the PAOI may be suitable for this species.

**Coracias garrulous** (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for

bushy plains and dry savannah areas, but the grasslands within the PAOI may also be suitable for this species (IUCN, 2017).

***Phoenicopterus roseus*** (Greater Flamingo) is widely distributed throughout sub-Saharan Africa and inhabits shallow eutrophic waterbodies such as saline lagoons, salt pans and large saline or alkaline lakes (BirdLife International, 2019b). Juveniles, and to a lesser extent adults undertake irregular nomadic or partially migratory movements throughout the species' range in response to water-level changes. In sub-Saharan Africa, the species may also join large flocks of non-breeding *Phoeniconaias minor* (Lesser Flamingo). The sub-Saharan African populations between 100 000 and 120 000 mature individuals. The species suffers from low reproductive success if exposed to disturbance at breeding colonies, or if water-levels surrounding nest-sites lower resulting in increased predation from ground predators. Further threats include effluents mining, pollution from sewage and heavy metal effluents from industries and collisions with powerlines (BirdLife International, 2019b). Larger and smaller water resources in and around the PAOI were found on a desktop basis and may be suitable for this species.

***Rostratula benghalensis*** (Greater Painted-snipe) shows a preference for recently flooded areas in shallow lowland freshwater temporary or permanent wetland, it has a wide range of these freshwater habitats which they occur in, such as, sewage pools, reservoirs, mudflats overgrown with marsh grass (IUCN, 2017). The wetlands in the PAOI may be deemed suitable for this species.

***Falco biarmicus*** (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). Global population estimates is more than 30000 breeding pairs, in South Africa it is estimated to be 1400 pairs. They may occur in groups up to 20 individuals, but have also been observed solitary. They are partial and facultative migrants, that breeds from May to early September. Nests are mostly found on cliff ledges, and they may alternate between more than one nest. Their diet is mainly composed of small birds such as pigeons and francolins. Anecdotal evidence suggest these species are susceptible to agrochemicals, another threat to their population is the clearing of grassland habitats (Roberts *et al.*, 2023). The grasslands and agricultural fields within the PAOI may be suitable foraging grounds for this SCC.

***Phoeniconaias minor*** (Lesser Flamingo) is widely distributed throughout sub-Saharan Africa but mainly breeds in the Rift Valley Lakes in East Africa, with smaller breeding congregations in West Africa and southern Africa. This species is nomadic and makes extensive movements in response to environmental conditions and southern African populations are partially migratory, with many making regular movements from their breeding sites inland to coastal wetlands when not breeding (BirdLife International, 2018). The species is an obligate filter feeder and feeds during the night and early morning when the surface of the water is calm, primarily by swimming and filtering the algae near the surface. The global population has been estimated at between 2 220 000-3 240 000 individuals, with a declining population trend. The main threat is breeding habitat loss due to mining and hydro-electric power (BirdLife International, 2018). Further threats include effluents mining, pollution from sewage and heavy metal effluents from industries and collisions with powerlines. Larger and smaller water resources in and around the PAOI may be suitable for this species.

***Sagittarius serpentarius*** (Secretarybird) is listed as EN on a global scale (BirdLife International, 2020). The species has a wide distribution across sub-Saharan Africa but surveyed densities suggest that the total population size does not exceed a five-figure number. Ad-hoc records, localised surveys and anecdotal observations indicate apparent declines in many parts of the species' range, especially in South Africa where reporting rates decreased by at least 60% of quarter degree grid cells used in Southern African Bird Atlas Projects. Threats include excessive burning of grasslands that may suppress populations of prey species, whilst the intensive grazing of livestock is also probably degrading otherwise suitable habitat. Disturbance by humans is likely to negatively affect breeding. The species is captured and traded; however, it is unknown how many deaths occur in captivity and transit. Direct hunting and nest-raiding for other uses and indiscriminate poisoning at waterholes are also further threats. A proposed conservation action is that landowners of suitable properties should join

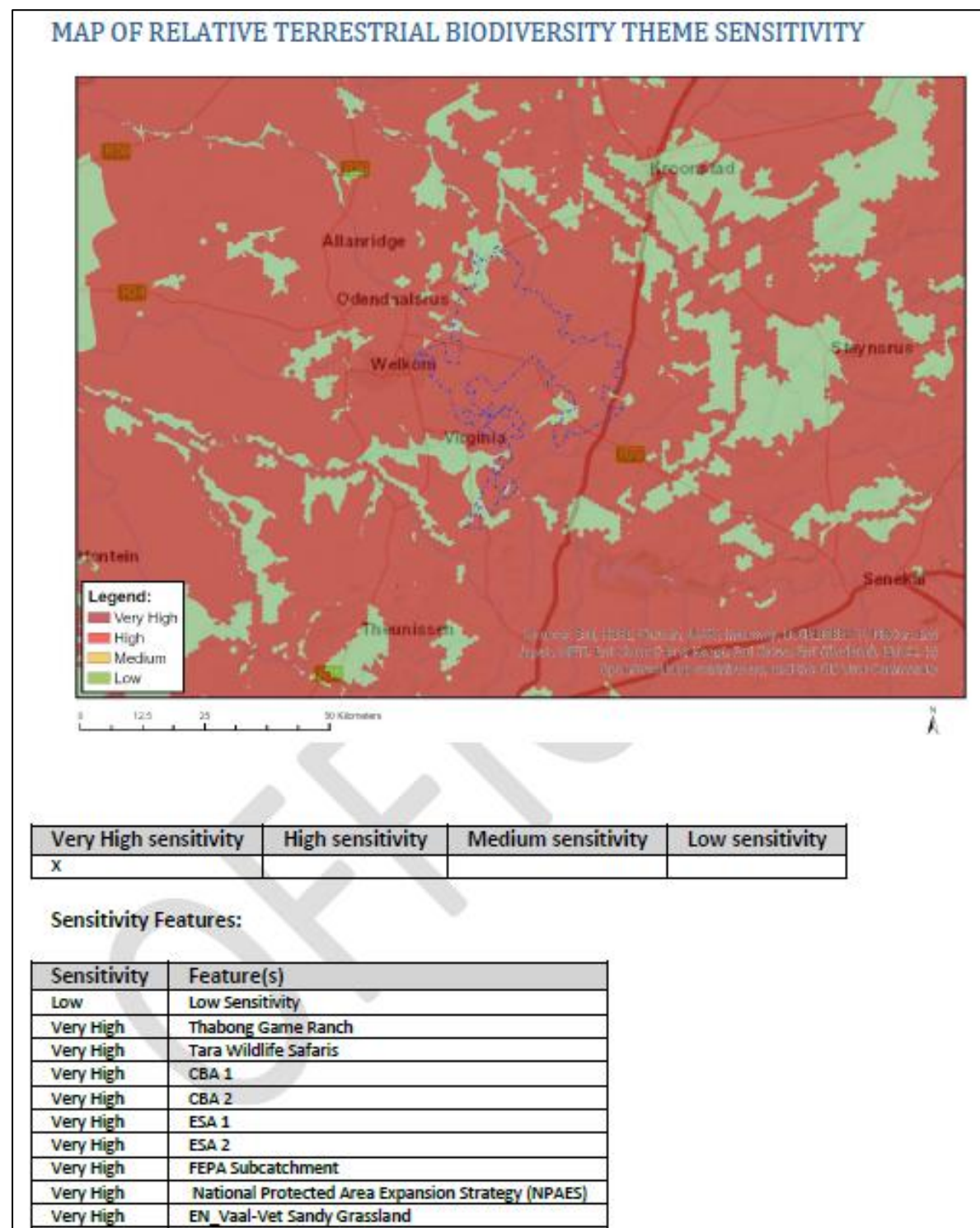


biodiversity stewardship initiatives and to manage their properties in a sustainable way for the species' populations. The grasslands and agricultural fields within the PAOI may be suitable foraging grounds for this SCC.

#### **3.1.3.5 DFFE Screening Tool**

According to the Screening Tool Report generated (Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended), the following sensitivity classifications were gathered from the National Web-based Environmental Screening Tool:

- Terrestrial Biodiversity Theme sensitivity is Very High for the PAOI, due to the area overlapping with CBA 1, CBA 2, ESA 1, ESA 2, NPAES, an Endangered Vegetation type, two protected areas and a FEPA Sub catchment area (Figure 3-9);
- Plant Species Theme sensitivity is Low for the PAOI, with no sensitive species predicted to occurring within the PAOI (Figure 3-10);
- Animal Species Theme sensitivity is High for the PAOI, with the possibility of one (1) medium to high sensitivity reptile species, two (2) high sensitivity avifauna species, one (1) medium-high sensitivity avifauna species and one (1) medium sensitivity mammal species being present (Figure 3-11);



**Figure 3-9** The Terrestrial Biodiversity Theme sensitivity for the PAOI

### MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at [eiadatarequests@sanbi.org.za](mailto:eiadatarequests@sanbi.org.za) listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

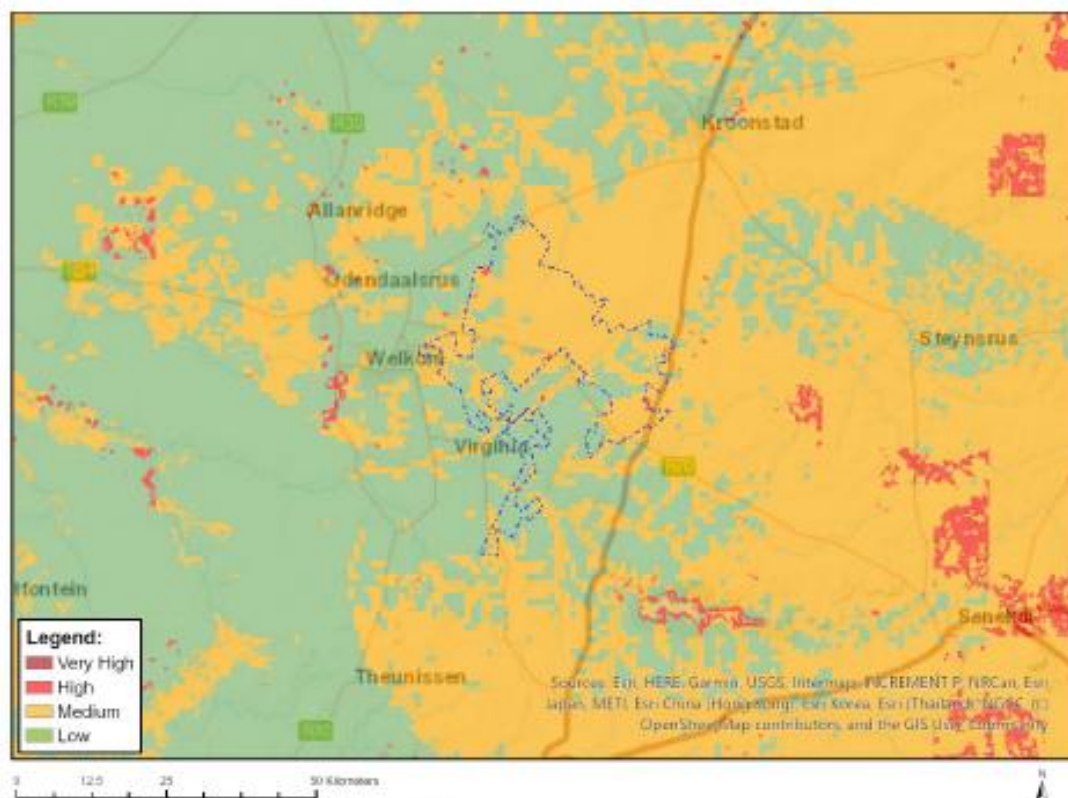
#### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

**Figure 3-10** The Plant Theme sensitivity for the PAOI.



### MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at [eiadatarequests@sanbi.org.za](mailto:eiadatarequests@sanbi.org.za) listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

#### Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Hydroprogne caspia
High	Aves-Sagittarius serpentarius
High	Aves-Mycteria ibis
High	Sensitive species 15
Low	Subject to confirmation
Medium	Aves-Hydroprogne caspia
Medium	Mammalia-Hydrictis maculicollis
Medium	Sensitive species 15

Figure 3-11 The Animal Theme sensitivity for the PAOI.

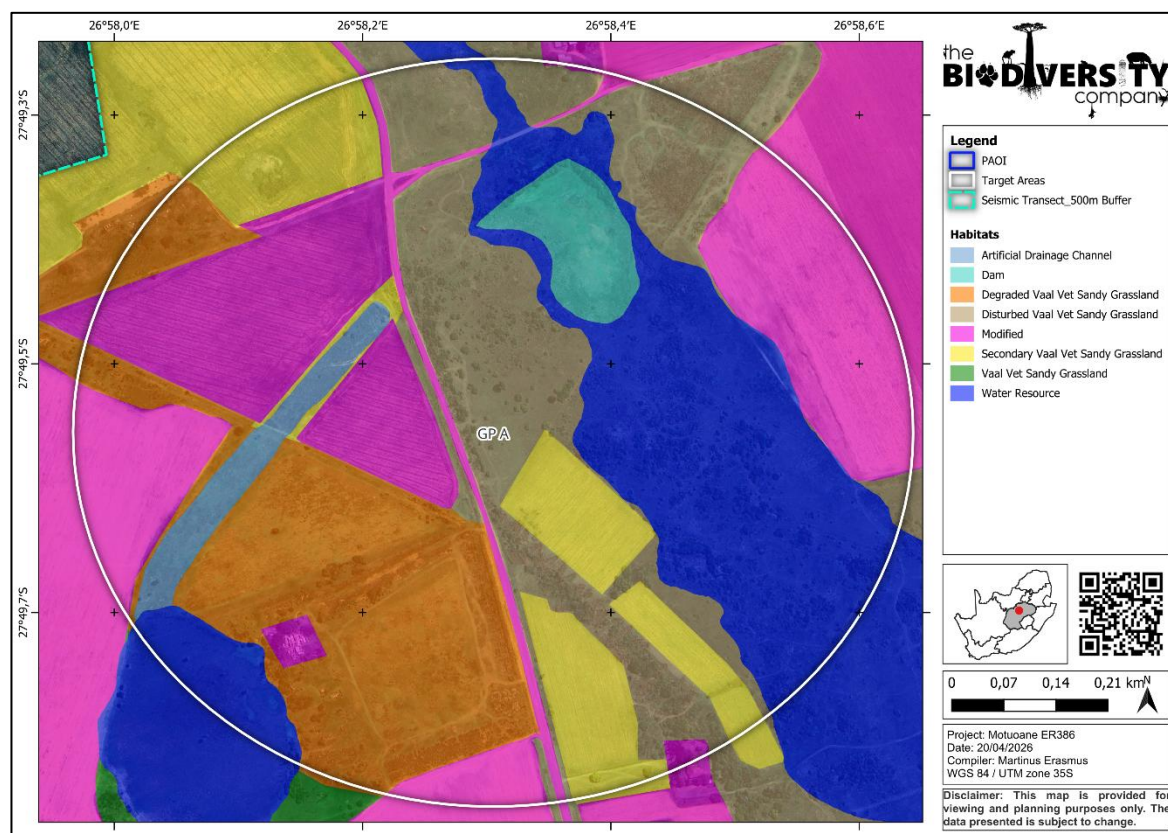
## 3.2 Fieldwork Findings

### 3.2.1 Field Assessment

The following sections discuss the results from the field surveys that was conducted for the proposed project on the 19<sup>th</sup> of March 2026. The habitats observed are discussed below (Table 3-5). The fieldwork within the PAOI was focused within the Target Areas for Drilling Wells, and thus the findings pertain to those areas.

