



TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED TETRA4 PRODUCTION RIGHT EXTENSION

**Matjhabeng and Masilonyana Local Municipalities,
Free State Province, South Africa**

14/06/2024

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com





Report Name	TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED TETRA4 PRODUCTION RIGHT EXTENSION	
Specialist Theme	Terrestrial Biodiversity	
Project Reference	Tetra4 Production Right Extension	
Report Version	Draft 1 / 14/06/2024	
Environmental Assessment Practitioner		
Fieldwork & Report Writer	Sarah Newman (Cand. Sci. Nat. 158474)	
Reviewer	Leigh-Ann de Wet (SACNASP 400233/12)	
Reviewer	Andrew Husted (SACNASP 400213/11)	
Declaration	<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.....	8
1.1	Background	8
1.2	Project Description	10
1.3	Scope of Work.....	10
1.4	Assumptions and Limitations	10
1.5	Key Legislative Requirements.....	11
2	Fieldwork	11
2.1	Biodiversity Field Assessment	11
3	Results & Discussion	13
3.1	Desktop Assessment	13
3.1.1	Ecologically Important Landscape Features	13
3.1.2	Flora Assessment.....	25
3.1.3	Fauna Assessment.....	29
3.2	Fieldwork Findings	33
3.2.1	Flora Assessment.....	33
3.2.2	Fauna Assessment.....	38
3.3	Habitat Assessment	41
3.4	Site Ecological Importance.....	49
3.4.1	Desktop Ecological Sensitivity	53
3.4.2	Screening Tool Comparison.....	57
4	Impact Risk Assessment.....	58
4.1	Biodiversity Risk Assessment	58
4.2	Present Impacts to Biodiversity.....	58
4.3	Alternatives Considered	59
4.4	Irreplaceable Loss	59
4.5	Identification of Additional Potential Impacts	60
4.6	Quantitative Impact Assessment.....	61
4.6.1	Construction/Operational Phase	61
4.6.2	Closure Phase.....	63
4.7	No-Go Scenario	64
5	Conclusion.....	67
5.1	Impact Statement	68

5.2	Specialist Opinion	68
6	References	69
7	Appendix Items.....	71
7.1	Appendix A: Methods	71
7.1.1	Desktop Dataset Assessment	71
7.1.2	Desktop Flora Assessment	72
7.1.3	Desktop Fauna Assessment	73
7.1.4	Vegetation & Flora Survey	74
7.2	Appendix B: Terrestrial Site Ecological Importance	76
7.3	Appendix C: Expected Species Lists	81
7.3.1	Expected Flora Species	81
7.3.3	Expected Mammal Species.....	89
7.3.5	Expected Reptile Species	90
7.3.7	Expected Amphibian Species	91
7.3.9	Expected Avifauna Species	92
7.4	Appendix D: Specialist Declaration of Independence	99
7.5	Appendix E: Specialist CVs.....	102

List of Tables

Table 1-1	A list of key legislative requirements	11
Table 3-1	Summary of relevance of the proposed project to ecologically important landscape features.....	13
Table 3-2	Flora SCC expected for the PAOI. EN = Endangered and NT = Near Threatened	29
Table 3-3	List of Sensitive Species of Conservation Concern that may occur in the PAOI. VU = Vulnerable	30
Table 3-4	List of mammal Species of Conservation Concern that may occur in the PAOI. NT = Near Threatened and VU = Vulnerable.....	30
Table 3-5	List of reptile Species of Conservation Concern that may occur in the PAOI. LC = Least Concern and VU = Vulnerable.....	30
Table 3-6	List of amphibian Species of Conservation Concern that may occur in the PAOI. LC = Least Concern and NT = Near Threatened.....	30
Table 3-7	List of avifauna Species of Conservation Concern that may occur in the PAOI. CR = Critically Endangered, EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable	31
Table 3-8	Table presenting the alien and invasive species recorded for the PAOI	36
Table 3-9	Proposed monitoring framework for the control of alien invasive plants within the PAOI	37
Table 3-10	Table presenting the mammal species recorded for the PAOI during the field survey	38
Table 3-11	Table presenting the avifauna species recorded for the PAOI during the field survey	40
Table 3-12	Table providing descriptions of the habitat types delineated for the PAOI	47
Table 3-13	Summary of habitat types delineated within field assessment area	49
Table 3-14	Summary of the screening tool vs specialist assigned sensitivities for the ER32 PAOI	57
Table 3-15	Summary of the screening tool vs specialist assigned sensitivities for the ER94 PAOI	57
Table 4-1	Summary of potential impacts to biodiversity associated with the proposed activity ..	60
Table 4-2	Assessment of significance of impacts on the terrestrial fauna and flora associated with the project.....	65
Table 7-1	Summary of Conservation Importance (CI) criteria.....	77
Table 7-2	Summary of Functional Integrity (FI) criteria	78
Table 7-3	Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)	78
Table 7-4	Summary of Receptor Resilience (RR) criteria	79
Table 7-5	Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)	79

Table 7-6	Guideline for interpreting Site Ecological Importance in the context of proposed activities.....	80
-----------	--	----

List of Figures

Figure 1-1	Map illustrating the regional context of the PAOI	8
Figure 1-2	Map illustrating the ER32 Drilling Collars and the PAOI	9
Figure 1-3	Map illustrating the ER94 Drilling Collars and the PAOI	9
Figure 2-1	Map illustrating the field tracks of the field survey of the ER32 PAOI	12
Figure 2-2	Map illustrating the field tracks of the field survey of the ER94 PAOI	12
Figure 3-1	Map illustrating the ecosystem threat status associated with the ER32 PAOI	14
Figure 3-2	Map illustrating the ecosystem threat status associated with the ER94 PAOI	14
Figure 3-3	Map illustrating the ecosystem protection level associated with the ER32 PAOI	15
Figure 3-4	Map illustrating the ecosystem protection level associated with the ER94 PAOI	15
Figure 3-5	Map illustrating the ER32 PAOI in relation to the Free State Terrestrial CBA Plan	16
Figure 3-6	Map illustrating the ER94 PAOI in relation to the Free State Terrestrial CBA Plan	17
Figure 3-7	Map illustrating the NPAES focus areas and their proximity to the ER32 PAOI	18
Figure 3-8	Map illustrating the NPAES focus areas and their proximity to the ER94 PAOI	19
Figure 3-9	Map illustrating the location of the Protected Areas proximal to the ER32 PAOI	20
Figure 3-10	Map illustrating the location of the Protected Areas proximal to the ER94 PAOI	20
Figure 3-11	Map illustrating the ER32 PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset	21
Figure 3-12	Map illustrating the ER94 PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset	22
Figure 3-13	Map illustrating the ER32 PAOI in relation to the National Freshwater Ecosystem Priority Area dataset	23
Figure 3-14	Map illustrating the ER94 PAOI in relation to the National Freshwater Ecosystem Priority Area dataset	24
Figure 3-15	Map illustrating the vegetation types associated with the ER32 PAOI	26
Figure 3-16	Map illustrating the vegetation types associated with the ER94 PAOI	26
Figure 3-17	Photos illustrating some indigenous flora species recorded for the PAOI; A) <i>Stomatium</i> sp.; B) <i>Chrysocoma ciliata</i> ; C) <i>Searsia burchellii</i> ; D) <i>Searsia lancea</i> ; E) <i>Lycium cinereum</i> ; F) <i>Nidorella hottentotica</i> ; G) <i>Vachellia karroo</i> ; H) <i>Asparagus laricinus</i> and I) <i>Bulbine abyssinica</i>	34
Figure 3-18	Photograph illustrating the provincially protected plant species recorded for the PAOI: A) <i>Aloe maculata</i> ; B) <i>Boophone disticha</i> and C) <i>Olea europaea</i> subsp. <i>africana</i>	35
Figure 3-19	Photographs illustrating some of the alien invasive plant species recorded for the PAOI: A) <i>Melia azederdach</i> ; B) <i>Nicotiana glauca</i> ; C) <i>Opuntia ficus-indica</i> ; D) <i>Cylindropuntia imbricata</i> ; E) <i>Datura ferox</i> and F) <i>Cirsium vulgare</i>	38

Figure 3-20	Photograph presenting some of the mammal species recorded for the PAOI: A) Yellow Mongoose (<i>Cynictis penicillate</i>); B) Black-backed Jackal (<i>Canis mesomelas</i>); C) Cape Ground Squirrel (<i>Xerus inauris</i>) and D) Steenbok (<i>Raphicercus campestris</i>) 39
Figure 3-21	Photographs presenting some of the avifauna species recorded for the PAOI: A) <i>Ardea cinerea</i> (Grey Heron); B) <i>Melierax canorus</i> (Pale Chanting Goshawk); C) <i>Afrotis afraoides</i> (Northern Black Korhaan) and D) <i>Bubulcus ibis</i> (Cattle Egret) 41
Figure 3-22	Photographs illustrating the grassland habitat type within the PAOI 42
Figure 3-23	Photographs illustrating the rocky grassland habitat type within the PAOI 42
Figure 3-24	Photographs illustrating the degraded grassland habitat type within the PAOI 43
Figure 3-25	Photographs illustrating the water resource habitat type within the PAOI 43
Figure 3-26	Photographs illustrating the modified habitat type within the PAOI 44
Figure 3-27	Maps of the habitats delineated for the ER32 PAOI: A) V2_P001, B) V2_P002, C) V2_P003, D) V2_P004, E) V2_P005, F) V2_P006, G) V2_P007, H) V2_P008, I) V2_P009 and J) V2_P010 45
Figure 3-28	Maps of the habitats delineated for the ER94 PAOI: A) V7_P001, B) V7_P002, C) V7_P003, D) V7_P004, E) V7_P005, F) V7_P006, G) V7_P007 and H) V7_P008 ... 46
Figure 3-29	Site Ecological Importance of the ER32 PAOI: A) V2_P001, B) V2_P002, C) V2_P003, D) V2_P004, E) V2_P005, F) V2_P006, G) V2_P007, H) V2_P008, I) V2_P009 and J) V2_P010 51
Figure 3-30	Site Ecological Importance of the ER94 PAOI: A) V7_P001, B) V7_P002, C) V7_P003, D) V7_P004, E) V7_P005, F) V7_P006, G) V7_P007 and H) V7_P008 52
Figure 3-31	Terrestrial Biodiversity Theme sensitivity for the ER32 PAOI 54
Figure 3-32	Terrestrial Biodiversity Theme sensitivity for the ER94 PAOI 54
Figure 3-33	Relative Plant Species Theme Sensitivity for the ER32 55
Figure 3-34	Relative Plant Species Theme Sensitivity for the ER94 55
Figure 3-35	Relative Animal Species Theme Sensitivity for the ER32 56
Figure 3-36	Relative Animal Species Theme Sensitivity for the ER34 56
Figure 4-1	Photographs illustrating current negative impacts associated within the PAOI: A) Overhead powerlines; B) Agricultural machinery; C) Grazing by cattle; D) Vehicle ingress into wetlands and other natural areas; E) Edge effects associated with mining activities; F) Roads; G) Erosion; H) Littering and I) Agriculture 59
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 73

1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake a Terrestrial Biodiversity Assessment for the proposed Tetra4 Production Right Extension, within the Matjhabeng (ER 32) and Masilonyana (ER 94) district municipalities, Free State Province, South Africa (Figure 1-1). The drilling collars and a 100 m buffer will collectively be referred to as the Project Area of Influence (PAOI) for reporting purposes. The ER32 PAOI can be seen depicted in Figure 1-2 and the ER94 PAOI can be seen depicted in Figure 1-3.

The National Web based Environmental Screening Tool has characterised the Terrestrial Theme Sensitivity of the PAOI as “Very High”. Accordingly, this assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020): “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

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.

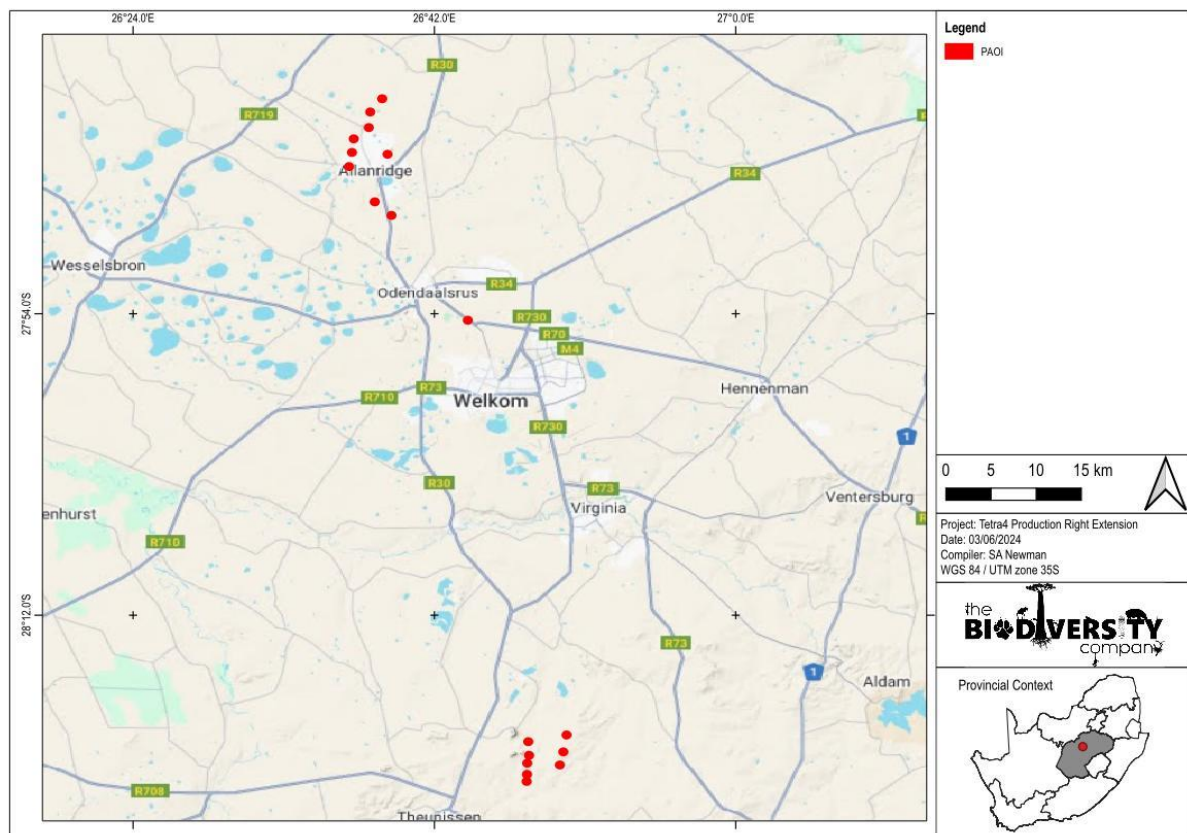


Figure 1-1 Map illustrating the regional context of the PAOI

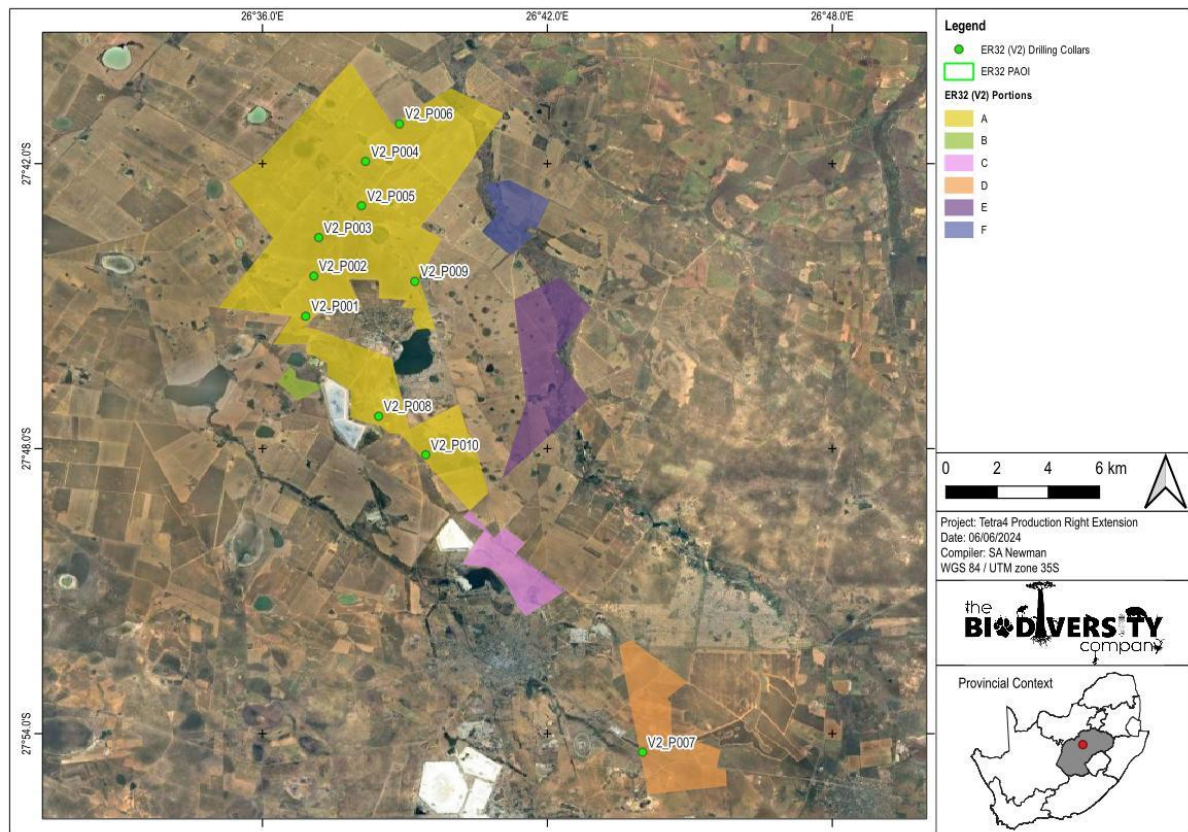


Figure 1-2 Map illustrating the ER32 Drilling Collars and the PAOI

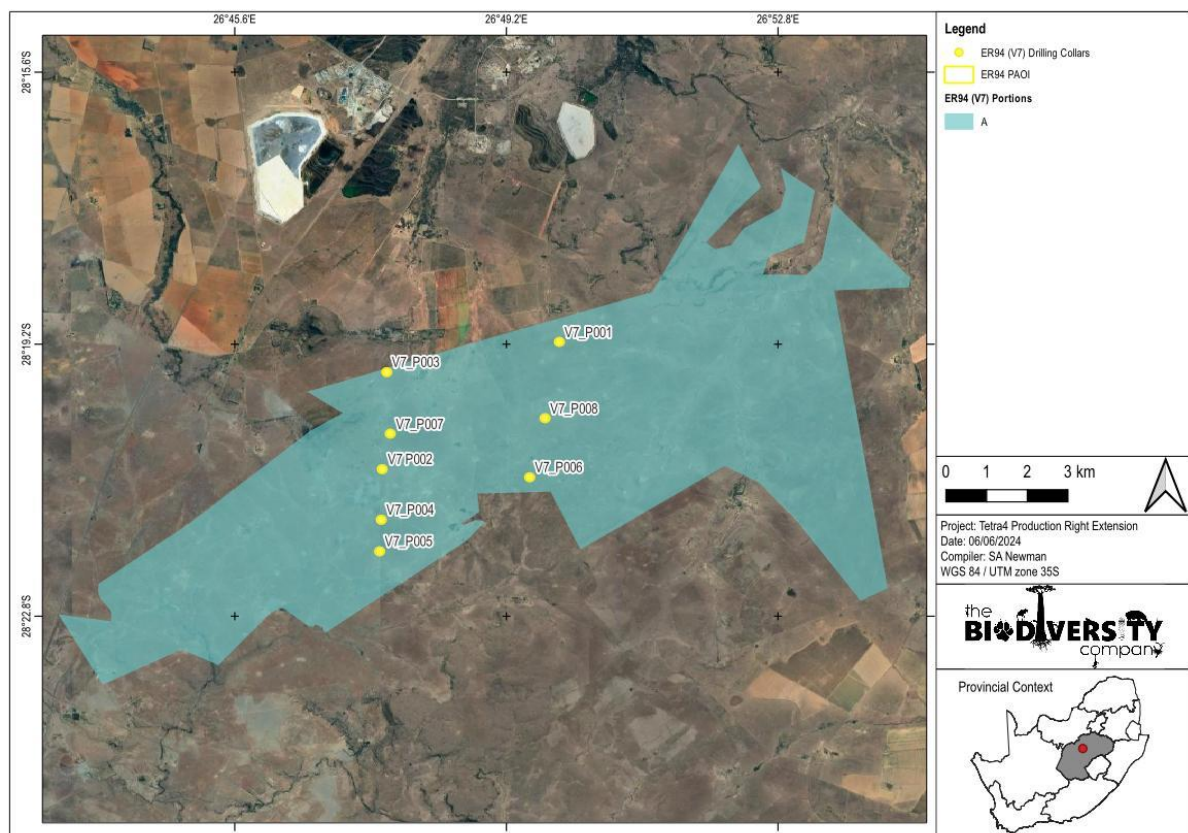


Figure 1-3 Map illustrating the ER94 Drilling Collars and the PAOI

1.2 Project Description

A project description was not provided at the time of compiling this report.

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);
- The site visit was conducted during the late dry season, which means that certain flora and fauna would not have been present or observable due to seasonal effects, however, the assessment is still deemed sufficient, provided a walkdown is conducted prior to development activities;
- 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; and

- 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
National	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.
Provincial	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) dry season field survey was undertaken for the project on the 4th and 5th of June 2024 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 and Figure 2-2)

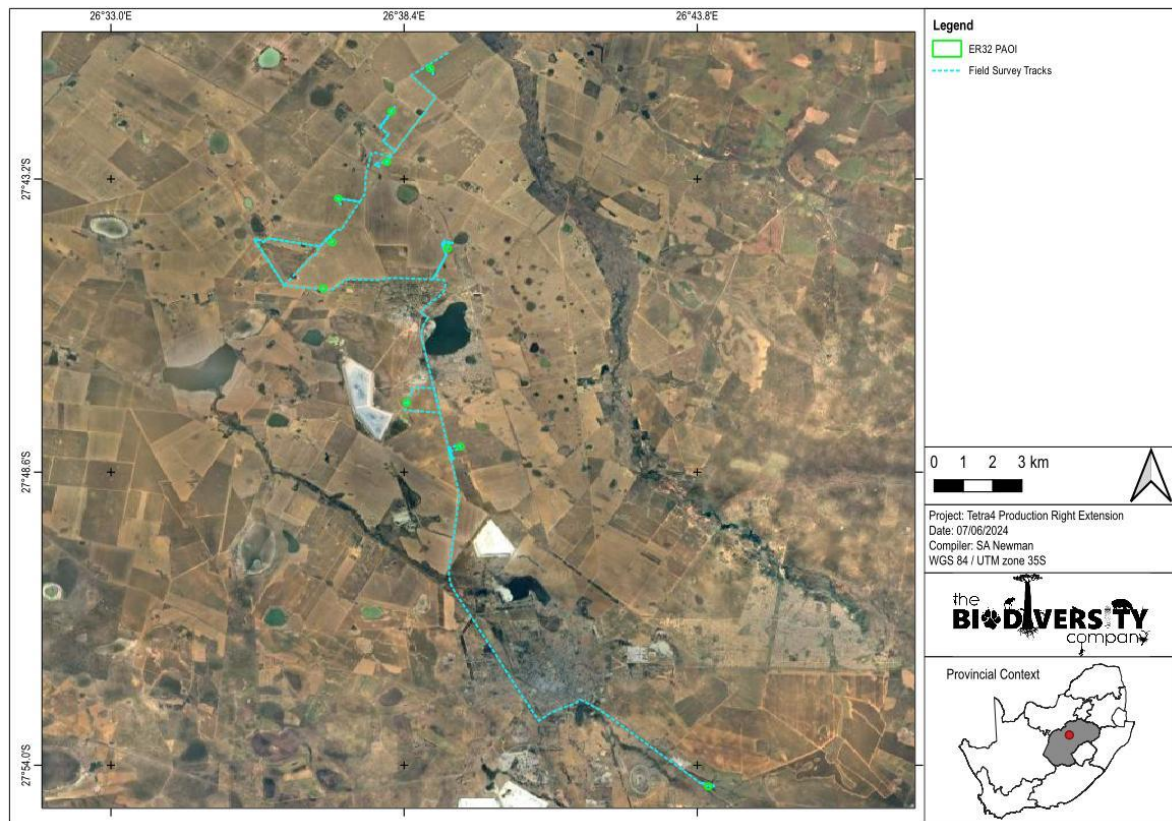


Figure 2-1 Map illustrating the field tracks of the field survey of the ER32 PAOI

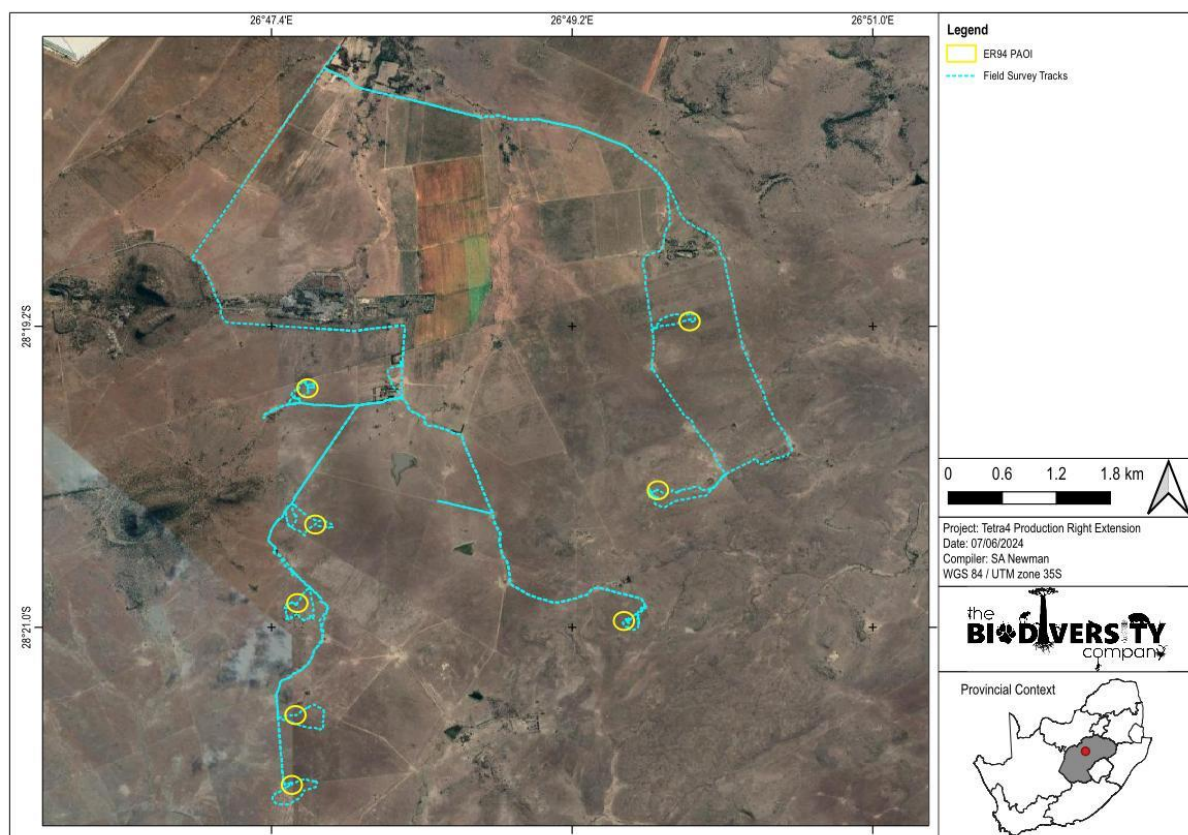


Figure 2-2 Map illustrating the field tracks of the field survey of the ER94 PAOI

3 Results & Discussion

3.1 Desktop Assessment

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 (RLE 2021)	Relevant	ER32 PAOI: Overlaps with 'Endangered' and 'Least Concern' ecosystems ER94 PAOI: Overlaps with a 'Least Concern' ecosystem	3.1.1.1
Ecosystem Protection Level	Relevant	ER32 PAOI: Overlaps with 'Not Protected' and 'Poorly Protected' Ecosystems ER94 PAOI: Overlaps with a 'Poorly Protected' Ecosystem	3.1.1.2
Provincial Conservation Plan	Relevant	ER32 PAOI: Overlaps with CBA 1, ESA1, ESA 2, Other Natural Areas and Degraded Areas ER94 PAOI: Overlaps with ESA1 and Other Natural Areas	3.1.1.3
National Protected Areas Expansion Strategy	Relevant	ER32 PAOI: Does not overlap with any relevant areas ER94 PAOI: Overlaps with NPAES Priority Focus Areas	3.1.1.4
SAPAD & SACAD	Relevant	ER32 PAOI: Does not occur within range of any protected areas ER94 PAOI: Occurs within 5 km of the H.J. Joel Private Nature Reserve	3.1.1.5
Important Bird & Biodiversity Areas (IBA)	Irrelevant	Not within range of any relevant areas	-
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant	ER32 PAOI: Overlaps with 'Least Concern' wetlands ER94 PAOI: Does not overlap with any relevant areas	3.1.1.6
National Freshwater Ecosystem Priority Area (NFEPA)	Relevant	ER32 PAOI: Overlaps with non-priority wetlands ER94 PAOI: Does not overlap with any relevant areas	3.1.1.7
Strategic Water Source Areas (SWSA)	Irrelevant	Does not overlap with 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 ER32 PAOI overlaps with an EN and LC ecosystem (Figure 3-1) and the ER94 PAOI overlaps with a LC ecosystem (Figure 3-2).

