



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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NEAS Reference Number:	DEA/EIA/
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Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Environmental Impact Assessment (EIA) for the proposed development of the Klipkraal Wind Energy Facility (WEF) 1, BESS and associated infrastructure near Fraserburg in the Northern Cape Province

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2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
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Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	3Foxes Biodiversity Solutions		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100%
Specialist name:	Simon Todd		
Specialist Qualifications:	BSc. (Zool. & Bot.), BSc Hons (Zool.), MSc (Cons. Biol.)		
Professional affiliation/registration:	SACNASP 400425/11		
Physical address:	23 De Villiers Road, Kommetjie 7975		
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Postal code:	7975	Cell:	082 3326502
Telephone:		Fax:	
E-mail:	Simon.Todd@3foxes.co.za		

2. DECLARATION BY THE SPECIALIST

I, Simon Todd, 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 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

3Foxes Biodiversity Solutions

Name of Company:

05 September 2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Simon Todd, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

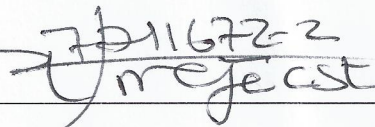
3Foxes Biodiversity Solutions

Name of Company

05 September 2022

Date

Signature of the Commissioner of Oaths



7116722
Urejeast

Date



KLIPKRAAL 1 WIND ENERGY FACILITY

SITE SENSITIVITY VERIFICATION



PRODUCED FOR SIVEST ON BEHALF OF AURA DEVELOPMENT COMPANY (PTY) LTD



Simon.Todd@3foxes.co.za

August 2022

TABLE OF CONTENTS

Table of Contents	2
List of Figures	3
Short CV/Summary of Expertise – Simon Todd	4
Specialist Declaration.....	6
1 Introduction	7
2 Relevant Aspects of the Development	7
3 DFFE Site Verification.....	8
4 Animal Species Theme	8
4.1 Plant Species Theme Sensitivity.....	10
5 Terrestrial Biodiversity Theme Sensitivity.	12
6 Conclusions & Implications of the Site Verification	14

LIST OF FIGURES

Figure 1. Satellite image showing the location of the proposed Klipkraal 1 Wind Farm, southeast of Fraserburg.	8
Figure 2. Animal Species Theme Sensitivity Map for the Klipkraal 1 site and surrounds.	9
Figure 3. The rocky hills of the Klipkraal 1 site are considered suitable habitat for the Karoo Dwarf Tortoise.	10
Figure 4. Plant Species Theme Sensitivity Map for the Klipkraal 1 site and surrounds.	11
Figure 5. Typical open plains vegetation of the Klipkraal 1 site, corresponding with the Eastern Upper Karoo vegetation type. No species of concern were observed within this habitat type and it is considered low sensitivity.	12
Figure 6. Terrestrial Biodiversity Theme Sensitivity Map of the Klipkraal 1 site and surrounds.	13

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

 <p>3Foxes Biodiversity Solutions ECOLOGICAL SPECIALIST SERVICES Assessment/Management/Research</p>	<p>Simon Todd Pr.Sci.Nat Director & Principle Scientist C: 082 3326502 Simon.Todd@3foxes.co.za</p> <p>23 De Villiers Road Kommetjie 7975</p>	<p>Ecological Solutions for People & the Environment</p>
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Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.
- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.
- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town

- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Recent Specialist Ecological Studies in the Vicinity of the Current Site

Environmental Impact Assessment for the Proposed Komsberg East and Komsberg West Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment. Arcus Consulting 2014.

Proposed Rietkloof & Brandvallei Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. EOH 2016.

Proposed Gunstfontein Wind Farm and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. Savannah Environmental 2016.

Mainstream South Africa Dwarsrug Wind Energy Facility: Fauna & Flora Specialist Impact Assessment Report. Sivist 2014.


Phezukomoya and San Kraal Wind Energy Facilities and associated grid connection. Fauna and Flora specialist studies. Arcus Consulting 2018.