**Table 3-5** *Sensitivity summary of the habitat types delineated within the PAOI.*

Target Area & Habitats Present	Area description and condition
GP A	
Secondary Vaal Vet Sandy Grassland	The target area contains the highest diversity of habitats compared to the other target areas. It comprises a water resource system associated with disturbed Vaal-Vet Sandy Grassland, interspersed with modified and secondary grassland areas. These grasslands have been affected by overgrazing and edge effects resulting from adjacent agricultural land uses. Overall, the target area is considered to have a Low to High SEI.
Degraded Vaal Vet Sandy Grassland	
Disturbed Vaal Vet Sandy Grassland	
Dam & Artificial Drainage	No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, are likely to make use of the water resource and the surrounding disturbed grassland habitats.
Water Resource	
Modified	

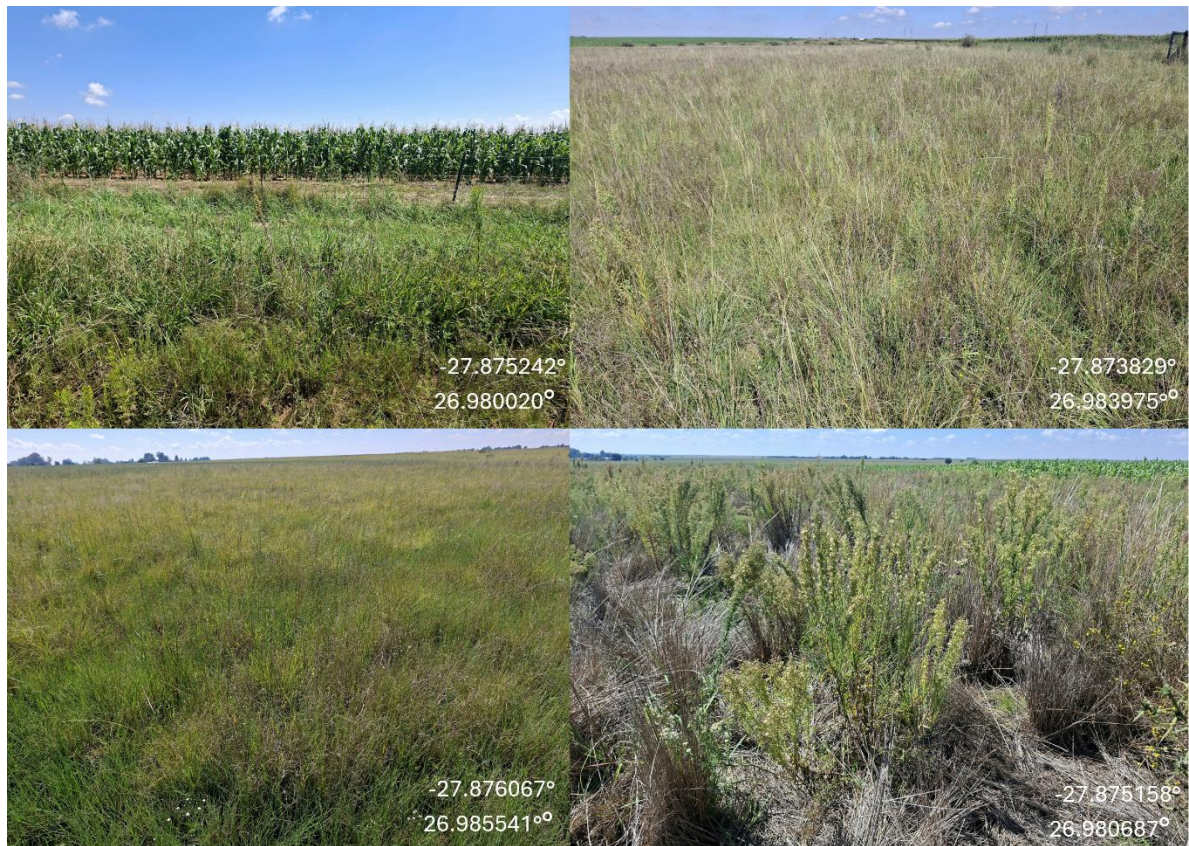
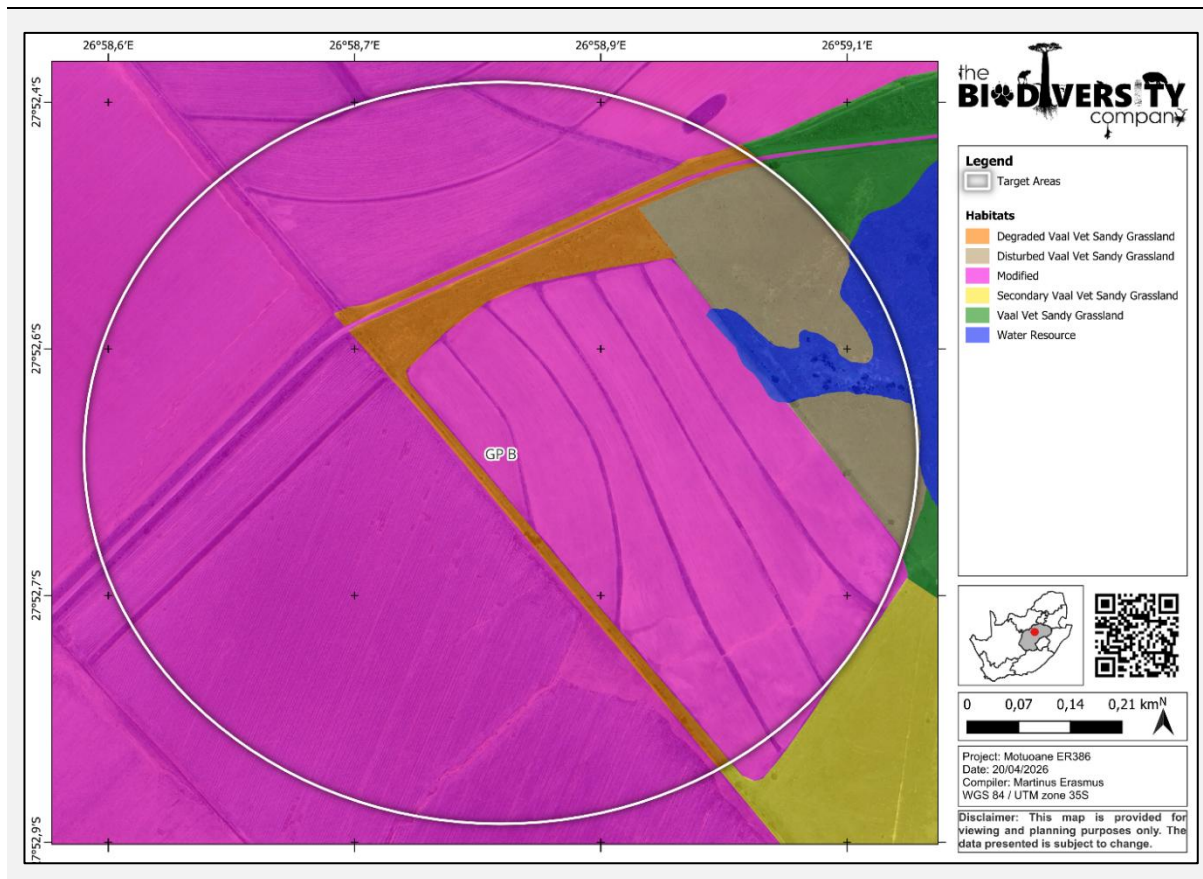






GP B			<p>The target area is largely composed of modified areas in the form of agricultural land, with limited remnant natural habitat remaining. It includes a water resource system associated with disturbed Vaal-Vet Sandy Grassland, interspersed with degraded grassland areas. The grasslands within and adjacent to the target area have been affected by overgrazing and the edge effects of surrounding agricultural activities. Overall, the target area is considered to have a largely very Low SEI, with a portion to the west being Medium/High SEI.</p> <p>No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, may utilise the water resource and the adjacent disturbed grassland habitats.</p>
Degraded	Vaal	Vet	
Sandy Grassland			
Disturbed Vaal Vet Sandy Grassland			
Water Resource			
Modified			

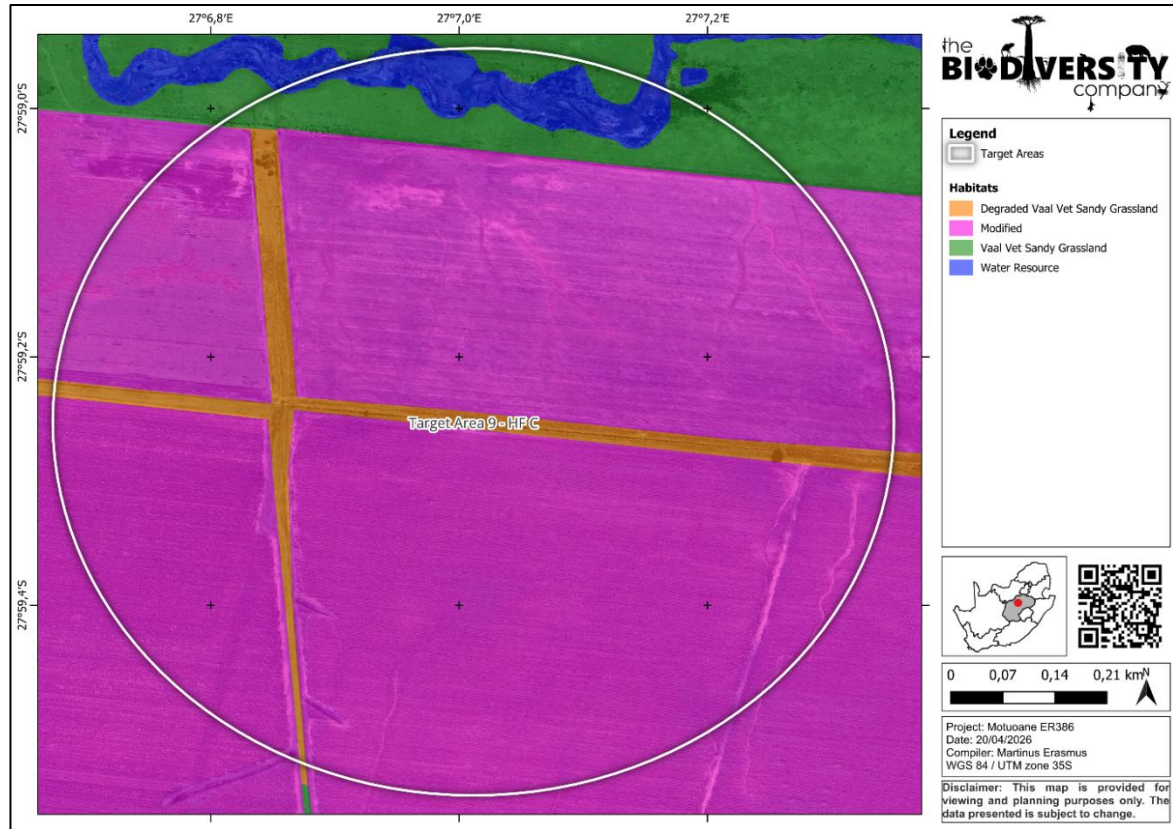






## Motuoane Exploration Right 386

Target Area 9- HFC	<p>The target area is largely composed of modified areas in the form of agricultural land, with limited remnant natural habitat remaining. It includes a water resource system associated with intact Vaal-Vet Sandy Grassland. The grasslands within and adjacent to the target area have been affected by overgrazing and the edge effects of surrounding agricultural activities. Overall, the target area is considered to have a largely very Low SEI, with a portion to the north being Medium/High SEI.</p> <p>No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, may utilise the water resource and the adjacent disturbed grassland habitats.</p>
Modified	
Degraded Vaal Vet Sandy Grassland	
Water Resource	
Vaal Vet Sandy Grassland	



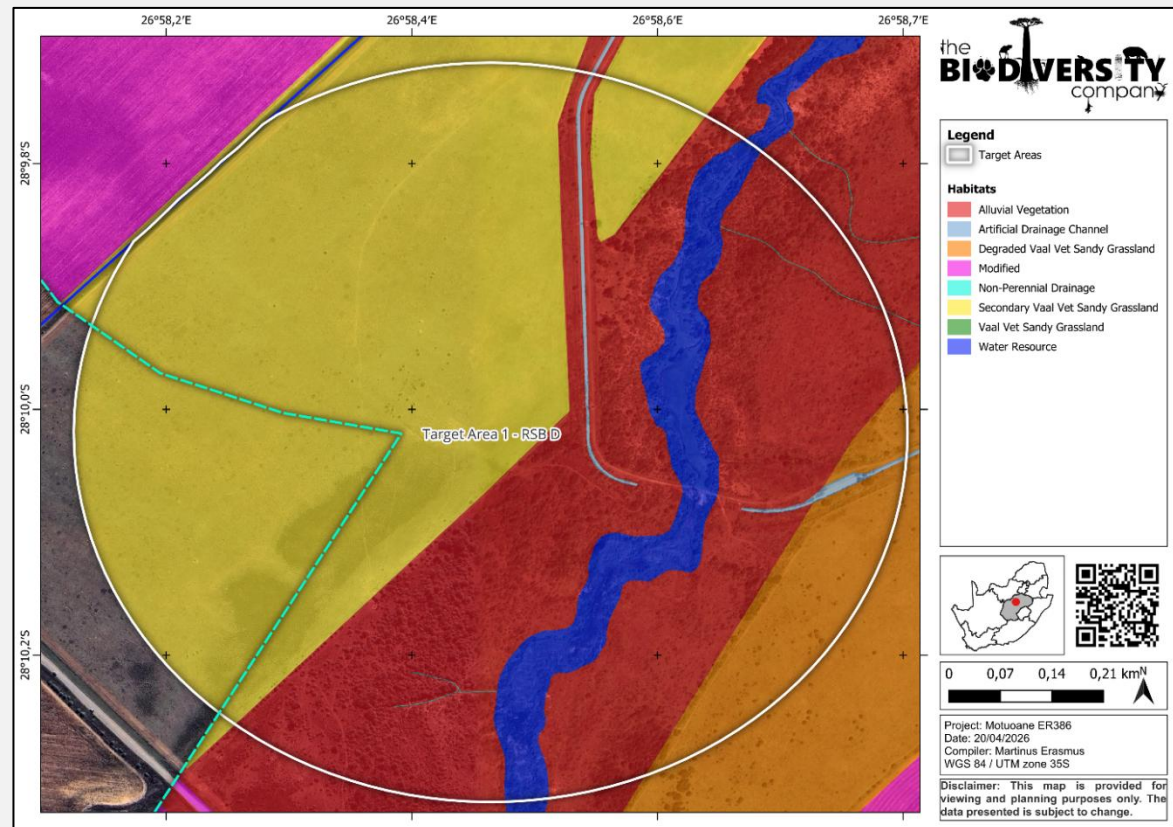




Target Area 1- RSB D

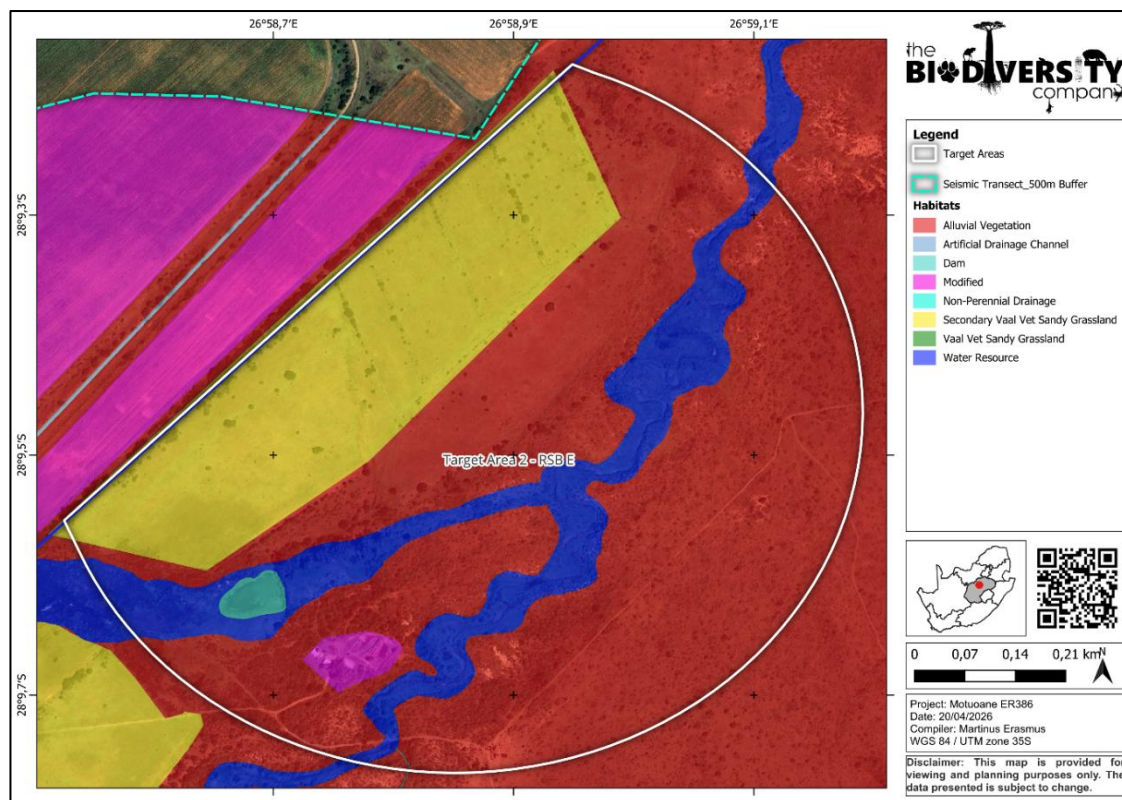
Degraded Vaal Vet Sandy Grassland	The target area is largely composed of secondary grassland habitat. It includes a water resource system associated with alluvial vegetation, as well as degraded grassland areas. The grasslands within and surrounding the target area have been degraded by overgrazing, as well as by edge effects associated with adjacent agricultural land uses. Overall, the target area is considered to have a Low to High SEI.	
Secondary Vaal Vet Sandy Grassland		
Alluvial vegetation	No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, may utilise the water resource and the surrounding alluvial vegetation grassland habitats.	
Water Resource		
Artificial Drainage Channel		







Target Area 2- RSB E	
Secondary Vaal Vet Sandy Grassland	<p>The target area is predominantly characterised by alluvial vegetation, with some secondary grassland areas also occurring within the broader habitat unit. It includes a water resource system associated with the alluvial vegetation. The target area has been affected through overgrazing, as well as by edge effects resulting from adjacent agricultural land uses. Overall, the target area is considered to have a Low to High SEI. No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, may utilise the water resource and the surrounding alluvial vegetation habitats.</p>
Alluvial vegetation	
Water Resource	
Dam	
Modified	







### 3.2.2 Flora Assessment

This section is divided into two sections:

- Indigenous flora; and
- Alien Invasive Plants (AIPs).

#### 3.2.2.1 Indigenous Flora

The vegetation assessment was conducted throughout the extent of the target areas. The species composition within the assessment area aligns with what is typically found in the vegetation types, considering some impact. This is largely due to some disturbance, as the land is primarily used for livestock grazing. Within this vegetation type, distinct communities were identified and can be categorized which varied across the PAOI. The list of plant species recorded is not exhaustive (can be provided upon request), and additional surveys conducted during different phenological periods, those not yet covered, could potentially reveal up to 20% more flora species in the PAOI. Nevertheless, the floristic analysis completed thus far is considered a reliable representation of the local flora for the PAOI.