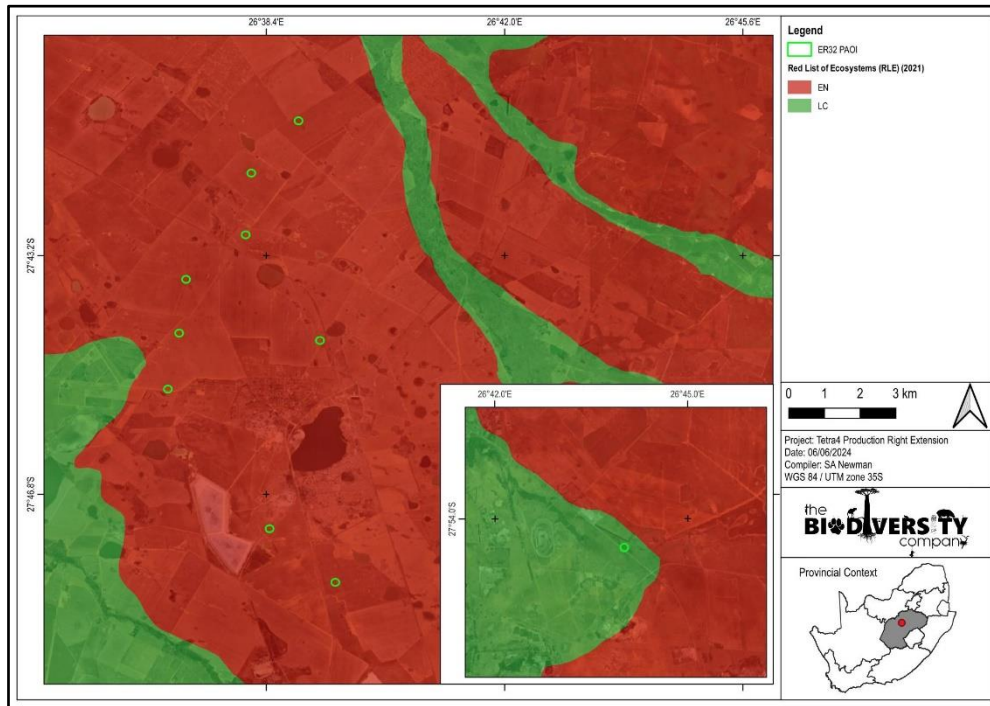


Figure 3-1 Map illustrating the ecosystem threat status associated with the ER32 PAOI

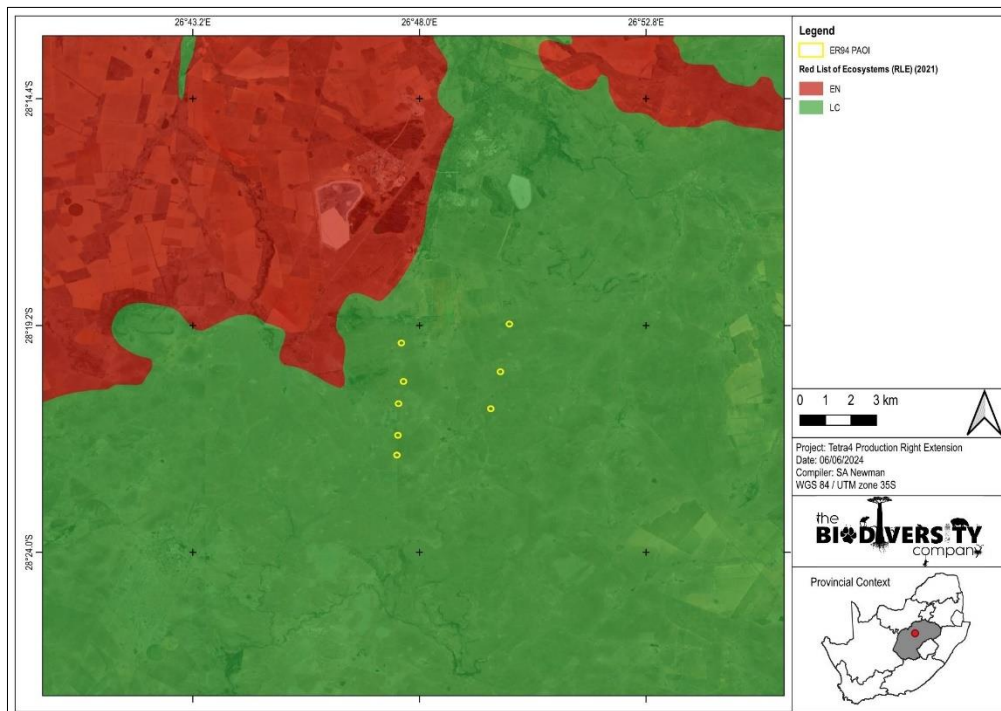


Figure 3-2 Map illustrating the ecosystem threat status associated with the ER94 PAOI

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 3-3) and the ER94 PAOI overlaps with a PP ecosystem (Figure 3-4).

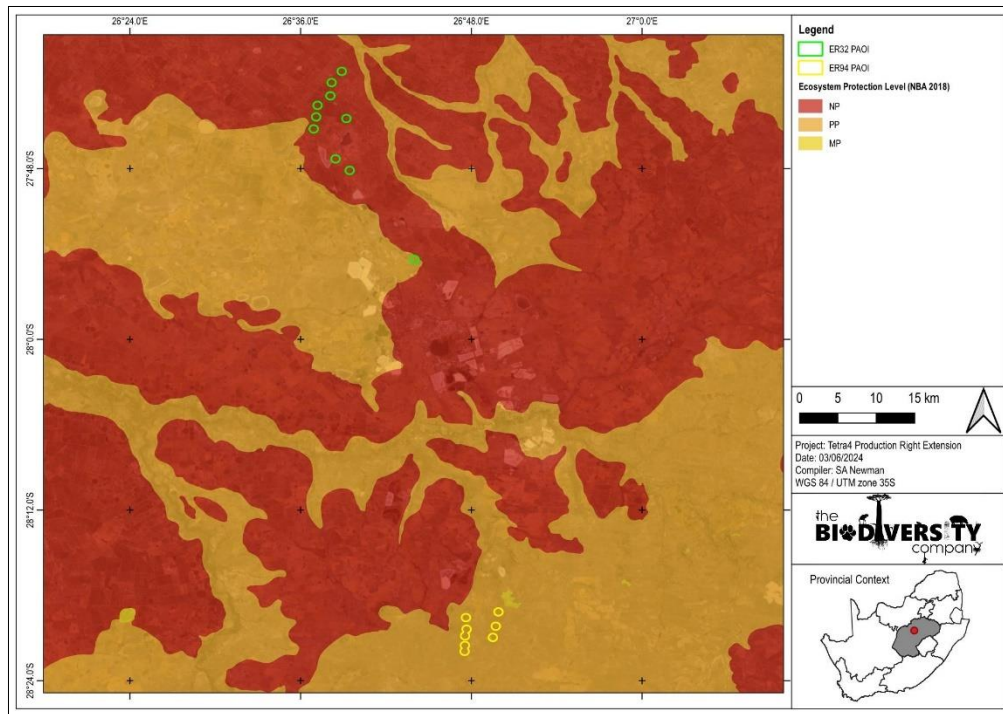


Figure 3-3 Map illustrating the ecosystem protection level associated with the ER32 PAOI

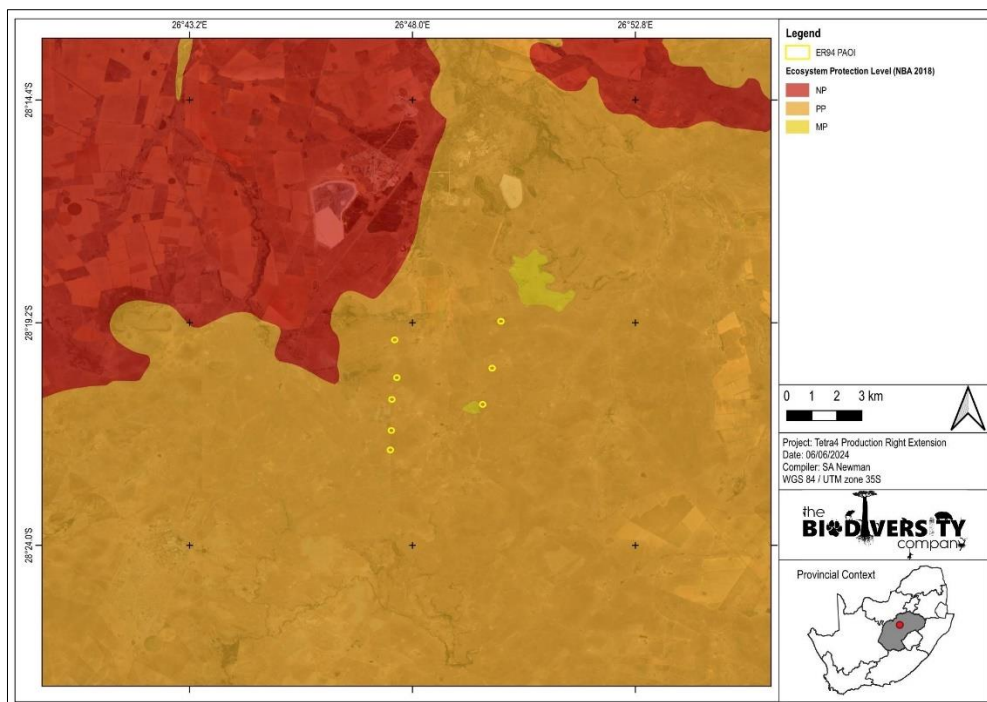


Figure 3-4 Map illustrating the ecosystem protection level associated with the ER94 PAOI

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 ER32 PAOI overlaps with CBA 1, ESA 1, ESA 2, Other Natural Areas and Degraded Areas (Figure 3-5). The ER94 PAOI overlaps with ESA 1, Other Natural Areas and Degraded Areas (Figure 3-6).

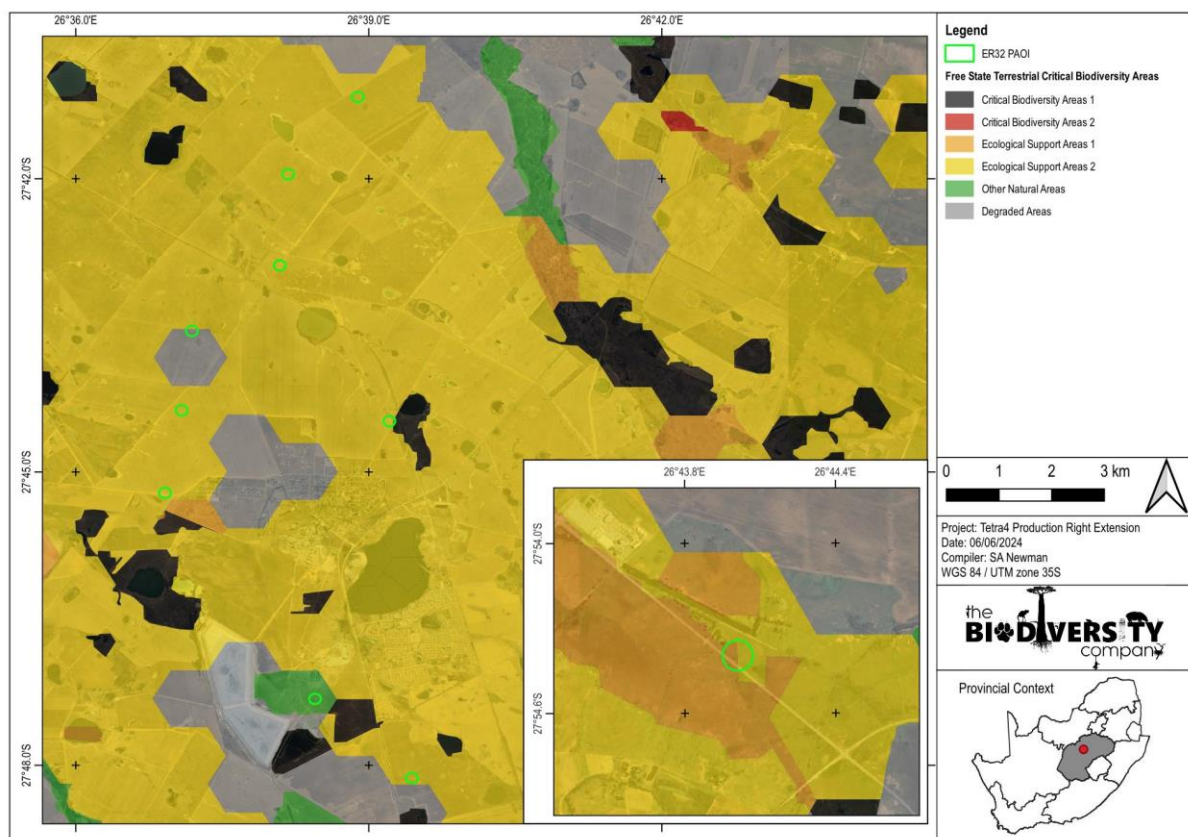


Figure 3-5 Map illustrating the ER32 PAOI in relation to the Free State Terrestrial CBA Plan

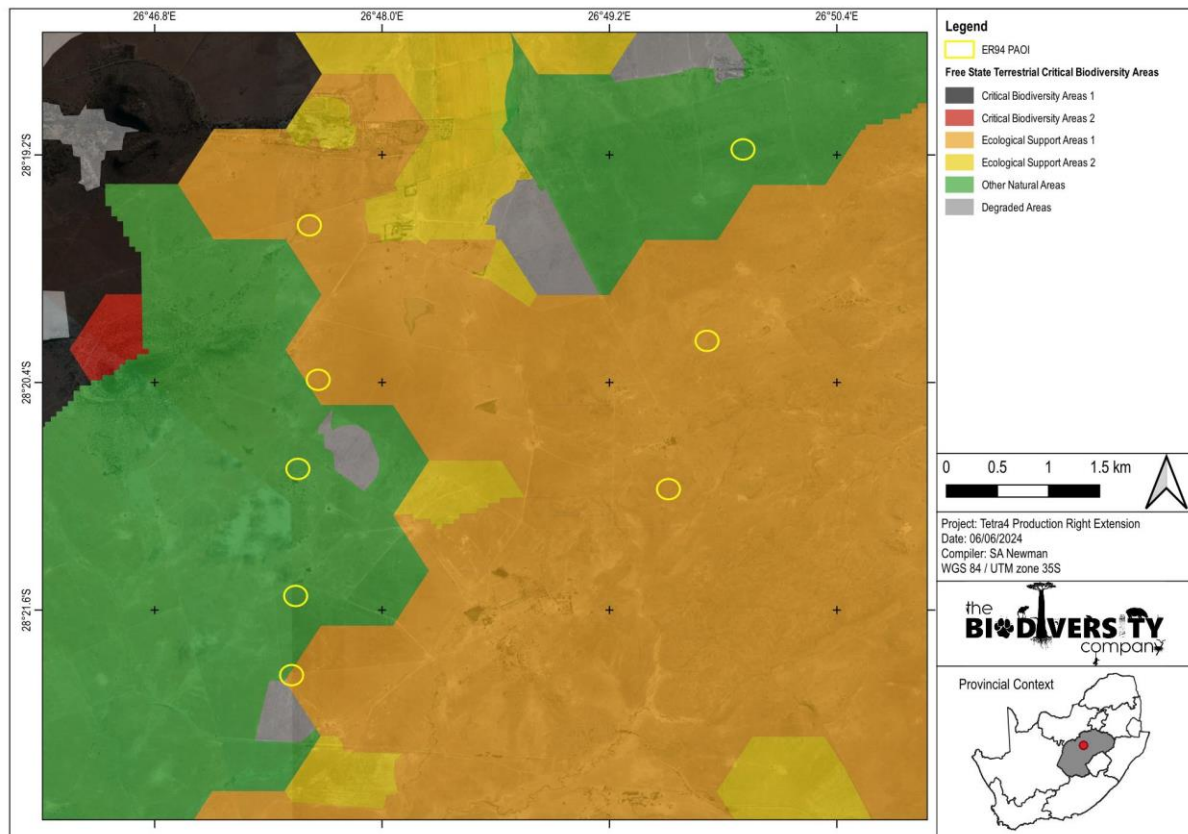


Figure 3-6 Map illustrating the ER94 PAOI in relation to the Free State Terrestrial CBA Plan

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 ER32 PAOI does not overlap with any relevant areas (Figure 3-7). The ER94 PAOI overlaps with a priority focus area for expansion according to the 2018 NPAES dataset (Figure 3-8).

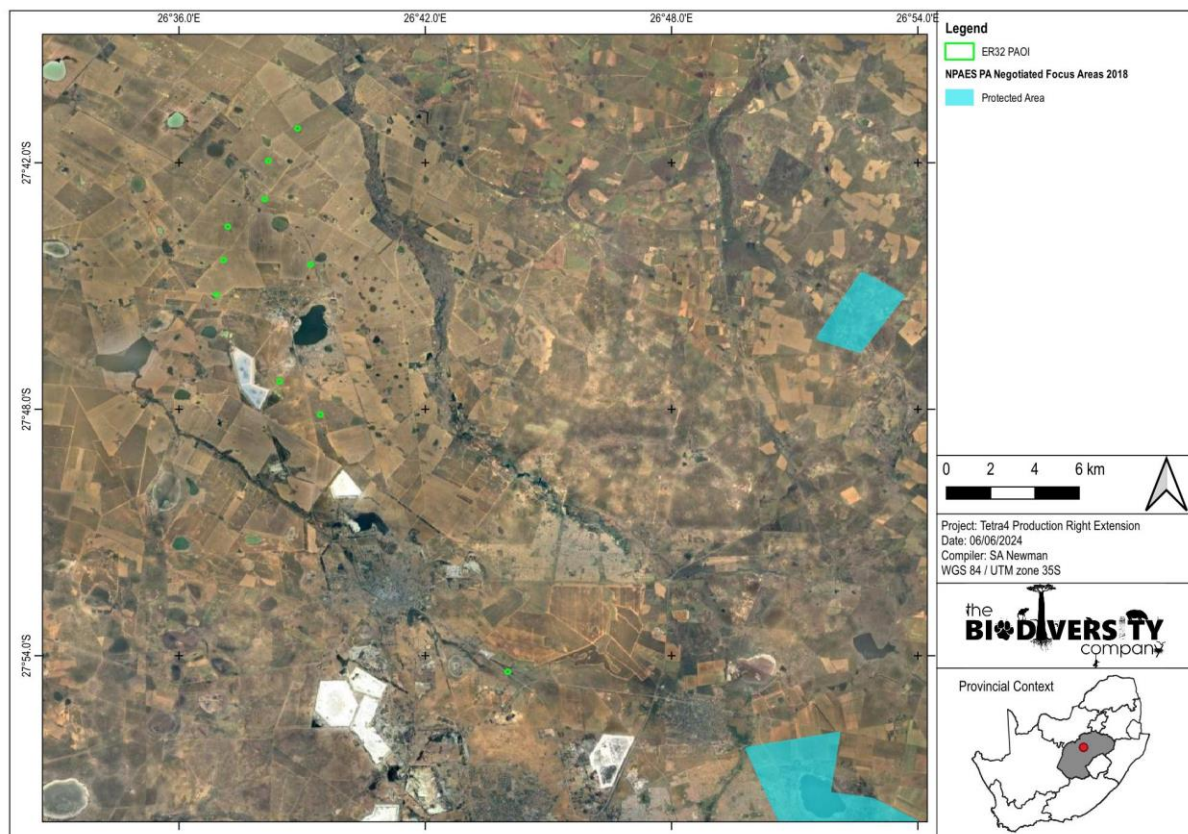


Figure 3-7 Map illustrating the NPAES focus areas and their proximity to the ER32 PAOI

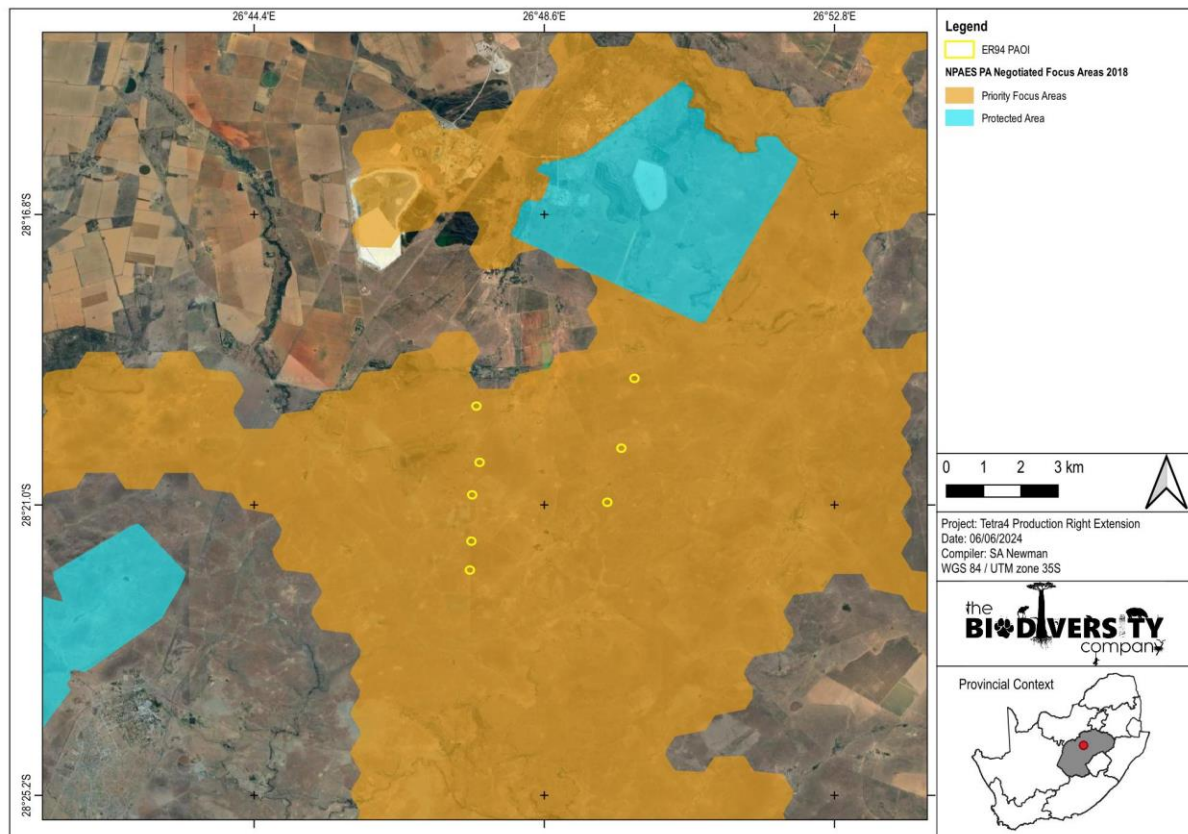


Figure 3-8 Map illustrating the NPAES focus areas and their proximity to the ER94 PAOI

3.1.1.5 Protected Areas

According to the protected area spatial datasets from SAPAD (2023) and SACAD (2023), the ER32 PAOI does not occur within range of any protected areas (Figure 3-9) and the ER94 PAOI V7_P001 drilling collar is located approximately 1.9 km from the H.J Joel Private Nature Reserve and the V7_P003 drilling collar is located approximately 4.5 km from the H.J Joel Private Nature Reserve (Figure 3-10). The two abovementioned drilling collars are, therefore, situated within the 5 km protected areas buffer.

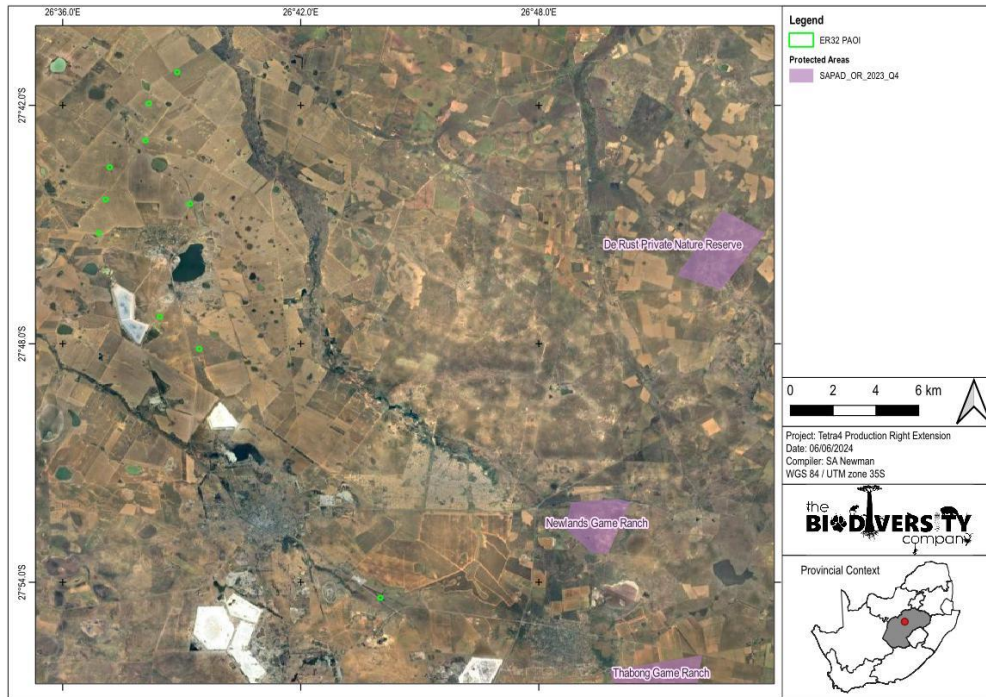


Figure 3-9 Map illustrating the location of the Protected Areas proximal to the ER32 PAOI

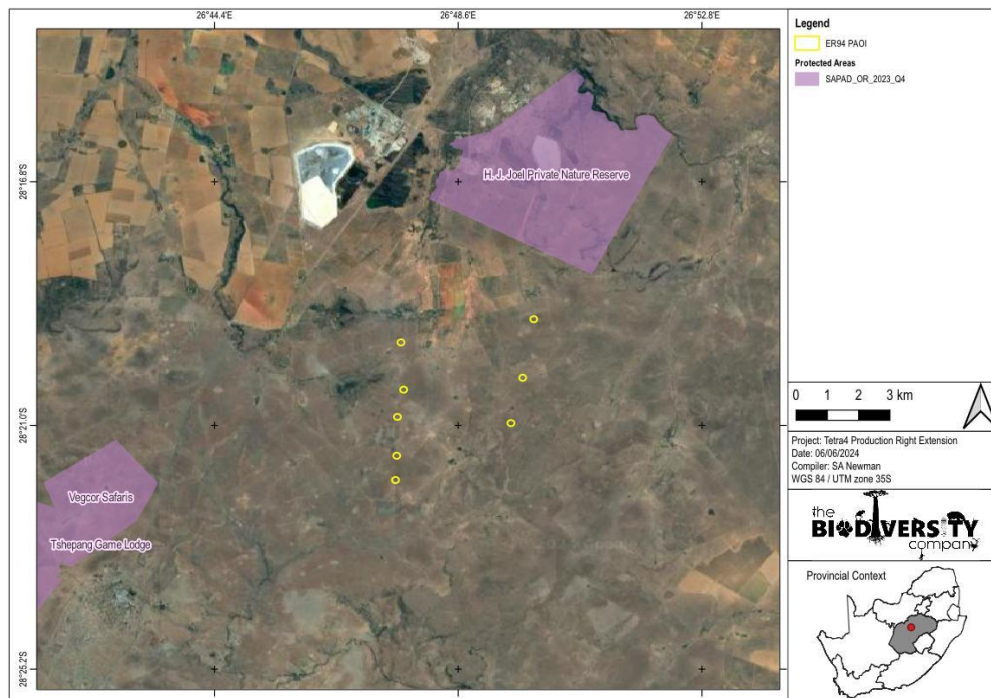


Figure 3-10 Map illustrating the location of the Protected Areas proximal to the ER94 PAOI

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). The ER32 PAOI overlaps with LC wetlands (Figure 3-11) and the ER94 PAOI doesn't overlap with any relevant systems (Figure 3-12).