Kokerboom Wind Energy Facilities (1-4) and associated grid connections. Fauna and Flora specialist studies. Aurecon 2017.

SPECIALIST DECLARATION

I, ..Simon Todd....., as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- 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 have no vested interest in the proposed activity proceeding;
- 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;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:  _____

Name of Specialist: ____Simon Todd_____

Date: ____20 June 2022_____

1 INTRODUCTION

Aura Development Company (Pty) Ltd is proposing to develop the Klipkraal 1 Wind Farm on a ca. 7600 ha site situated about 30km southeast of Fraserburg, within the Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape. SIVEST are conducting the required EIA process and 3Foxes Biodiversity Solutions has been appointed by SIVEST, on behalf of Aura Development Company (Pty) Ltd to provide Terrestrial Biodiversity inputs for the proposed Klipkraal 1 Wind Farm as part of the EIA application.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations (4 December 2014, Government Notice (GN) R982, R983, R984 and R985, as amended), various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. In accordance with GN 320 and GN 1150 (20 March 2020) ¹ of the NEMA EIA Regulations of 2014, prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool). 3Foxes Biodiversity Solutions has been commissioned to verify the sensitivity of the Klipkraal 1 Wind Farm project site under these specialist protocols.

2 RELEVANT ASPECTS OF THE DEVELOPMENT

The Klipkraal 1 Wind Farm is part of the Klipkraal Cluster and is located approximately 30 km southeast of Fraserburg in the Northern Cape. The layout and location of the Klipkraal 1 Wind Farm is illustrated below in Figure 1 and includes 31 potential turbine locations with a maximum output of 240 MW. The estimated total permanent footprint of the Klipkraal 1 Wind Farm is estimated at 120ha.