#### 3.2.2.2 Protected Flora

Two (2) species of provincially protected plant were recorded for the Target areas – *Ammocharis coranica* and *Helichrysum nudifolium*. These species occurred in close proximity to water resources and the associated grassland. They are protected under the Free State Nature Conservation Ordinance No. 8 of 1969.

According to the list of protected species under the Schedule, if any individuals of these plant species are to be disturbed, permits must be obtained from the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (FSDESTEA). Due to suitable grassland habitat present on site, more protected species are expected for the PAOI and a site walkdown must be conducted prior to development activities and any protected species identified on site marked and relocated to a nearby area of similar habitat which will not be impacted by the project activities.

#### 3.2.2.3 Alien Invasive Plants

Alien Invasive Plants (AIPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 43726, 18 September 2020. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing;
- Take steps to manage the listed invasive species in compliance with:
- Section 75 of the Act;
- The relevant invasive species management programme developed in terms of regulation 4; and
- Any directive issued in terms of section 73(3) of the Act.

Twelve (12) AIP species were recorded for the PAOI. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003. Nine (9) of these species are NEMBA category 1b AIP species that must be controlled by implementing an AIP Management Programme, in compliance with section 75 of NEMBA, as stated above (Table 3-6).

**Table 3-6**      **Table presenting the alien and invasive species recorded for the PAOI**

Family	Species	Common Name	Category
Asteraceae	<i>Cirsium vulgare</i>	Spear thistle	NEMBA 1b
Asteraceae	<i>Bidens pilosa</i>	Blackjack	Naturalised Exotic
Asteraceae	<i>Tagetes minuta</i>	Kakiebos	Naturalised Exotic
Asteraceae	<i>Erigeron bonariensis</i>	Flax-leaf Fleabane	Naturalised Exotic
Cactaceae	<i>Opuntia ficus-indica</i>	Sweet Prickly Pear	NEMBA 1b
Cactaceae	<i>Cylindropuntia imbricata</i>	Imbricate Cactus	NEMBA 1b
Fabaceae	<i>Prosopis velutina</i>	Velvet Mesquite	NEMBA 1b
Meliaceae	<i>Melia azedarach</i>	Syringa	NEMBA 1b
Myrtaceae	<i>Eucalyptus camaldulensis</i>	River Red Gum	NEMBA 1b
Solanaceae	<i>Datura ferox</i>	Large thorn apple	NEMBA 1b
Verbenaceae	<i>Verbena brasiliensis</i>	Brazilian Vervain	NEMBA 1b
Asteraceae	<i>Xanthium strumarium</i>	Cocklebur	NEMBA 1b



### 3.2.3 Fauna Assessment

Mammal, herpetofauna and avifauna observations and recordings fall under this section.

#### 3.2.3.1 Mammals

The mammal species recorded for the PAOI during the field survey are presented in Table 3-7 below. Additional common mammal species are expected for the PAOI. One SCC was recorded, in **bold**.

**Table 3-7**      **Table presenting the mammal species recorded for the PAOI during the field survey**

Scientific Name	Common Name	Conservation Status		Free State Nature Conservation Ordinance 8 of 1969
		SANBI	IUCN	
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC	
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC	Schedule 2
<i>Raphicerus campestris</i>	Steenbok	LC	LC	Schedule 2
<i>Xerus inauris</i>	Cape Ground Squirrel	LC	LC	
<i>Leptailurus serval</i>	Serval	NT	LC	

#### 3.2.3.2 Herpetofauna

No reptile or amphibian species were recorded for the PAOI. Common reptile and amphibian species are expected for the PAOI.

#### 3.2.3.3 Avifauna

Thirty (30) species of bird were recorded for the PAOI during the survey based on either direct observation, vocalisations, or the presence of visual tracks and signs (Table 3-8). Three species are SCC, in **bold**. These species are likely to make use of the water resource and the surrounding grassland habitats.

**Table 3-8**      **Table presenting the avifauna species recorded for the PAOI during the field survey**

Species	Common Name	Conservation Status		Free State Nature Conservation Ordinance 8 of 1969
		Regional	IUCN	
<i>Acridotheres tristis</i>	Myna, Common	Unlisted	LC	-
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC	Schedule 1
<i>Alopochen aegyptiaca</i>	Egyptian Goose	Unlisted	LC	Schedule 2
<i>Anas undulata</i>	<b>Yellow-billed Duck</b>	<b>NT</b>	<b>LC</b>	<b>Schedule 2</b>
<i>Bostrychia hagedash</i>	Ibis, Hadedda	Unlisted	LC	Schedule 1
<i>Bubulcus ibis</i>	Egret, Cattle	Unlisted	LC	Schedule 1
<i>Cisticola tinniens</i>	Levaillant's Cisticola	Unlisted	LC	Schedule 1
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC	-
<i>Dendrocygna viduata</i>	White-faced Whistling Duck	Unlisted	LC	Schedule 1
<i>Elanus caeruleus</i>	<b>Black-winged Kite</b>	<b>NT</b>	<b>LC</b>	<b>Schedule 1</b>
<i>Euplectes orix</i>	Southern Red Bishop	Unlisted	LC	
<i>Fulica cristata</i>	Coot, Red-knobbed	LC	LC	Schedule 2
<i>Gallinula chloropus</i>	Common Moorhen	Unlisted	LC	Schedule 1
<i>Lanius collaris</i>	Southern Fiscal	Unlisted	LC	Schedule 1
<i>Macronyx capensis</i>	Cape Longclaw	Unlisted	LC	Schedule 1
<i>Oena capensis</i>	Namaqua Dove	Unlisted	LC	Schedule 1
<i>Passer melanurus</i>	Cape Sparrow	Unlisted	LC	
<i>Phalacrocorax lucidus</i>	White-breasted Cormorant	Unlisted	LC	
<i>Plectropterus gambensis</i>	Spur-winged Goose	Unlisted	LC	Schedule 2
<i>Prinia flavicans</i>	Black-chested Prinia	Unlisted	LC	Schedule 1
<i>Pternistis swainsonii</i>	Swainson's Spurfowl	Unlisted	LC	Schedule 2
<i>Saxicola torquatus</i>	African Stonechat	Unlisted	LC	Schedule 1
<i>Scopus umbretta</i>	<b>Hamerkop</b>	<b>NT</b>	<b>LC</b>	<b>Schedule 1</b>
<i>Spilopelia senegalensis</i>	Dove, Laughing	Unlisted	LC	-
<i>Tachybaptus ruficollis</i>	Little Grebe	Unlisted	LC	Schedule 1
<i>Tricholaema leucomelas</i>	Acacia Pied Barbet	Unlisted	LC	Schedule 1
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC	Schedule 1
<i>Vanellus armatus</i>	Blacksmith Lapwing	Unlisted	LC	Schedule 1
<i>Vanellus coronatus</i>	Lapwing, Crowned	Unlisted	LC	Schedule 1
<i>Vidua chalybeata</i>	Village Indigobird	Unlisted	LC	Schedule 1

### 3.3 Habitat Assessment

The habitat assessment for the PAOI was completed in the following way:

- Desktop habitat delineation for the PAOI (Figure 3-12);
- Extrapolation of habitats observed within the Target areas for the Seismic Transects and 500m Buffer; and
- Habitat delineations based on the field observation Target Areas for Drilling Wells (these can be seen in Table 3-5).

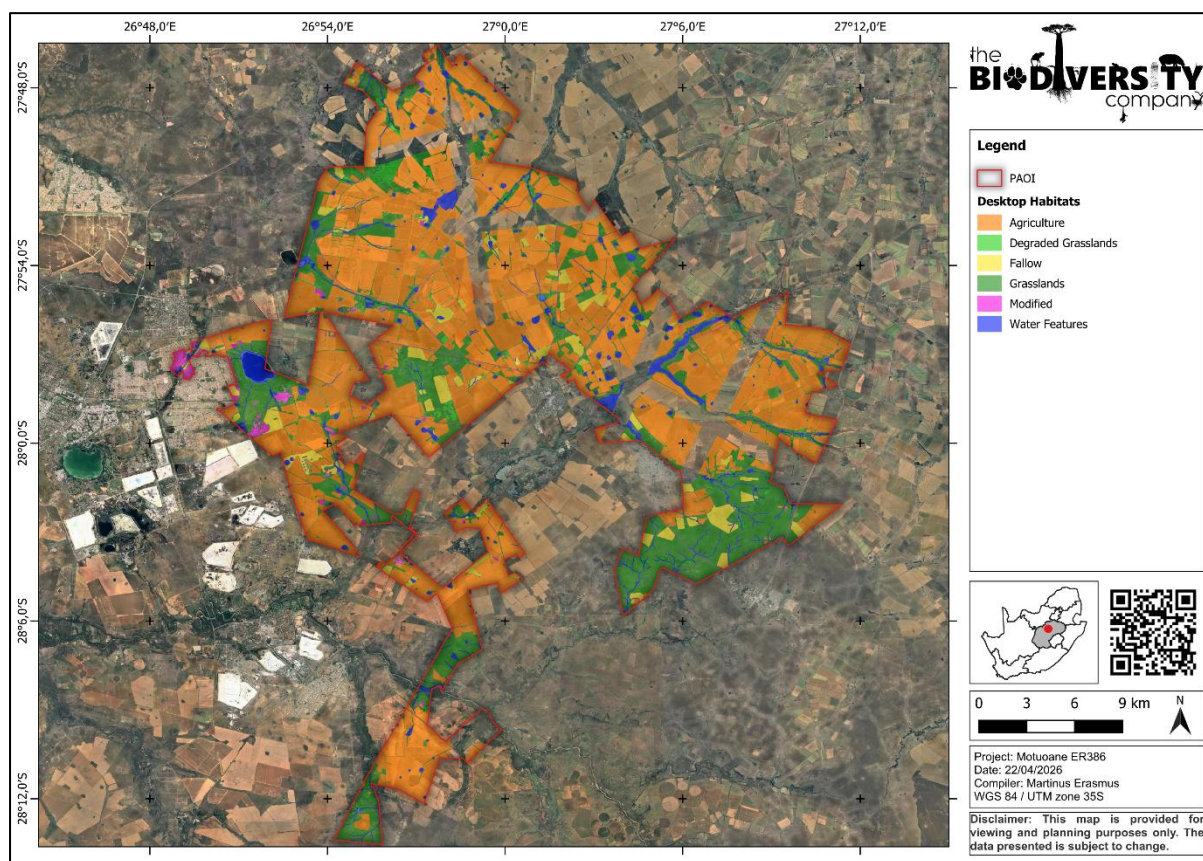
Descriptions of the habitat units can be found in Table 3-9.

**Table 3-9** *Table providing descriptions of the habitat types delineated for the PAOI*

Habitat	Description and condition	Ecosystem Processes and Services
<b>Alluvial vegetation</b>	Alluvial habitat includes areas that are connected to, and play an important role in supporting, the associated water resource habitats. This type of habitat is considered semi-natural, although it has been disturbed by fragmentation, livestock grazing, and human encroachment, particularly in areas adjacent to roads. In general, the habitat unit retains intact ecological functioning, largely due to the faunal communities it supports. However, its current ecological condition is variable, reflecting the influence of differing land uses across the area. Certain portions have been impacted by both historical and ongoing grazing pressure. In addition, disturbances such as AIP presence and edge effects on floral communities have contributed to reduced habitat integrity. Variation in conditions across the habitat is mainly related to the severity of disturbance, with some areas being more heavily overgrazed than others.	Provides refuge, grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage areas. Important corridor for fauna dispersion within the landscape. The areas may be used as a movement corridor. Habitat is used by faunal species and is important for several life stages and may support several SCC. No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, are likely to make use of the habitat.
<b>Water Resources</b>	Impacted permanently to seasonally wet portions of land as delineated by the wetland specialist. Even though somewhat disturbed, the ecological integrity, importance and functioning of these areas play a crucial role as a water resource system locally and regionally and an important habitat for various fauna and flora.	Provides surface water resources within the landscape. Aids in trapping sediment and nutrients carried by surface runoff. Corridor for fauna dispersion within the landscape and important foraging and nesting habitat. No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, are likely to make use of the habitat.
<b>Disturbed Vaal Vet Sandy Grassland</b>	Disturbed Grassland habitat type is regarded as semi-natural, but disturbed due to fragmentation, grazing by livestock and human infringement in areas close to roads. The condition difference within this habitat depends on the extent of the disturbance in some areas being more severe, usually related to one being more overgrazed than the other. Variable in the presence or absence of Woody species and shrub density. Semi-natural, but slightly disturbed due to the grazing by livestock and also human infringement. including woody plant species in form of trees and shrubs.	The current ecological condition of this habitat, regarding the driving forces, are inconsistent due to the different land uses. Provides grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage areas. Important corridor for fauna dispersion within the landscape. Supports SCCs. No flora SCC are expected within this habitat unit. However, fauna SCC, particularly avifauna, are likely to make use of the habitat.
<b>Degraded Vaal Vet Sandy Grassland</b>	The habitat isn't entirely modified but in a constant impacted state and can't recover to a more natural state due to historic and ongoing disturbances and impacts received from grazing, edge effects from land use and mismanagement.	Provides limited grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage areas. Important corridor for fauna dispersion within the landscape. The areas may be



Habitat	Description and condition	Ecosystem Processes and Services
		used as a movement corridor and in many cases form a barrier between the more degraded and the modified areas.
<b>Secondary Vaal Vet Sandy Grassland</b>	Secondary grassland refers to grassland that developed in an area where the original natural vegetation was historically cleared for agriculture, and which has subsequently regenerated through natural ecological succession following the cessation of cultivation.	The ecological services provided by this habitat are limited; provides some grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage areas. Locally common bird species will forage and nest in the larger trees, and parts of the area may be considered a movement corridor.
<b>Modified</b>	The transformed areas have little to no remaining natural vegetation due to land transformation by historic and current agriculture, roads and mismanagement. These habitats exist in a constant disturbed state as it cannot recover to a more natural state due to ongoing disturbances and impacts it receives.	The ecological services provided by this habitat are limited due to the extensive cover of impermeable surfaces and the large amount of bare land. Locally common bird species will forage and nest in the larger trees, and parts of the area may be considered a movement corridor.



**Figure 3-12** Desktop Habitats of the PAOI

### 3.4 Site Ecological Importance

Based on the criteria provided in Appendix B of this report, all habitats within the PAOI were assigned a sensitivity category, i.e., a SEI category. Target areas, Seismic Transects and 500m Buffer was categorised as possessing habitats with areas ranging from 'Very Low' to 'High' (Table 3-10). The Desktop PAOI was categorised as possessing habitats with areas ranging from 'Very Low' to 'High' SEI (Table 3-11).

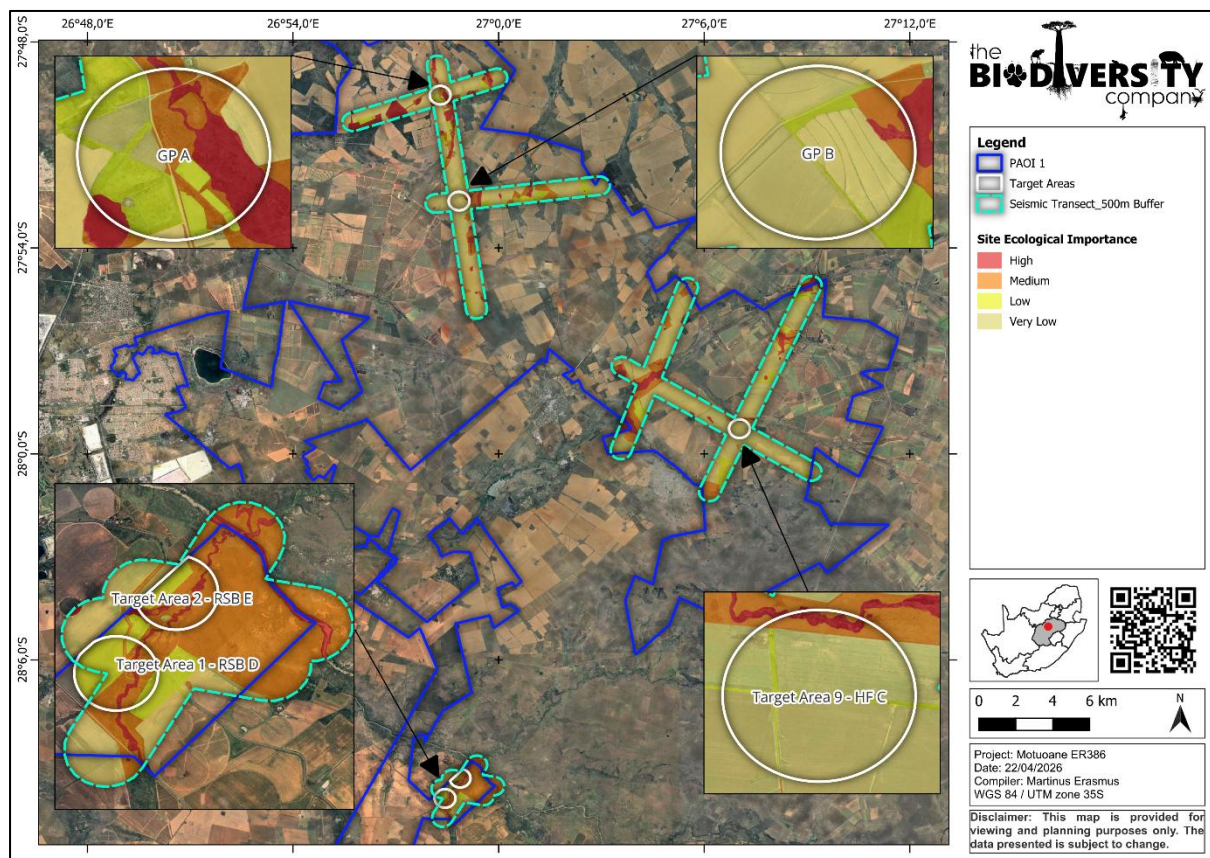
The SEI of the Target areas, Seismic Transects and 500m Buffer is illustrated in Figure 3-13. The SEI of the Target areas, Seismic Transects and 500m Buffer is illustrated in Figure 3-14.