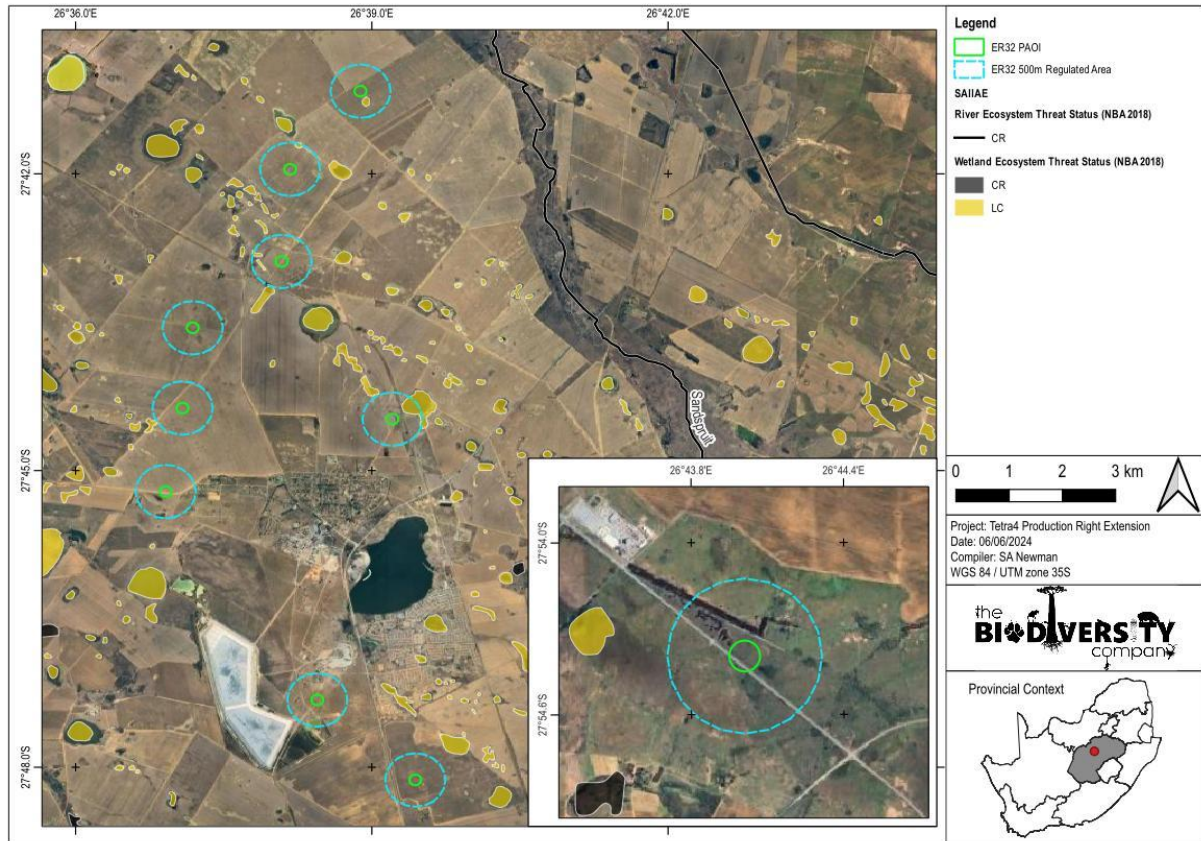


Figure 3-11 Map illustrating the ER32 PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset

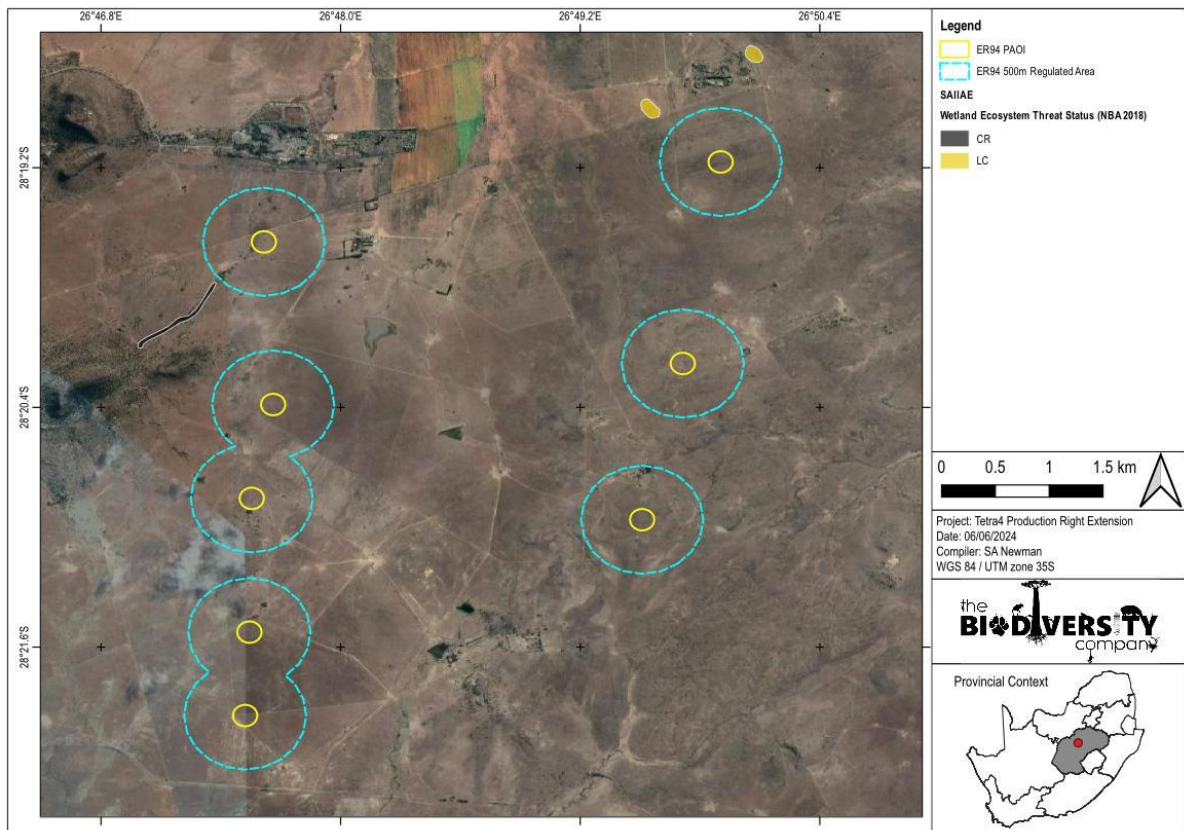


Figure 3-12 Map illustrating the ER94 PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset

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). The ER32 PAOI overlaps with non-priority wetlands (Figure 3-13) and the ER94 PAOI also overlaps with non-priority wetlands (Figure 3-14).

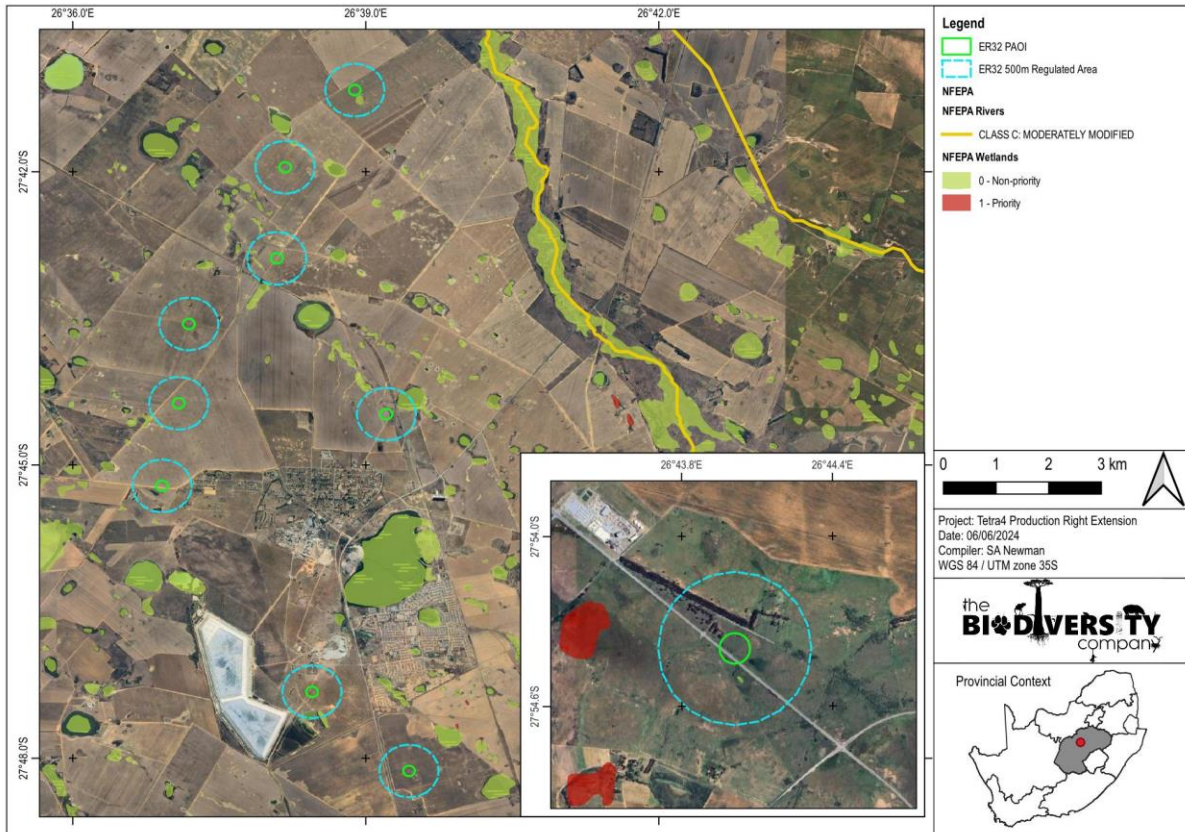


Figure 3-13 Map illustrating the ER32 PAOI in relation to the National Freshwater Ecosystem Priority Area dataset

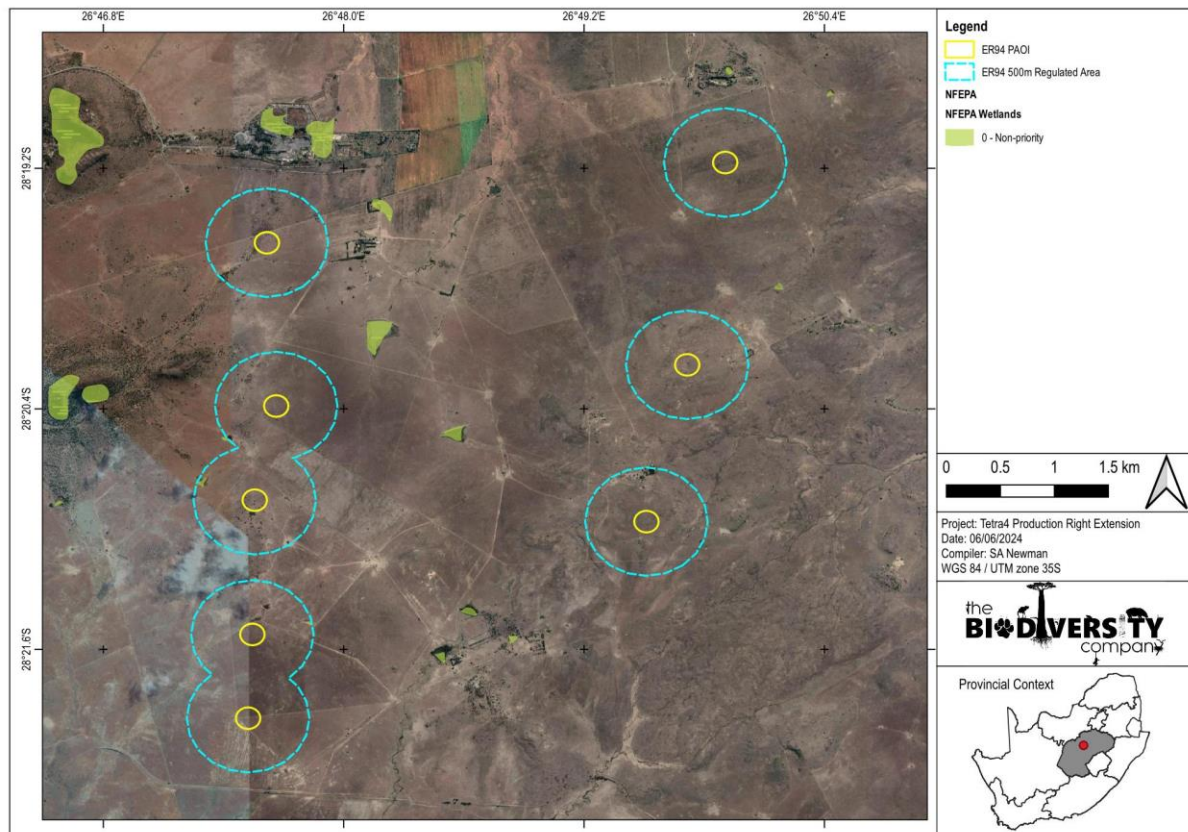


Figure 3-14 Map illustrating the ER94 PAOI in relation to the National Freshwater Ecosystem Priority Area dataset

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 ER32 PAOI is situated in the Vaal-Vet Sandy Grassland and Western Free State Clay Grassland vegetation types (Figure 3-15), and the ER94 PAOI is situated in the Central Free State Grassland vegetation type (Figure 3-16). These are all members of the Dry Highveld Grassland Bioregion.

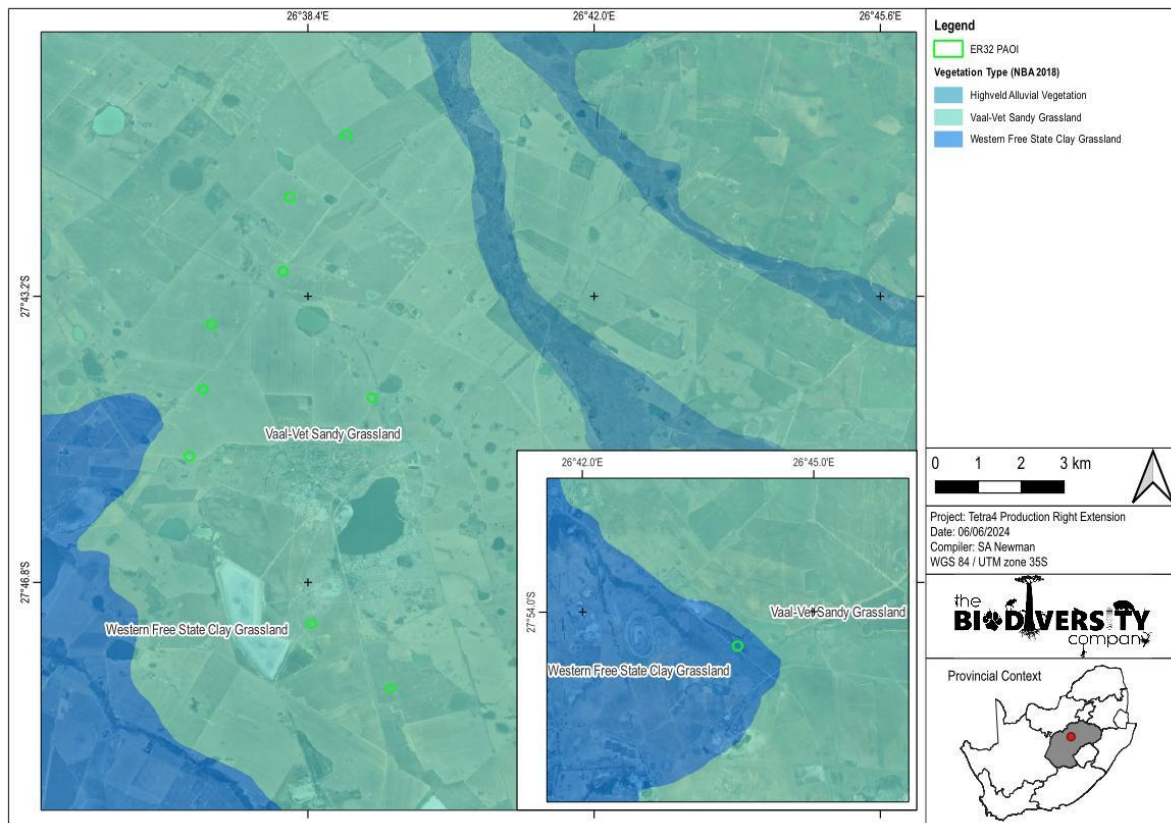


Figure 3-15 Map illustrating the vegetation types associated with the ER32 PAOI

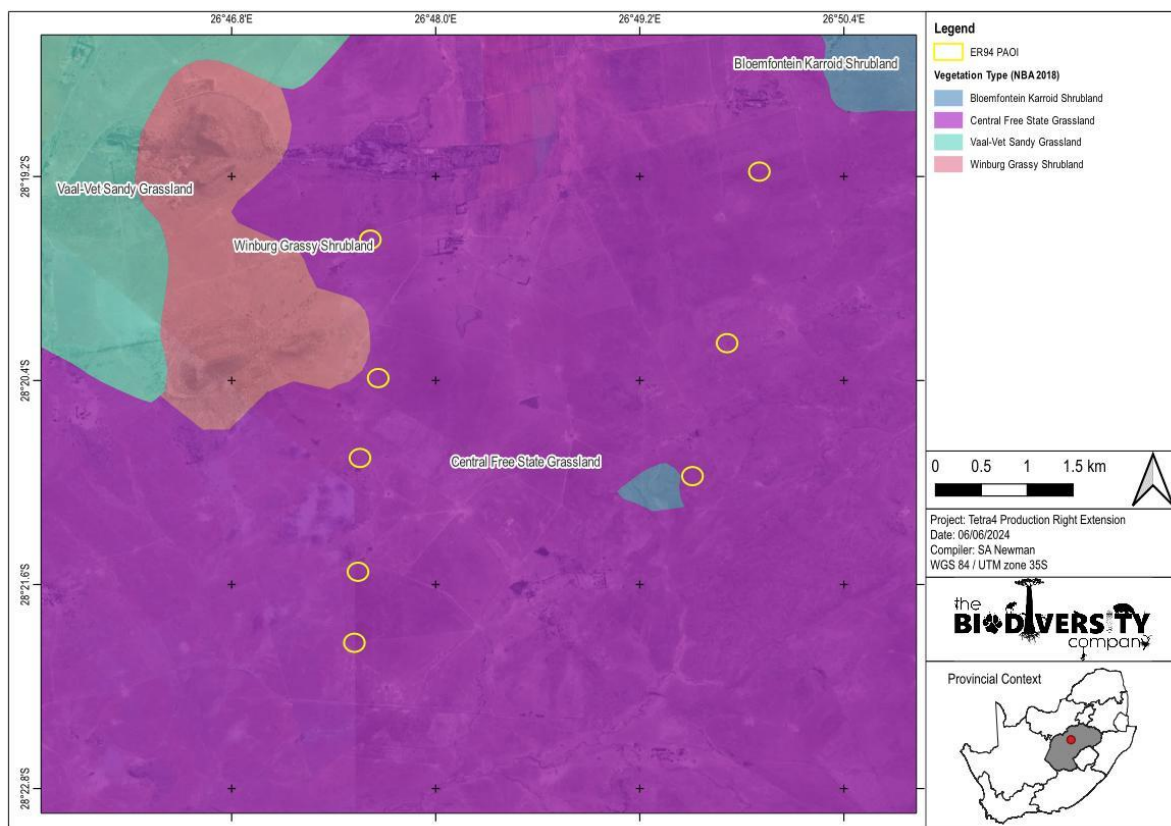


Figure 3-16 Map illustrating the vegetation types associated with the ER94 PAOI

3.1.2.1.1 Vaal-Vet Sandy Grassland

This vegetation type is a plains-dominated landscape with some scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element occurs here. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall (Mucina & Rutherford, 2006).

Important Taxa

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the Vaal Vet Sandy Grassland vegetation type (d = dominant):

Graminoids: *Antheophora pubescens* (d), *Aristida congesta* (d), *Chloris virgata* (d), *Cymbopogon caesius* (d), *Cynodon dactylon* (d), *Digitaria argyrogypsa* (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 caespititium*, *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*.

Endemic Taxon

Herb: *Lessertia phillipsiana*.

Conservation Status

This vegetation type is classified as Endangered according to Mucina and Rutherford (2006). The conservation target for this vegetation type is 24% with only 0.3% statutorily conserved in the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves. More than 63% has been transformed for cultivation (ploughed for commercial crops) and the rest under strong grazing pressure from cattle and sheep.

3.1.2.1.2 Western Free State Clay Grassland

This vegetation type is restricted to flat bottomlands and is characterised by dry, species-poor grassland. It also supports a high number of salt pans embedded within. Dwarf karoo shrublands will surround these pans in disturbed areas (Mucina & Rutherford, 2006).

This vegetation type experiences seasonal rainfall concentrated from November to March, with a mean annual precipitation of 450 mm. Mean annual temperature from 16°-17°C with a frequent occurrence of frost (Mucina & Rutherford, 2006).

Important taxa:

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the Western Free State Clay Grassland vegetation type (d = dominant):

Graminoids: *Aristida adscensionis* (d), *A. bipartita* (d), *Cynodon dactylon* (d), *Eragrostis chloromelas* (d), *E. lehmanniana* (d), *Panicum coloratum* (d), *Themeda triandra* (d), *Aristida congesta*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis bicolor*, *E. curvula*, *E. micrantha*, *E. obtusa*, *E. plana*, *E. superba*, *E. trichophora*, *Heteropogon contortus*, *Setaria nigrirostris*, *Tragus berteronianus*, *T. koelerioides*, *T. racemosus*.

Herbs: *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Gnaphalium declinatum*, *Indigofera alternans*, *Kohautia cynanchica*, *Nidorella microcephala*, *Platycarpha parvifolia*, *Salvia stenophylla*, *Selago paniculata*, *Stachys spathulata*.

Geophytic Herbs: *Bulbine narcissifolia*, *Oxalis depressa*.

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

Low Shrubs: *Lycium cinereum* (d), *Pentzia globosa* (d), *Amphiglossa triflora*, *Aptosimum elongatum*, *Berkheya annectens*, *Felicia filifolia* subsp. *filifolia*, *F. muricata*, *Gnidia polycephala*, *Helichrysum dregeanum*, *Melolobium candicans*, *Nenax microphylla*, *Rosenia humilis*, *Selago saxatilis*.

Succulent Shrub: *Hertia pallens*.

Conservation Status

This vegetation type is classified as Least Threatened according to Mucina and Rutherford (2006). The conservation target for this vegetation type is 24% with none conserved in statutory conservation areas. Almost 20% has already been transformed for maize and wheat cultivation. A species of *Prosopis* appears as an occasional invasive alien.

3.1.2.1.3 Central Free State Grassland

The Central Free State Grassland is characterised by undulating plains which support short grassland. In its natural condition, these grasslands are dominated by *Themeda triandra*, but *Eragrostis curvula* and *E. chloromelas* become dominant once degraded (Mucina & Rutherford, 2006). Dwarf karoo bushes will establish in severely degraded, clayey bottomlands and overgrazed low-lying areas with heavy clayey soils are prone to encroachment by *Vachellia karroo* (Mucina & Rutherford, 2006).

This vegetation type experiences summer rainfall with a mean annual precipitation of 560 mm. The mean annual temperature is 25°C and incidence of frost is high with an average of 43 days per year (Mucina & Rutherford, 2006).

Important taxa:

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the Central Free State Grassland vegetation type (d = dominant):

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 argyrograptia*, *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

The national conservation target is 24%. Only small portions enjoy statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves) as well as some protection in private nature reserves. The conservation status of this vegetation community was listed by Mucina and Rutherford (2006) as Vulnerable.

3.1.2.2 Expected Flora Species

The iNaturalist database indicates that 283 species of plants are expected to occur within the PAOI (Appendix C). The Screening Tool does not list any flora SCC and the iNaturalist database lists two (2) flora SCC that may occur within the PAOI. These are shown in Table 3-2 along with their likelihood of occurrence.

Table 3-2 Flora SCC expected for the PAOI. EN = Endangered and NT = Near Threatened

Family	Scientific name	Screening Tool Designation	SANBI	Habitat	Likelihood of occurrence	Reason
Asphodelaceae	<i>Aloe braamvanwykii</i>	-	EN	Schweizer-Reneke Bushveld, Stella Bushveld, Klerksdorp Thornveld, Highveld Alluvial Vegetation - Thornveld, deep sandy soils on plains.	Low	Outside of species native range
Asparagaceae	<i>Drimia sanguinea</i>	-	NT	Madikwe Dolomite Bushveld - Plants grow in open veld and scrubby woodland in a variety of soil types.	Low	Outside of species native vegetation type

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 3-3.

Table 3-3 *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
			SANBI	IUCN		
Sensitive Species 15	-	Medium	VU	VU	Low	No suitable habitat present on site

3.1.3.2 Mammals

The MammalMap database provided by the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2023c) lists 21 mammal species that could be expected to occur within the PAOI. Species generally restricted to protected areas such as game reserves were not expected to occur in PAOI and were removed from the list but those identified by the Screening Tool are retained (Appendix C). Three (3) mammal species are listed by the MammalMap database as being of conservation concern for the PAOI and one (1) species was listed by the Screening Tool (Table 3-4).

Table 3-4 *List of mammal Species of Conservation Concern that may occur in the PAOI. NT = Near Threatened and VU = Vulnerable*

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence	Reason
			SANBI	IUCN		
<i>Felis nigripes</i>	Black-footed Cat	-	VU	VU	Low	No suitable habitat present on site
<i>Hyaena brunnea</i>	Brown Hyena	-	NT	NT	Low	No suitable habitat present on site
<i>Hydrictis maculicollis</i>	Spotted-necked Otter	Medium	VU	NT	Low	No suitable habitat present on site

3.1.3.3 Herpetofauna

Based on the ReptileMap database provided by the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2023b) 16 reptile species have the potential to occur in the PAOI (Appendix C). One of the expected species is an SCC (Table 3-5). No reptile SCC were listed by the screening tool.

Table 3-5 *List of reptile Species of Conservation Concern that may occur in the PAOI. LC = Least Concern and VU = Vulnerable*

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence	Reason
			SANBI	IUCN		
<i>Psammophis leightoni</i>	Cape Sand Snake	-	VU	LC	Low	No suitable habitat present on site

Based on the AmphibianMap database provided by the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2023a) nine (9) amphibian species have the potential to occur in the PAOI (Appendix C). One (1) of the expected species is an SCC (Table 3-6). No amphibian SCC were listed by the screening tool.

Table 3-6 *List of amphibian Species of Conservation Concern that may occur in the PAOI. LC = Least Concern and NT = Near Threatened*

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence	Reason
			SANBI	IUCN		

<i>Pyxicephalus adspersus</i>	Giant Bull Frog	-	NT	LC	Low	No savanna habitat present on site
-------------------------------	-----------------	---	----	----	-----	------------------------------------

3.1.3.4 Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 236 bird species have the potential to occur in the vicinity of the PAOI (Appendix C). Of these, and according to the Screening Tool, 15 species of avifauna SCC are expected for the PAOI and can be seen presented in Table 3-7.

Table 3-7 *List of avifauna Species of Conservation Concern that may occur in the PAOI. CR = Critically Endangered, EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable*

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence	Reason
			SANBI	IUCN		
<i>Calidris ferruginea</i>	Sandpiper, Curlew	-	LC	NT	Low	No suitable habitat present on site
<i>Charadrius pallidus</i>	Plover, Chestnut-banded	-	NT	NT	Low	No suitable habitat present on site
<i>Ciconia abdimii</i>	Stork, Abdim's	-	NT	LC	Low	No suitable habitat present on site
<i>Ciconia nigra</i>	Stork, Black	-	VU	LC	Low	No suitable habitat present on site
<i>Circus ranivorus</i>	Harrier, African Marsh	High	EN	LC	Low	No suitable habitat present on site
<i>Eupodotis caerulescens</i>	Korhaan, Blue	-	LC	NT	High	Suitable habitat present on site
<i>Falco biarmicus</i>	Falcon, Lanner	-	VU	LC	Moderate	Some suitable habitat present on site
<i>Gyps africanus</i>	Vulture, White-backed	-	CR	CR	Low	No suitable habitat present on site
<i>Hydroprogne caspia</i>	Tern, Caspian	High	Unlisted	LC	Low	No suitable habitat present on site
<i>Mycteria ibis</i>	Stork, Yellow-billed	-	EN	LC	Low	No suitable habitat present on site
<i>Oxyura maccoa</i>	Duck, Maccoa	-	NT	VU	Low	No suitable habitat present on site
<i>Phoeniconaias minor</i>	Flamingo, Lesser	-	NT	NT	High	Recorded in the area
<i>Phoenicopterus roseus</i>	Flamingo, Greater	-	NT	LC	High	Recorded in the area
<i>Rostratula benghalensis</i>	Painted-snipe, Greater	-	NT	LC	Low	No suitable habitat present on site
<i>Sagittarius serpentarius</i>	Secretarybird	Medium	VU	EN	High	Recorded in the area

Eupodotis caerulescens (Blue Korhaan) is listed as NT according to the IUCN (2023). Their moderately rapid decline is accredited to habitat loss that is a result of intensive agriculture. They are found in high grassveld in close proximity to water, usually above an altitude of 1 500m (del Hoyo *et al.*, 1996). The

species nests in bare open ground, situated in thick grass or cropland. The species is known from the area and, therefore, assigned a high likelihood of occurrence.