¹ GN 320 (20 March 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

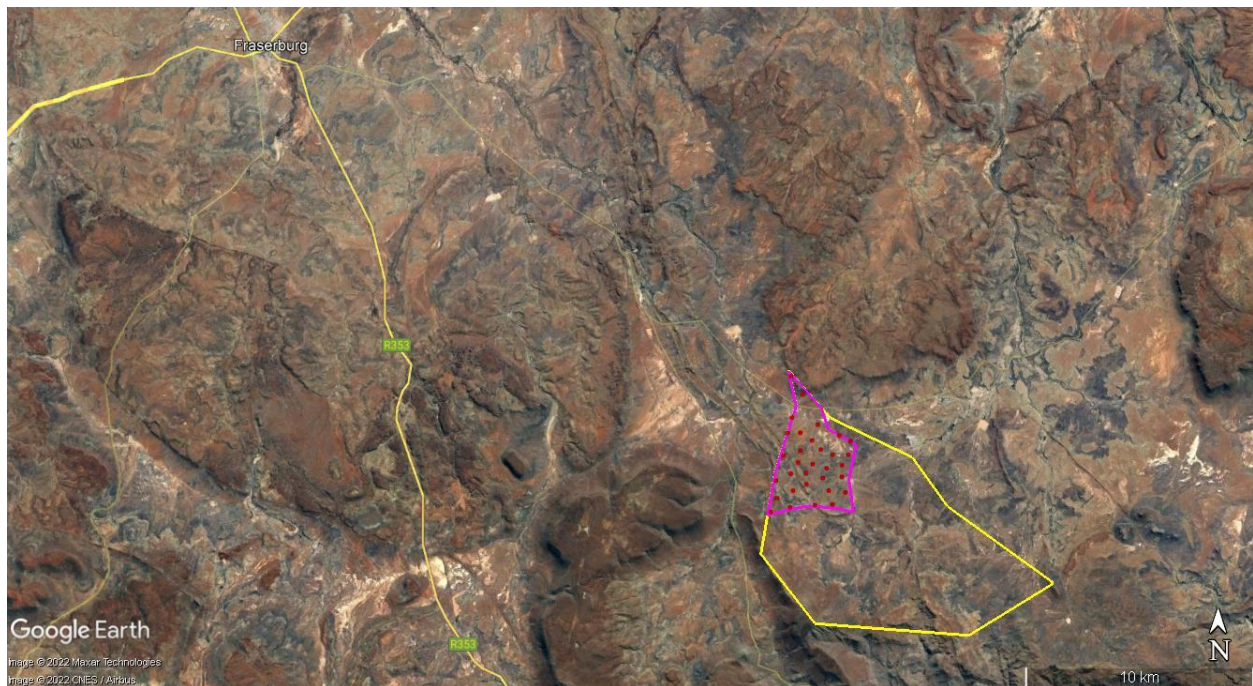


Figure 1. Satellite image showing the location of the proposed Klipkraal 1 Wind Farm, southeast of Fraserburg.

3 DFFE SITE VERIFICATION

Government Notice No. 320, dated 20 March 2020, includes the requirement that an Initial Site Sensitivity Verification Report must be produced for a development footprint. The outcomes of the Site Verification Report determine the level of assessment required for the site. The outputs of the Screening Tool are illustrated and briefly discussed below for each theme as relevant to the current study and related to the results of the field assessment and associated site verification.

4 ANIMAL SPECIES THEME

The DFFE Screening Tool identified the entire site as having a medium animal sensitivity theme due to the modelled possible presence of the Riverine Rabbit and the Karoo Dwarf Tortoise. In addition, avifauna are included under the animal theme but would be covered under the avifaunal specialist study. Refer to Table 1 and Figure 2 below for the Animal Theme results.

In terms of the site verification, the presence of the Riverine Rabbit has been confirmed on the Klipkraal site through camera trapping but was not detected within the Klipkraal 1 development area. As the field assessment indicates that there is very little potentially suitable habitat for the Riverine Rabbit within the Klipkraal 1 development area, it is considered to be low sensitivity for this species. The field verification however confirmed that the site includes suitable habitat for the Karoo Dwarf Tortoise. While no specimens of this species were observed within site despite

extensive searching, the presence of historical records from the area and the presence of suitable habitat are considered sufficient to confirm the likely presence of this species within the site. As such a full assessment for the Karoo Dwarf Tortoise is required.

In terms of fauna of concern that may be present on the site, but which are not listed under the DFFE Screening Tool, several different species are potentially present on the site including Mountain Reedbuck *Redunca fulvorufula* (EN), Black-footed Cat *Felis nigripes* (VU), Grey Rhebok *Pelea capreolus* (NT), and Brown Hyena *Hyaena brunnea* (NT). Extensive camera trapping was conducted across the site and since these none of these species have been detected within the site, it is considered to be low sensitivity for these species.