**Table 3-10 Summary of habitat types delineated within Target areas, Seismic Transects and 500m Buffer**

Habitat Type	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Project Component in relation to habitat type	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Alluvial Vegetation Water resources	<u>Medium</u> > 50% of receptor contains natural habitat with potential to support SCC.	<u>Medium</u> Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential	Medium	Seismic Transect and drilling wells	<u>Low</u> Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality.	<u>High</u> Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Disturbed Vaal Vet Sandy Grassland Alluvial Vegetation (Target Area) Dam	<u>Medium</u> > 50% of receptor contains natural habitat with potential to support SCC.	<u>Medium</u> Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential	Medium	Seismic Transect and drilling wells	<u>Medium</u> Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	<u>Medium</u> Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.



Habitat Type	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Project Component in relation to habitat type	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Artificial Drainage Features Non-Perennial Drainage Secondary Vaal Vet Sandy Grassland	Low < 50% of receptor contains natural habitat with limited potential to support SCC.	Medium Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential	Low	Seismic Transect and drilling wells	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	<u>Low</u> Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Modified	Very Low No natural habitat remaining.	Very Low Several major current negative ecological impacts.	Very Low	Seismic Transect and drilling wells	Medium	<u>Very Low</u> Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.



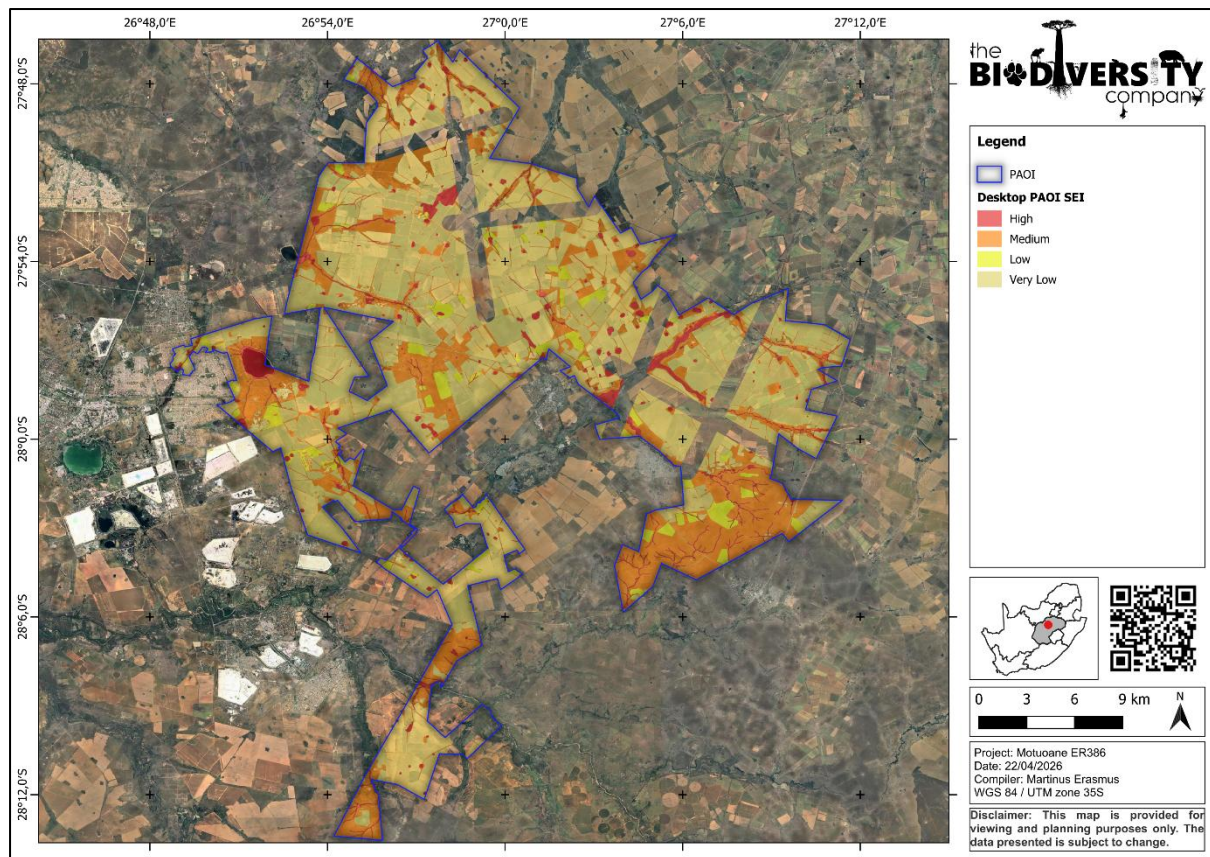
**Figure 3-13 Site Ecological Importance of the Target areas, Seismic Transects and 500m Buffer**



**Table 3-11 Summary of habitat types delineated within Desktop PAOI.**

Habitat Type	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Project Component in relation to habitat type	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Water Features	<u>Medium</u> > 50% of receptor contains natural habitat with potential to support SCC.	<u>Medium</u> Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential	Medium	Seismic Transect and drilling wells	<u>Low</u> Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor	<u>High</u> Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Grasslands	<u>Medium</u> > 50% of receptor contains natural habitat with potential to support SCC.	<u>Medium</u> Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential	Medium	Seismic Transect and drilling wells	<u>Medium</u> Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor	<u>Medium</u> Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Degraded Grasslands Fallow	<u>Low</u> < 50% of receptor contains natural habitat with limited potential to support SCC.	<u>Medium</u> Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential	Low	Seismic Transect and drilling wells	<u>Medium</u> Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor	<u>Low</u> Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Agriculture Modified	Very Low No natural habitat remaining.	Very Low Several major current negative ecological impacts.	Very Low	Seismic Transect and drilling wells	High	<u>Very Low</u> Minimisation mitigation – development activities of medium to high impact acceptable

Habitat Type	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Project Component in relation to habitat type	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
						and restoration activities may not be required.



**Figure 3-14** Site Ecological Importance of the Desktop PAOI

### 3.4.1 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed **Target areas for the Seismic Transects and 500m Buffer**<sup>1</sup>. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC or protected species.

**Table 3-12 Summary of the screening tool vs specialist assigned sensitivities for the Target areas**

Screening Tool Theme	Screening Tool	Habitat	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	High	Alluvial Vegetation Water resources Disturbed Vaal Vet Sandy Grassland Alluvial Vegetation (Target Area) Dam	Medium	Disputed –Fauna SCCs are unlikely to resident here, although some may make use of the PAOI for foraging and movement.
		Artificial Drainage Features Non-Perennial Drainage Secondary Vaal Vet Sandy Grassland Modified	Low	Disputed –No SCCs were recorded. Habitat is unlikely to support SCCs.
Plant Theme	Low	-	Low	Validated – No SCCs were recorded or are expected within the target areas.
Terrestrial Theme	Very High	Alluvial Vegetation Water resources	High	Disputed – Considered semi-natural, although it has been disturbed by fragmentation, livestock grazing, and human encroachment, particularly in areas adjacent to roads. Viable CBA.
		Disturbed Vaal Vet Sandy Grassland Alluvial Vegetation (Target Area) Dam	Medium	Disputed – Considered natural, although it has been disturbed by fragmentation, livestock grazing, and human encroachment, particularly in areas adjacent to roads. Viable CBA and EN ecosystem, however the proposed activity should not result in major impacts.
		Artificial Drainage Features Non-Perennial Drainage Secondary Vaal Vet Sandy Grassland	Low	Disputed – Habitat modified in nature and currently and/or historically used for agricultural activities with limited potential to support SCC. Severe levels of disturbance present.
		Modified	Very Low	Disputed – Habitat modified in nature, predominantly made up of roads.

<sup>1</sup> The Desktop POAI cannot be compared due to no field coverage.



## **4 Impact Risk Assessment**

### **4.1 Biodiversity Risk Assessment**

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora, and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors, such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the PAOI. The relevant impacts associated with the proposed construction and operation of the development were then subjected to a prescribed impact assessment method. Impacts were assessed in terms of the construction and operational phases. The operational phase refers to that phase of the project where the construction has been completed. It should be noted that the impacts described are not exhaustive, and more impacts may be identified at a later stage. Mitigation measures were only applied to impacts deemed relevant based on the impact analysis.

Impacts were assessed for the following activities:

- Construction Phase/ Operational Phase ; and
- Closure Phase.

### **4.2 Present Impacts to Biodiversity**

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the PAOI. These include:

- Edge effects associated with mining and agricultural activities in the region;
- Human and vehicle ingress;
- Littering;
- Invasions by alien and invasive plants;
- Erosion;
- Grazing by livestock; and
- Linear infrastructure in the form of fences, roads and overhead powerlines.

### **4.3 Alternatives Considered**

There is minimal difference between the Vibroseis and AWD alternatives considered.

#### **4.3.1 No-Go Scenario**

The current land use is predominantly agriculture and livestock grazing and the associated impacts caused by this to the terrestrial ecology is considered to be medium. If the land use is well managed, then the long-term impacts to the local ecology will continue to be low - this will require that grazing areas are rotated, grazing capacities are sustained, and stocking densities are controlled. Under the current circumstances, the 'no-go' alternative is considered to represent a low-medium long-term negative impact on the environment. However, it is noted that if the current land uses are left

unmanaged for the foreseeable future, it is probable that the ecological integrity and functioning of the grassland area will deteriorate.

**Table 4-1 Assessment of significance of impacts on the terrestrial fauna and flora associated with the project**

Identifier	Impact	Pre-mitigation ER	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
<b>Construction/Operational Phase</b>								
4.6.1.1.	Destruction, further loss and fragmentation of the vegetation community	-13	-5.25	High	1	1	1.00	-5.25
Mitigation	<ul style="list-style-type: none"> <li>Mitigation measures in the approved Motuoane ER315 EMPr are adequate to mitigate this impact with the addition of the following: <ul style="list-style-type: none"> <li>Drilling, especially the creation of Drilling Pads should be limited to very low-medium sensitivity areas.</li> <li>Transects via 2 track roads over the surface are acceptable within High SEI areas</li> <li>All construction/operational and access must make use of the existing roads as much as possible, the creation of new roads should be avoided; <ul style="list-style-type: none"> <li>The seismic transect lines should not be cleared for roads, all vehicles should use existing roads as much as possible, however 2 track roads over the surface are acceptable.</li> <li>Make use of existing roads to crossing the wetlands and drainage features. Crossing of these features should only be considered in the dry season (April-August)</li> <li>Construct new roads only where absolutely necessary. <ul style="list-style-type: none"> <li>Avoid wetlands, drainage lines, seep zones, floodplains, and steep slopes.</li> <li>Avoid bisecting intact grassland blocks where alternative routes exist.</li> </ul> </li> </ul> </li> <li>It should be made an offence for any staff to remove any indigenous plant species from any portion of the PAOI or to bring any alien species into the PAOI outside of rehabilitation and AIP management activities. This is to prevent the spread of exotic or invasive species and the illegal collection of plants.</li> <li>Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.</li> </ul> </li> </ul>							
4.6.1.2.	Introduction of alien species, especially plants	-12	-3.5	High	1	1	1.00	-3.50
Mitigation	<ul style="list-style-type: none"> <li>Mitigation measures in the approved Motuoane ER315 EMPr are adequate to mitigate this impact with the addition of the following: <ul style="list-style-type: none"> <li>Monitor disturbed areas for alien invasive species, especially Drilling Pads.</li> </ul> </li> </ul>							
4.6.1.3.	Displacement of faunal community (including SSCs) due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching).	-14	-6	Medium	1	1	1.00	-6,00
Mitigation	<ul style="list-style-type: none"> <li>Mitigation measures in the approved Motuoane ER315 EMPr are adequate to mitigate this impact with the addition of the following: <ul style="list-style-type: none"> <li>Prior to commencing work each day, two individuals should traverse the working area in order to disturb any fauna and so they have a chance to vacate.</li> <li>Any holes/deep excavations must be done in a progressive manner on a needs only basis. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas and subsequently inspected prior to backfilling.</li> <li>Road users and contractors to undergo/receive Environmental Awareness Training. Discussions/training must include:</li> </ul> </li> </ul>							

## Motuoane Exploration Right 386

Identifier	Impact	Pre-mitigation ER	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
	▪ General rules of road use, not limited to avoiding the widening of the road and environmental sensitivity of surrounding habitat							
4.6.1.4.	Potential leaks, discharges, pollutant from machinery and storage leaching into the surrounding environment.	-14	-4	High	1	1	1.00	-4.00
Mitigation	• Mitigation measures in the approved Motuoane ER315 EMPr are adequate to mitigate this impact.							
Rehab and closure								
4.6.2.1.	Continued encroachment of an indigenous and vegetation community by alien invasive plant species as well as erosion due to disturbed soils	-9.75	3.5	Medium	2	2	1.25	4.38
Mitigation	• Mitigation measures in the approved Motuoane ER315 EMPr are adequate to mitigate this impact.							
4.6.2.2.	Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances (noise, dust and vibrations) and habitat degradation/loss (litter, road mortalities and/or poaching).	-9.75	3.5	Medium	2	2	1.25	4.38
Mitigation	• Mitigation measures in the approved Motuoane ER315 EMPr are adequate to mitigate this impact							



#### 4.4 Irreplaceable Loss

The proposed activities will be conducted over the numerous habitats. These areas encompass indigenous vegetation that may be considered largely functional in nature and as such any irresponsible and/or medium to high impact activities will likely result in the loss of the following resources:

- CBA 1, ESA 1, ESA 2 and NPAES areas;
- Water resources;
- Potential fauna SCC;
- Potential protected species; and
- Indigenous vegetation.

#### 4.5 Identification of Additional Potential Impacts

The following potential activities and potential impacts are expected. A summary of the potential impacts during the construction and operational phases of the proposed activity are presented in Table 4-2.

**Table 4-2** *Summary of potential impacts to biodiversity associated with the proposed activity*

Main Impact	Project Activities	Secondary Impacts Anticipated
Loss of indigenous habitat	<ul style="list-style-type: none"> <li>• Direct loss as a result of proposed activities</li> <li>• Secondary impacts associated with noise, dust and influx of AIPs into these areas.</li> <li>• Prevention of fires or incorrect fire regimes.</li> <li>• Improper solid waste disposal</li> <li>• Dust precipitation.</li> <li>• Contamination and pollution of water resources in the area.</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat fragmentation.</li> <li>• Loss of ecosystem services.</li> <li>• Emigration of fauna species, potentially including SCC.</li> <li>• Increased potential for soil erosion.</li> <li>• Habitat fragmentation.</li> <li>• Increased potential for establishment of alien invasive vegetation.</li> </ul>
Encroachment of AIP species in disturbed areas.	<ul style="list-style-type: none"> <li>• Vegetation removal.</li> <li>• Soil disturbance.</li> <li>• Vehicles potentially spreading seed.</li> <li>• Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents.</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss for native flora &amp; fauna (including potential SCC).</li> <li>• Alteration of fauna assemblages due to habitat modification.</li> <li>• Reduced forage quality of grazing habitat.</li> <li>• Spreading of potentially dangerous diseases.</li> </ul>
Direct mortality of fauna species.	<ul style="list-style-type: none"> <li>• Clearing of vegetation.</li> <li>• Roadkill due to vehicle collision.</li> <li>• Preparation of soil with heavy machinery</li> <li>• Soil excavations and soil transportation.</li> <li>• Intentional killing of fauna for food (hunting) or persecution (especially with regard to herpetofauna).</li> <li>• Pollution of water resources due to spilling of hazardous chemicals from heavy machinery during construction.</li> <li>• Collisions of volant fauna with overhead powerlines.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of ecosystem services.</li> <li>• Explosion of rodent populations and associated disease risk.</li> </ul>
Emigration of fauna	<ul style="list-style-type: none"> <li>• Disturbance from construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced population of protected species, and potentially SCC</li> </ul>

	<ul style="list-style-type: none"> <li>Loss of habitat and degradation of surrounding habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of ecosystem services.</li> </ul>
<b>Reduced dispersal/migration of fauna</b>	<ul style="list-style-type: none"> <li>Removal of vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Loss of ecosystem services</li> <li>Reduced plant seed dispersal.</li> </ul>
<b>Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, light and dust</b>	<ul style="list-style-type: none"> <li>Operation of machinery (generators, crushers, vehicles).</li> <li>Vehicles operating at night.</li> <li>Large, intense fluorescent and mercury vapor lighting.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of ecosystem services.</li> </ul>
<b>Loss of SCCs and/or protected species</b>	<ul style="list-style-type: none"> <li>All unregulated/unsupervised activities outdoors.</li> <li>Poaching and trapping</li> <li>Staff and others interacting directly with fauna (potentially dangerous), or flora.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of SCC.</li> <li>Harm to people (dangerous fauna).</li> </ul>

#### 4.6 Quantitative Impact Assessment

An impact assessment methodology was provided by EIMS to determine the environmental risk associated with various aspects related to the proposed activities. This impact assessment takes the following components into consideration.