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). They may occur in groups up to 20 individuals but have also been observed solitary. Their diet is mainly composed of small birds such as pigeons and francolins. The likelihood of incidental records of this species in the PAOI is rated as moderate due to the presence of many bird species on which Lanner Falcons may predate.

Phoenicopus minor (Lesser Flamingo) is listed as NT on a global and regional scale whereas *Phoenicopus roseus* (Greater Flamingo) is listed as NT on a regional scale only. Both species have similar habitat requirements and the species breed on large undisturbed alkaline and saline lakes, salt pans or coastal lagoons, usually far out from the shore after seasonal rains have provided the flooding necessary to isolate remote breeding sites from terrestrial predators and the soft muddy material for nest building (IUCN, 2017). The species was recorded in the area during the field survey.

Phoenicopus roseus (Greater Flamingo) is listed as NT on a regional scale only. This species breed on large undisturbed alkaline and saline lakes, salt pans or coastal lagoons, usually far out from the shore after seasonal rains have provided the flooding necessary to isolate remote breeding sites from terrestrial predators and the soft muddy material for nest building (IUCN, 2017). The species was recorded in the area during the field survey.

Sagittarius serpentarius (Secretarybird) occurs in sub-Saharan Africa and inhabits grasslands, open plains, and lightly wooded savanna. It is also found in agricultural areas and sub-desert (IUCN, 2023). The species was recorded in the area during the field survey.

3.2 Fieldwork Findings

3.2.1 Flora Assessment

This section is divided into two sections:

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

3.2.1.1 Indigenous Flora

The vegetation assessment was conducted throughout the extent of the PAOI. A total of 43 tree, shrub, herbaceous and graminoid plant species were recorded in the PAOI during the field assessment and can be viewed in the iNaturalist project for the site at the following link: <https://www.inaturalist.org/projects/tetra4>. However, species identifications were limited by seasonal constraints and it is likely that most of the geophytes and graminoids expected for the grassland habitats were not recorded.

The list of plant species recorded to is by no means comprehensive, and repeated surveys during different phenological periods not covered may likely yield up to 30% additional flora species for the PAOI. However, floristic analysis conducted to date is regarded as a sound representation of the local flora for the PAOI. Some of the recorded species can be seen presented in Figure 3-17.



Figure 3-17 Photos illustrating some indigenous flora species recorded for the PAOI; A) *Stomatium* sp.; B) *Chrysocoma ciliata*; C) *Searsia burchellii*; D) *Searsia lancea*; E) *Lycium cinereum*; F) *Nidorella hottentotica*; G) *Vachellia karroo*; H) *Asparagus laricinus* and I) *Bulbine abyssinica*

3.2.1.2 Protected Flora

Three (3) species of provincially protected plant were recorded for the ER94 PAOI – *Aloe maculata*, *Boophone disticha* and *Olea europaea* subsp. *africana* (Figure 3-18). They are protected under the Free State Nature Conservation Ordinance No. 8 of 1969. No protected species were recorded for the ER32 PAOI.

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.

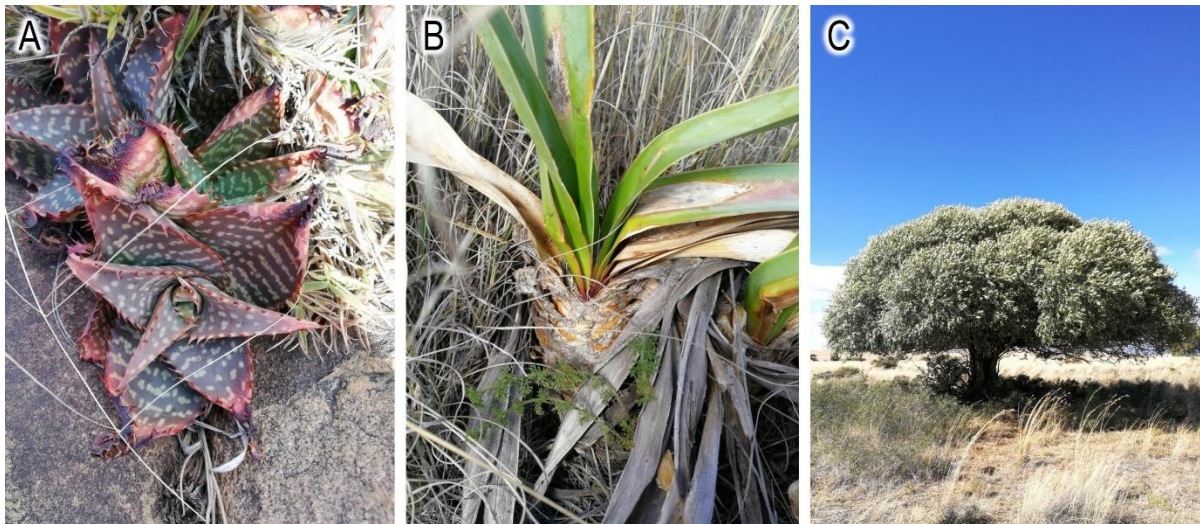


Figure 3-18 Photograph illustrating the provincially protected plant species recorded for the PAOI: A) *Aloe maculata*; B) *Boophone disticha* and C) *Olea europaea* subsp. *africana*

3.2.1.3 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.

Eleven (11) AIP species were recorded for the PAOI. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003. Seven (7) 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 3-8 and Figure 3-19).

Table 3-8 **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>	Black Jack	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 3
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

Considering that the PAOI includes grassland habitat which likely supports a variety of indigenous species, it is recommended that any AIP species that may colonise the area in the future be controlled by implementing an AIP Management Programme in compliance of section 75 of the Act as stated above. This is also pertinent to the development as invasive species are linked to enhanced fire effects and risk (Aslan & Dickson, 2020). The AIP Management Programme must implement the following monitoring framework must be implemented to ensure that AIPs are continually monitored, and progress pertaining to their control is recorded (Table 3-9). The monitoring of the PAOI throughout the process is crucial in order to prevent AIPs growing and spreading out of control, thereby threatening the wellbeing of indigenous flora and fauna. It is also important to note that while herbicide application has been recommended for control, herbicides should not be applied adjacent to the aquatic ecosystems within the site area and herbicide application should not be used during windy days to prevent drift.

Table 3-9 ***Proposed monitoring framework for the control of alien invasive plants within the PAOI***

Metric	Frequency	Method	Response
How effective are the control methods?	4-6 months after every operation	Survey the cleared areas and look for regrowth. Before and after photographs are effective for this. Observe for non-target effects of herbicide application.	If the survey reveals that the control methods are effective, e.g., low levels of re-sprouting, continue following the herbicide mixtures and control methods. If non-target plants are dying off where herbicides were applied, ensure appropriate training for herbicide applicators, demonstrate the off-target effects to herbicide applicators to ensure they are using the correct methods and herbicides. (If the results show that the control methods are not effective, adapt by e.g., cutting lower above ground or changing herbicides or timing of herbicide application.
Do the infestation levels decrease?	Annually	Survey the cleared areas and record species, densities and size. Before and after pictures are very effective.	If the infestation levels are not decreasing, reconsider clearing intervals and look at clearing methods. If infestation levels are decreasing, then continue current control method.
Quantity of herbicides used	During every operation	Keep track of cost and ensure no wastage. Record herbicide usage	Track usage over time, it will reveal a certain trend in quantities for different infestation levels. Less herbicides should be used when the infestation levels are lower. Record herbicide cost.
Does the indigenous vegetation recover in the cleared areas?	Annually	Survey the cleared areas and look out for indigenous species variety and presence. Before and after pictures are effective.	If there is recovery of indigenous vegetation, then continue current control method. If there is no recovery, consider rehabilitation with local indigenous species.
How many jobs were created?	After every operation	Timesheets	Job creation figures are useful when asking for landowner assistance from WFW or to demonstrate contributions to jobs and socio-economic conditions

How many person days (PD) were spent per operations?	After every operation	Timesheets	Keep track of cost and assist with planning and budgeting. Determine cost per person per day (PD)
---	-----------------------	------------	--

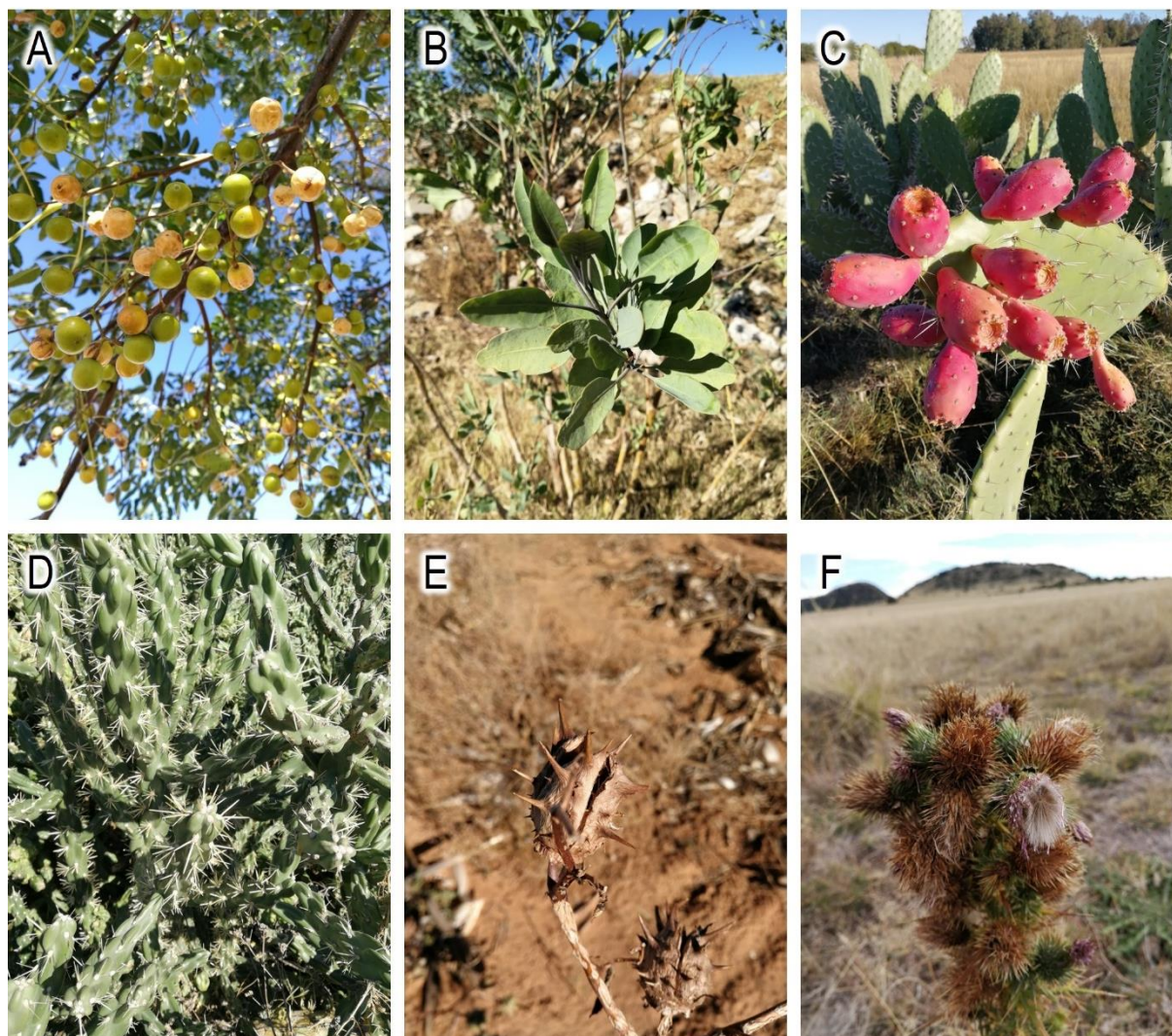


Figure 3-19 Photographs illustrating some of the alien invasive plant species recorded for the PAOI: A) *Melia azederdach*; B) *Nicotiana glauca*; C) *Opuntia ficus-indica*; D) *Cylindropuntia imbricata*; E) *Datura ferox* and F) *Cirsium vulgare*

3.2.2 Fauna Assessment

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

3.2.2.1 Mammals

The mammal species recorded for the PAOI during the field survey are presented in Table 3-10 below. Additional common mammal species are expected for the PAOI. Examples of some of the mammal species recorded can be seen presented in Figure 3-20.

Table 3-10 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>Canis mesomelas</i>	Black-backed Jackal	LC	LC	
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC	
<i>Damaliscus pygargus</i>	Blesbok	LC	LC	Schedule 2
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC	Schedule 2
<i>Raphicerus campestris</i>	Steenbok	LC	LC	Schedule 2
<i>Suricata suricatta</i>	Suricate	LC	LC	
<i>Xerus inauris</i>	Cape Ground Squirrel	LC	LC	

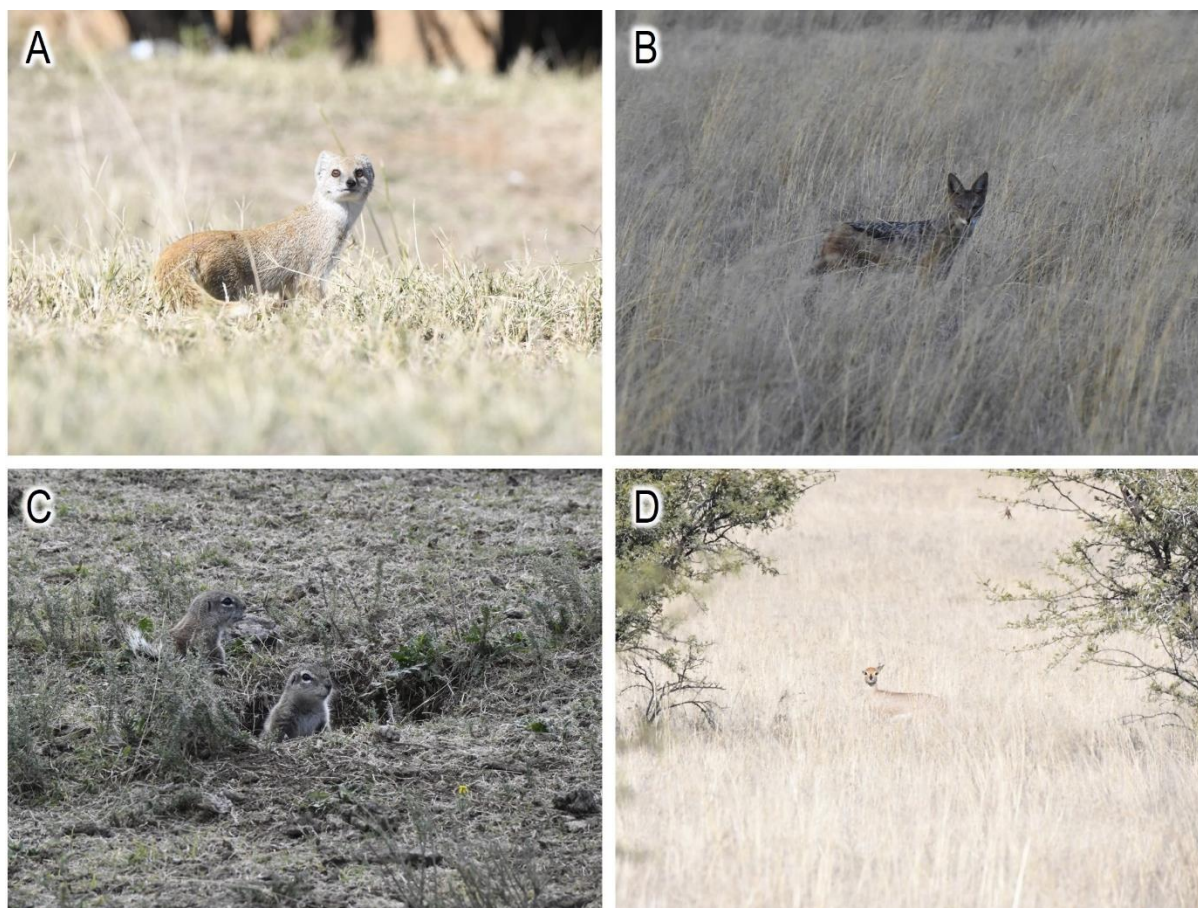


Figure 3-20 Photograph presenting some of the mammal species recorded for the PAOI: A) Yellow Mongoose (*Cynictis penicillata*); B) Black-backed Jackal (*Canis mesomelas*); C) Cape Ground Squirrel (*Xerus inauris*) and D) Steenbok (*Raphicerus campestris*)

3.2.2.2 Herpetofauna

No reptile or amphibian species were recorded for the PAOI, however, this was likely due to seasonal constraints and the low temperatures experienced on site at the time of the survey. Common reptile and amphibian species are expected for the PAOI.

3.2.2.3 Avifauna

Fifteen (15) 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 3-11). The low number of species recorded was attributed to the low temperatures experienced on site at the time of the survey and seasonal constraints. Some examples of the bird species recorded can be seen presented in Figure 3-21. Three (3) species of avifauna SCC were recorded in the area but were not recorded within the

PAOI or its 500 m buffer. These species are *Sagittarius serpentarius* (Secretarybird; EN), *Phoeniconaias minor* (Lesser Flamingo; NT) and *Phoenicopterus roseus* (Greater Flamingo; NT). These species all have the potential to occur within the PAOI, particularly *Sagittarius serpentarius*.

Table 3-11 **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>Ardea cinerea</i>	Heron, Grey	Unlisted	LC	Schedule 1
<i>Bostrychia hagedash</i>	Ibis, Hadedda	Unlisted	LC	Schedule 1
<i>Bubulcus ibis</i>	Egret, Cattle	Unlisted	LC	Schedule 1
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC	-
<i>Elanus caeruleus</i>	Kite, Black-shouldered	Unlisted	LC	Schedule 1
<i>Fulica cristata</i>	Coot, Red-knobbed	LC	LC	Schedule 2
<i>Melierax canorus</i>	Goshawk, Pale Chanting	LC	LC	Schedule 1
<i>Ploceus velatus</i>	Masked-weaver, Southern	Unlisted	LC	-
<i>Spilopelia senegalensis</i>	Dove, Laughing	Unlisted	LC	-
<i>Struthio camelus</i>	Ostrich	LC	LC	
<i>Threskiornis aethiopicus</i>	Ibis, African Sacred	LC	LC	Schedule 1
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC	Schedule 1
<i>Vanellus coronatus</i>	Lapwing, Crowned	Unlisted	LC	Schedule 1

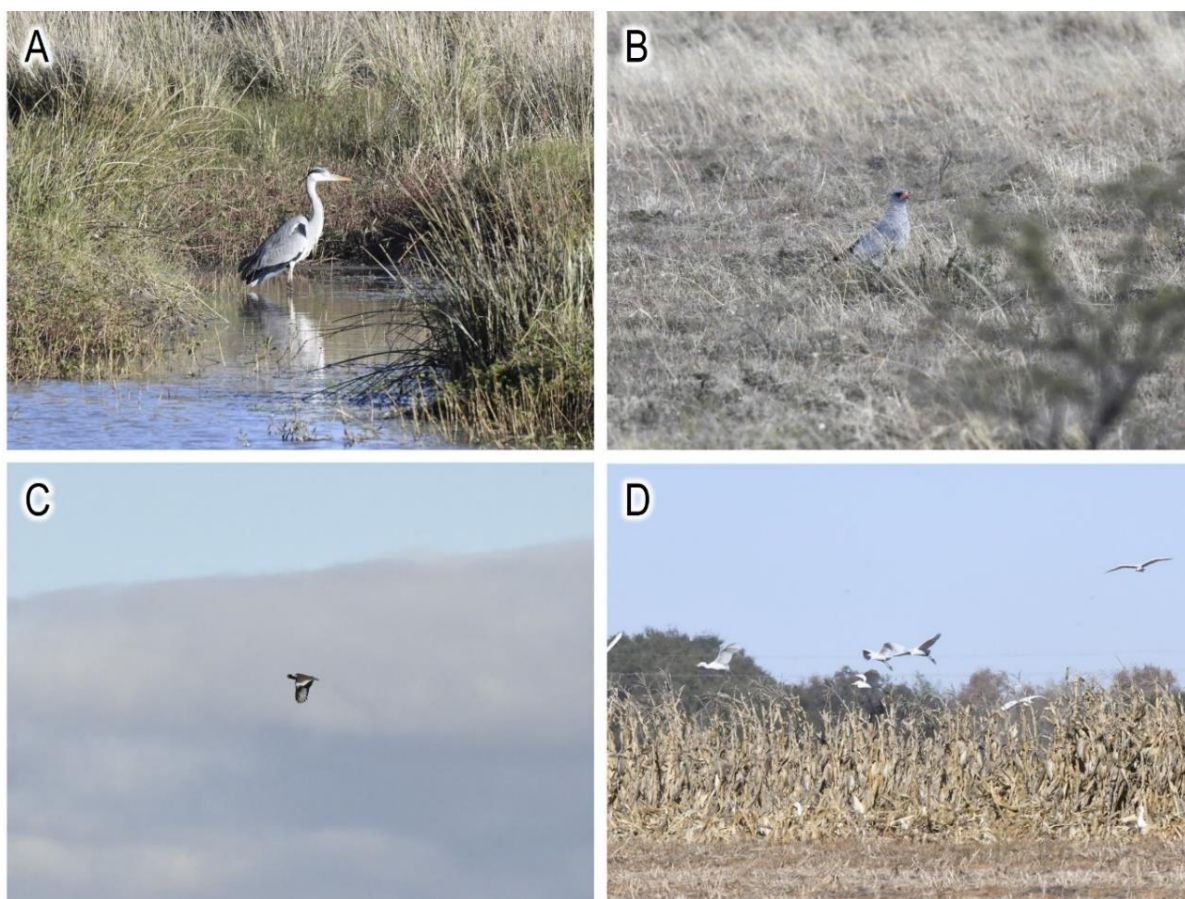


Figure 3-21 Photographs presenting some of the avifauna species recorded for the PAOI: A) *Ardea cinerea* (Grey Heron); B) *Melierax canorus* (Pale Chanting Goshawk); C) *Afrotis afraoides* (Northern Black Korhaan) and D) *Bubulcus ibis* (Cattle Egret)

3.3 Habitat Assessment

Five (5) main habitat types were identified across the PAOI and include:

- Grassland (Figure 3-22);
- Rocky Grassland (Figure 3-23);
- Degraded grassland (Figure 3-24);
- Water resource (Figure 3-25); and
- Modified (Figure 3-26).

The habitat units for the ER32 PAOI and ER94 PAOI can be seen delineated in Figure 3-27 and Figure 3-28 respectively. Descriptions of the habitat units can be found in Table 3-12.



Figure 3-22 *Photographs illustrating the grassland habitat type within the PAOI*

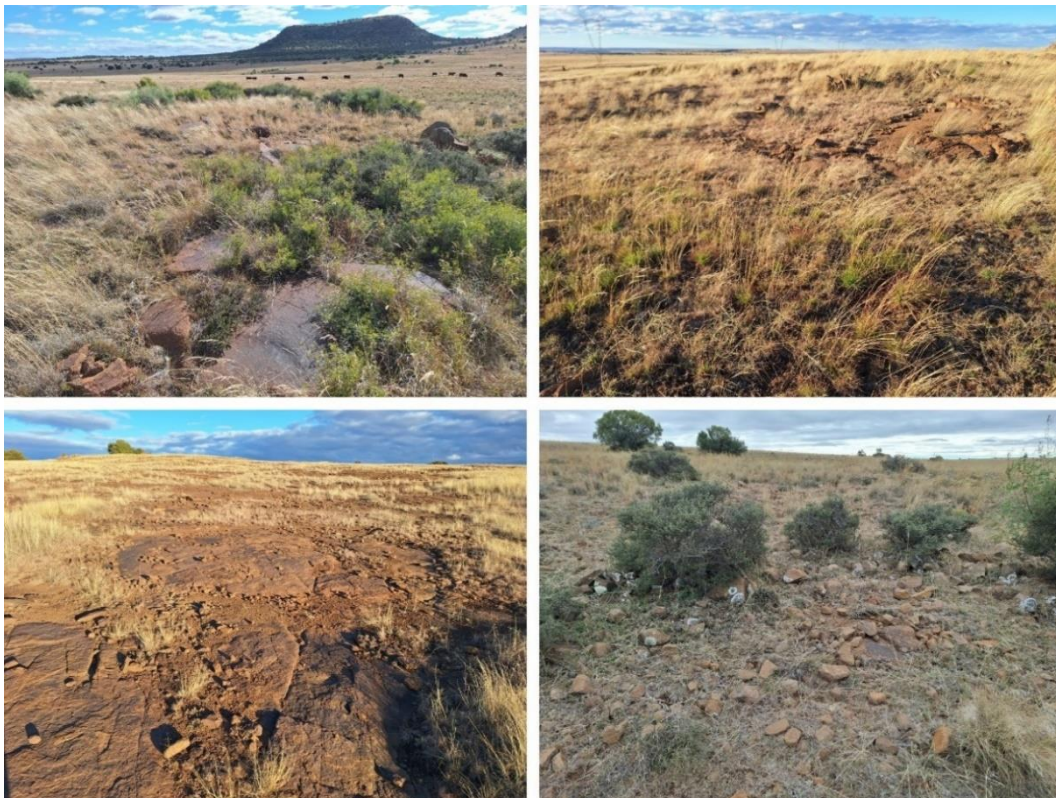


Figure 3-23 *Photographs illustrating the rocky grassland habitat type within the PAOI*



Figure 3-24 *Photographs illustrating the degraded grassland habitat type within the PAOI*



Figure 3-25 *Photographs illustrating the water resource habitat type within the PAOI*



Figure 3-26 *Photographs illustrating the modified habitat type within the PAOI*

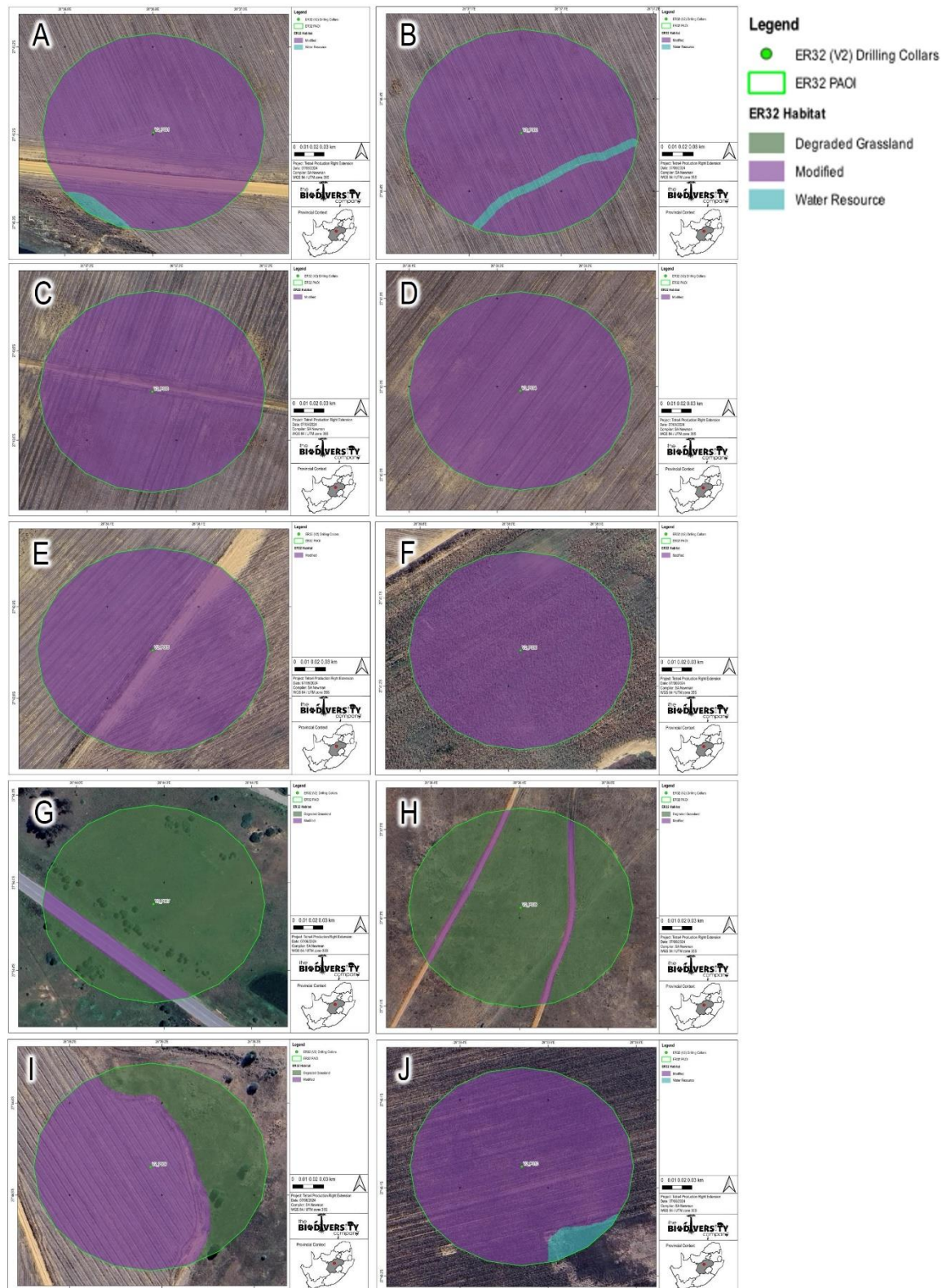


Figure 3-27 Maps of the habitats delineated for the ER32 PAOI: A) V2_P001, B) V2_P002, C) V2_P003, D) V2_P004, E) V2_P005, F) V2_P006, G) V2_P007, H) V2_P008, I) V2_P009 and J) V2_P010