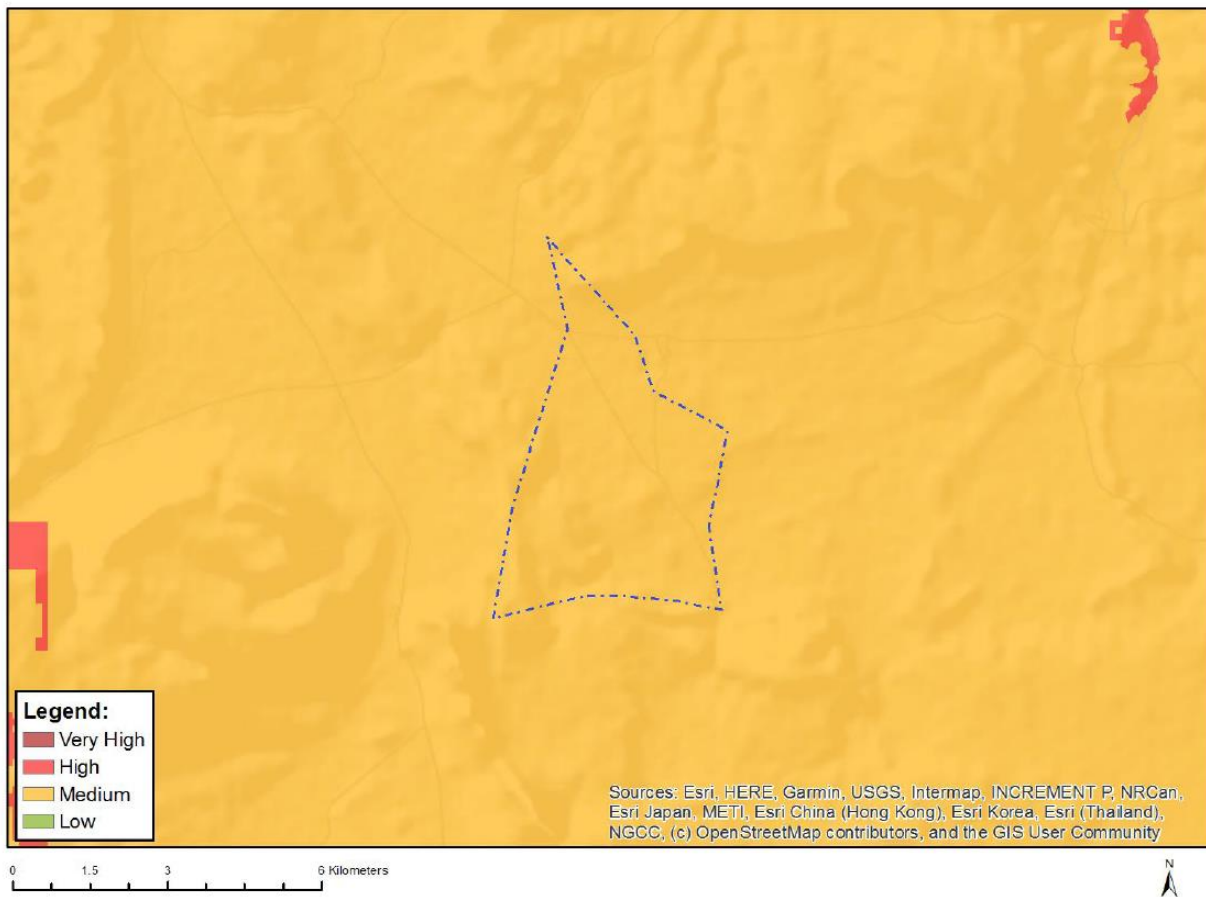


Figure 2. Animal Species Theme Sensitivity Map for the Klipkraal 1 site and surrounds.

Table 1. Animal Species Theme Features for the Klipkraal 1 site.

Sensitivity	Feature(s)
Medium	Reptilia - <i>Chersobius boulengeri</i>
Medium	Mammalia - <i>Bunolagus monticularis</i>
Medium	Aves - <i>Neotis ludwigii</i>



Figure 3. The rocky hills of the Klipkraal 1 site are considered suitable habitat for the Karoo Dwarf Tortoise.

4.1 PLANT SPECIES THEME SENSITIVITY

The DFFE Screening Tool indicates that there are several potential botanical sensitivities from the Klipkraal 1 study area (Figure 4, Table 2). None of these species were observed at the site and it is unlikely that any of these species are present but were not observed. As such, The Klipkraal 1 site is considered to be low sensitivity for the Plant Species Theme.