- The nature of the associated impact (positive or negative);
- The extent of the proposed activities;
- The duration of the proposed activities;
- The magnitude of the effects caused by the proposed activities;
- The reversibility of associated impacts; and
- The probability of relevant aspects affecting sensitive receptors.

Each one of the above-mentioned components are given a rating, which cumulatively provides the specialist with a pre-mitigation environmental risk rating. These components are then scored again taking into consideration mitigating factors. The cumulative impact and irreplaceable loss to sensitive receptors are then scored to ultimately indicate a "Priority Factor" score.

The purpose of the impact assessment is to:

- Assess impacts of proposed activities on biodiversity of the proposed development area;
- Assess whether proposed activities are likely to have significant impacts on biodiversity and specifically species of conservation concern; and
- Identify practical, implementable mitigation measures to reduce the significance of proposed activities on biodiversity.

It is important to note that the ratings applied within the risk assessment model, considered impacts to open space or natural habitats within the development area and not for areas already transformed.

The impacts associated with the different phases of the project are discussed below and the assessment of the impacts can be seen in Table 4-1. Mitigation measures are provided within and must be considered in conjunction with the mitigation measures provided by the Biodiversity Monitoring Plan in the existing EMP as provided by EIMS.

These impacts should be considered in conjunction with the wetland and soil assessments as provided (TBC, 2026).

#### **4.6.1 Construction/Operational Phase**

The following potential impacts on the biodiversity were considered for the construction/operational phase of the project. Due to the nature of the project, only one phase of impacts is expected, and refers to the period during which the seismic studies are conducted. This phase usually has the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered.

##### **4.6.1.1 Destruction, further loss and fragmentation of the vegetation community**

Through potential site clearing, more of the vegetation communities will be lost. Unmitigated, this will also lead to habitat fragmentation and the establishment of alien invasive species as well as soil erosion.

Activities that will contribute to this impact:

- Driving/moving outside of designated areas;
- Physical removal of vegetation;

##### **4.6.1.1.1 Temporary site establishment (laydown, chemical toilets, etc.);**

- Soil dust precipitation as a result of site establishment;
- Dumping of waste products;
- Hydrocarbon storage and leakages; and
- Random events such as fire (cooking fires or cigarettes).

##### **4.6.1.1.2 Cumulative Impacts**

- Further loss of vegetation type

##### **4.6.1.1.3 Irreplaceable Loss of Resources**

- Loss of CBA/ESA;
- Loss of a threatened (EN) ecosystem;
- Loss of NPAES; and
- Loss of protected species.

##### **4.6.1.2 Introduction of alien species, especially plants**

The spread of alien and invasive species will result in the loss of habitat and water for indigenous fauna and flora. It can also contribute to the spreading of potentially dangerous diseases due to invasive - and pest species. Overall, the fauna and flora assemblage will be changed. Activities that will contribute to this impact:

- Vegetation removal and disturbance of soil;
- Vehicles potentially spreading seed;



- Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive; and
- Eating area increasing pest species such as rats and flies.

#### **4.6.1.2.1 Cumulative Impacts**

- Loss of habitat for indigenous species; and
- Spread of disease to surrounding areas.

#### **4.6.1.2.2 Irreplaceable Loss of Resources**

- Loss of CBA/ESA;
- Loss of a threatened (EN) ecosystem;
- Loss of NPAES.

#### **4.6.1.3 Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching).**

Faunal community will be influenced in a number of ways, including the loss of habitat, disturbances that will either make them move out of the area if possible or have to adapt and possible deaths due to physical harm or indirect harm. Activities that will contribute to this impact:

- Clearing of vegetation;
- Roadkill due to vehicle collision;
- Pollution of water resources due to dust effects and run-off;
- Intentional killing of fauna for food (hunting) or otherwise (killing of snakes);
- Disease caused by increased dust levels;
- Increase in pest species in the area due to new food source created; and
- Vibrations and noise due to the proposed activities.

#### **4.6.1.3.1 Cumulative Impacts**

- Loss of habitat for indigenous species.

#### **4.6.1.3.2 Irreplaceable Loss of Resources**

- Loss of fauna SCCs.

#### **4.6.1.4 Leaks, discharges, pollutant from machinery and storage leaching into the surrounding environment.**

Hydrocarbons leaching into the surrounding area will result in the loss of usable water resources, the loss of fauna and flora species. This will also result in the contamination of the topsoil and reduce the likelihood of successful rehabilitation of an area.

Activities that will contribute to this impact:

- Loss of vegetation; and
- Loss of topsoil.

#### **4.6.1.4.1 Cumulative Impacts**

- Loss of usable water resources for fauna species; and
- Loss of viable habitat.

#### **4.6.1.4.2 Irreplaceable Loss of Resources**

- Loss of usable water resources for fauna species resulting in loss of SCC and other species.

### **4.6.2 Closure Phase**

This phase will initially involve the rehabilitation of any cleared/disturbed areas, seismic studies have been completed.

#### **4.6.2.1 Continued encroachment of an indigenous and vegetation community by alien invasive plant species as well as erosion due to disturbed soils**

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. Overall, the fauna assemblage will be changed. Erosion will also disrupt the vegetation in the surrounding areas and result in habitat loss. Activities that will contribute to this impact:

- Vehicles potentially spreading seed.

#### **4.6.2.1.1 Cumulative Impacts**

- Loss of habitat; and
- Loss of indigenous flora species due to competition.

#### **4.6.2.1.2 Irreplaceable Loss of Resources**

- Loss of habitat and food sources for Fauna SCCs.

#### **4.6.2.2 Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances (noise, dust and vibrations) and habitat degradation/loss (litter, road mortalities and/or poaching).**

- Habitat loss; and
- The disruption of natural faunal movement corridors.

#### **4.6.2.2.1 Cumulative Impacts**

- Loss of suitable habitat.

#### **4.6.2.2.2 Irreplaceable Loss of Resources**

- Loss of faunal SCCs.

## 5 Conclusion

The Terrestrial Biodiversity Assessment for the proposed Motuoane Exploration Right 386 indicates that, although the project area has been subject to substantial historical and ongoing disturbance from agriculture, grazing, and associated infrastructure, it still contains areas of notable ecological importance. These include remaining natural and semi-natural grassland habitats, wetlands, and watercourses. The presence of threatened and sensitive ecological features means that the receiving environment cannot be regarded as uniformly low sensitivity, despite the modified nature of large portions of the PAOI.

From a terrestrial biodiversity perspective, no fatal flaws were identified that would preclude the proposed exploration activities. However, the key risks associated with the development include habitat loss and fragmentation, disturbance to fauna, the spread of alien invasive plant species, and pollution-related impacts on sensitive habitats, particularly wetlands and intact grassland areas. These risks can be reduced to acceptable levels only through the strict application of mitigation measures, including the avoidance of high-sensitivity areas, minimisation of vegetation clearance and surface disturbance, protection of fauna and flora, effective alien invasive species control, and the rehabilitation of disturbed areas.

Overall, the proposed project is considered potentially acceptable from a biodiversity perspective, provided that exploration activities are carefully planned and implemented in line with the mitigation and management measures outlined in this report. Ongoing environmental monitoring and compliance will be essential to ensure that ecological impacts remain as low as possible and that the long-term functioning of the affected terrestrial ecosystems is maintained.

### 5.1 Impact Statement

No fatal flaws were identified for the project. The overall residual impact of the exploration project is expected to be low. It is the opinion of the specialist that the proposed development is favourable for authorisation provided the mitigation measures outlined in this report are implemented correctly, as well as the recommendations listed below. The Competent Authority must consider all mitigation measures provided in this report, as well as in the existing EMP for cluster 1 and 2, for the authorisation.

### 5.2 Specialist Opinion

The overall low cumulative residual impact does not present a fatal flaw for the development, and in accordance with the Biodiversity Offset Guideline (2023) will not incur a listed (and notable) change to the land and resource. Considering the above-mentioned information, no fatal flaws are evident for the proposed project.

There are areas within the PAOI that possess a 'High' SEI. This denotes that avoidance mitigation wherever possible must be implemented. This includes changes to project infrastructure design and activity to limit the amount of habitat impacted.

The following should be considered for the areas outside the Target areas (especially grassland habitat), this includes the Seismic Transects and 500m Buffer:

- 1) A site walkdown must be conducted prior to development activities to search for potential fauna SCC, in particular *Sensitive Species 15* in case it occurs on the region;



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## 7 Appendix Items

### 7.1 Appendix A: Methods

#### 7.1.1 Desktop Dataset Assessment

##### 7.1.1.1 Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the proposed development might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- National Biodiversity Assessment 2018 (Skowno *et al*, 2019) - The purpose of the National Biodiversity Assessment (NBA) is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
  - Red List of Ecosystems (RLE) 2021 – The list was first published in 2011 and has since been substantially revised by authors Dr Andrew Skowno and Mrs Maphale Monyeki (SANBI, 2022). This list is based on assessments that followed the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Framework (version 1.1) and covers all 456 terrestrial ecosystem types described in South Africa by Mucina and Rutherford (2006). A total of 120 of the 456 terrestrial ecosystem types assessed are categorised as threatened and together make up approximately 10% of the remaining natural habitat in the country. Of these 120 ecosystem types, 55 are Critically Endangered (CR), 51 Endangered (EN) and 14 are Vulnerable (VU). The remainder are categorised as Least Concern (LC) (SANBI, 2022; Skowno & Monyeki, 2021).
  - Ecosystem Protection Level – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, Poorly Protected or Moderately Protected ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
  - South Africa Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) (DFFE, 2023a) – The South African Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. The database is updated on a continuous basis and forms the basis for the Register of Protected Areas which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
  - National Protected Areas Expansion Strategy (NPAES) (DFFE, 2022b) – The National Protected Area Expansion Strategy (NPAES) provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact



and unfragmented and are therefore, of high importance for biodiversity, climate resilience and freshwater protection.

- Conservation/Biodiversity Sector Plans:

The Free State Biodiversity Plan (DESTEA, 2015) – A key objective of the Free State Provincial Spatial Development Plan is to integrate and standardize planning at all spheres of government in the province with specific reference to amongst others facilitating land-use classification of the entire land surface of the province. To this extent a set of dedicated Spatial Planning Categories (SPCs) were developed which provide a spatial framework to guide decision-making regarding land-use at all levels of planning. The SPCs represent a classification system that indicates the most suitable, or a range of, land use options for a certain piece of land. Associated with each SPC category is land use guidelines which when implemented ensures a balance between development and conservation. Mainstreaming of the biodiversity plan into spatial planning process will be achieved by aligning the biodiversity plan categories with those of the SPCs so that planning according to SPC will then automatically also adopt the biodiversity plan categories and their associated land use guidelines.

- Important Bird and Biodiversity Areas (BirdLife South Africa, 2015) – Important Bird and Biodiversity Areas (IBAs) constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria; and

- Freshwater Ecology:

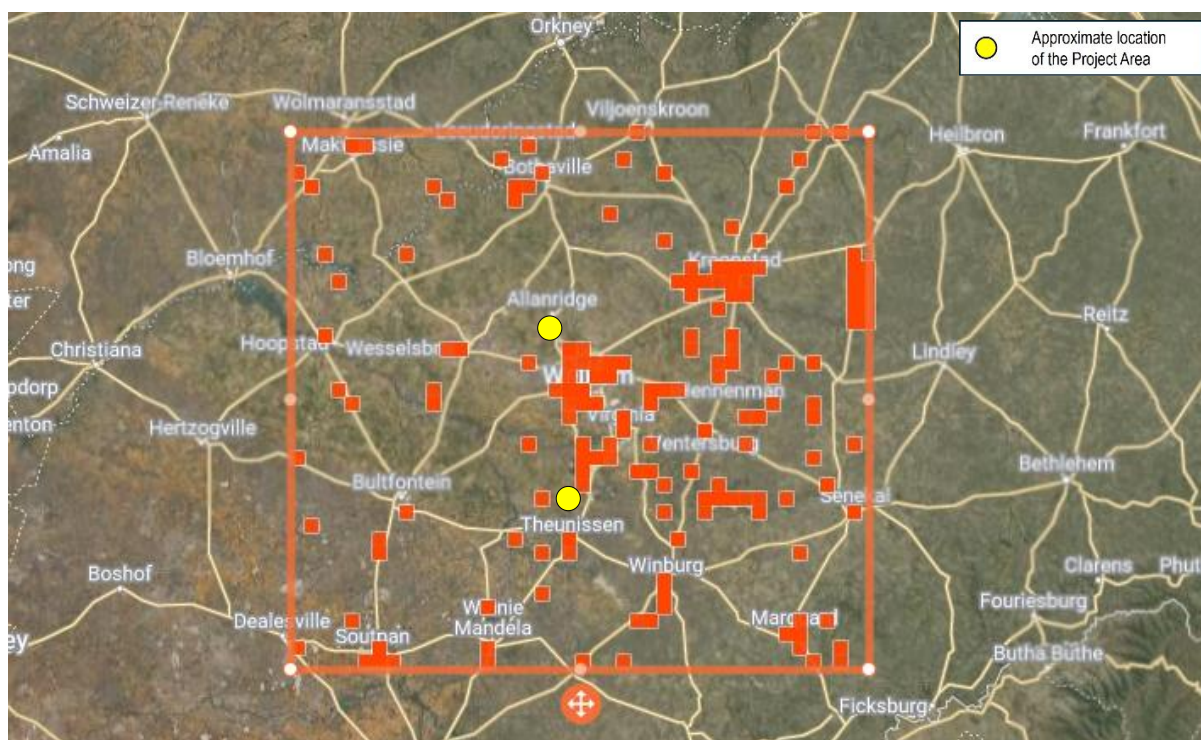
- Strategic Water Source Areas (SWSAs) (Le Maitre *et al*, 2018) – SWSAs are defined as areas of land that supply a quantity of mean annual surface water runoff in relation to their size and therefore, contribute considerably to the overall water supply of the country. These are key ecological infrastructure assets and the effective protection of surface water SWSAs areas is vital for national security because a lack of water security will compromise national security and human wellbeing.
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al*, 2018) – A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types as well as pressures on these systems.
- National Freshwater Ecosystem Priority Area (NFEPA) (Nel *et al.*, 2011) – The NFEPA database provides strategic spatial priorities for conserving the country's freshwater ecosystems and associated biodiversity as well as supporting sustainable use of water resources.

### 7.1.2 Desktop Flora Assessment

The desktop flora assessment encompassed an assessment of all the vegetation units and habitat types within the PAOI, as well as the identification of expected plant species and any locally occurring flora SCC.

The Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2006) and the 2018 Terrestrial & Freshwater Assessment by SANBI (2018) was used to identify the vegetation types that would have occurred under natural or pre-anthropogenically altered conditions. Furthermore, the iNaturalist database was accessed to compile a list of expected flora species within the PAOI (Figure

7-1). The Red List of South African Plants website (SANBI, 2016) was used to provide the most current account of the national conservation status of flora.



**Figure 7-1** Map illustrating extent of area used to obtain the expected flora species list from the iNaturalist database. The yellow dots indicate the approximate location of the PAOI

The latest information regarding provincially, and nationally protected flora was obtained from the following published legislative sources:

- Provincially Protected Plant Species (Schedule 6 of the Free State Nature Conservation Ordinance 8 of 1969);
- Nationally Protected plant species (The 2007 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the NEM:BA No. 10 of 2004); and
- List of Nationally Protected Tree Species (DEFF, 2022).

### 7.1.3 Desktop Fauna Assessment

The non-volant faunal desktop assessment comprised of the following:

- Compiling an expected amphibian list generated from the FrogMap database of the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2024a) using the 2726DA, 2726DC and 2826BD quarter degree square;
- Compiling an expected reptile list generated from the ReptileMap database of the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2024b) using the 2726DA, 2726DC and 2826BD quarter degree square;
- Compiling an expected mammal list generated from the MammalMap database of the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2024c) using the 2726DA, 2726DC and 2826BD quarter degree square; and

- Avifauna list from the Southern African Bird Atlas Project 2 (SABAP2). The Avifauna list was generated from the SABAP2 dataset by looking at pentads 2745\_2650, 2745\_2655, 2745\_2700, 2750\_2650, 2750\_2655, 2750\_2700, 2750\_2705, 2755\_2645, 2755\_2650, 2755\_2655, 2755\_2700, 2755\_2705, 2755\_2710, 2800\_2650, 2800\_2655, 2800\_2700, 2800\_2705, 2800\_2710, 2805\_2655, 2805\_2700, 2810\_2650, 2810\_2655, 2740\_2645, 2745\_2645, 2750\_2645, 2740\_2650, 2740\_2655, 2740\_2700, 2740\_2705, 2745\_2705, 2745\_2710, 2750\_2710, 2750\_2640, 2755\_2640, 2800\_2640, 2800\_2645, 2750\_2715, 2755\_2715, 2800\_2715, 2805\_2645, 2805\_2650, 2805\_2705, 2805\_2710, 2805\_2715, 2810\_2700, 2810\_2705, 2810\_2645, 2815\_2645, 2815\_2650, 2815\_2655, 2815\_2700.

South Africa's official site for Species Information and National Red Lists (SANBI, 2022) was used to provide the most current national Red-List status of fauna. The latest information regarding provincially, and nationally protected fauna was obtained from the following published legislative lists:

- Provincially Protected Wildlife Species (Schedule 1 of the Free State Nature Conservation Ordinance 8 of 1969); and
- Nationally Protected Wildlife species (The 2007 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the NEM:BA No. 10 of 2004).