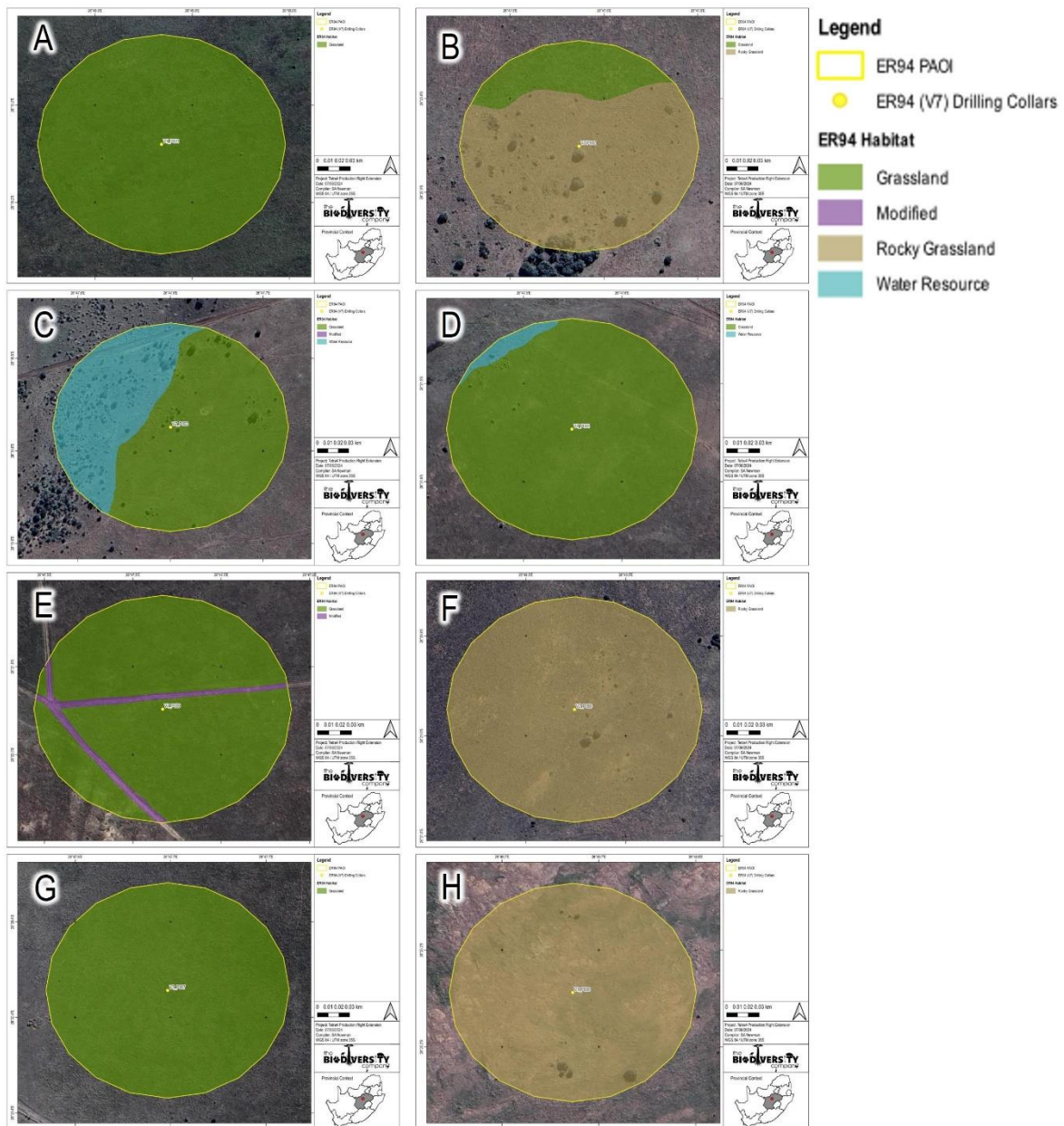


Figure 3-28 Maps of the habitats delineated for the ER94 PAOI: A) V7_P001, B) V7_P002, C) V7_P003, D) V7_P004, E) V7_P005, F) V7_P006, G) V7_P007 and H) V7_P008

Table 3-12 Table providing descriptions of the habitat types delineated for the PAOI

Habitat	Description and condition	Ecosystem Processes and Services
Grassland	<p>This habitat is typical of the vegetation type expected for the area, the Central Free State Grassland. The habitat unit is dominated by <i>Themeda triandra</i>, along with other species of graminoid, such as <i>Eragrostis curvula</i>, <i>E. gummiiflua</i>, <i>Aristida congesta</i>, <i>Cymbopogon pospischilii</i> and <i>Melinis repens</i>. In areas that have experienced higher levels of overgrazing and disturbance, there has been some encroachment by <i>Vachellia karroo</i>. However, in general, this habitat unit remains intact and functional with low levels of disturbance associated with grazing by livestock.</p> <p>Other dominant species include; <i>Asparagus laricusinus</i>, <i>Berkheya radula</i>, <i>Chrysocoma ciliata</i> and <i>Nidorella hottentotica</i>. However, species identifications were severely limited by seasonality and it is likely that other species of graminoid and geophyte expected for the PAOI were not recorded. Some species of protected flora were recorded for this unit, and more are expected.</p> <p>No flora SCC are expected for this habitat unit and no fauna SCC were recorded during the survey, although this habitat is capable of supporting some species of avifauna SCC expected for the PAOI.</p>	<p>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.</p>
Rocky Grassland	<p>This habitat unit is characterised by areas of rocky grassland interspersed by rocky outcrops and trees. This unit has experienced low levels of disturbance, mainly attributed to the grazing by livestock. However, it remains intact and in good condition, offering important microhabitats for local flora and fauna.</p> <p>Dominant species include; <i>Themeda triandra</i>, <i>Eragrostis curvula</i>, <i>E. gummiiflua</i>, <i>E. superba</i>, <i>Aristida congesta</i>, <i>Cymbopogon pospischilii</i>, <i>Melinis repens</i>, <i>Asparagus laricusinus</i>, <i>Berkheya radula</i>, <i>Chrysocoma ciliata</i>, <i>Stomatium sp.</i>, <i>Ledebouria sp.</i> and <i>Nidorella hottentotica</i>. Dominant tree species include; <i>Searsia lancea</i>, <i>S. burchelli</i>, <i>Olea europaea subsp. Africana</i> (protected) and <i>Vachellia karroo</i>.</p> <p>No flora SCC are expected for this habitat unit and no fauna SCC were recorded during the survey, although this habitat is capable of supporting some species of avifauna SCC expected for the PAOI.</p>	<p>Provides important microhabitats and refugia for flora and fauna species. Also 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. 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.</p>
Degraded grassland	<p>This habitat unit is predominantly made up of the endangered Vaal-Vet Sandy Grassland vegetation type, and the Western Free State Clay Grassland vegetation type in the case of the V2_P007 drilling collar. However, this habitat unit is no longer representative of either of these vegetation types, having undergone high levels of anthropogenic disturbance, resulting in severe degradation.</p> <p>Species identifications were limited by seasonality, and most expected graminoid and geophyte species could not be positively identified due to this. The apparent dominant</p>	<p>Provides some grazing and foraging resources for indigenous fauna and livestock. The areas may be used as a movement corridor.</p>

	<p>graminoid species was <i>Digitaria didactyla</i>, and dominant species of herb included <i>Nidorella hottentotica</i> and <i>Asparagus laricinus</i>. Alien and invasive species were prominent in this habitat unit, including <i>Bidens pilosa</i>, <i>Eucalyptus camaldulensis</i>, <i>Verbena bonariensis</i>, <i>Cirsium vulgare</i>, <i>Cylindropuntia imbricata</i>, <i>Datura ferox</i>, <i>Nicotiana glauca</i>, <i>Opuntia ficus-indica</i>, <i>Prosopis sp.</i>, <i>Melia azedarach</i> and <i>Tagetes minuta</i>.</p> <p>No fauna or flora SCC were recorded, and none are expected for the habitat unit.</p>	
Water resource	<p>This non-terrestrial habitat unit is composed of wetlands and drainage lines. Dominated by species of hydrophyte. More information regarding this habitat unit can be found in the accompanying wetland report (TBC, 2024).</p> <p>No flora SCC are expected for this habitat unit but it may support some species of avifauna SCC expected for the area.</p>	<p>Assists in regulating microclimate and water quality, and provides foraging for local fauna and provides habitat for terrestrial, amphibious and aquatic organisms.</p>
Modified	<p>This habitat unit includes all areas that maintain little to no native vegetation and/or where anthropogenic activity has substantially modified an area's primary ecological functions and species composition. This habitat unit no longer maintains its functional integrity and does not contribute significantly to ecosystem services. This habitat unit is predominantly made up of gravel roads and agricultural fields.</p>	<p>The ecological services provided by this habitat are limited due to the extent of land transformation and the large amount of bare ground. Provides some foraging for local fauna.</p>

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. The PAOI was categorised as possessing habitats with areas ranging from 'Very Low' to 'High' SEI (Table 3-13). This indicates that the findings of this assessment are contrary to the Screening Tool with respect to the Combined Terrestrial, Plant and Animal Species Theme sensitivity. The SEI of the ER32 PAOI is illustrated in Figure 3-29 and the SEI of the ER94 PAOI is illustrated in Figure 3-30.

Table 3-13 Summary of habitat types delineated within field assessment area

Habitat Type	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance Guidelines
Grassland	Medium	High	Medium	Medium	Medium
	> 50% of receptor contains natural habitat with potential to support SCC	Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches		Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Rocky Grassland	Medium	High	Medium	Low	High
	> 50% of receptor contains natural habitat with potential to support SCC	Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches.		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	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
Degraded grassland	Low	Low	Low	Medium	Low
	No confirmed or highly likely populations of SCC	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		Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

Habitat Type	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance Guidelines
	Medium	High	Medium	Low	High
ER94 Water resource: HGM1 – UVB Drainage Features	> 50% of receptor contains natural habitat with potential to support SCC	Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches.		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	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.
	Low	Low	Low	Low	Medium
ER32 Water resource: HGM 6 – Seep HGM 8 – Depression Drainage Features	< 50% of receptor contains natural habitat with limited potential to support SCC	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		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	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities
	Very Low	Low	Very Low	High	Very Low
Modified	No natural habitat remaining.	Several minor and major current negative ecological impacts.		Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

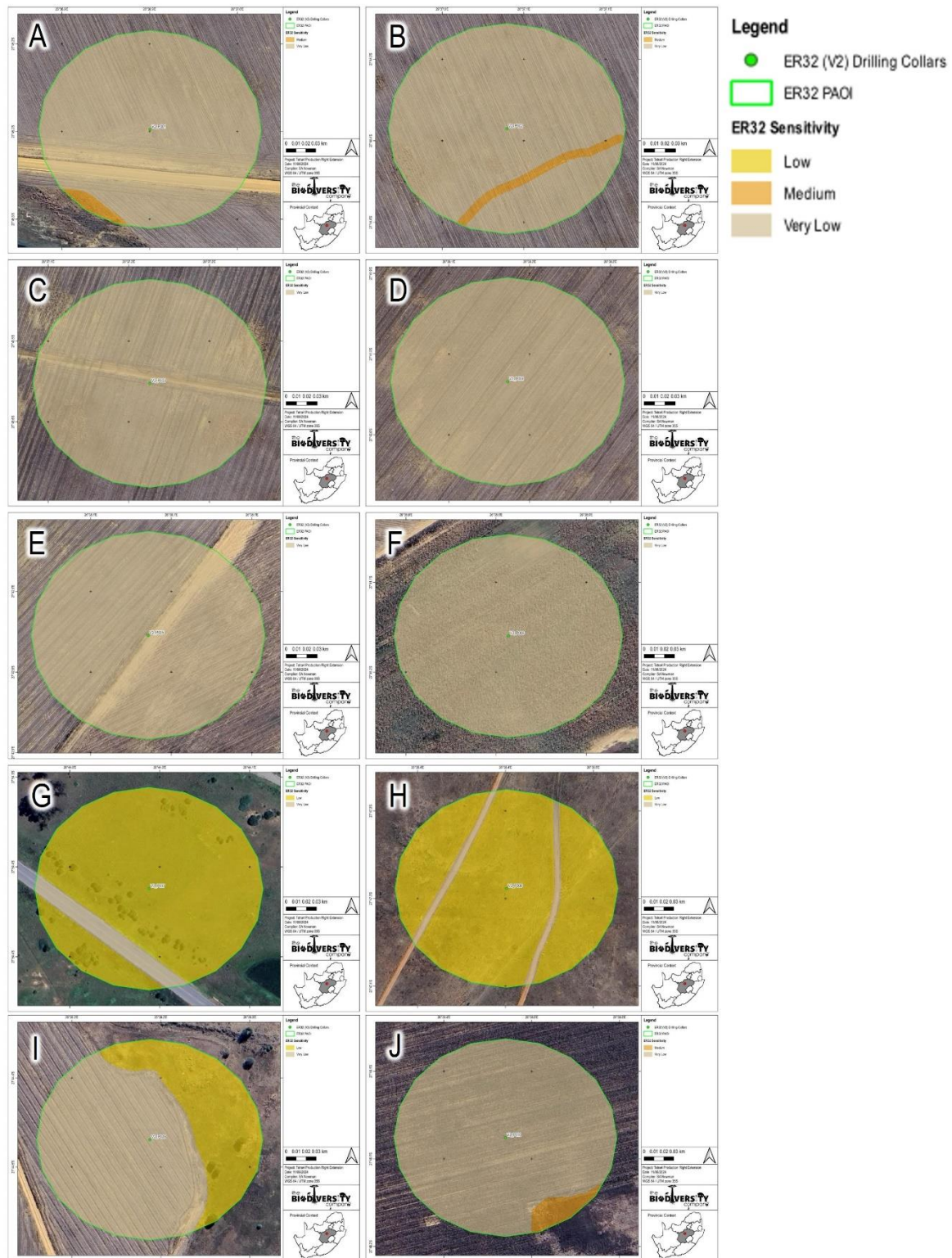


Figure 3-29 Site Ecological Importance of the ER32 PAOI: A) V2_P001, B) V2_P002, C) V2_P003, D) V2_P004, E) V2_P005, F) V2_P006, G) V2_P007, H) V2_P008, I) V2_P009 and J) V2_P010

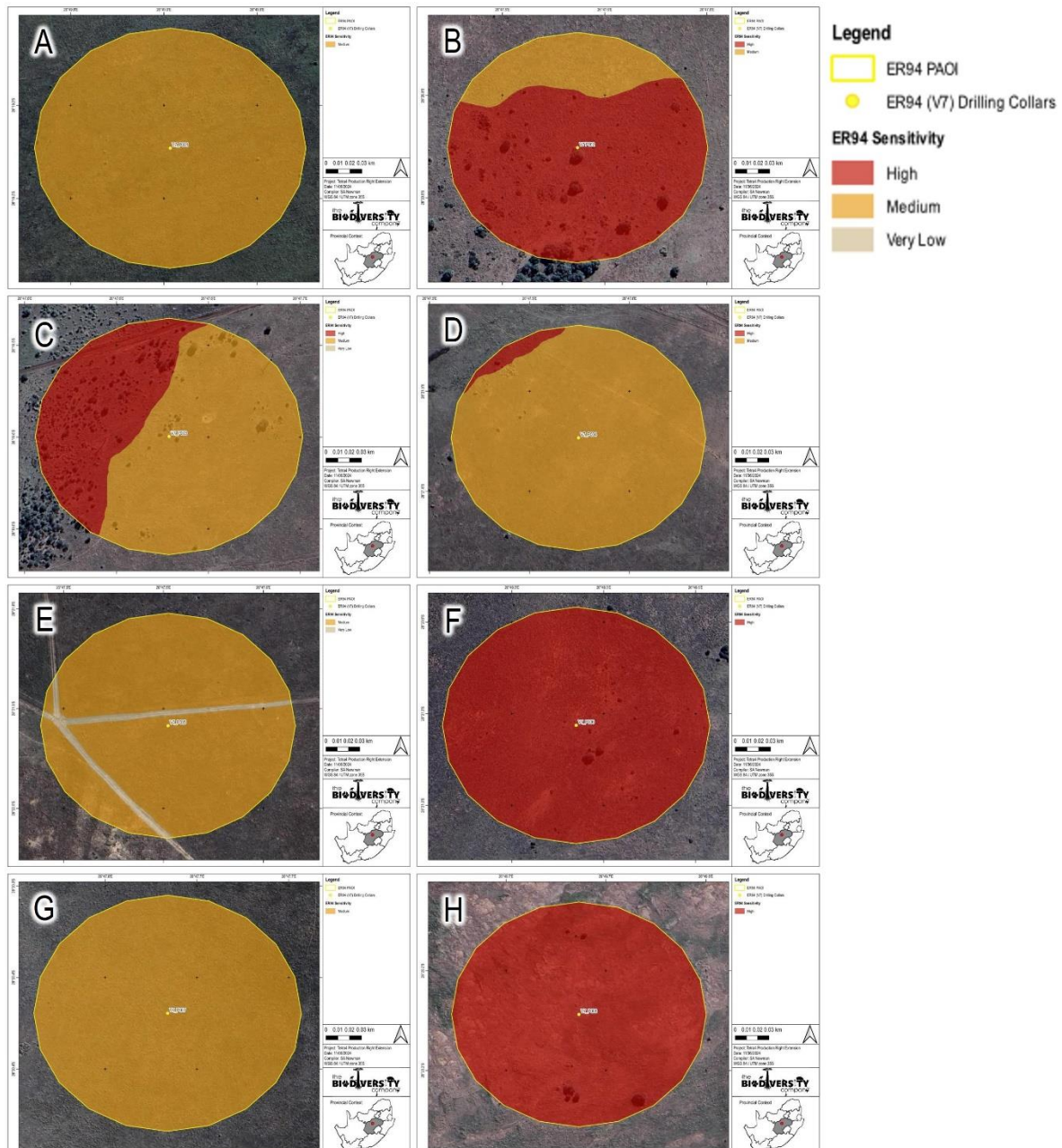


Figure 3-30 Site Ecological Importance of the ER94 PAOI: A) V7_P001, B) V7_P002, C) V7_P003, D) V7_P004, E) V7_P005, F) V7_P006, G) V7_P007 and H) V7_P008

3.4.1 Desktop Ecological Sensitivity

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Terrestrial Biodiversity Theme sensitivity is 'Very High' for the ER32 development area, due to it overlapping with a CBA 1, ESA 1, ESA 2 and the Endangered Vall-Vet Sandy Grassland vegetation type (Figure 3-31) and it is 'Very High' for the ER94 development area due to it overlapping with a CBA 1, CBA 2, ESA 1, ESA 2, FEPA Subcatchment and an NPAES (Figure 3-32);
- Plant Species Theme sensitivity is 'Low' for the ER32 PAOI due the presence of low sensitivity species (Figure 3-33) and it is 'Low' for the ER94 PAOI due to the presence of low sensitivity species (Figure 3-34); and
- Animal Species Theme sensitivity is 'High' for the ER32 PAOI due to the possible presence of one high sensitivity avifauna species and several medium sensitivity fauna species (Figure 3-35) and it is 'Medium' for the ER94 PAOI due to the possible presence of two medium sensitivity fauna species (Figure 3-36).

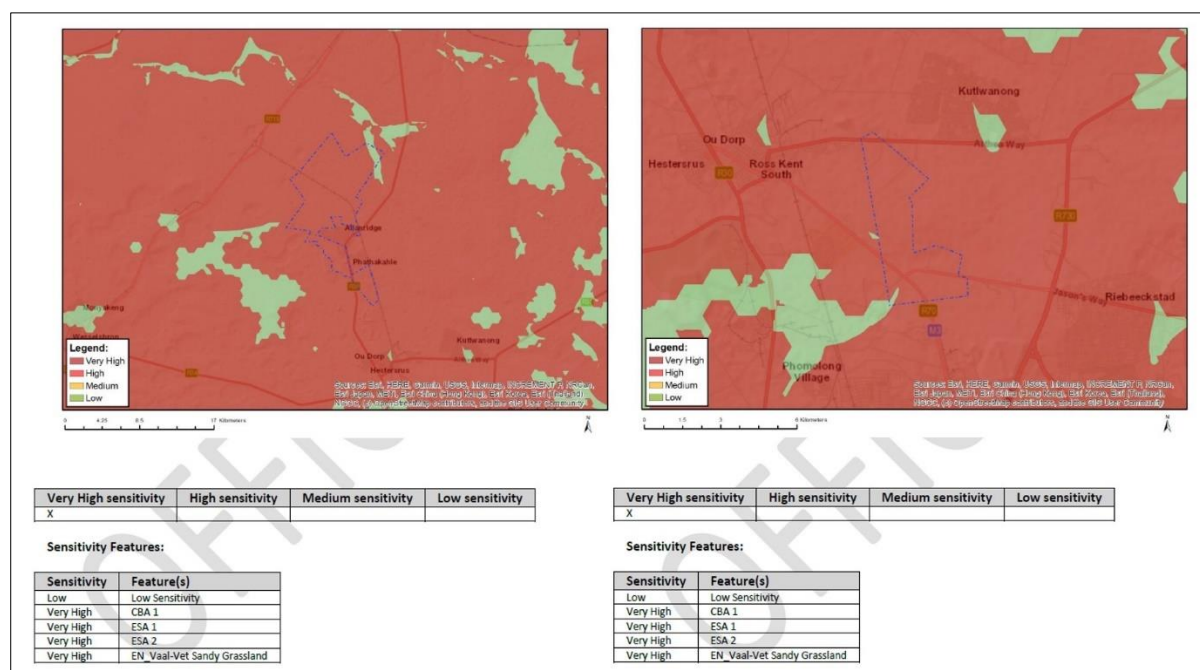


Figure 3-31 Terrestrial Biodiversity Theme sensitivity for the ER32 PAOI

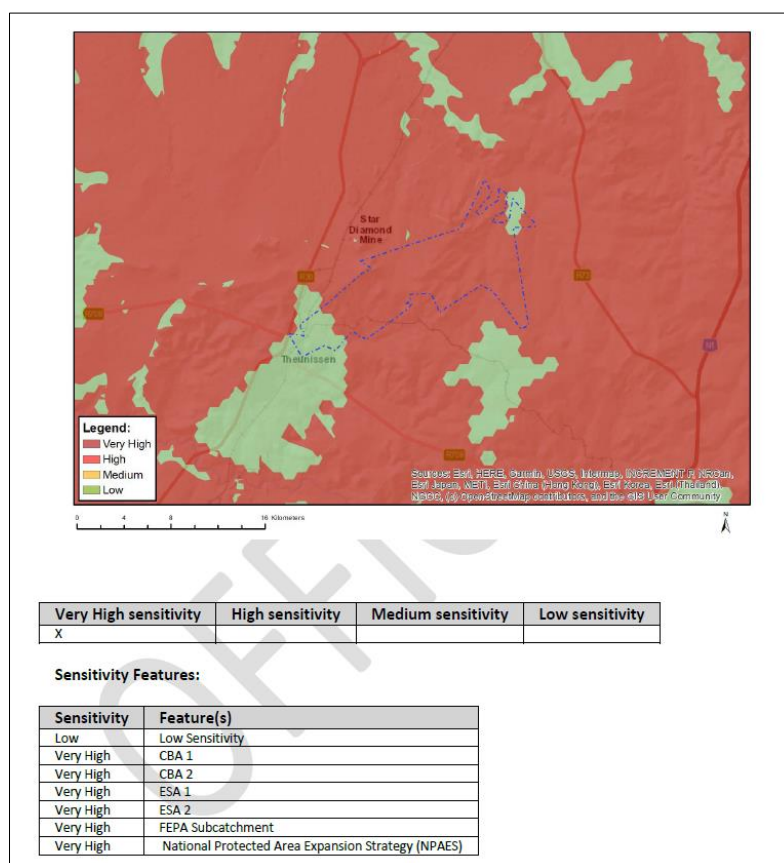


Figure 3-32 Terrestrial Biodiversity Theme sensitivity for the ER94 PAOI

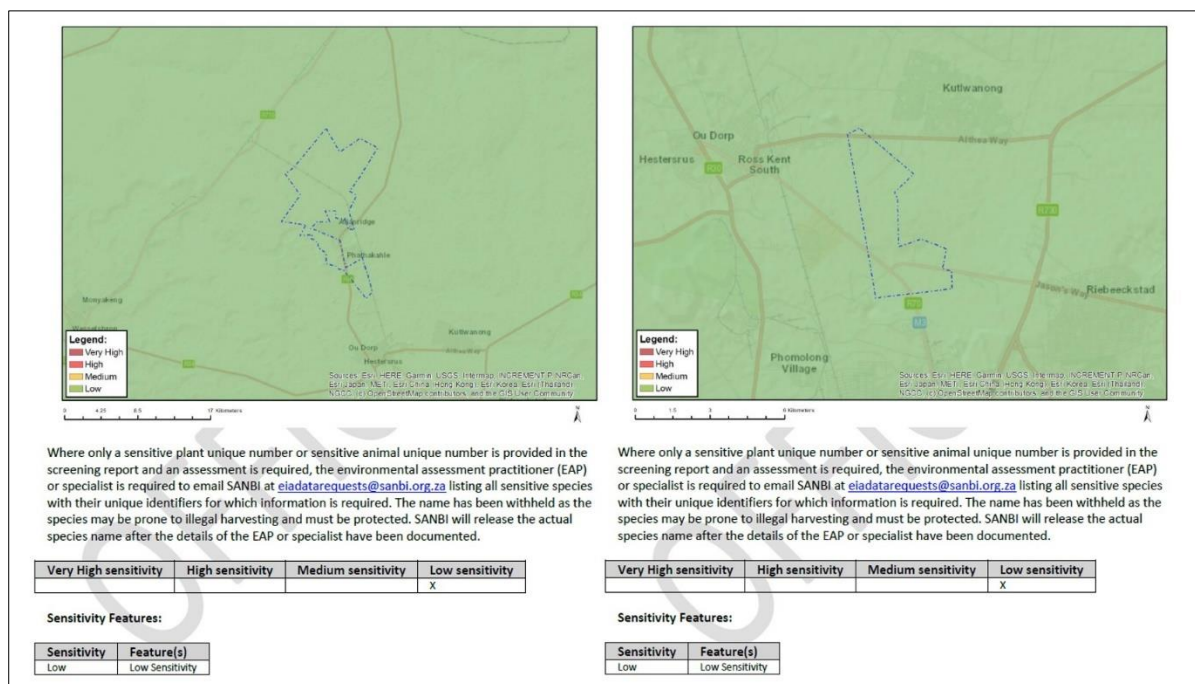


Figure 3-33 Relative Plant Species Theme Sensitivity for the ER32

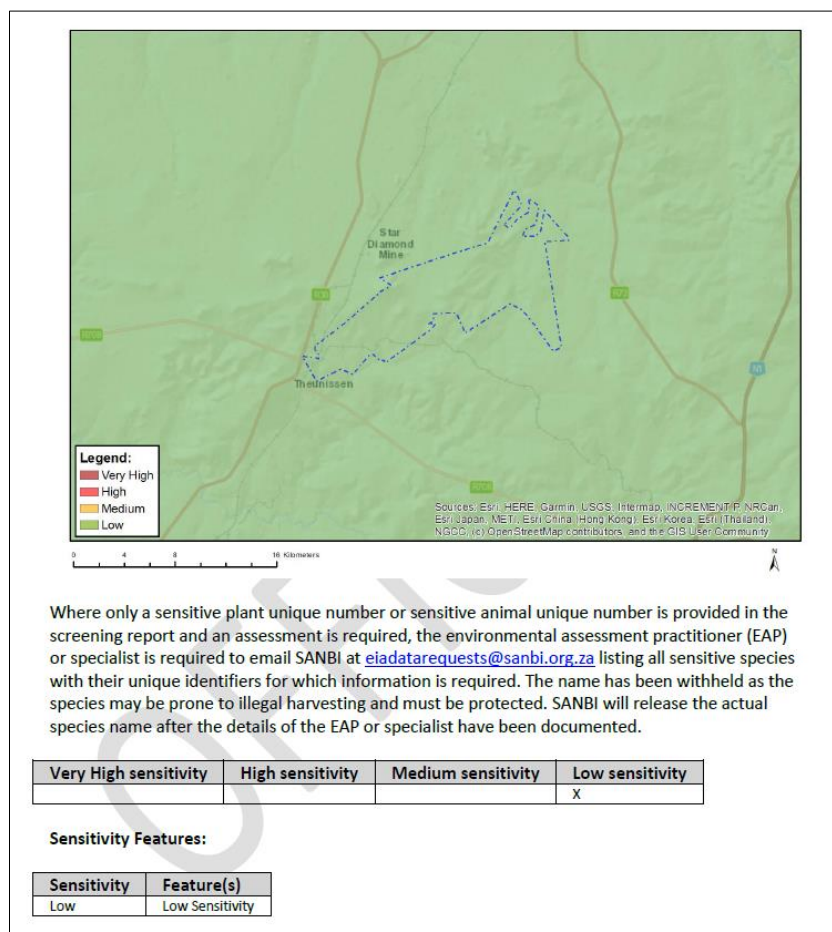


Figure 3-34 Relative Plant Species Theme Sensitivity for the ER94

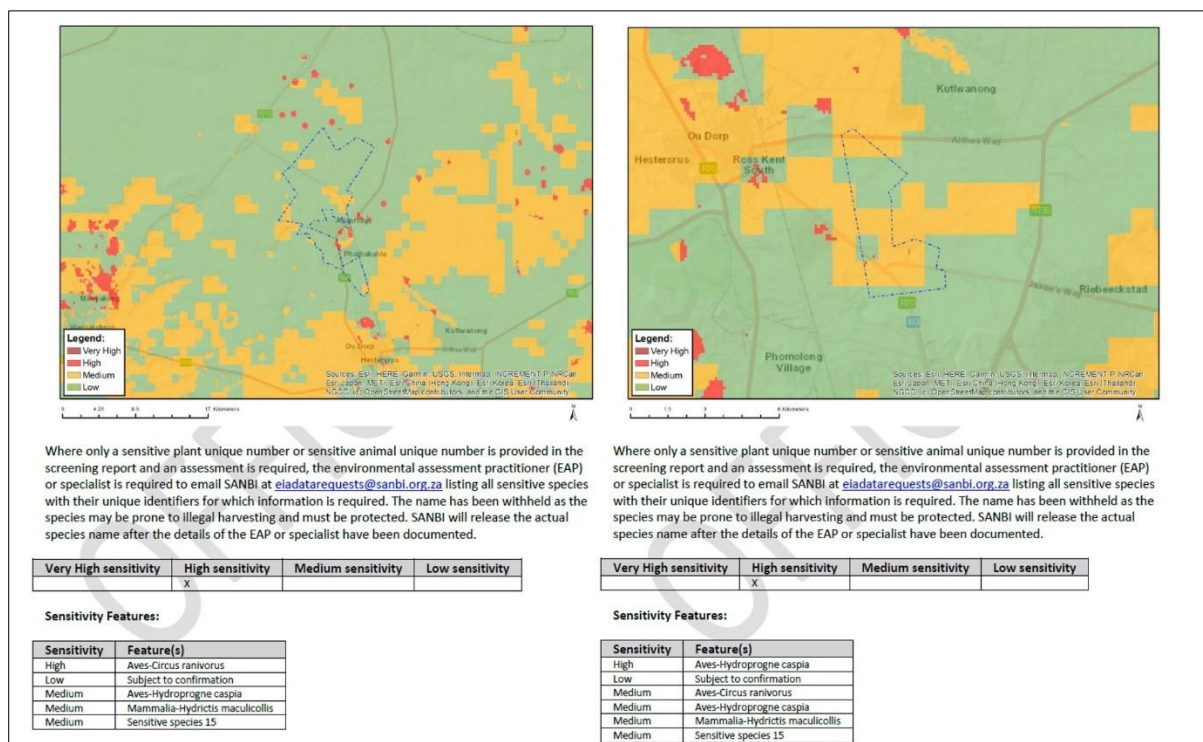


Figure 3-35 Relative Animal Species Theme Sensitivity for the ER32

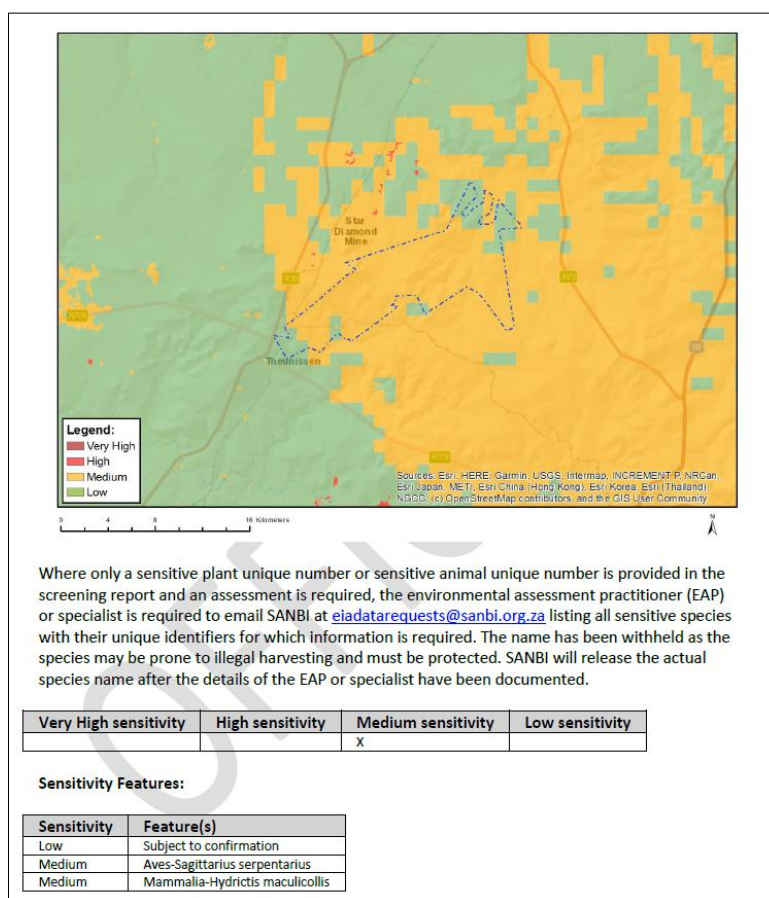


Figure 3-36 Relative Animal Species Theme Sensitivity for the ER34

3.4.2 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas of the ER32 PAOI in Table 3-14 and for the assessed areas of the ER94 PAOI in Table 3-15 below. 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 3-14 Summary of the screening tool vs specialist assigned sensitivities for the ER32 PAOI

Screening Tool Theme	Screening Tool	Habitat	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	High	-	Low	Disputed – Most of the PAOI is modified, with the remaining grassland areas existing in a heavily degraded state. Fauna SCC are unlikely to be resident here, although some may make use of the PAOI for foraging.
Plant Theme	Low	-	Low	Validated – Most of the PAOI is modified with the remaining grassland areas existing in a heavily degraded state. These grassland areas have been overgrazed and the incidence of Alien and invasive plants is high. SCC are unlikely.
Terrestrial Theme	Very High	Degraded grassland	Low	Disputed – Habitat heavily degraded, forming part of a fragmented landscape, with high levels of human ingress and high incidence of alien and invasive plants. As a result, flora SCC are unlikely to be present. Fauna SCC may make use of this habitat as a corridor or for foraging, but are unlikely to be resident here. CBA area has been transformed and is no longer representative of a CBA.
		Water Resource	Medium	Disputed – Habitat is degraded and surrounded by agricultural fields. It forms part of a fragmented landscape. Fauna SCC may use this habitat for foraging but are unlikely to be resident here. Flora SCC are unlikely to occur here.
		Modified	Very 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. Fauna and flora SCC unlikely to occur here.

Table 3-15 Summary of the screening tool vs specialist assigned sensitivities for the ER94 PAOI

Screening Tool Theme	Screening Tool	Habitat	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	Medium	-	Medium	Validated – Habitat is disturbed but still capable of supporting some species of SCC, and also acts as a corridor and foraging resource in a highly fragmented landscape. Fauna SCC likely.
Plant Theme	Low	-	Low	Validated – Habitat is disturbed and predominantly used for grazing cattle. Due to current land use, SCC are unlikely to occur in the grassland habitat due to trampling by cattle. However, protected species were recorded and are likely present so a walkdown must be performed prior to commencement of project activities.
Terrestrial Theme	Very High	Grassland	Medium	Disputed – Habitat disturbed in nature, with evidence of overgrazing and the subsequent bush encroachment by <i>Vachellia karroo</i> in some areas. Other areas remain in good condition. Flora SCC were not recorded and are not likely. Fauna SCC may make use of this habitat as a corridor or for foraging.
		Rocky Grassland	High	Disputed – Habitat is disturbed but inherently sensitive due to the microhabitats provided by rocky areas. Flora SCC were not recorded and are not likely, but protected species were recorded and more are expected. Fauna SCC may make use of this habitat as a corridor or for foraging.
		Water Resource	High	Disputed – Habitat is disturbed but inherently sensitive, providing an important resource for fauna in the region. It forms part of a fragmented landscape. Flora SCC may be present but seasonality restricted confirmation of this. Fauna SCC may make use of this habitat as a corridor or for foraging.

Modified

Very Low

Disputed – Habitat modified in nature, predominantly made up of roads. Fauna and flora SCC unlikely to occur here.

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 (Figure 4-1). 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.

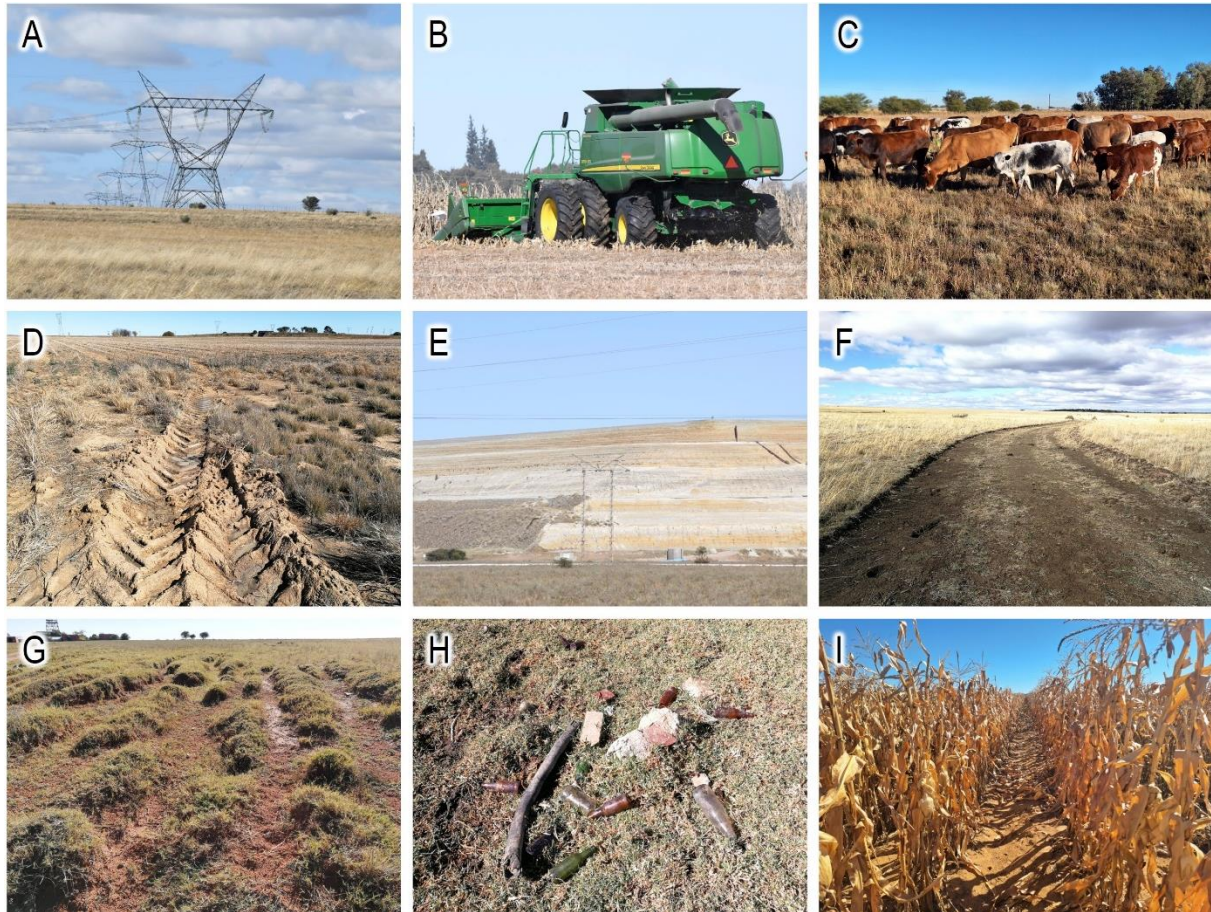


Figure 4-1 *Photographs illustrating current negative impacts associated within the PAOI: A) Overhead powerlines; B) Agricultural machinery; C) Grazing by cattle; D) Vehicle ingress into wetlands and other natural areas; E) Edge effects associated with mining activities; F) Roads; G) Erosion; H) Littering and I) Agriculture*

4.3 Alternatives Considered

No alternatives were considered.

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 and flora 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 Figure 4-1.

Table 4-1 *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"> • Direct loss as a result of construction and operation of the proposed development. • Secondary impacts associated with noise, dust and influx of AIPs into these areas. • Prevention of fires or incorrect fire regimes. • Improper solid waste disposal • Dust precipitation. • Contamination and pollution of water resources in the area. 	<ul style="list-style-type: none"> • Habitat fragmentation. • Loss of ecosystem services. • Emigration of fauna species, potentially including SCC. • Increased potential for soil erosion. • Habitat fragmentation. • Increased potential for establishment of alien invasive vegetation.
Encroachment of AIP species in disturbed areas.	<ul style="list-style-type: none"> • Vegetation removal. • Soil disturbance. • Vehicles potentially spreading seed. • Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents. 	<ul style="list-style-type: none"> • Habitat loss for native flora & fauna (including potential SCC). • Alteration of fauna assemblages due to habitat modification. • Reduced forage quality of grazing habitat. • Spreading of potentially dangerous diseases.
Direct mortality of fauna species.	<ul style="list-style-type: none"> • Clearing of vegetation. • Roadkill due to vehicle collision. • Preparation of soil with heavy machinery • Soil excavations and soil transportation. • Intentional killing of fauna for food (hunting) or persecution (especially with regard to herpetofauna). • Pollution of water resources due to spilling of hazardous chemicals from heavy machinery during construction. • Collisions of volant fauna with overhead powerlines. 	<ul style="list-style-type: none"> • Loss of ecosystem services. • Explosion of rodent populations and associated disease risk.
Emigration of fauna	<ul style="list-style-type: none"> • Disturbance from construction activities. • Loss of habitat and degradation of surrounding habitats. 	<ul style="list-style-type: none"> • Reduced population of protected species, and potentially SCC • Loss of ecosystem services.
Reduced dispersal/migration of fauna	<ul style="list-style-type: none"> • Removal of vegetation 	<ul style="list-style-type: none"> • Loss of ecosystem services • Reduced plant seed dispersal.
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, light and dust	<ul style="list-style-type: none"> • Operation of machinery (generators, crushers, vehicles). • Vehicles operating at night. • Large, intense fluorescent and mercury vapor lighting. 	<ul style="list-style-type: none"> • Loss of ecosystem services.
Loss of SCCs and/or protected species	<ul style="list-style-type: none"> • All unregulated/unsupervised activities outdoors. • Poaching and trapping • Staff and others interacting directly with fauna (potentially dangerous), or flora. 	<ul style="list-style-type: none"> • Loss of SCC. • Harm to people (dangerous fauna).

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 4-2. 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, 2024).

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 ESA;
- 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 ESA;
- 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.

4.7 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 4-2 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
Construction/Operational Phase								
4.6.1.1.	Destruction, further loss and fragmentation of the vegetation community	-13	-5.25	High	2	2	1.25	-6.56
Mitigation	<ul style="list-style-type: none"> Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be avoided where possible, otherwise minimised. All activities must be restricted within the very low-medium sensitivity areas. No further loss of high sensitivity areas and associated buffers should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. Minimise vegetation clearing to the minimum required. Areas should be cleared and disturbed on a needs only basis, as opposed to clearing and disturbing a number of sites simultaneously. All laydown, chemical toilets etc. should be restricted to Very Low SEI areas. Any materials may not be stored for extended periods of time and must be removed from the PAOI once the construction/closure phase has been concluded. No permanent structures should be permitted on site. No storage of vehicles or equipment will be allowed outside of the designated project areas. 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. Additional mitigations as per the existing EMPr for cluster 1 and 2, as provided by EIMS. 							
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"> The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas Compile and implement a Solid Waste Management Plan. Waste management must be a priority and all waste must be collected, stored and disposed of adequately. It is recommended that all waste be removed from site on a weekly basis as a minimum. Additional mitigations as per the existing EMPr for cluster 1 and 2, as provided by EIMS. 							
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	2	1.13	-6,75
Mitigation	<ul style="list-style-type: none"> Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the Project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories. Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals 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. Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons. <ul style="list-style-type: none"> Activities should take place during the day <i>Eupodotis caerulea</i> (Korhaan, Blue) breed from September to February, the project must avoid this period. 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 							

Tetra4 Production Right Extension

Identifier	Impact	Pre-mitigation ER	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
	overnight, these areas must be covered to prevent fauna falling into these areas and subsequently inspected prior to backfilling. <ul style="list-style-type: none"> Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and dumps especially. No non-environmentally friendly suppressants may be used as this could result in pollution of the environment, especially water sources. Additional mitigations as per the existing EMPr for cluster 1 and 2, as provided by EIMS 							
4.6.1.4.	Potential leaks, discharges, pollutant from machinery and storage leaching into the surrounding environment.	-14	-4	High	1	2	1.13	-4.50
Mitigation	<ul style="list-style-type: none"> Inspect vehicles and machinery on a daily basis for fuel and oil leakages and repair such. All mine vehicles to have spill kits to absorb medium sized oil or fuel spills <ul style="list-style-type: none"> Leaking equipment and vehicles must be repaired immediately or be removed from the project site to facilitate repair Additional mitigations as per the existing EMPr for cluster 1 and 2, as provided by EIMS. 							
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	<ul style="list-style-type: none"> Additional mitigations as per the existing EMPr for cluster 1 and 2, as provided by EIMS. 							
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	<ul style="list-style-type: none"> All vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Any excavations should not be left open. Limiting the closure and rehabilitation activities to the footprint areas only. Avoid entry/access to previously undisturbed or already rehabilitated areas. Additional mitigations as per the existing EMPr for cluster 1 and 2, as provided by EIMS. 							

5 Conclusion

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a medium-high confidence in the information provided. The survey ensured that there was suitable ground-truth coverage of the open-spaces and natural habitats, and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed.

Most of the ER32 PAOI is composed of Modified habitat, and what little grassland remains is severely degraded and no longer representative of its representative vegetation type or a CBA. Most of the ER94 PAOI is made up of Grassland habitat which has experienced some disturbance, mainly attributed to the grazing of cattle. No flora or fauna SCC were confirmed for the PAOI during the assessment, although some avifauna SCC are expected as they were recorded in the area. Flora species identifications were limited by seasonal constraints, therefore, a site walkdown, and search and rescue must be conducted for any and all protected and red listed species during the correct flowering season for this vegetation type (between October and March), along with permit applications, prior to commencement of any development activities. This walkdown must also incorporate a fauna component, with specific focus on *Sensitive Species 15* in case it should occur.

The PAOI was identified with the screening tool as possessing a 'Very High' sensitivity within a Terrestrial Biodiversity context, with the PAOI made up of CBA 1, ESA and NPAES areas. However, the outcome of the SEI assessment suggests that the Grassland habitat should be assigned a 'Medium' sensitivity and the Rocky Grassland habitat a 'High' sensitivity. The following aspects support this classification:

- Disturbed portions of Central Free State Grassland vegetation type which still contribute to valuable ecosystem functions and services;
- Serve and represent ESA areas, as identified by the conservation plan;
- Serve as NPAES;
- CBA area which overlaps with the PAOI no longer functions as a CBA as it has been severely degraded and has lost all functionality;
- Connectivity to natural areas within the landscape; and
- Protected flora species present, with the possibility of avifauna SCC occurring.

The Water Resource habitat was assigned a 'Medium' sensitivity within the ER32 PAOI and a 'High' sensitivity within the ER94 PAOI. These must receive a buffer as stipulated in the accompanying freshwater assessment (TBC, 2024) and should be avoided by all project activities.

The ecological integrity, importance and functioning of these habitats play a crucial role and an important habitat for various fauna and flora. The preservation of these systems is the most important aspect to consider for the proposed project. These habitats need to be protected and improved due to the role they play in a fragmented landscape.

Development within confirmed 'High' sensitivity areas is not considered favourably by the regulating authorities, and implementation of the mitigation hierarchy must be demonstrated. Development in 'Medium' sensitivity areas must demonstrate minimisation and restoration mitigation as much as possible.

Information on a project's proximity to protected areas and their buffers are included in the desktop component of the biodiversity assessment as this is taken into consideration by the department for

approval. The department will make a final decision as to whether construction within protected areas and their buffers is acceptable or not. The environmental impacts presented in this assessment apply overall, as well as their mitigations. There will be no change in impacts or mitigations pertaining specifically to protected area buffer zones, therefore, no specific impacts or mitigations were included here.

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 EMPr 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 (2022) 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 maintenance of basal vegetation cover is important for the project, so complete clearance of roads for activities is not recommended. Project planning according to mitigation may provide favourable avoidance mitigation

The following conditions may be considered by the Competent Authority for the authorisation:

- 1) Basal vegetation cover must be maintained;
- 2) A site walkdown must be conducted during the correct flowering season prior to the commencement of development activities and all protected species must be avoided or the relevant permits obtained to carry out a plant search and rescue, particularly in the case of drilling collar V7_P002 where numerous individuals of the provincially protected tree species; *Oleo europaea subsp. africana* were recorded;
- 3) 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;
- 4) All water resources and their buffers must be avoided; and
- 5) Avoidance mitigation must be implemented for the Rocky Grassland habitat unit.

6 References

Apps, P. 2000. *Smither's Mammals of Southern Africa – A Field Guide*. Struik Nature, Cape Town.

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (Eds). 2014. *Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1*. South African Biodiversity Institute, Pretoria.

Branch, B. 1998. *Field Guide to Snakes and Other Reptiles of Southern Africa*. Struik Nature, Cape Town.

Department of Forestry, Fisheries and the Environment (DFFE). 2023. SACAD (South Africa Conservation Areas Database) and SAPAD (South Africa Protected Areas Database). <http://egis.environment.gov.za>.

Department of Forestry, Fisheries and the Environment (DFFE). 2022. National Protected Areas Expansion Strategy <http://egis.environment.gov.za>.

Du Preez, L.H. & Carruthers, V. 2009. *A Complete Guide to the Frogs of Southern Africa*. Struik Nature, Cape Town.

Fish, L., Mashau, A.C., Moeaha, M.J. & Nembudani, M.T. 2015. *Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions*. SANBI, Pretoria.

FitzPatrick Institute of African Ornithology. 2024a. MammalMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=MammalMAP>

FitzPatrick Institute of African Ornithology. 2024b. ReptileMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=ReptileMAP>

FitzPatrick Institute of African Ornithology. 2024c. FrogMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=FrogMAP>

Mucina, L. & Rutherford, M.C. (Eds.). 2006. *The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19*. South African National Biodiversity Institute, Pretoria, South African.

Mucina, L., Rutherford, M.C. & Powrie, L.W. (Eds.). 2007. *Vegetation map of South Africa, Lesotho and Swaziland. 1:1 000 000 scale sheet maps. 2nd ed.* South African National Biodiversity Institute, Pretoria.

Mucina, L., Scott-Shaw, CR., Rutherford, MC., Camp., KGT., Matthews, WS., Powrie, LW and Hoare, DB. Indian Ocean Coastal Belt. IN Mucina, L. & Rutherford, M.C. (Eds.). 2006. *The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19*. South African National Biodiversity Institute, Pretoria, South African.

National Biodiversity Assessment spatial data. 2018. <http://bgis.sanbi.org/>. Accessed January 2022.

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

NEMBA. 2014. Government Gazette, Volume 584. No 37320. www.gpwonline.co.za. Accessed January 2022.

POSA. 2016. Plants of South Africa - an online checklist. POSA ver. 3.0. <http://newposa.sanbi.org/>. (Accessed: August 2023).

Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. 2009. *Red List of South African Plants. Strelitzia 25*. South African National Biodiversity Institute, Pretoria.

SANBI. 2022. Red List of South African Plants version 2020. redlist.sanbi.org (Accessed: May 2023)

SANBI-BGIS. 2017. Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning.

SAPAD (South Africa Protected Areas Database) and SACAD (South Africa Conservation Areas Database) (2023). <http://egis.environment.gov.za>

Skinner, J.D. & Chimimba, C.T. 2005. *The Mammals of the Southern African Sub-region*. Cambridge University Press, Cape Town.

Skowno, A.L. & Monyeki, M.S. 2021. South Africa's Red List of Terrestrial Ecosystems (RLEs). *Land*, 10, 1048, 1-14.

Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.

Stuart, C & Stuart, M. A. 2013. Field guide to the tracks & signs of Southern, Central & East African Wildlife. Penguin Random House, Cape Town.

Stuart, C & Stuart, M. A. 2015. Stuarts' Field Guide to Mammals of Southern Africa including Angola, Zambia & Malawi. Struik Nature, Cape Town.

Taylor A, Cowell C, Drouilly M, Schulze E, Avenant N, Birss C, Child MF. 2016. A conservation assessment of *Pelea capreolus*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Taylor, M.R., Peacock, F. & Wanless, R.M. (Eds). 2015. The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

Van Deventer H, Smith-Adao L, Collins NB, Grenfell M, Grundling A, Grundling P-L, Impson D, Job N, Lötter M, Ollis D, Petersen C, Scherman P, Sieben E, Snaddon K, Tererai F. and Van der Colff D. 2019. *South African National Biodiversity Assessment 2018: Technical Report*. Volume 2b: Inland Aquatic (Freshwater) Realm. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria. <http://hdl.handle.net/20.500.12143/6230>.

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.

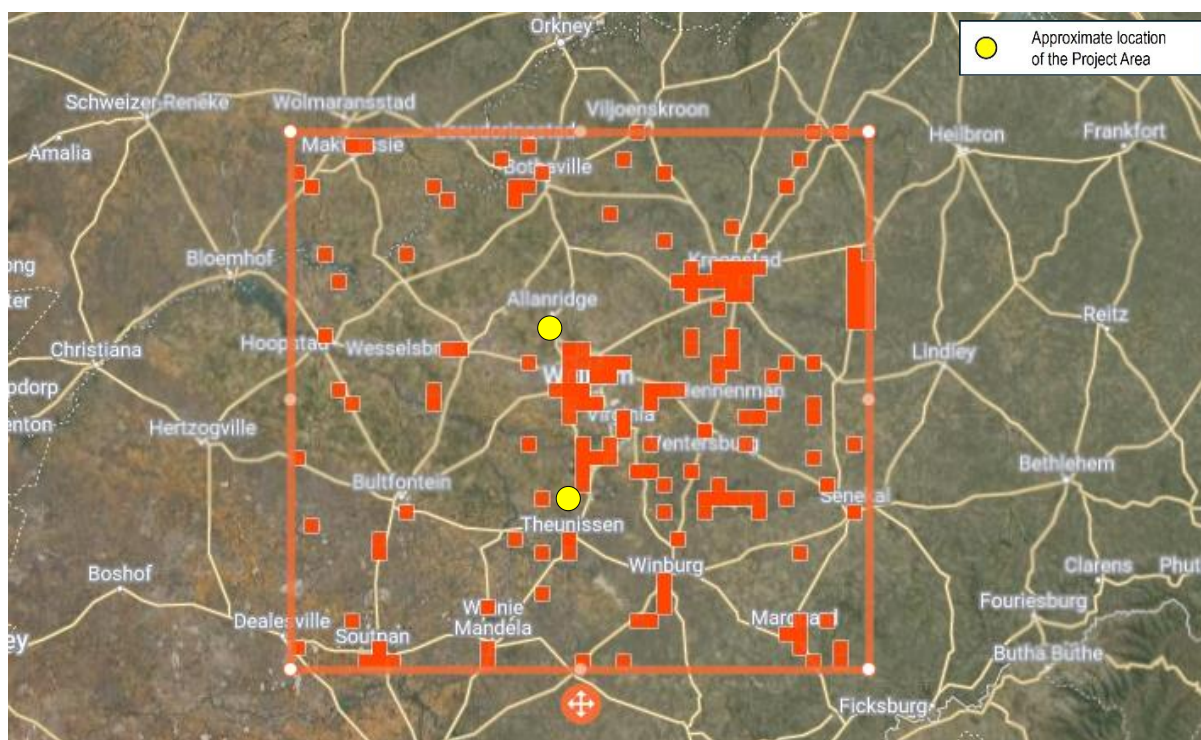


Figure 7-1 Map illustrating extent of area used to obtain the expected flora species list from the iNaturalist database. The yellow dots indicate the approximate location of the PAOI

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) 2726DA, 2726DC and 2826BD quarter degree square and the associated pentads.