#### 7.1.4 Vegetation & Flora Survey

The late dry season fieldwork and sample sites were placed within targeted areas (i.e., target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork was, therefore, to maximise coverage and navigate to each target site in the field in order to perform a rapid vegetation and ecological assessment at each sample site.

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps (confirmed during the field survey). The floristic diversity and search for protected plants and flora SCC were conducted through timed meanders within representative habitat units delineated during the desktop assessment. Emphasis was placed on sensitive habitats, especially those overlapping with the PAOI.

The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting protected plants and flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling observed flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the original technique described by Goff et al. (1982). Suitable habitat for SCC were identified according to Raimondo et al. (2009) and targeted as part of the timed meanders.

At each sample site notes were made regarding current impacts (e.g., roads, erosion etc.), and this included the subjective recording of dominant vegetation species and any sensitive features (e.g., wetlands, rock outcrops etc.). In addition, opportunistic observations were made while navigating through the area.

Species were identified in field wherever possible. If they could not be identified in the field, field guides and texts were used. Relevant field guides and texts consulted for identification purposes included, but was not limited, to the following:

- Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions (Fish *et al.*, 2015);

- A Field Guide to Wild Flowers (Pooley, 1998);
- Problem Plants and Alien Weeds of South Africa (Bromilow, 2018);
- Field Guide to Succulents in Southern Africa (Smith *et al.*, 2017);
- Field Guide to Wildflowers of South Africa (Manning, 2009); and
- iNaturalist. Available at <https://www.inaturalist.org/home>

#### 7.1.4.1 Fauna Survey

The faunal component of this report pertains only to mammals and herpetofauna (reptiles and amphibians), as a separate avifauna assessment was conducted and can be found in the accompanying avifauna assessment report (TBC, 2024). The faunal field survey utilised a variety of sampling techniques, including but not limited to:

- Visual and auditory searches: This involves strategic meandering and the use of binoculars and specialist camera equipment to view species from a distance without them being disturbed;
- Active hand-searches: Used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.); and
- The identification of tracks and signs, and listening to species calls.

Relevant field guides and texts consulted for identification purposes included the following:

- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Snakes of Southern Africa (Marais, 2004);
- Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates et al, 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez and Carruthers, 2009);
- Stuarts' Field Guide to Mammals of Southern Africa including Angola, Zambia & Malawi (Stuart and Stuart, 2015); and
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000).



## **7.2 Appendix B: Terrestrial Site Ecological Importance**

The different habitat types within the PAOI were delineated and identified based on observations made during the field survey, and information from available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of SCC and their ecosystem processes.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present in the PAOI) and Receptor Resilience (RR) (its resilience to impacts).

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The criteria for the CI and FI ratings are provided in Table 7-1 and

Table 7-2 respectively.

**Table 7-1 Summary of Conservation Importance (CI) criteria**

Conservation Importance	Fulfilling Criteria
<b>Very High</b>	Confirmed or highly likely occurrence of Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Extremely Rare or CR species that have a global extent of occurrence (EOO) of < 10 km <sup>2</sup> . Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of an EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
<b>High</b>	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km <sup>2</sup> . IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
<b>Medium</b>	Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
<b>Low</b>	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
<b>Very Low</b>	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

**Table 7-2 Summary of Functional Integrity (FI) criteria**

Functional Integrity	Fulfilling Criteria
<b>Very High</b>	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts, with no signs of major past disturbance.
<b>High</b>	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.
<b>Medium</b>	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
<b>Low</b>	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
<b>Very Low</b>	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table 7-3.

**Table 7-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)**

Biodiversity Importance		Conservation Importance				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor, as summarised in Table 7-4.

**Table 7-4 Summary of Receptor Resilience (RR) criteria**

Resilience	Fulfilling Criteria
<b>Very High</b>	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
<b>High</b>	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
<b>Medium</b>	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
<b>Low</b>	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
<b>Very Low</b>	Habitat that is unable to recover from major impacts, or species that are unlikely to: (i) remain at a site even when a disturbance or impact is occurring, or (ii) return to a site once the disturbance or impact has been removed.

After the determination of BI and RR, the SEI can be ascertained using the matrix as provided in Table 7-5.

**Table 7-5 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)**

Site Ecological Importance		Biodiversity Importance				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	Very Low	Very High	Very High	High	Medium	Low
	Low	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	High	High	Medium	Low	Very Low	Very Low
	Very High	Medium	Low	Very Low	Very Low	Very Low



Interpretation of the SEI in the context of the proposed project is provided in Table 7-6.

**Table 7-6** *Guideline for interpreting Site Ecological Importance in the context of proposed activities*

Site Ecological Importance	Interpretation in relation to proposed development activities
<b>Very High</b>	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
<b>High</b>	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
<b>Medium</b>	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
<b>Low</b>	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
<b>Very Low</b>	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

### 7.3 Appendix C: Expected Species Lists

#### 7.3.1 Expected Flora Species

Family	Scientific Name	SANBI, IUCN Conservation Status	RSA Status
<b>Acanthaceae</b>	<i>Justicia orchoides</i>	,	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Ruschia rigens</i>	LC , LC	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Ruschia ruralis</i>	LC , LC	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Trianthema salsoloides</i>	,	Indigenous
<b>Aizoaceae</b>	<i>Mestoklema arboriforme</i>	LC , LC	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Delosperma mahonii</i>	LC , LC	Indigenous
<b>Aizoaceae</b>	<i>Trianthema parvifolia</i>	,	Indigenous
<b>Aizoaceae</b>	<i>Chasmatophyllum musculinum</i>	LC , LC	Indigenous
<b>Amaranthaceae</b>	<i>Sericorema sericea</i>	LC , LC	Indigenous
<b>Amaranthaceae</b>	<i>Sericorema remotiflora</i>	LC , LC	Indigenous
<b>Amaranthaceae</b>	<i>Salsola humifusa</i>	LC , LC	Indigenous; Endemic
<b>Amaryllidaceae</b>	<i>Nerine laticoma</i>	LC , LC	Indigenous
<b>Amaryllidaceae</b>	<i>Boophone disticha</i>	LC , LC	Indigenous
<b>Amaryllidaceae</b>	<i>Brunsvigia radulosa</i>	LC , LC	Indigenous
<b>Anacampserotaceae</b>	<i>Anacampseros buderiana</i>	,	Indigenous
<b>Anacampserotaceae</b>	<i>Avonia ustulata</i>	,	Indigenous; Endemic
<b>Anacampserotaceae</b>	<i>Anacampseros ustulata</i>	LC , LC	Indigenous; Endemic
<b>Anacardiaceae</b>	<i>Smodingium argutum</i>	LC , LC	Indigenous; Endemic
<b>Apocynaceae</b>	<i>Stenostelma capense</i>	LC , LC	Indigenous
<b>Apocynaceae</b>	<i>Stapelia grandiflora</i>	,	Indigenous
<b>Aponogetonaceae</b>	<i>Aponogeton junceus</i>	LC , LC	Indigenous
<b>Araceae</b>	<i>Lemna gibba</i>	LC , LC	Indigenous
<b>Asphodelaceae</b>	<i>Bulbine narcissifolia</i>	LC , LC	Indigenous
<b>Asphodelaceae</b>	<i>Aloe grandidentata</i>	LC , LC	Indigenous
<b>Asphodelaceae</b>	<i>Trachyandra asperata</i>	,	Indigenous
<b>Asphodelaceae</b>	<i>Bulbine abyssinica</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio laevigatus</i>	,	Indigenous
<b>Asteraceae</b>	<i>Tarchonanthus camphoratus</i>		
<b>Asteraceae</b>	<i>Nolletia ciliaris</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Arctotis arctotoides</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio hastatus</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio harveianus</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Eriocephalus karoocicus</i>	LC , LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Senecio affinis</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Tripteris aghillana</i>	,	Indigenous
<b>Asteraceae</b>	<i>Felicia burkei</i>	LC , LC	Indigenous

<b>Asteraceae</b>	<i>Helichrysum paronychioides</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Hilliardiella pinifolia</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Rosenia humilis</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio inornatus</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio coronatus</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Felicia fascicularis</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Dimorphotheca zeyheri</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Dicoma anomala</i>	,	Indigenous
<b>Asteraceae</b>	<i>Gazania krebsiana</i>	,	Indigenous
<b>Asteraceae</b>	<i>Helichrysum caespititium</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio asperulus</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio consanguineus</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Helichrysum pumilio</i>	,	Indigenous
<b>Asteraceae</b>	<i>Geigeria aspera</i>	,	Indigenous
<b>Asteraceae</b>	<i>Arctotis stoechadifolia</i>	LC , LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Senecio achilleifolius</i>	LC , LC	Indigenous
<b>Asteraceae</b>	<i>Senecio radicans</i>	,	Indigenous
<b>Boraginaceae</b>	<i>Heliotropium lineare</i>	LC , LC	Indigenous
<b>Bryaceae</b>	<i>Bryum dichotomum</i>	,	Indigenous
<b>Bryaceae</b>	<i>Bryum argenteum</i>	,	Indigenous
<b>Campanulaceae</b>	<i>Wahlenbergia undulata</i>	LC , LC	Indigenous
<b>Campanulaceae</b>	<i>Wahlenbergia androsacea</i>	LC , LC	Indigenous
<b>Convolvulaceae</b>	<i>Merremia verecunda</i>	LC , LC	Indigenous
<b>Convolvulaceae</b>	<i>Ipomoea simplex</i>	LC , LC	Indigenous
<b>Convolvulaceae</b>	<i>Convolvulus sagittatus</i>	LC , LC	Indigenous
<b>Convolvulaceae</b>	<i>Seddera capensis</i>	LC , LC	Indigenous
<b>Crassulaceae</b>	<i>Crassula tabularis</i>	LC , LC	Indigenous
<b>Crassulaceae</b>	<i>Kalanchoe thyrsiflora</i>	LC , LC	Indigenous
<b>Crassulaceae</b>	<i>Crassula corallina</i>		
<b>Cucurbitaceae</b>	<i>Acanthosicyos naudinianus</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Bulbostylis hispidula</i>	,	Indigenous
<b>Cyperaceae</b>	<i>Cyperus longus</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Cyperus esculentus</i>	,	Indigenous
<b>Cyperaceae</b>	<i>Cyperus marginatus</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Cyperus usitatus</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Schoenoplectus muricinix</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Schoenoplectus corymbosus</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Cyperus semitrifidus</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Kyllinga alata</i>	LC , LC	Indigenous

<b>Cyperaceae</b>	<i>Kyllinga alba</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Cyperus difformis</i>	LC , LC	Indigenous
<b>Cyperaceae</b>	<i>Afroscirpoides dioeca</i>	,	Indigenous
<b>Cyperaceae</b>	<i>Cyperus laevigatus</i>	LC , LC	Indigenous
<b>Ebenaceae</b>	<i>Diospyros lycioides</i>	,	Indigenous
<b>Euphorbiaceae</b>	<i>Euphorbia striata</i>	LC , LC	Indigenous
<b>Euphorbiaceae</b>	<i>Euphorbia clavarioides</i>	LC , LC	Indigenous
<b>Euphorbiaceae</b>	<i>Euphorbia spartaria</i>	LC , LC	Indigenous
<b>Euphorbiaceae</b>	<i>Euphorbia inaequilatera</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Listia heterophylla</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Lessertia frutescens</i>	,	Indigenous
<b>Fabaceae</b>	<i>Argyrobium collinum</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Listia marlothii</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Indigofera torulosa</i>	,	Indigenous
<b>Fabaceae</b>	<i>Vachellia karroo</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Lessertia frutescens</i>	,	Indigenous
<b>Fabaceae</b>	<i>Bolusia acuminata</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Crotalaria burkeana</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Crotalaria sphaerocarpa</i>	,	Indigenous
<b>Fabaceae</b>	<i>Indigofera daleoides</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Tephrosia burchellii</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Indigofera alternans</i>	,	Indigenous
<b>Fabaceae</b>	<i>Lessertia prostrata</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Indigofera filipes</i>	LC , LC	Indigenous
<b>Fabaceae</b>	<i>Vachellia hebeclada</i>	,	Indigenous
<b>Fagaceae</b>	<i>Quercus acutissima</i>		
<b>Frankeniaceae</b>	<i>Frankenia pulverulenta</i>	LC , LC	Indigenous
<b>Geraniaceae</b>	<i>Pelargonium dolomiticum</i>	LC , LC	Indigenous
<b>Hyacinthaceae</b>	<i>Drimia elata</i>	LC , LC	Indigenous
<b>Iridaceae</b>	<i>Gladiolus permeabilis</i>	,	Indigenous
<b>Iridaceae</b>	<i>Gladiolus dalenii</i>	,	Indigenous
<b>Iridaceae</b>	<i>Duthiastrum linifolium</i>	LC , LC	Indigenous; Endemic
<b>Iridaceae</b>	<i>Lapeirousia plicata</i>	,	Indigenous
<b>Iridaceae</b>	<i>Babiana hypogaea</i>	LC , LC	Indigenous
<b>Iridaceae</b>	<i>Moraea pallida</i>		
<b>Juncaceae</b>	<i>Juncus rigidus</i>	LC , LC	Indigenous
<b>Lamiaceae</b>	<i>Salvia stenophylla</i>	,	Indigenous
<b>Lamiaceae</b>	<i>Stachys spathulata</i>	LC , LC	Indigenous
<b>Lobeliaceae</b>	<i>Cyphia triphylla</i>	LC , LC	Indigenous



<b>Lobeliaceae</b>	<i>Lobelia thermalis</i>	LC , LC	Indigenous
<b>Menispermaceae</b>	<i>Antizoma angustifolia</i>	LC , LC	Indigenous
<b>Myrsinaceae</b>	<i>Myrsine africana</i>	LC , LC	Indigenous
<b>Orchidaceae</b>	<i>Habenaria epipactidea</i>	LC , LC	Indigenous
<b>Orobanchaceae</b>	<i>Harveya pumila</i>	LC , LC	Indigenous
<b>Papaveraceae</b>	<i>Papaver aculeatum</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Aristida congesta</i>	,	Indigenous
<b>Poaceae</b>	<i>Setaria sphacelata</i>	,	Indigenous
<b>Poaceae</b>	<i>Cynodon transvaalensis</i>		
<b>Poaceae</b>	<i>Eragrostis trichophora</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Digitaria eriantha</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eleusine coracana</i>	,	Indigenous
<b>Poaceae</b>	<i>Eragrostis bicolor</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Themeda triandra</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eragrostis nindensis</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Aristida diffusa</i>	,	Indigenous
<b>Poaceae</b>	<i>Cymbopogon plurinodis</i>	,	Indigenous
<b>Poaceae</b>	<i>Aristida junciformis</i>	,	Indigenous
<b>Poaceae</b>	<i>Eragrostis racemosa</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Heteropogon contortus</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Brachiaria serrata</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Echinochloa holubii</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eragrostis gummiflua</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Aristida meridionalis</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Oropetium capense</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Chloris virgata</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Cynodon dactylon</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Hyparrhenia hirta</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Elionurus muticus</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eustachys paspaloides</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eragrostis × pseudobtusa</i>	NE , NE	Indigenous; Endemic
<b>Poaceae</b>	<i>Aristida stipitata</i>	,	Indigenous
<b>Poaceae</b>	<i>Aristida adscensionis</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Fingerhuthia africana</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eragrostis micrantha</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Panicum stapfianum</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Eleusine indica</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Dactyloctenium aegyptium</i>	LC , LC	Indigenous
<b>Poaceae</b>	<i>Setaria pumila</i>	LC , LC	Indigenous

Poaceae	<i>Eragrostis lappula</i>	LC , LC	Indigenous
Poaceae	<i>Aristida congesta</i>	,	Indigenous
Poaceae	<i>Eragrostis biflora</i>	LC , LC	Indigenous
Poaceae	<i>Panicum schinzii</i>	LC , LC	Indigenous
Poaceae	<i>Eragrostis lehmanniana</i>	,	Indigenous
Poaceae	<i>Echinochloa crus-galli</i>	LC , LC	Indigenous
Poaceae	<i>Eragrostis curvula</i>	LC , LC	Indigenous
Poaceae	<i>Cymbopogon pospischilii</i>	NE , NE	Indigenous
Poaceae	<i>Tragus koelerioides</i>	LC , LC	Indigenous
Poaceae	<i>Anthephora pubescens</i>	LC , LC	Indigenous
Poaceae	<i>Triraphis andropogonoides</i>		
Poaceae	<i>Eragrostis superba</i>	LC , LC	Indigenous
Poaceae	<i>Eragrostis stapfii</i>	LC , LC	Indigenous
Poaceae	<i>Sporobolus ioclados</i>	LC , LC	Indigenous
Poaceae	<i>Aristida canescens</i>	,	Indigenous
Poaceae	<i>Tragus berteronianus</i>	LC , LC	Indigenous
Poaceae	<i>Panicum coloratum</i>	LC , LC	Indigenous
Poaceae	<i>Sporobolus fimbriatus</i>	LC , LC	Indigenous
Poaceae	<i>Tragus racemosus</i>	LC , LC	Indigenous
Poaceae	<i>Brachiaria nigropedata</i>	LC , LC	Indigenous
Poaceae	<i>Setaria sphacelata</i>	,	Indigenous
Poaceae	<i>Microchloa caffra</i>	LC , LC	Indigenous
Poaceae	<i>Brachiaria eruciformis</i>	LC , LC	Indigenous
Poaceae	<i>Tarigidia aequiglumis</i>	LC , LC	Indigenous
Poaceae	<i>Leptochloa fusca</i>	LC , LC	Indigenous
Poaceae	<i>Digitaria tricholaenoides</i>	LC , LC	Indigenous
Poaceae	<i>Eragrostis obtusa</i>	LC , LC	Indigenous
Poaceae	<i>Urochloa panicoides</i>	LC , LC	Indigenous
Poaceae	<i>Stipagrostis uniplumis</i>	,	Indigenous
Polygalaceae	<i>Polygala hottentotta</i>	LC , LC	Indigenous
Polygonaceae	<i>Rumex lanceolatus</i>	LC , LC	Indigenous
Portulacaceae	<i>Portulaca quadrifida</i>	LC , LC	Indigenous
Portulacaceae	<i>Portulaca hereroensis</i>		
Potamogetonaceae	<i>Potamogeton pectinatus</i>	LC , LC	Indigenous
Pottiaceae	<i>Trichostomum brachydontium</i>	,	Indigenous
Ranunculaceae	<i>Ranunculus trichophyllus</i>	LC , LC	Indigenous
Ricciaceae	<i>Riccia albolimbata</i>	,	Indigenous
Ricciaceae	<i>Riccia albovestita</i>	,	Indigenous
Ricciaceae	<i>Riccia simii</i>	,	Indigenous

<b>Ricciaceae</b>	<i>Riccia angolensis</i>	,	Indigenous
<b>Rubiaceae</b>	<i>Oldenlandia herbacea</i>	,	Indigenous
<b>Rubiaceae</b>	<i>Nenax microphylla</i>	LC , LC	Indigenous
<b>Santalaceae</b>	<i>Viscum rotundifolium</i>	LC , LC	Indigenous
<b>Scrophulariaceae</b>	<i>Manulea parviflora</i>	,	Indigenous
<b>Scrophulariaceae</b>	<i>Chaenostoma neglectum</i>	LC , LC	Indigenous
<b>Scrophulariaceae</b>	<i>Chaenostoma patrioticum</i>	LC , LC	Indigenous
<b>Scrophulariaceae</b>	<i>Buddleja saligna</i>	LC , LC	Indigenous
<b>Scrophulariaceae</b>	<i>Jamesbrittenia aurantiaca</i>	LC , LC	Indigenous
<b>Scrophulariaceae</b>	<i>Gomphostigma virgatum</i>	LC , LC	Indigenous
<b>Scrophulariaceae</b>	<i>Nemesia fruticans</i>	LC , LC	Indigenous
<b>Solanaceae</b>	<i>Lycium arenicola</i>	LC , LC	Indigenous
<b>Solanaceae</b>	<i>Lycium hirsutum</i>	LC , LC	Indigenous
<b>Solanaceae</b>	<i>Lycium horridum</i>	LC , LC	Indigenous
<b>Solanaceae</b>	<i>Solanum campylacanthum</i>	,	Indigenous
<b>Solanaceae</b>	<i>Lycium cinereum</i>	LC , LC	Indigenous
<b>Tamaricaceae</b>	<i>Tamarix chinensis</i>		
<b>Verbenaceae</b>	<i>Chascanum pinnatifidum</i>	,	Indigenous
<b>Xyridaceae</b>	<i>Xyris gerrardii</i>	LC , LC	Indigenous
<b>Zygophyllaceae</b>	<i>Tribulus terrestris</i>	LC , LC	Indigenous

### 7.3.2 Expected Mammal Species

Family	Scientific name	Common name	SANBI, IUCN
Bovidae	<i>Tragelaphus strepsiceros</i>	Southern Greater Kudu	LC, LC
Bovidae	<i>Sylvicapra grimmia</i>	Grey common duiker	LC, LC
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Southern vervet monkey	LC, LC
Cercopithecidae	<i>Papio ursinus</i>	Chacma baboon	LC, LC
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	LC, LC
Herpestidae	<i>Cynictis penicillata</i>	Southern Yellow Mongoose	LC, LC
Herpestidae	<i>Herpestes sanguineus</i>	Common slender mongoose	LC, LC
Leporidae	<i>Lepus saxatilis</i>	Scrub hare	LC, LC
Mustelidae	<i>Aonyx capensis</i>	Cape clawless otter	NT, NT
Sciuridae	<i>Xerus inauris</i>	South African Ground Squirrel	LC, LC
Suidae	<i>Phacochoerus africanus</i>	Southern warthog	LC, LC

### 7.3.3 Expected Reptile Species

Family	Scientific name	Common name	SANBI, IUCN
Agamidae	<i>Agama atra</i>	Southern Rock agama	LC, LC
Colubridae	<i>Dasypeltis scabra</i>	Egg eating snake	LC, LC
Colubridae	<i>Duberria lutrix</i>	Common slug eater	LC, LC
Elapidae	<i>Hemachatus haemachatus</i>	Rinkhals	LC, LC
Gekkonidae	<i>Lygodactylus capensis</i>	Common dwarf gecko	LC, LC
Gekkonidae	<i>Pachydactylus capensis</i>	Cape Thick-toed gecko	LC, LC
Lamprophiidae	<i>Pseudaspis cana</i>	Mole snake	LC, LC
Lamprophiidae	<i>Boaedon capensis</i>	Cape house snake	LC, LC
Lamprophiidae	<i>Psammophylax rhombeatus</i>	Rhombic skaapsteker	LC, LC
Pelomedusidae	<i>Pelomedusa galeata</i>	Cape Terrapin	LC, LC
Scincidae	<i>Trachylepsis punctatissima</i>	Speckled rock skink	LC, LC
Scincidae	<i>Panaspis wahlbergii</i>	Wahlberg's snake-eyed skink	LC, LC
Testudinidae	<i>Stigmochelys pardalis</i>	Leopard Tortoise	LC, LC
Typhlopidae	<i>Afrotyphlops bibronii</i>	Bibron's blind snake	LC, LC

### 7.3.4 Expected Amphibian Species

Family	Scientific name	Common name	SANBI, IUCN
Bufonidae	<i>Sclerophrys capensis</i>	Raucous toad	LC, LC
Hyperoliidae	<i>Kassina senegalensis</i>	Senegal Running Frog	LC, LC
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Boettger's Dainty frog	LC, LC
Pyxicephalidae	<i>Amietia delalandii</i>	Common River frog	LC, LC
Pyxicephalidae	<i>Pyxicephalus adspersus</i>	Giant African Bullfrog	NT, LC



### 7.3.5 Expected Avifauna Species

Family Name	Scientific Name	Common Name	Regional	Global
Accipitridae	<i>Haliaeetus vocifer</i>	African Fish Eagle		
Accipitridae	<i>Polyboroides typus</i>	African Harrier-hawk		
Accipitridae	<i>Circus ranivorus</i>	African Marsh Harrier	VU	LC
Accipitridae	<i>Milvus migrans</i>	Black Kite		
Accipitridae	<i>Accipiter melanoleucus</i>	Black Sparrowhawk		
Accipitridae	<i>Circaetus pectoralis</i>	Black-chested Snake Eagle		
Accipitridae	<i>Elanus caeruleus</i>	Black-winged Kite	NT	LC
Accipitridae	<i>Hieraaetus pennatus</i>	Booted Eagle		
Accipitridae	<i>Buteo buteo</i>	Common Buzzard		
Accipitridae	<i>Pernis apivorus</i>	European Honey Buzzard		
Accipitridae	<i>Micronisus gabar</i>	Gabar Goshawk		
Accipitridae	<i>Buteo rufofuscus</i>	Jackal Buzzard		
Accipitridae	<i>Polemaetus bellicosus</i>	Martial Eagle	EN	EN
Accipitridae	<i>Melierax canorus</i>	Pale Chanting Goshawk		
Accipitridae	<i>Aquila rapax</i>	Tawny Eagle	EN	VU
Accipitridae	<i>Milvus aegyptius</i>	Yellow-billed Kite		
Acrocephalidae	<i>Acrocephalus baeticatus</i>	Common Reed Warbler		
Acrocephalidae	<i>Acrocephalus arundinaceus</i>	Great Reed Warbler		
Acrocephalidae	<i>Hippolais icterina</i>	Icterine Warbler		
Acrocephalidae	<i>Acrocephalus gracilirostris</i>	Lesser Swamp Warbler		
Acrocephalidae	<i>Acrocephalus palustris</i>	Marsh Warbler		
Acrocephalidae	<i>Acrocephalus schoenobaenus</i>	Sedge Warbler		
Alaudidae	<i>Eremopterix leucotis</i>	Chestnut-backed Sparrow-lark		
Alaudidae	<i>Mirafra fasciolata</i>	Eastern Clapper Lark		
Alaudidae	<i>Certhilauda semitorquata</i>	Eastern Long-billed Lark		
Alaudidae	<i>Eremopterix verticalis</i>	Grey-backed Sparrow-lark		
Alaudidae	<i>Mirafra cheniana</i>	Melodious Lark	NT	LC
Alaudidae	<i>Spizocorys conirostris</i>	Pink-billed Lark		
Alaudidae	<i>Calandrella cinerea</i>	Red-capped Lark		
Alaudidae	<i>Mirafra africana</i>	Rufous-naped Lark		
Alaudidae	<i>Calendulauda sabota</i>	Sabota Lark		
Alaudidae	<i>Chersomanes albobasciata</i>	Spike-heeled Lark		
Alcedinidae	<i>Halcyon albiventris</i>	Brown-hooded Kingfisher		
Alcedinidae	<i>Megaceryle maxima</i>	Giant Kingfisher		
Alcedinidae	<i>Corythornis cristatus</i>	Malachite Kingfisher		
Alcedinidae	<i>Ceryle rudis</i>	Pied Kingfisher		
Anatidae	<i>Anas sparsa</i>	African Black Duck		
Anatidae	<i>Spatula hottentota</i>	Blue-billed Teal		
Anatidae	<i>Spatula smithii</i>	Cape Shoveler	NT	LC
Anatidae	<i>Anas capensis</i>	Cape Teal		
Anatidae	<i>Alopochen aegyptiaca</i>	Egyptian Goose		
Anatidae	<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck	NT	LC

Anatidae	<i>Sarkidiornis melanotos</i>	Knob-billed Duck	NT	LC
Anatidae	<i>Oxyura maccoa</i>	Maccoa Duck	VU	EN
Anatidae	<i>Anas erythrorhyncha</i>	Red-billed Teal	NT	LC
Anatidae	<i>Tadorna cana</i>	South African Shelduck		
Anatidae	<i>Netta erythrophthalma</i>	Southern Pochard	NT	LC
Anatidae	<i>Plectropterus gambensis</i>	Spur-winged Goose		
Anatidae	<i>Thalassornis leuconotus</i>	White-backed Duck	NT	LC
Anatidae	<i>Dendrocygna viduata</i>	White-faced Whistling Duck		
Anatidae	<i>Anas undulata</i>	Yellow-billed Duck	NT	LC
Anhingidae	<i>Anhinga rufa</i>	African Darter	NT	LC
Apodidae	<i>Apus barbatus</i>	African Black Swift		
Apodidae	<i>Cypsiurus parvus</i>	African Palm Swift		
Apodidae	<i>Tachymarpis melba</i>	Alpine Swift		
Apodidae	<i>Apus apus</i>	Common Swift		
Apodidae	<i>Apus horus</i>	Horus Swift		
Apodidae	<i>Apus affinis</i>	Little Swift		
Apodidae	<i>Apus caffer</i>	White-rumped Swift		
Ardeidae	<i>Egretta ardesiaca</i>	Black Heron		
Ardeidae	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	NT	LC
Ardeidae	<i>Ardea melanocephala</i>	Black-headed Heron		
Ardeidae	<i>Ardea goliath</i>	Goliath Heron		
Ardeidae	<i>Ardea alba</i>	Great Egret	NT	LC
Ardeidae	<i>Ardea cinerea</i>	Grey Heron		
Ardeidae	<i>Ixobrychus minutus</i>	Little Bittern		
Ardeidae	<i>Egretta garzetta</i>	Little Egret		
Ardeidae	<i>Ardea purpurea</i>	Purple Heron		
Ardeidae	<i>Ardeola ralloides</i>	Squacco Heron		
Ardeidae	<i>Butorides striata</i>	Striated Heron		
Ardeidae	<i>Bubulcus ibis</i>	Western Cattle Egret		
Ardeidae	<i>Ardea brachyrhyncha</i>	Yellow-billed Egret	NT	LC
Burhinidae	<i>Burhinus capensis</i>	Spotted Thick-knee		
Caprimulgidae	<i>Caprimulgus rufigena</i>	Rufous-cheeked Nightjar		
Charadriidae	<i>Vanellus armatus</i>	Blacksmith Lapwing		
Charadriidae	<i>Charadrius pallidus</i>	Chestnut-banded Plover	VU	LC
Charadriidae	<i>Charadrius hiaticula</i>	Common Ringed Plover		
Charadriidae	<i>Vanellus coronatus</i>	Crowned Lapwing		
Charadriidae	<i>Pluvialis squatarola</i>	Grey Plover	NT	VU
Charadriidae	<i>Charadrius pecuarius</i>	Kittlitz's Plover	NT	LC
Charadriidae	<i>Charadrius tricollaris</i>	Three-banded Plover		
Ciconiidae	<i>Ciconia abdimii</i>	Abdim's Stork		
Ciconiidae	<i>Anastomus lamelligerus</i>	African Openbill		
Ciconiidae	<i>Ciconia nigra</i>	Black Stork	EN	LC
Ciconiidae	<i>Mycteria ibis</i>	Yellow-billed Stork	VU	LC
Cisticolidae	<i>Apalis thoracica</i>	Bar-throated Apalis		

## Motuoane Exploration Right 386

<b>Cisticolidae</b>	<i>Prinia flavicans</i>	Black-chested Prinia		
<b>Cisticolidae</b>	<i>Cisticola textrix</i>	Cloud Cisticola		
<b>Cisticolidae</b>	<i>Cisticola aridulus</i>	Desert Cisticola		
<b>Cisticolidae</b>	<i>Cisticola tinniens</i>	Levaillant's Cisticola		
<b>Cisticolidae</b>	<i>Cisticola fulvicapilla</i>	Neddicky		
<b>Cisticolidae</b>	<i>Cisticola chiniana</i>	Rattling Cisticola		
<b>Cisticolidae</b>	<i>Malcorus pectoralis</i>	Rufous-eared Warbler		
<b>Cisticolidae</b>	<i>Cisticola ayresii</i>	Wing-snapping Cisticola		
<b>Cisticolidae</b>	<i>Eremomela icteropygialis</i>	Yellow-bellied Eremomela		
<b>Cisticolidae</b>	<i>Cisticola juncidis</i>	Zitting Cisticola		
<b>Coliidae</b>	<i>Urocolius indicus</i>	Red-faced Mousebird		
<b>Coliidae</b>	<i>Colius striatus</i>	Speckled Mousebird		
<b>Coliidae</b>	<i>Colius colius</i>	White-backed Mousebird		
<b>Columbidae</b>	<i>Spilopelia senegalensis</i>	Laughing Dove		
<b>Columbidae</b>	<i>Oena capensis</i>	Namaqua Dove		
<b>Columbidae</b>	<i>Streptopelia semitorquata</i>	Red-eyed Dove		
<b>Columbidae</b>	<i>Streptopelia capicola</i>	Ring-necked Dove		
<b>Columbidae</b>	<i>Columba livia</i>	Rock Dove		
<b>Columbidae</b>	<i>Columba guinea</i>	Speckled Pigeon		
<b>Coraciidae</b>	<i>Coracias garrulus</i>	European Roller	NT	LC
<b>Coraciidae</b>	<i>Coracias caudatus</i>	Lilac-breasted Roller		
<b>Corvidae</b>	<i>Corvus albus</i>	Pied Crow		
<b>Cuculidae</b>	<i>Centropus burchellii</i>	Burchell's Coucal		
<b>Cuculidae</b>	<i>Cuculus canorus</i>	Common Cuckoo		
<b>Cuculidae</b>	<i>Chrysococcyx caprius</i>	Diederik Cuckoo		
<b>Cuculidae</b>	<i>Clamator glandarius</i>	Great Spotted Cuckoo		
<b>Cuculidae</b>	<i>Clamator jacobinus</i>	Jacobin Cuckoo		
<b>Cuculidae</b>	<i>Chrysococcyx klaas</i>	Klaas's Cuckoo		
<b>Cuculidae</b>	<i>Cuculus solitarius</i>	Red-chested Cuckoo		
<b>Emberizidae</b>	<i>Emberiza capensis</i>	Cape Bunting		
<b>Emberizidae</b>	<i>Emberiza tahapisi</i>	Cinnamon-breasted Bunting		
<b>Emberizidae</b>	<i>Emberiza flaviventris</i>	Golden-breasted Bunting		
<b>Emberizidae</b>	<i>Emberiza impetuari</i>	Lark-like Bunting		
<b>Estrildidae</b>	<i>Lagonosticta rhodopareia</i>	Jameson's Firefinch		
<b>Estrildidae</b>	<i>Lagonosticta senegala</i>	Red-billed Firefinch		
<b>Estrildidae</b>	<i>Amadina erythrocephala</i>	Red-headed Finch		
<b>Estrildidae</b>	<i>Brunhilda erythronotos</i>	Black-faced Waxbill		
<b>Estrildidae</b>	<i>Uraeginthus angolensis</i>	Blue Waxbill		
<b>Estrildidae</b>	<i>Spermestes cucullata</i>	Bronze Mannikin		
<b>Estrildidae</b>	<i>Estrilda astrild</i>	Common Waxbill		
<b>Estrildidae</b>	<i>Pytilia melba</i>	Green-winged Pytilia		
<b>Estrildidae</b>	<i>Amandava subflava</i>	Orange-breasted Waxbill		
<b>Estrildidae</b>	<i>Ortygospiza atricollis</i>	Quailfinch		
<b>Estrildidae</b>	<i>Granatina granatina</i>	Violet-eared Waxbill		