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
Very High	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 ² . 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).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km ² . 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).
Medium	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.
Low	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.
Very Low	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
Very High	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.
High	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.
Medium	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.
Low	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.
Very Low	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
Very High	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.
High	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.
Medium	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.
Low	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.
Very Low	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
Very High	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.
High	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.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	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	Common Name	Red List	Ecology
Acanthaceae	<i>Dicliptera clinopodia</i>		LC	Indigenous
Acanthaceae	<i>Blepharis squarrosa</i>		LC	Indigenous; Endemic
Aizoaceae	<i>Delosperma cooperi</i>	Purple Trailing Sheepfig		Indigenous
Aizoaceae	<i>Ruschia calcarea</i>		DDT	Indigenous; Endemic
Aizoaceae	<i>Nananthus vittatus</i>		DDT	Indigenous
Aizoaceae	<i>Mestoklema tuberosum</i>	Common Donkeyfig	LC	Indigenous; Endemic
Aizoaceae	<i>Ruschia hamata</i>	Cow Tentfig	LC	Indigenous
Aizoaceae	<i>Ruschia pulvinaris</i>	Cushion Tentfig	LC	Indigenous; Endemic
Aizoaceae	<i>Rabiea albipuncta</i>		LC	Indigenous; Endemic
Aizoaceae	<i>Ruschia rigens</i>	Bushy Cushion Tentfig	LC	Indigenous; Endemic
Aizoaceae	<i>Chasmatophyllum musculinum</i>	Yellow Humbugfig	LC	Indigenous
Aizoaceae	<i>Delosperma floribundum</i>	Stock Sheepfig	LC	Indigenous; Endemic
Aizoaceae	<i>Delosperma herbeum</i>	Witberg Sheepfig	LC	Indigenous
Amaranthaceae	<i>Alternanthera pungens</i>	Paperthorn		Not indigenous; Naturalised
Amaranthaceae	<i>Guilleminea densa</i>	small matweed		Not indigenous; Naturalised; Invasive
Amaranthaceae	<i>Gomphrena celosioides</i>	Bachelor's Button		Not indigenous; Naturalised
Amaranthaceae	<i>Salsola kali</i>	Russian Tumbleweed		Not indigenous; Naturalised; Invasive
Amaranthaceae	<i>Cyathula uncinulata</i>	Globe Cyathula	LC	Indigenous
Amaryllidaceae	<i>Boophone disticha</i>	Common Oxbane		Indigenous
Amaryllidaceae	<i>Nothoscordum gracile</i>	Onion Weed		Not indigenous; Naturalised; Invasive
Amaryllidaceae	<i>Ammocharis coranica</i>	Ground lily	LC	Indigenous
Amaryllidaceae	<i>Gethyllis transkarooica</i>	Karoo Kukumakranka	LC	Indigenous
Amaryllidaceae	<i>Brunsvigia radulosa</i>	Eastern Candelabra	LC	Indigenous
Amaryllidaceae	<i>Crinum bulbispermum</i>	Orange River Swampily	LC	Indigenous
Amaryllidaceae	<i>Tulbaghia acutiloba</i>	Pungent Wild Garlic	LC	Indigenous
Anacampserotaceae	<i>Anacampseros ustulata</i>		LC	Indigenous; Endemic
Anacampserotaceae	<i>Anacampseros filamentosa</i>		LC	Indigenous
Anacardiaceae	<i>Searsia lancea</i>	Karee	LC	Indigenous
Anacardiaceae	<i>Searsia pyroides pyroides</i>	Common Wild Currant	LC	Indigenous
Anacardiaceae	<i>Searsia erosa</i>	Broom Karree	LC	Indigenous
Anacardiaceae	<i>Searsia burchellii</i>	Karoo Kunirhus	LC	Indigenous
Anacardiaceae	<i>Searsia pyroides</i>	Common Wild Currant	LC	Indigenous
Anacardiaceae	<i>Schinus molle</i>	Peruvian Pepper Tree	NE	Not indigenous; Naturalised; Invasive
Apiaceae	<i>Bupleurum mundii</i>		LC	Indigenous

Apocynaceae	<i>Asclepias stellifera</i>	common meadow-star	LC	Indigenous
Apocynaceae	<i>Gomphocarpus fruticosus fruticosus</i>	Wild Cotton	LC	Indigenous
Apocynaceae	<i>Raphionacme hirsuta</i>	False Gentian	LC	Indigenous
Apocynaceae	<i>Asclepias multicaulis</i>	doily cartwheel	LC	Indigenous
Apocynaceae	<i>Gomphocarpus fruticosus</i>	Narrow-leaf Cotton Bush	LC	Indigenous
Apocynaceae	<i>Pentarrhinum insipidum</i>	African Heartvine	LC	Indigenous
Apocynaceae	<i>Cynanchum virens</i>	Green Buckhorn	LC	Indigenous
Apocynaceae	<i>Vinca major</i>	greater periwinkle	NE	Not indigenous; Naturalised; Invasive
Aponogetonaceae	<i>Aponogeton desertorum</i>	Desert Waterblommetjie	LC	Indigenous
Araliaceae	<i>Cussonia paniculata sinuata</i>	Mountain Cabbagetree	LC	Indigenous
Asparagaceae	<i>Albuca prasina</i>			Indigenous
Asparagaceae	<i>Agave americana</i>	American century plant		Not indigenous; Naturalised; Invasive
Asparagaceae	<i>Agave angustifolia</i>	Caribbean Agave		Not indigenous; Naturalised; Invasive
Asparagaceae	<i>Albuca setosa</i>	Thick Slime-lily	LC	Indigenous
Asparagaceae	<i>Dipcadi ciliare</i>	Curlicurly Daintybells	LC	Indigenous; Endemic
Asparagaceae	<i>Asparagus larinicus</i>	Clusterleaf Asparagus	LC	Indigenous
Asparagaceae	<i>Dipcadi viride</i>	Green Daintybells	LC	Indigenous
Asparagaceae	<i>Asparagus suaveolens</i>	Catthorn Asparagus	LC	Indigenous
Asparagaceae	<i>Massonia jasminiflora</i>	Jasmine Hedgehog Lily	LC	Indigenous
Asparagaceae	<i>Ledebouria luteola</i>	highveld African hyacinth	LC	Indigenous
Asparagaceae	<i>Albuca seineri</i>		LC	Indigenous
Asparagaceae	<i>Chlorophytum cooperi</i>		LC	Indigenous
Asparagaceae	<i>Albuca virens</i>	Green Tamarak	LC	Indigenous
Asparagaceae	<i>Schizocarpus nervosus</i>	sand lily	LC	Indigenous
Asparagaceae	<i>Ledebouria marginata</i>	tough-leaved African hyacinth	LC	Indigenous
Asparagaceae	<i>Drimia sanguinea</i>	Red Squill	NT	Indigenous
Asparagaceae	<i>Yucca aloifolia</i>	Aloe Yucca		
Asparagaceae	<i>Yucca gigantea</i>	Spineless Yucca		
Asphodelaceae	<i>Bulbine asphodeloides</i>	Copaiba		Present
Asphodelaceae	<i>Aloe davyana</i>	Highveld Spotted Aloe		Indigenous; Endemic
Asphodelaceae	<i>Aloe braamvanwykii</i>		EN	Indigenous; Endemic
Asphodelaceae	<i>Bulbine abyssinica</i>	African Beardstyle	LC	Indigenous
Asphodelaceae	<i>Aloe grandidentata</i>	Soup Aloe	LC	Indigenous
Asphodelaceae	<i>Bulbine narcissifolia</i>	Strapleaf Kopieva	LC	Indigenous
Asteraceae	<i>Tagetes minuta</i>	Tall Khaki Weed		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Sonchus oleraceus</i>	Common Sow-thistle		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Cirsium vulgare</i>	Bull Thistle		Not indigenous; Naturalised; Invasive

Asteraceae	<i>Zinnia peruviana</i>	Peruvian zinnia		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Hilliardiella elaeagnoides</i>	Bicolour Vernonia		Indigenous
Asteraceae	<i>Cichorium intybus</i>	chicory		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Xanthium strumarium</i>	rough cocklebur		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Bidens pilosa</i>	Common Black Jack		Not indigenous; Naturalised
Asteraceae	<i>Artemisia afra</i>	African wormwood		Indigenous
Asteraceae	<i>Schkuhria pinnata</i>	dwarf marigold		Not indigenous; Naturalised
Asteraceae	<i>Bidens bipinnata</i>	Spanish needles		Not indigenous; Naturalised
Asteraceae	<i>Cosmos bipinnatus</i>	Cosmos		Not indigenous; Naturalised
Asteraceae	<i>Sonchus asper</i>	prickly sowthistle		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Erigeron bonariensis</i>	Flax-leaved Horseweed		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Xanthium spinosum</i>	spiny cocklebur		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Berkheya onopordifolia</i>			Indigenous
Asteraceae	<i>Flaveria bidentis</i>	speedyweed		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Gazania krebsiana</i>	Terracotta Gazania		Indigenous
Asteraceae	<i>Gazania krebsiana serrulata</i>	Grassland Terracotta Gazania	LC	Indigenous
Asteraceae	<i>Helichrysum argyrosphaerum</i>	Wild Everlasting	LC	Indigenous
Asteraceae	<i>Nidorella podocephala</i>	Conyza	LC	Indigenous
Asteraceae	<i>Euryops imbricatus</i>		LC	Indigenous; Endemic
Asteraceae	<i>Helichrysum dregeanum</i>		LC	Indigenous
Asteraceae	<i>Lactuca inermis</i>	African Lettuce	LC	Indigenous
Asteraceae	<i>Felicia muricata muricata</i>		LC	Indigenous
Asteraceae	<i>Senecio laevigatus</i>		LC	Indigenous; Endemic
Asteraceae	<i>Haplocarpha scaposa</i>	Common Falsegerbera	LC	Indigenous
Asteraceae	<i>Arctotis venusta</i>	blue-eyed African daisy	LC	Indigenous
Asteraceae	<i>Dicoma macrocephala</i>	Bighead Karmedik	LC	Indigenous
Asteraceae	<i>Helichrysum rugulosum</i>	Wrinkly Everlasting	LC	Indigenous
Asteraceae	<i>Senecio inaequidens</i>	Narrow-leaved Ragwort	LC	Indigenous
Asteraceae	<i>Cineraria erodioides</i>		LC	Indigenous
Asteraceae	<i>Seriphium vulgaris</i>	Grassveld Snakebush	LC	Indigenous
Asteraceae	<i>Tarchonanthus camphoratus</i>	Wild Camphorbush	LC	Indigenous
Asteraceae	<i>Arctotheca calendula</i>	Capeweed	LC	Indigenous
Asteraceae	<i>Senecio consanguineus</i>	Starvation Groundsel	LC	Indigenous
Asteraceae	<i>Dimorphotheca caulescens</i>	Longstem Rain Daisy	LC	Indigenous
Asteraceae	<i>Felicia muricata</i>	Pale Felicia	LC	Indigenous; Endemic
Asteraceae	<i>Pentzia globosa</i>	Grey Karoo	LC	Indigenous
Asteraceae	<i>Chrysocoma ciliata</i>	Bitterbush	LC	Indigenous

Asteraceae	<i>Arctotis arctotoides</i>	Gold African Daisy	LC	Indigenous
Asteraceae	<i>Berkheya pinnatifida stobaeoides</i>		LC	Indigenous
Asteraceae	<i>Nidorella hottentotica</i>	Grassland Vleiweed	LC	Indigenous
Asteraceae	<i>Helichrysum nudifolium</i>	Icholocholo	LC	Indigenous
Asteraceae	<i>Felicia filifolia</i>	Fine Felicia	LC	Indigenous; Endemic
Asteraceae	<i>Senecio erubescens erubescens</i>		NE	
Asteraceae	<i>Tagetes lunulata</i>	Red-crescent marigold		
Asteraceae	<i>Hypochaeris albiflora</i>	white flatweed		
Bignoniaceae	<i>Tecoma stans</i>	yellow bells		Not indigenous; Naturalised; Invasive
Bignoniaceae	<i>Pandorea jasminoides</i>	Bower Plant		
Boraginaceae	<i>Heliotropium curassavicum</i>	Seaside String-of-Stars		Not indigenous; Naturalised
Brassicaceae	<i>Rorippa fluvialis</i>			Indigenous
Bryaceae	<i>Bryum argenteum</i>	Silvery Bryum		Indigenous
Cactaceae	<i>Opuntia cespitosa</i>	Eastern Pricklypear		Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	<i>Opuntia elata</i>	Riverina pear		Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	<i>Opuntia leucotricha</i>	Arborescent Pricklypear		Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	<i>Cylindropuntia imbricata</i>	tree cholla		Not indigenous; Naturalised; Invasive
Cactaceae	<i>Austrocylindropuntia cylindrica</i>	Cane Cactus		Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	<i>Opuntia ficus-indica</i>	Prickly Pear Cactus	NE	Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	<i>Trichocereus spachianus</i>	torch cactus	NE	
Cactaceae	<i>Cereus jamacaru</i>	Queen-of-the-night	NE	Not indigenous; Naturalised; Invasive
Cactaceae	<i>Cylindropuntia imbricata imbricata</i>	Northern Tree Cholla		
Cactaceae	<i>Cylindropuntia imbricata spinosior</i>	walkingstick cactus		
Cactaceae	<i>Bergerocactus emoryi</i>	Golden-spined Cereus		
Campanulaceae	<i>Lobelia flaccida</i>	Floppy Lobelia		Indigenous
Cannabaceae	<i>Celtis africana</i>	White Stinkwood	LC	Indigenous
Caprifoliaceae	<i>Scabiosa columbaria</i>	Small Scabious	LC	Indigenous
Celastraceae	<i>Gymnosporia buxifolia</i>	Common Spikethorn	LC	Indigenous
Colchicaceae	<i>Colchicum melanthioides melanthioides</i>	Common Pajamaflower	LC	Indigenous
Commelinaceae	<i>Commelina africana</i>	Yellow Dayflower	LC	Indigenous
Commelinaceae	<i>Cyanotis speciosa</i>	Showy Blue Ear	LC	Indigenous
Convolvulaceae	<i>Convolvulus sagittatus</i>	arrow bindweed		Present
Convolvulaceae	<i>Dichondra micrantha</i>	Wonderlawn		Not indigenous; Naturalised
Convolvulaceae	<i>Ipomoea oenotheroides</i>	Turbine Morning Glory	LC	Indigenous

Convolvulaceae	<i>Seddera capensis</i>		LC	Indigenous
Convolvulaceae	<i>Ipomoea bolusiana</i>	Narrowleaf Morning Glory	LC	Indigenous
Convolvulaceae	<i>Ipomoea pellita</i>	Grassveld Morning Glory	LC	Indigenous
Crassulaceae	<i>Kalanchoe rotundifolia</i>	Nentakalanchoe		Indigenous
Crassulaceae	<i>Cotyledon orbiculata oblonga</i>	Oblong Pigs Ear	LC	Indigenous
Crassulaceae	<i>Crassula capitella</i>	Redspot Stonecrop	LC	Indigenous
Crassulaceae	<i>Crassula corallina</i>	Coral Stonecrop	LC	Indigenous
Crassulaceae	<i>Kalanchoe delagoensis</i>	Mother-of-Millions		
Cucurbitaceae	<i>Cucumis myriocarpus</i>	Thorny Cucumber	LC	Indigenous
Cucurbitaceae	<i>Coccinia sessilifolia sessilifolia</i>			
Cyperaceae	<i>Cyperus chrysanthus</i>			Indigenous
Cyperaceae	<i>Afroscirpoides dioeca</i>			Indigenous
Cyperaceae	<i>Cyperus congestus</i>	Purple Umbrella Sedge		Indigenous
Cyperaceae	<i>Cyperus erectus</i>			
Ebenaceae	<i>Diospyros lycioides lycioides</i>	Karoobloubos	LC	Indigenous
Ebenaceae	<i>Diospyros austro-africana microphylla</i>		LC	Indigenous
Ebenaceae	<i>Euclea crispa crispa</i>	Common Blue Guarri	LC	Indigenous
Ebenaceae	<i>Diospyros lycioides</i>	Quilted Bluebush	LC	Indigenous; Endemic
Ebenaceae	<i>Diospyros austro-africana</i>	Firestick Starapple	LC	Indigenous
Euphorbiaceae	<i>Euphorbia serpens</i>	Matted Sandmat	NE	Not indigenous; Naturalised
Euphorbiaceae	<i>Euphorbia prostrata</i>	prostrate sandmat	NE	Not indigenous; Naturalised
Euphorbiaceae	<i>Euphorbia clavarioides</i>	Lion Spoor	NE	Indigenous; Endemic
Fabaceae	<i>Ophrestia oblongifolia</i>			Indigenous
Fabaceae	<i>Erythrostemon gilliesii</i>	yellow bird-of-paradise shrub		Not indigenous; Naturalised; Invasive
Fabaceae	<i>Indigofera alternans</i>	Springbuck Indigo		Indigenous
Fabaceae	<i>Argyrobium pauciflorum</i>	Mini Silverpod	LC	Indigenous
Fabaceae	<i>Vachellia erioloba</i>	Camel Thorn	LC	Indigenous
Fabaceae	<i>Vachellia karroo</i>	Sweetthorn	LC	Indigenous
Fabaceae	<i>Indigofera sessilifolia</i>	Karoo Indigo	LC	Indigenous
Fabaceae	<i>Erythrina zeyheri</i>	Ploegbreker	LC	Indigenous
Fabaceae	<i>Rhynchosia reptabunda</i>		LC	Indigenous
Fabaceae	<i>Lessertia frutescens</i>	cancer bush	LC	Indigenous; Endemic
Fabaceae	<i>Sesbania punicea</i>	Scarlet Sesbane	NE	Not indigenous; Naturalised; Invasive
Fabaceae	<i>Gleditsia triacanthos</i>	honey locust	NE	Not indigenous; Naturalised; Invasive
Fabaceae	<i>Trifolium africanum africanum</i>	African Wild Clover	NE	
Francoaceae	<i>Melianthus comosus</i>	Crown Honeyflower	LC	Indigenous
Geraniaceae	<i>Monsonia angustifolia</i>	Narrowleaf Dysentry-Herb	LC	Indigenous

Tetra4 Production Right Extension

Geraniaceae	<i>Pelargonium sidoides</i>	Black Storksbill	LC	Indigenous
Hypoxidaceae	<i>Hypoxis hemerocallidea</i>	African Stargrass	LC	Indigenous
Iridaceae	<i>Moraea simulans</i>	Fake Glasstulp	LC	Indigenous
Iridaceae	<i>Moraea pallida</i>	Pale Tulp	LC	Indigenous
Iridaceae	<i>Moraea stricta</i>		LC	Indigenous
Iridaceae	<i>Gladiolus permeabilis edulis</i>		LC	Indigenous
Juncaceae	<i>Juncus rigidus</i>	Salt Rush	LC	Indigenous
Lamiaceae	<i>Leucas martinicensis</i>	White Tumbleweed		Indigenous
Lamiaceae	<i>Lamium amplexicaule</i>	henbit deadnettle		Not indigenous; Naturalised; Invasive
Lamiaceae	<i>Salvia verbenaca</i>	wild clary	LC	Not indigenous; Naturalised; Invasive
Lamiaceae	<i>Teucrium trifidum</i>	Fever Woodsage	LC	Indigenous
Malvaceae	<i>Sphaeralcea bonariensis</i>	Latin globemallow		Not indigenous; Naturalised
Malvaceae	<i>Malva parviflora</i>	cheeseweed mallow		Not indigenous; Naturalised
Malvaceae	<i>Hibiscus trionum</i>	flower-of-an-hour		Not indigenous; Naturalised
Malvaceae	<i>Modiola caroliniana</i>	Carolina Bristlemallow		Not indigenous; Naturalised
Malvaceae	<i>Hermannia depressa</i>	Purpleleaf Dollsrose	LC	Indigenous
Malvaceae	<i>Sida dregei</i>	Spiderlegs	LC	Indigenous
Malvaceae	<i>Hermannia transvaalensis</i>		LC	Indigenous; Endemic
Malvaceae	<i>Hibiscus microcarpus</i>		LC	Indigenous
Malvaceae	<i>Hermannia coccocarpa</i>	Pink Dollsrose	LC	Indigenous
Marsileaceae	<i>Marsilea macrocarpa</i>		LC	Indigenous
Meliaceae	<i>Melia azedarach</i>	Syringa	NE	Not indigenous; Naturalised; Invasive
Nyctaginaceae	<i>Mirabilis jalapa</i>	Marvel of Peru		Not indigenous; Naturalised; Invasive
Nyctaginaceae	<i>Commicarpus pentandrus</i>		LC	Indigenous
Oleaceae	<i>Ligustrum lucidum</i>	tree privet		Not indigenous; Cultivated; Naturalised; Invasive
Oleaceae	<i>Olea europaea cuspidata</i>	African olive	LC	Indigenous
Onagraceae	<i>Oenothera rosea</i>	rose evening primrose		Not indigenous; Naturalised; Invasive
Orobanchaceae	<i>Striga bilabiata bilabiata</i>		LC	Indigenous
Oxalidaceae	<i>Oxalis corniculata</i>	Creeping Woodsorrel		Not indigenous; Naturalised; Invasive
Oxalidaceae	<i>Oxalis latifolia</i>	Garden pink-sorrel		Not indigenous; Naturalised; Invasive
Oxalidaceae	<i>Oxalis obliquifolia</i>	Skewleaf Sorrel	LC	Indigenous
Papaveraceae	<i>Argemone ochroleuca</i>	Mexican Poppy		Not indigenous; Naturalised; Invasive
Papaveraceae	<i>Papaver aculeatum</i>	Bristle Poppy	LC	Indigenous
Papaveraceae	<i>Argemone ochroleuca ochroleuca</i>	White-flowered Mexican Poppy	NE	
Pedaliaceae	<i>Pterodiscus speciosus</i>	Bushveld Sandkambroo	LC	Indigenous

Pedaliaceae	<i>Harpagophytum procumbens procumbens</i>	Common Kalahari Devilclaw	NE	
Plantaginaceae	<i>Linaria dalmatica</i>	Balkan toadflax		Not indigenous; Naturalised; Invasive
Plantaginaceae	<i>Plantago lanceolata</i>	ribwort plantain	LC	Indigenous
Poaceae	<i>Melinis repens</i>	Natal grass		Indigenous
Poaceae	<i>Imperata cylindrica</i>	Cogon Grass		Indigenous
Poaceae	<i>Themeda triandra</i>	Red Grass	LC	Indigenous
Poaceae	<i>Chloris virgata</i>	feather finger grass	LC	Indigenous
Poaceae	<i>Eragrostis superba</i>	Heartseed Lovegrass	LC	Indigenous
Poaceae	<i>Chloris pycnorrhix</i>	Spider Web Chloris	LC	Indigenous
Poaceae	<i>Paspalum distichum</i>	knot grass	LC	Not indigenous; Naturalised; Invasive
Poaceae	<i>Eragrostis obtusa</i>	Dew Grass	LC	Indigenous
Poaceae	<i>Enneapogon scoparius</i>	Bottlebrush Grass	LC	Indigenous
Poaceae	<i>Melinis repens repens</i>	ruby grass	LC	Indigenous
Poaceae	<i>Elionurus muticus</i>	Wire Grass	LC	Indigenous
Poaceae	<i>Cynodon dactylon</i>	Quick Grass	LC	Indigenous
Poaceae	<i>Aristida congesta</i>	Tassle Three-awn	LC	Indigenous
Poaceae	<i>Setaria sphacelata</i>	African bristlegrass	LC	Indigenous
Poaceae	<i>Perotis patens</i>	Purple Spike Grass	LC	Indigenous
Poaceae	<i>Cenchrus ciliaris</i>	buffelgrass	LC	Indigenous
Poaceae	<i>Leersia hexandra</i>	Native rice grass	LC	Indigenous
Poaceae	<i>Digitaria eriantha</i>	Digitgrass	LC	Indigenous
Poaceae	<i>Setaria verticillata</i>	Rough Bristlegrass	LC	Indigenous
Poaceae	<i>Cymbopogon caesius</i>	Broad-leaved Turpentine Grass	LC	Indigenous
Poaceae	<i>Cenchrus longisetus</i>	feathertop	NE	Not indigenous; Naturalised; Invasive
Poaceae	<i>Arundo donax</i>	giant reed	NE	Not indigenous; Naturalised; Invasive
Poaceae	<i>Paspalum dilatatum</i>	Dallis grass	NE	Not indigenous; Naturalised; Invasive
Poaceae	<i>Cenchrus setaceus</i>	Purple Fountain Grass	NE	Not indigenous; Cultivated; Naturalised; Invasive
Poaceae	<i>Megathyrsus maximus</i>	guinea grass		
Portulacaceae	<i>Portulaca oleracea</i>	Common Purslane		Not indigenous; Naturalised
Pottiaceae	<i>Pseudocrossidium crinitum</i>	Bearded Screwmoss		Indigenous
Pteridaceae	<i>Pellaea calomelanos</i>	Hard Fern		Indigenous
Pteridaceae	<i>Cheilanthes hirta</i>	Woolly Lipfern		Indigenous
Pteridaceae	<i>Cheilanthes eckloniana</i>	Resurrection Fern	LC	Indigenous
Ranunculaceae	<i>Clematis brachiata</i>	Travellers Joy		Indigenous
Ranunculaceae	<i>Ranunculus multifidus</i>	Wild Buttercup	LC	Indigenous
Rhamnaceae	<i>Ziziphus mucronata mucronata</i>	Buffalo-thorn	LC	Indigenous
Rhamnaceae	<i>Ziziphus zeyheriana</i>	Dwarf Buffalothorn	LC	Indigenous

Rhamnaceae	<i>Ziziphus mucronata</i>	buffalo-thorn	LC	Indigenous
Rosaceae	<i>Rosa rubiginosa</i>	Sweet-brier		Not indigenous; Naturalised; Invasive
Rosaceae	<i>Pyracantha angustifolia</i>	Yellow Firethorn		Not indigenous; Cultivated; Naturalised; Invasive
Salicaceae	<i>Salix babylonica</i>	weeping willow		Not indigenous; Naturalised; Invasive
Salicaceae	<i>Populus deltoides</i>	Eastern Cottonwood		Not indigenous; Naturalised; Invasive
Salicaceae	<i>Populus alba</i>	white poplar		Not indigenous; Naturalised; Invasive
Salicaceae	<i>Scolopia zeyheri</i>	Thorn Pear	LC	Indigenous
Salviniaceae	<i>Azolla filiculoides</i>	water fern	NE	Not indigenous; Naturalised; Invasive
Scrophulariaceae	<i>Jamesbrittenia burkeana</i>	Brown Jaybee	LC	Indigenous
Scrophulariaceae	<i>Jamesbrittenia aurantiaca</i>	Gold Jaybee	LC	Indigenous
Scrophulariaceae	<i>Selago densiflora</i>	Grassveld Bitterbush	LC	Indigenous
Scrophulariaceae	<i>Nemesia fruticans</i>	Grassveld Lionface	LC	Indigenous
Scrophulariaceae	<i>Buddleja salviifolia</i>	Sagewood	LC	Indigenous
Simaroubaceae	<i>Ailanthus altissima</i>	tree-of-heaven		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Cestrum parqui</i>	green cestrum		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Datura stramonium</i>	common thornapple		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Nicotiana glauca</i>	tree tobacco		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Nierembergia linariifolia</i>	dwarf cupflower		Not indigenous; Naturalised
Solanaceae	<i>Solanum mauritianum</i>	bugweed		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Solanum elaeagnifolium</i>	silverleaf nightshade		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Solanum sisymbriifolium</i>	Red Buffalo-bur		Not indigenous; Naturalised; Invasive
Solanaceae	<i>Lycium cinereum</i>	Brownstem Honeythorn	LC	Indigenous
Solanaceae	<i>Lycium hirsutum</i>	River Honeythorn	LC	Indigenous
Solanaceae	<i>Solanum lichtensteinii</i>	Thorn Bitter Apple	LC	Indigenous
Talinaceae	<i>Talinum cafferum</i>	Oxbush	LC	Indigenous
Thymelaeaceae	<i>Lasiosiphon polycephalus</i>	Summer Curryflower	LC	Indigenous
Vahliaceae	<i>Vahlia capensis</i>	Toiing	NE	Indigenous
Verbenaceae	<i>Glandularia aristigera</i>	Moss Verbena		Not indigenous; Naturalised; Invasive
Verbenaceae	<i>Verbena incompta</i>	purpletop vervain		Not indigenous; Naturalised; Invasive
Verbenaceae	<i>Verbena bonariensis</i>	purpletop vervain		Not indigenous; Naturalised; Invasive
Verbenaceae	<i>Lippia javanica</i>	Fever Tea	LC	Indigenous
Vitaceae	<i>Cyphostemma hereroense</i>	Purge Grape	LC	Indigenous