## Motuoane Exploration Right 386

<b>Falconidae</b>	<i>Falco amurensis</i>	Amur Falcon		
<b>Falconidae</b>	<i>Falco rupicoloides</i>	Greater Kestrel		
<b>Falconidae</b>	<i>Falco biarmicus</i>	Lanner Falcon	NT	LC
<b>Falconidae</b>	<i>Falco naumanni</i>	Lesser Kestrel	VU	LC
<b>Falconidae</b>	<i>Falco peregrinus</i>	Peregrine Falcon		
<b>Falconidae</b>	<i>Falco vespertinus</i>	Red-footed Falcon	VU	VU
<b>Falconidae</b>	<i>Falco rupicolus</i>	Rock Kestrel		
<b>Fringillidae</b>	<i>Crithagra atrogularis</i>	Black-throated Canary		
<b>Fringillidae</b>	<i>Serinus canicollis</i>	Cape Canary		
<b>Fringillidae</b>	<i>Crithagra albogularis</i>	White-throated Canary		
<b>Fringillidae</b>	<i>Crithagra flaviventris</i>	Yellow Canary		
<b>Glareolidae</b>	<i>Glareola nordmanni</i>	Black-winged Pratincole	LC	NT
<b>Glareolidae</b>	<i>Rhinoptilus africanus</i>	Double-banded Courser		
<b>Glareolidae</b>	<i>Cursorius temminckii</i>	Temminck's Courser		
<b>Hirundinidae</b>	<i>Neophedina cincta</i>	Banded Martin		
<b>Hirundinidae</b>	<i>Hirundo rustica</i>	Barn Swallow		
<b>Hirundinidae</b>	<i>Riparia paludicola</i>	Brown-throated Martin		
<b>Hirundinidae</b>	<i>Delichon urbicum</i>	Common House Martin		
<b>Hirundinidae</b>	<i>Cecropis cucullata</i>	Greater Striped Swallow		
<b>Hirundinidae</b>	<i>Ptyonoprogne fuligula</i>	Large Rock Martin		
<b>Hirundinidae</b>	<i>Hirundo dimidiata</i>	Pearl-breasted Swallow		
<b>Hirundinidae</b>	<i>Cecropis semirufa</i>	Red-breasted Swallow		
<b>Hirundinidae</b>	<i>Petrochelidon spilodera</i>	South African Cliff Swallow		
<b>Hirundinidae</b>	<i>Hirundo albigularis</i>	White-throated Swallow		
<b>Indicatoridae</b>	<i>Indicator indicator</i>	Greater Honeyguide		
<b>Indicatoridae</b>	<i>Indicator minor</i>	Lesser Honeyguide		
<b>Jacanidae</b>	<i>Actophilornis africanus</i>	African Jacana		
<b>Laniidae</b>	<i>Lanius minor</i>	Lesser Grey Shrike		
<b>Laniidae</b>	<i>Lanius collurio</i>	Red-backed Shrike		
<b>Laniidae</b>	<i>Lanius collaris</i>	Southern Fiscal		
<b>Laridae</b>	<i>Hydropogon caspia</i>	Caspian Tern	VU	LC
<b>Laridae</b>	<i>Chroicocephalus cirrocephalus</i>	Grey-headed Gull		
<b>Laridae</b>	<i>Larus dominicanus</i>	Kelp Gull		
<b>Laridae</b>	<i>Chlidonias hybrida</i>	Whiskered Tern		
<b>Laridae</b>	<i>Chlidonias leucopterus</i>	White-winged Tern		
<b>Locustellidae</b>	<i>Bradypterus baboecala</i>	Little Rush Warbler		
<b>Lybiidae</b>	<i>Tricholaema leucomelas</i>	Acacia Pied Barbet		
<b>Lybiidae</b>	<i>Lybius torquatus</i>	Black-collared Barbet		
<b>Lybiidae</b>	<i>Trachyphonus vaillantii</i>	Crested Barbet		
<b>Macrosphenidae</b>	<i>Sylvietta rufescens</i>	Long-billed Crombec		
<b>Malaconotidae</b>	<i>Telophorus zeylonus</i>	Bokmakierie		
<b>Malaconotidae</b>	<i>Tchagra australis</i>	Brown-crowned Tchagra		
<b>Malaconotidae</b>	<i>Nilais afer</i>	Brubru		
<b>Malaconotidae</b>	<i>Laniarius atrococcineus</i>	Crimson-breasted Shrike		



## Motuoane Exploration Right 386

<b>Meropidae</b>	<i>Merops apiaster</i>	European Bee-eater		
<b>Meropidae</b>	<i>Merops pusillus</i>	Little Bee-eater		
<b>Meropidae</b>	<i>Merops hirundineus</i>	Swallow-tailed Bee-eater		
<b>Meropidae</b>	<i>Merops bullockoides</i>	White-fronted Bee-eater		
<b>Monarchidae</b>	<i>Terpsiphone viridis</i>	African Paradise Flycatcher		
<b>Motacillidae</b>	<i>Motacilla aguimp</i>	African Pied Wagtail		
<b>Motacillidae</b>	<i>Anthus cinnamomeus</i>	African Pipit		
<b>Motacillidae</b>	<i>Anthus vaalensis</i>	Buffy Pipit		
<b>Motacillidae</b>	<i>Macronyx capensis</i>	Cape Longclaw		
<b>Motacillidae</b>	<i>Motacilla capensis</i>	Cape Wagtail		
<b>Motacillidae</b>	<i>Anthus nicholsoni</i>	Nicholson's Pipit		
<b>Motacillidae</b>	<i>Anthus leucophrys</i>	Plain-backed Pipit		
<b>Muscicapidae</b>	<i>Saxicola torquatus</i>	African Stonechat		
<b>Muscicapidae</b>	<i>Myrmecocichla formicivora</i>	Ant-eating Chat		
<b>Muscicapidae</b>	<i>Cossypha caffra</i>	Cape Robin-chat		
<b>Muscicapidae</b>	<i>Oenanthe pileata</i>	Capped Wheatear		
<b>Muscicapidae</b>	<i>Stenostira scita</i>	Fairy Flycatcher		
<b>Muscicapidae</b>	<i>Oenanthe familiaris</i>	Familiar Chat		
<b>Muscicapidae</b>	<i>Melaenornis silens</i>	Fiscal Flycatcher		
<b>Muscicapidae</b>	<i>Cercotrichas paena</i>	Kalahari Scrub Robin		
<b>Muscicapidae</b>	<i>Cercotrichas coryphoeus</i>	Karoo Scrub Robin		
<b>Muscicapidae</b>	<i>Thamnolaea cinnamomeiventris</i>	Mocking Cliff Chat		
<b>Muscicapidae</b>	<i>Myrmecocichla monticola</i>	Mountain Wheatear		
<b>Muscicapidae</b>	<i>Emarginata sinuata</i>	Sickle-winged Chat		
<b>Muscicapidae</b>	<i>Muscicapa striata</i>	Spotted Flycatcher		
<b>Nectariniidae</b>	<i>Chalcomitra amethystina</i>	Amethyst Sunbird		
<b>Nectariniidae</b>	<i>Cinnyris talatala</i>	White-bellied Sunbird		
<b>Numididae</b>	<i>Numida meleagris</i>	Helmeted Guinea fowl		
<b>Otididae</b>	<i>Eupodotis caerulea</i>	Blue Korhaan	VU	NT
<b>Otididae</b>	<i>Afrotis afraoides</i>	Northern Black Korhaan		
<b>Paridae</b>	<i>Melaniparus cinerascens</i>	Ashy Tit		
<b>Passeridae</b>	<i>Passer melanurus</i>	Cape Sparrow		
<b>Passeridae</b>	<i>Passer domesticus</i>	House Sparrow		
<b>Passeridae</b>	<i>Passer diffusus</i>	Southern Grey-headed Sparrow		
<b>Phalacrocoracidae</b>	<i>Microcarbo africanus</i>	Reed Cormorant		
<b>Phalacrocoracidae</b>	<i>Phalacrocorax lucidus</i>	White-breasted Cormorant		
<b>Phasianidae</b>	<i>Coturnix coturnix</i>	Common Quail		
<b>Phasianidae</b>	<i>Pavo cristatus</i>	Indian Peafowl		
<b>Phasianidae</b>	<i>Pternistis natalensis</i>	Natal Spurfowl		
<b>Phasianidae</b>	<i>Scleroptila gutturalis</i>	Orange River Francolin		
<b>Phasianidae</b>	<i>Pternistis swainsonii</i>	Swainson's Spurfowl		
<b>Phoenicopteridae</b>	<i>Phoenicopterus roseus</i>	Greater Flamingo	NT	LC
<b>Phoenicopteridae</b>	<i>Phoeniconaias minor</i>	Lesser Flamingo	VU	NT
<b>Phoeniculidae</b>	<i>Rhinopomastus cyanomelas</i>	Common Scimitarbill		

<b>Phoeniculidae</b>	<i>Phoeniculus purpureus</i>	Green Wood Hoopoe		
<b>Phylloscopidae</b>	<i>Phylloscopus trochilus</i>	Willow Warbler		
<b>Picidae</b>	<i>Dendropicos fuscescens</i>	Cardinal Woodpecker		
<b>Picidae</b>	<i>Campethera abingoni</i>	Golden-tailed Woodpecker		
<b>Picidae</b>	<i>Jynx ruficollis</i>	Red-throated Wryneck		
<b>Platysteiridae</b>	<i>Batis pririt</i>	Pirit Batis		
<b>Ploceidae</b>	<i>Ploceus capensis</i>	Cape Weaver		
<b>Ploceidae</b>	<i>Euplectes progne</i>	Long-tailed Widowbird		
<b>Ploceidae</b>	<i>Quelea quelea</i>	Red-billed Quelea		
<b>Ploceidae</b>	<i>Euplectes ardens</i>	Red-collared Widowbird		
<b>Ploceidae</b>	<i>Sporopipes squamifrons</i>	Scaly-feathered Weaver		
<b>Ploceidae</b>	<i>Ploceus velatus</i>	Southern Masked Weaver		
<b>Ploceidae</b>	<i>Euplectes orix</i>	Southern Red Bishop		
<b>Ploceidae</b>	<i>Ploceus cucullatus</i>	Village Weaver		
<b>Ploceidae</b>	<i>Plocepasser mahali</i>	White-browed Sparrow-weaver		
<b>Ploceidae</b>	<i>Euplectes albonotatus</i>	White-winged Widowbird		
<b>Ploceidae</b>	<i>Euplectes afer</i>	Yellow-crowned Bishop		
<b>Podicipedidae</b>	<i>Podiceps nigricollis</i>	Black-necked Grebe		
<b>Podicipedidae</b>	<i>Podiceps cristatus</i>	Great Crested Grebe	VU	LC
<b>Podicipedidae</b>	<i>Tachybaptus ruficollis</i>	Little Grebe		
<b>Pteroclididae</b>	<i>Pterocles namaqua</i>	Namaqua Sandgrouse		
<b>Pycnonotidae</b>	<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul		
<b>Pycnonotidae</b>	<i>Tringa nebularia</i>	Common Greenshank		
<b>Rallidae</b>	<i>Crecopsis egregia</i>	African Crake		
<b>Rallidae</b>	<i>Rallus caerulescens</i>	African Rail		
<b>Rallidae</b>	<i>Porphyrio madagascariensis</i>	African Swamphe		
<b>Rallidae</b>	<i>Zapornia flavirostra</i>	Black Crake		
<b>Rallidae</b>	<i>Gallinula chloropus</i>	Common Moorhen		
<b>Rallidae</b>	<i>Fulica cristata</i>	Red-knobbed Coot		
<b>Recurvirostridae</b>	<i>Himantopus himantopus</i>	Black-winged Stilt		
<b>Recurvirostridae</b>	<i>Recurvirostra avosetta</i>	Pied Avocet		
<b>Remizidae</b>	<i>Anthoscopus minutus</i>	Cape Penduline Tit		
<b>Rostratulidae</b>	<i>Rostratula benghalensis</i>	Greater Painted-snipe		
<b>Sagittariidae</b>	<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN
<b>Scolopacidae</b>	<i>Gallinago nigripennis</i>	African Snipe		
<b>Scolopacidae</b>	<i>Actitis hypoleucos</i>	Common Sandpiper		
<b>Scolopacidae</b>	<i>Calidris ferruginea</i>	Curlew Sandpiper	VU	VU
<b>Scolopacidae</b>	<i>Calidris minuta</i>	Little Stint		
<b>Scolopacidae</b>	<i>Tringa stagnatilis</i>	Marsh Sandpiper		
<b>Scolopacidae</b>	<i>Calidris pugnax</i>	Ruff		
<b>Scolopacidae</b>	<i>Tringa glareola</i>	Wood Sandpiper		
<b>Scopidae</b>	<i>Scopus umbretta</i>	Hamerkop	NT	LC
<b>Strigidae</b>	<i>Asio capensis</i>	Marsh Owl	NT	LC
<b>Strigidae</b>	<i>Bubo africanus</i>	Spotted Eagle Owl		

## Motuoane Exploration Right 386

<b>Strigidae</b>	<i>Tyto alba</i>	Western Barn Owl		
<b>Struthionidae</b>	<i>Struthio camelus</i>	Common Ostrich		
<b>Sturnidae</b>	<i>Lamprotornis nitens</i>	Cape Starling		
<b>Sturnidae</b>	<i>Acridotheres tristis</i>	Common Myna		
<b>Sturnidae</b>	<i>Sturnus vulgaris</i>	Common Starling		
<b>Sturnidae</b>	<i>Lamprotornis bicolor</i>	Pied Starling		
<b>Sturnidae</b>	<i>Onychognathus morio</i>	Red-winged Starling		
<b>Sturnidae</b>	<i>Creatophora cinerea</i>	Wattled Starling		
<b>Sylviidae</b>	<i>Curruca subcoerulea</i>	Chestnut-vented Warbler		
<b>Sylviidae</b>	<i>Sylvia borin</i>	Garden Warbler		
<b>Threskiornithidae</b>	<i>Threskiornis aethiopicus</i>	African Sacred Ibis		
<b>Threskiornithidae</b>	<i>Platalea alba</i>	African Spoonbill		
<b>Threskiornithidae</b>	<i>Plegadis falcinellus</i>	Glossy Ibis		
<b>Threskiornithidae</b>	<i>Bostrychia hagedash</i>	Hadada Ibis		
<b>Threskiornithidae</b>	<i>Geronticus calvus</i>	Southern Bald Ibis	NT	NT
<b>Turdidae</b>	<i>Turdus smithi</i>	Karoo Thrush		
<b>Turnicidae</b>	<i>Turnix sylvaticus</i>	Common Buttonquail		
<b>Upupidae</b>	<i>Upupa africana</i>	African Hoopoe		
<b>Viduidae</b>	<i>Vidua paradisaea</i>	Long-tailed Paradise Whydah		
<b>Viduidae</b>	<i>Vidua macroura</i>	Pin-tailed Whydah		
<b>Viduidae</b>	<i>Vidua regia</i>	Shaft-tailed Whydah		
<b>Viduidae</b>	<i>Vidua chalybeata</i>	Village Indigobird		
<b>Zosteropidae</b>	<i>Zosterops virens</i>	Cape White-eye		
<b>Zosteropidae</b>	<i>Zosterops pallidus</i>	Orange River White-eye		

#### **7.4 Appendix D: Specialist Declaration of Independence**

I, Marnus Erasmus, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Marnus Erasmus

Ecologist

The Biodiversity Company

April 2026



## 7.5 Appendix E: Specialist CVs

# Martinus ERASMUS

Pr. Sci. Nat. 118630/17    +27 82 448 1667    [martinus@thebiodiversitycompany.com](mailto:martinus@thebiodiversitycompany.com)



### PROFILE SUMMARY

Environmental and Ecological Specialist with 11 years of consulting experience, including international assignments. Demonstrated expertise across project exploration, mining, engineering, hydropower, renewable energy, and private sector development. Skilled in delivering specialist guidance, technical support, and facilitation to ensure compliance with both local legislative requirements and international lender standards. Registered as a Professional Natural Scientist (Pr Sci Nat) with the South African Council for Natural Scientific Professions.

### PERSONAL INFO

Nationality: South African  
Date of birth: 03 September 1992

### EXPERIENCE

Lender reporting requirements  
Environmental, Social and Health Impact Assessments (ESHIA)  
Environmental Management Programmes (EMP)  
Ecology  
Unit Management

### SKILLS

- ✓ Biodiversity Assessment
- ✓ Rehabilitation
- ✓ Monitoring & Management Plans
- ✓ GIS spatial analysis and digital cartography
- ✓ Grazing and Fire Management
- ✓ Critical Habitat Assessments

### ACADEMIC QUALIFICATIONS

B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa  
  
National Diploma in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.

### PROFESSIONAL EXPERIENCE


Aug 2017 – Present	<b>The Biodiversity Company</b> Terrestrial Ecologist / Manager
Jan 2015 – July 2017	<b>Enviro-Insight</b> General and Field assistant

### INTERNATIONAL EXPERIENCE

Botswana, Eswatini, Guinea, Lesotho, Liberia, Mauritius, Mozambique, Nigeria, South Africa  
Zambia, Zimbabwe

### LANGUAGES

English – Proficient  
Afrikaans – Proficient



Signed: Martinus Erasmus