7.3.3 Expected Mammal Species

Family	Scientific Name	Common Name	SANBI	IUCN
Bathyergidae	<i>Cryptomys hottentotus</i>	Southern African Mole-rat	LC	LC
Bovidae	<i>Damaliscus pygargus phillipsi</i>	Blesbok	LC	LC
Bovidae	<i>Raphicerus campestris</i>	Steenbok	LC	LC
Bovidae	<i>Redunca arundinum</i>	Southern Reedbuck	LC	LC
Bovidae	<i>Redunca fulvorufula</i>	Mountain Reedbuck	LC	LC
Bovidae	<i>Sylvicapra grimmia</i>	Bush Duiker	LC	LC
Felidae	<i>Felis nigripes</i>	Black-footed Cat	VU	VU
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC
Herpestidae	<i>Suricata suricatta</i>	Meerkat	LC	LC
Hyaenidae	<i>Hyaena brunnea</i>	Brown Hyena	NT	NT
Hyaenidae	<i>Proteles cristata</i>	Aardwolf	LC	LC
Hystriidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC
Muridae	<i>Gerbilliscus brantsii</i>	Highveld Gerbil	LC	LC
Muridae	<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC	LC
Muridae	<i>Mastomys coucha</i>	Southern African Mastomys	LC	LC
Muridae	<i>Mus (Nannomys) indutus</i>	Desert Pygmy Mouse	LC	LC
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	LC	LC
Nesomyidae	<i>Malacothrix typica</i>	Large-eared African Desert Mouse	LC	LC
Sciuridae	<i>Xerus inauris</i>	South African Ground Squirrel	LC	LC
Soricidae	<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	LC
Suidae	<i>Phacochoerus africanus</i>	Common Warthog	LC	LC

7.3.5 Expected Reptile Species

Family	Scientific Name	Common Name	SANBI	IUCN
Agamidae	<i>Agama aculeata distanti</i>	Distant's Ground Agama	LC	LC
Agamidae	<i>Agama atra</i>	Southern Rock Agama	LC	LC
Amphisbaenidae	<i>Monopeltis capensis</i>	Cape Worm Lizard	LC	LC
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	LC	Unlisted
Colubridae	<i>Dasypeltis scabra</i>	Rhombic Egg-eater	LC	LC
Gekkonidae	<i>Pachydactylus capensis</i>	Cape Gecko	LC	Unlisted
Gerrhosauridae	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	LC	Unlisted
Lacertidae	<i>Nucras holubi</i>	Holub's Sandveld Lizard	LC	Unlisted
Lacertidae	<i>Nucras intertexta</i>	Spotted Sandveld Lizard	LC	Unlisted
Lacertidae	<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	LC	LC
Lamprophiidae	<i>Psammophis crucifer</i>	Cross-marked Grass Snake	LC	LC
Lamprophiidae	<i>Psammophis leightoni</i>	Cape Sand Snake	VU	LC
Lamprophiidae	<i>Pseudaspis cana</i>	Mole Snake	LC	Unlisted
Scincidae	<i>Trachylepis capensis</i>	Cape Skink	LC	Unlisted
Scincidae	<i>Trachylepis punctatissima</i>	Speckled Rock Skink	LC	LC
Testudinidae	<i>Stigmochelys pardalis</i>	Leopard Tortoise	LC	LC

7.3.7 Expected Amphibian Species

Family	Scientific Name	Common Name	SANBI	IUCN
Bufonidae	<i>Sclerophrys capensis</i>	Raucous Toad	LC	LC
Bufonidae	<i>Sclerophrys gutturalis</i>	Guttural Toad	LC	LC
Bufonidae	<i>Sclerophrys poweri</i>	Power's Toad	LC	LC
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	LC	LC
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	LC	Unlisted
Pyxicephalidae	<i>Amietia fuscigula</i>	Cape River Frog	LC	LC
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	LC	LC
Pyxicephalidae	<i>Pyxicephalus adspersus</i>	Giant Bull Frog	NT	LC
Pyxicephalidae	<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	LC	LC

7.3.9 Expected Avifauna Species

Scientific Name	Common Name	SANBI	IUCN
<i>Sclerophrys capensis</i>	Raucous Toad	LC	LC
<i>Accipiter melanoleucus</i>	Sparrowhawk, Black	Unlisted	LC
<i>Acridotheres tristis</i>	Myna, Common	Unlisted	LC
<i>Acrocephalus arundinaceus</i>	Reed-warbler, Great	Unlisted	LC
<i>Acrocephalus baeticatus</i>	Reed-warbler, African	Unlisted	Unlisted
<i>Acrocephalus gracilirostris</i>	Swamp-warbler, Lesser	Unlisted	LC
<i>Actitis hypoleucos</i>	Sandpiper, Common	Unlisted	LC
<i>Actophilornis africanus</i>	Jacana, African	Unlisted	LC
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC
<i>Alopochen aegyptiaca</i>	Goose, Egyptian	Unlisted	LC
<i>Amadina erythrocephala</i>	Finch, Red-headed	Unlisted	LC
<i>Amandava subflava</i>	Waxbill, Orange-breasted	Unlisted	Unlisted
<i>Anas capensis</i>	Teal, Cape	Unlisted	LC
<i>Anas erythrorhyncha</i>	Teal, Red-billed	Unlisted	LC
<i>Anas sparsa</i>	Duck, African Black	Unlisted	LC
<i>Anas undulata</i>	Duck, Yellow-billed	Unlisted	LC
<i>Anhinga rufa</i>	Darter, African	Unlisted	LC
<i>Anser anser</i>	Goose, Domestic	Unlisted	LC
<i>Anthoscopus minutus</i>	Penduline-tit, Cape	Unlisted	LC
<i>Anthus cinnamomeus</i>	Pipit, African	Unlisted	LC
<i>Anthus leucophrys</i>	Pipit, Plain-backed	Unlisted	LC
<i>Apalis thoracica</i>	Apalis, Bar-throated	Unlisted	LC
<i>Apus affinis</i>	Swift, Little	Unlisted	LC
<i>Apus apus</i>	Swift, Common	Unlisted	LC
<i>Apus barbatus</i>	Swift, African Black	Unlisted	LC
<i>Apus caffer</i>	Swift, White-rumped	Unlisted	LC
<i>Ardea alba</i>	Egret, Great	Unlisted	LC
<i>Ardea cinerea</i>	Heron, Grey	Unlisted	LC
<i>Ardea goliath</i>	Heron, Goliath	Unlisted	LC
<i>Ardea intermedia</i>	Egret, Yellow-billed (Intermediate)	Unlisted	LC
<i>Ardea melanocephala</i>	Heron, Black-headed	Unlisted	LC
<i>Ardea purpurea</i>	Heron, Purple	Unlisted	LC
<i>Ardeola ralloides</i>	Heron, Squacco	Unlisted	LC
<i>Asio capensis</i>	Owl, Marsh	Unlisted	LC
<i>Batis pririt</i>	Batis, Pririt	Unlisted	LC
<i>Bostrychia hagedash</i>	Ibis, Hageda	Unlisted	LC
<i>Brunhilda erythronotos</i>	Waxbill, Black Cheeked	Unlisted	LC

<i>Bubo africanus</i>	Eagle-owl, Spotted	Unlisted	LC
<i>Bubulcus ibis</i>	Egret, Cattle	Unlisted	LC
<i>Burhinus capensis</i>	Thick-knee, Spotted	Unlisted	LC
<i>Buteo buteo</i>	Buzzard, Common (Steppe)	Unlisted	LC
<i>Buteo rufofuscus</i>	Buzzard, Jackal	Unlisted	LC
<i>Calandrella cinerea</i>	Lark, Red-capped	Unlisted	LC
<i>Calendulauda sabota</i>	Lark, Sabota	Unlisted	LC
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC	NT
<i>Calidris minuta</i>	Stint, Little	LC	LC
<i>Calidris pugnax</i>	Ruff	Unlisted	LC
<i>Cecropis cucullata</i>	Swallow, Greater Striped	Unlisted	LC
<i>Cecropis semirufa</i>	Swallow, Red-breasted	Unlisted	LC
<i>Centropus burchellii</i>	Coucal, Burchell's	Unlisted	Unlisted
<i>Cercotrichas coryphoeus</i>	Scrub-robin, Karoo	Unlisted	LC
<i>Cercotrichas paena</i>	Scrub-robin, Kalahari	Unlisted	LC
<i>Ceryle rudis</i>	Kingfisher, Pied	Unlisted	LC
<i>Chalcomitra amethystina</i>	Sunbird, Amethyst	Unlisted	LC
<i>Charadrius hiaticula</i>	Plover, Common Ringed	Unlisted	LC
<i>Charadrius pallidus</i>	Plover, Chestnut-banded	NT	NT
<i>Charadrius pecuarius</i>	Plover, Kittlitz's	Unlisted	LC
<i>Charadrius tricollaris</i>	Plover, Three-banded	Unlisted	LC
<i>Chersomanes albofasciata</i>	Lark, Spike-heeled	Unlisted	LC
<i>Chlidonias hybrida</i>	Tern, Whiskered	Unlisted	LC
<i>Chlidonias leucopterus</i>	Tern, White-winged	Unlisted	LC
<i>Chlorocichla flaviventris</i>	Greenbul, Yellow-bellied	Unlisted	LC
<i>Chroicocephalus cirrocephalus</i>	Gull, Grey-headed	Unlisted	LC
<i>Chrysococcyx caprius</i>	Cuckoo, Diderick	Unlisted	LC
<i>Chrysococcyx klaas</i>	Cuckoo, Klaas's	Unlisted	LC
<i>Ciconia abdimii</i>	Stork, Abdim's	NT	LC
<i>Ciconia ciconia</i>	Stork, White	Unlisted	LC
<i>Ciconia nigra</i>	Stork, Black	VU	LC
<i>Cinnyris fuscus</i>	Sunbird, Dusky	Unlisted	LC
<i>Cinnyris talatala</i>	Sunbird, White-bellied	Unlisted	LC
<i>Cisticola aridulus</i>	Cisticola, Desert	Unlisted	LC
<i>Cisticola chiniana</i>	Cisticola, Rattling	Unlisted	LC
<i>Cisticola fulvicapilla</i>	Neddicky, Neddicky	Unlisted	LC
<i>Cisticola juncidis</i>	Cisticola, Zitting	Unlisted	LC
<i>Cisticola textrix</i>	Cisticola, Cloud	Unlisted	LC
<i>Cisticola tinniens</i>	Cisticola, Levillant's	Unlisted	LC

<i>Clamator jacobinus</i>	Cuckoo, Jacobin	Unlisted	LC
<i>Colius colius</i>	Mousebird, White-backed	Unlisted	LC
<i>Colius striatus</i>	Mousebird, Speckled	Unlisted	LC
<i>Columba guinea</i>	Pigeon, Speckled	Unlisted	LC
<i>Columba livia</i>	Dove, Rock	Unlisted	LC
<i>Coracias caudatus</i>	Roller, Lilac-breasted	Unlisted	LC
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC
<i>Corythornis cristatus</i>	Kingfisher, Malachite	Unlisted	Unlisted
<i>Cossypha caffra</i>	Robin-chat, Cape	Unlisted	LC
<i>Coturnix coturnix</i>	Quail, Common	Unlisted	LC
<i>Creatophora cinerea</i>	Starling, Wattled	Unlisted	LC
<i>Crithagra atrogularis</i>	Canary, Black-throated	Unlisted	LC
<i>Crithagra flaviventris</i>	Canary, Yellow	Unlisted	LC
<i>Cuculus solitarius</i>	Cuckoo, Red-chested	Unlisted	LC
<i>Curruca subcoerulea</i>	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
<i>Cursorius temminckii</i>	Courser, Temminck's	Unlisted	LC
<i>Cypsiurus parvus</i>	Palm-swift, African	Unlisted	LC
<i>Dendrocygna bicolor</i>	Duck, Fulvous	Unlisted	LC
<i>Dendrocygna viduata</i>	Duck, White-faced Whistling	Unlisted	LC
<i>Dendropicos fuscescens</i>	Woodpecker, Cardinal	Unlisted	LC
<i>Egretta ardesiaca</i>	Heron, Black	Unlisted	LC
<i>Egretta garzetta</i>	Egret, Little	Unlisted	LC
<i>Elanus caeruleus</i>	Kite, Black-shouldered	Unlisted	LC
<i>Emarginata sinuata</i>	Chat, Sickle-winged	Unlisted	LC
<i>Emberiza tahapisi</i>	Bunting, Cinnamon-breasted	Unlisted	LC
<i>Eremopterix leucotis</i>	Sparrowlark, Chestnut-backed	Unlisted	LC
<i>Estrilda astrild</i>	Waxbill, Common	Unlisted	LC
<i>Euplectes afer</i>	Bishop, Yellow-crowned	Unlisted	LC
<i>Euplectes albonotatus</i>	Widowbird, White-winged	Unlisted	LC
<i>Euplectes orix</i>	Bishop, Southern Red	Unlisted	LC
<i>Euplectes progne</i>	Widowbird, Long-tailed	Unlisted	LC
<i>Eupodotis caeruleus</i>	Korhaan, Blue	LC	NT
<i>Falco amurensis</i>	Falcon, Amur	Unlisted	LC
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC
<i>Falco naumanni</i>	Kestrel, Lesser	Unlisted	LC
<i>Falco peregrinus</i>	Falcon, Peregrine	Unlisted	LC
<i>Falco rupicoloides</i>	Kestrel, Greater	Unlisted	LC
<i>Falco rupicolus</i>	Kestrel, Rock	Unlisted	LC
<i>Fulica cristata</i>	Coot, Red-knobbed	Unlisted	LC

<i>Gallinago nigripennis</i>	Snipe, African	Unlisted	LC
<i>Gallinula chloropus</i>	Moorhen, Common	Unlisted	LC
<i>Granatina granatina</i>	Waxbill, Violet-eared	Unlisted	LC
<i>Gyps africanus</i>	Vulture, White-backed	CR	CR
<i>Halcyon albiventris</i>	Kingfisher, Brown-hooded	Unlisted	LC
<i>Haliaeetus vocifer</i>	Fish-eagle, African	Unlisted	LC
<i>Hieraaetus pennatus</i>	Eagle, Booted	Unlisted	LC
<i>Himantopus himantopus</i>	Stilt, Black-winged	Unlisted	LC
<i>Hirundo albigularis</i>	Swallow, White-throated	Unlisted	LC
<i>Hirundo dimidiata</i>	Swallow, Pearl-breasted	Unlisted	LC
<i>Hirundo rustica</i>	Swallow, Barn	Unlisted	LC
<i>Indicator indicator</i>	Honeyguide, Greater	Unlisted	LC
<i>Ixobrychus minutus</i>	Bittern, Little	Unlisted	LC
<i>Jynx ruficollis</i>	Wryneck, Red-throated	Unlisted	LC
<i>Lagonosticta rhodopareia</i>	Firefinch, Jameson's	Unlisted	LC
<i>Lagonosticta senegala</i>	Firefinch, Red-billed	Unlisted	LC
<i>Lamprotornis bicolor</i>	Starling, Pied	Unlisted	LC
<i>Lamprotornis nitens</i>	Starling, Cape Glossy	Unlisted	LC
<i>Lanius collaris</i>	Fiscal, Common (Southern)	Unlisted	LC
<i>Lanius collurio</i>	Shrike, Red-backed	Unlisted	LC
<i>Lanius minor</i>	Shrike, Lesser Grey	Unlisted	LC
<i>Larus dominicanus</i>	Gull, Kelp	Unlisted	LC
<i>Lophoceros nasutus</i>	Hornbill, African Grey	Unlisted	LC
<i>Lybius torquatus</i>	Barbet, Black-collared	Unlisted	LC
<i>Macronyx capensis</i>	Longclaw, Cape	Unlisted	LC
<i>Megaceryle maxima</i>	Kingfisher, Giant	Unlisted	Unlisted
<i>Melaenornis silens</i>	Flycatcher, Fiscal	Unlisted	LC
<i>Melaniparus cinerascens</i>	Tit, Ashy	Unlisted	LC
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC
<i>Merops apiaster</i>	Bee-eater, European	Unlisted	LC
<i>Merops bullockoides</i>	Bee-eater, White-fronted	Unlisted	LC
<i>Microcarbo africanus</i>	Cormorant, Reed	Unlisted	LC
<i>Micronisus gabar</i>	Goshawk, Gabar	Unlisted	LC
<i>Mirafraga africana</i>	Lark, Rufous-naped	Unlisted	LC
<i>Mirafraga fasciolata</i>	Lark, Eastern Clapper	Unlisted	LC
<i>Motacilla capensis</i>	Wagtail, Cape	Unlisted	LC
<i>Muscicapa striata</i>	Flycatcher, Spotted	Unlisted	LC
<i>Mycteria ibis</i>	Stork, Yellow-billed	EN	LC
<i>Myrmecocichla formicivora</i>	Chat, Anteating	Unlisted	LC

<i>Myrmecocichla monticola</i>	Wheatear, Mountain	Unlisted	LC
<i>Netta erythrophthalma</i>	Pochard, Southern	Unlisted	LC
<i>Numida meleagris</i>	Guineafowl, Helmeted	Unlisted	LC
<i>Nycticorax nycticorax</i>	Night-Heron, Black-crowned	Unlisted	LC
<i>Oena capensis</i>	Dove, Namaqua	Unlisted	LC
<i>Oenanthe familiaris</i>	Chat, Familiar	Unlisted	LC
<i>Oenanthe pileata</i>	Wheatear, Capped	Unlisted	LC
<i>Onychognathus morio</i>	Starling, Red-winged	Unlisted	LC
<i>Ortygospiza atricollis</i>	Quailfinch, African	Unlisted	LC
<i>Oxyura maccoa</i>	Duck, Maccoa	NT	VU
<i>Passer diffusus</i>	Sparrow, Southern Grey-headed	Unlisted	LC
<i>Passer domesticus</i>	Sparrow, House	Unlisted	LC
<i>Passer melanurus</i>	Sparrow, Cape	Unlisted	LC
<i>Petrochelidon spilodera</i>	Cliff-swallow, South African	Unlisted	LC
<i>Phalacrocorax lucidus</i>	Cormorant, White-breasted	Unlisted	LC
<i>Phoeniconaias minor</i>	Flamingo, Lesser	NT	NT
<i>Phoenicopterus roseus</i>	Flamingo, Greater	NT	LC
<i>Phoeniculus purpureus</i>	Wood-hoopoe, Green	Unlisted	LC
<i>Phylloscopus trochilus</i>	Warbler, Willow	Unlisted	LC
<i>Platalea alba</i>	Spoonbill, African	Unlisted	LC
<i>Plectropterus gambensis</i>	Goose, Spur-winged	Unlisted	LC
<i>Plegadis falcinellus</i>	Ibis, Glossy	Unlisted	LC
<i>Plocepasser mahali</i>	Sparrow-weaver, White-browed	Unlisted	LC
<i>Ploceus velatus</i>	Masked-weaver, Southern	Unlisted	LC
<i>Pluvialis squatarola</i>	Plover, Grey	Unlisted	LC
<i>Podiceps cristatus</i>	Grebe, Great Crested	Unlisted	LC
<i>Podiceps nigricollis</i>	Grebe, Black-necked	Unlisted	LC
<i>Polyboroides typus</i>	Harrier-Hawk, African	Unlisted	LC
<i>Porphyrio madagascariensis</i>	Swamphen, African Purple	Unlisted	Unlisted
<i>Prinia flavicans</i>	Prinia, Black-chested	Unlisted	LC
<i>Pternistis natalensis</i>	Spurfowl, Natal	Unlisted	LC
<i>Pternistis swainsonii</i>	Spurfowl, Swainson's	Unlisted	LC
<i>Ptyonoprogne fuligula</i>	Martin, Rock	Unlisted	Unlisted
<i>Pycnonotus nigricans</i>	Bulbul, African Red-eyed	Unlisted	LC
<i>Pytilia melba</i>	Pytilia, Green-winged	Unlisted	LC
<i>Quelea quelea</i>	Quelea, Red-billed	Unlisted	LC
<i>Rallus caerulescens</i>	Rail, African	Unlisted	LC
<i>Recurvirostra avosetta</i>	Avocet, Pied	Unlisted	LC
<i>Rhinopomastus cyanomelas</i>	Scimitarbill, Common	Unlisted	LC

<i>Rhinoptilus africanus</i>	Courser, Double-banded	Unlisted	LC
<i>Riparia paludicola</i>	Martin, Brown-throated	Unlisted	LC
<i>Rostratula benghalensis</i>	Painted-snipe, Greater	NT	LC
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN
<i>Saxicola torquatus</i>	Stonechat, African	Unlisted	LC
<i>Scleroptila gutturalis</i>	Francolin, Orange River	Unlisted	LC
<i>Scopus umbretta</i>	Hamerkop, Hamerkop	Unlisted	LC
<i>Spatula hottentota</i>	Teal, Hottentot	Unlisted	LC
<i>Spatula smithii</i>	Shoveler, Cape	Unlisted	LC
<i>Spilopelia senegalensis</i>	Dove, Laughing	Unlisted	LC
<i>Sporopipes squamifrons</i>	Finch, Scaly-feathered	Unlisted	LC
<i>Stenostira scita</i>	Flycatcher, Fairy	Unlisted	LC
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC
<i>Streptopelia semitorquata</i>	Dove, Red-eyed	Unlisted	LC
<i>Struthio camelus</i>	Ostrich, Common	Unlisted	LC
<i>Sturnus vulgaris</i>	Starling, Common	Unlisted	LC
<i>Tachybaptus ruficollis</i>	Grebe, Little	Unlisted	LC
<i>Tachymarptis melba</i>	Swift, Alpine	Unlisted	LC
<i>Tadorna cana</i>	Shelduck, South African	Unlisted	LC
<i>Tchagra australis</i>	Tchagra, Brown-crowned	Unlisted	LC
<i>Telophorus zeylonus</i>	Bokmakierie, Bokmakierie	Unlisted	LC
<i>Terpsiphone viridis</i>	Paradise-flycatcher, African	Unlisted	LC
<i>Thalassornis leuconotus</i>	Duck, White-backed	Unlisted	LC
<i>Threskiornis aethiopicus</i>	Ibis, African Sacred	Unlisted	LC
<i>Trachyphonus vaillantii</i>	Barbet, Crested	Unlisted	LC
<i>Tricholaema leucomelas</i>	Barbet, Acacia Pied	Unlisted	LC
<i>Tringa glareola</i>	Sandpiper, Wood	Unlisted	LC
<i>Tringa nebularia</i>	Greenshank, Common	Unlisted	LC
<i>Tringa stagnatilis</i>	Sandpiper, Marsh	Unlisted	LC
<i>Turdus smithi</i>	Thrush, Karoo	Unlisted	LC
<i>Tyto alba</i>	Owl, Barn	Unlisted	LC
<i>Upupa africana</i>	Hoopoe, African	Unlisted	LC
<i>Uraeginthus angolensis</i>	Waxbill, Blue	Unlisted	LC
<i>Urocolius indicus</i>	Mousebird, Red-faced	Unlisted	LC
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC
<i>Vanellus coronatus</i>	Lapwing, Crowned	Unlisted	LC
<i>Vidua chalybeata</i>	Indigobird, Village	Unlisted	LC
<i>Vidua funerea</i>	Indigobird, Dusky	Unlisted	LC
<i>Vidua macroura</i>	Whydah, Pin-tailed	Unlisted	LC

<i>Vidua paradisaea</i>	Paradise-whydah, Long-tailed	Unlisted	LC
<i>Vidua regia</i>	Whydah, Shaft-tailed	Unlisted	LC
<i>Zapornia flavirostra</i>	Crake, Black	Unlisted	LC
<i>Zosterops pallidus</i>	White-eye, Orange River	Unlisted	LC
<i>Zosterops virens</i>	White-eye, Cape	Unlisted	LC

7.4 Appendix D: Specialist Declaration of Independence

I, Sarah Newman, 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.



Sarah Newman

Terrestrial Ecologist

The Biodiversity Company

June 2024

I, Leigh-Ann de Wet, 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.



Leigh-Ann de Wet

Terrestrial Specialist

The Biodiversity Company

June 2024

I, Andrew Husted, 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.



Andrew Husted

Ecologist

The Biodiversity Company

June 2024

7.5 Appendix E: Specialist CVs

Sarah Newman

M.Sc. Entomology

Cell: +27 73 391 6933

Email: sarah@thebiodiversitycompany.com

Identity Number: 9312170034086

Date of birth: 17 December 1993



Profile Summary

Work experience in South Africa, Lesotho and Costa Rica.

Extensive experience working in the Sani Pass region of southern Africa investigating the patterns and drivers of ant diversity across an elevation gradient.

Experience with sea turtle monitoring and conservation in Costa Rica.

Areas of Interest

Entomology, Zoology, Biodiversity, Conservation and Community Ecology.

Key Experience

- Terrestrial Ecological Assessments
- Rehabilitation plans and monitoring
- Field work and research
- Taxonomic classification of insects

Country Experience

South Africa
Lesotho
Mauritius
Costa Rica

Nationality

South African

Languages

English – Proficient
Afrikaans – Conversational
Spanish – Conversational

Qualifications

- MSc Entomology (*Distinction*), University of Pretoria
- BSc (Hons) Zoology, University of Pretoria
- BSc Zoology, University of Pretoria
- Cand Sci Nat (158474)

Signed:

Sarah Newman

CURRICULUM VITAE: Sarah Newman

Leigh-Ann de Wet

M.Sc. Botany (*Pr Sci Nat*)

Cell: +27 83 352 1936

Email: leigh-ann@thebiodiversitycompany.com

Identity Number: 8209010127081

Date of birth: 1 September 1982



Profile Summary

Working experience throughout South Africa, Southern Africa West and Central Africa and also Madagascar.

Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.

Experience with project management for national and international biodiversity projects.

Experience with IFC Performance Standards, Critical Habitat and High Conservation Value Assessments. Experience in numerous vegetation and habitat types throughout Africa,

Specialist expertise includes botany, forest ecology, avifauna and terrestrial fauna. Methodology development, conservation management and terrestrial monitoring.

Areas of Interest

Forest ecology and ecosystem functionality.

Ecology and plant identification.

Field methodology.

Publication of scientific journals and articles.

Key Experience

- World Bank, Equator Principles and the International Finance Corporation requirements
- Familiar with High Conservation Value assessments as per ProForest guidelines.
- Conservation Management Plans.
- Flora assessments.
- Avifauna assessments.
- Terrestrial fauna assessments.
- Monitoring.
- Ecosystem services
- Rehabilitation Plans.
- Alien Invasive Plant Management Plans.
- Permitting.

Country Experience

Mozambique, Botswana;
Malawi,
Zambia,
Madagascar,
Liberia,
Guinea'
Democratic Republic of the Congo,
South Africa

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

Zulu - Basic

Qualifications

- MSc (Rhodes University) – Botany.
- BSc Honours (Rhodes University) – Botany
- BSc Natural Science (Botany and Entomology)
- Pr Sci Nat (400233/12)
- Certificate of Competence: UFS Introduction to wetland delineation.
- Certificate of Competence: UFS Introduction to wetland law
- Certificate of competence: Africa Land Use Training Grass Identification (long and short course)
- Certificate of Competence: ASI Snake Awareness, first aid for snake bite and venomous snake handling.

Signed:

CURRICULUM VITAE: Leigh-Ann de Wet

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979



Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia & Serbia.

Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.

Experience with project management for national and international multi-disciplinary projects.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, Freshwater Ecology, Terrestrial Ecology and also Ecosystem Services.

Areas of Interest

Sustainability and Conservation.

Instream Flow and Ecological Water Requirements.

Publication of scientific journals and articles.

Key Experience

- World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality
- Aquatic Ecological Assessments
- Aquaculture

Country Experience

Angola, Botswana, Cameroon
Democratic Republic of Congo
Ghana, Ivory Coast, Lesotho
Liberia, Mali, Mauritius, Mozambique
Nigeria, Republic of Armenia,
Senegal, Serbia, Sierra Leone, South Africa
Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

Signed:

Andrew Husted

CURRICULUM VITAE: Andrew Husted