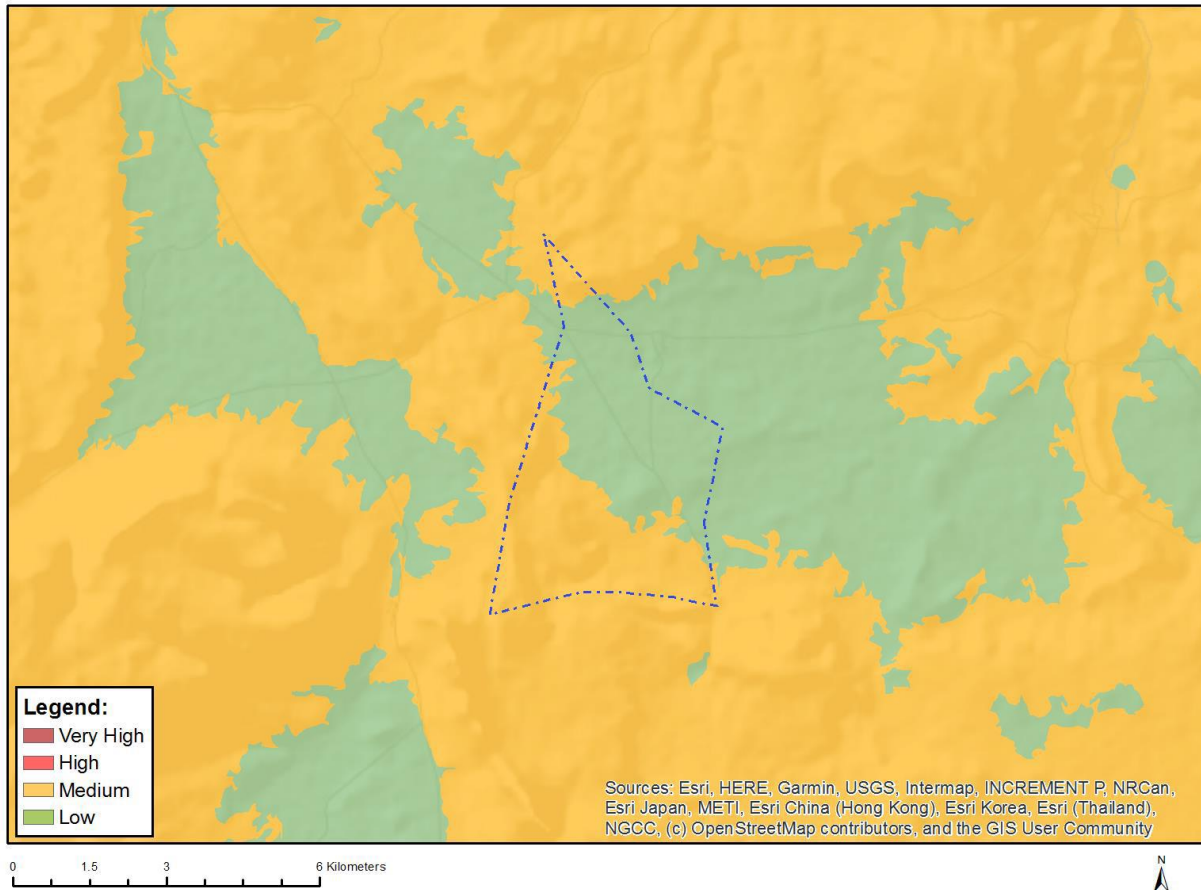


Figure 4. Plant Species Theme Sensitivity Map for the Klipkraal 1 site and surrounds.

Table 2. Plant species theme sensitivities for the Klipkraal 1 site.

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 484
Medium	Sensitive species 886
Medium	<i>Cliffortia arborea</i>

Table 3. Sensitive Species as listed by the DFFE Screening Tool for the Klipkraal 1 site and the likely presence of these species within the site.

DFFE Site Status	Name	IUCN Status	Possible presence within the Hoogland South Grid Corridor
Medium	Sensitive species 484	Rare	This small cryptic succulent occurs from the Roggeveld Escarpment to the Nuweveld Mountains. As this species is localised habitat specialist it is possible that it was overlooked within the site. However, as it was not observed despite searching

			within suitable habitat, it is assumed absent from the site.
Medium	Sensitive species 886	Rare	This asteraceous shrub grows on the Roggeveld and Hantamsberg Mountains. The habitat is considered to represent steep or gentle slopes of a mainly southern aspect in low karroid scrub. This species was not observed within the site and it is assumed to be absent from the site.
Medium	<i>Cliffortia arborea</i>	VU	This is a conspicuous species that grows on cliffs from the Hantamsberg Mountain to the Nuweveld Mountains. There is little suitable habitat for this species at the site and it can be confirmed that this species is not present within the site.



Figure 5. Typical open plains vegetation of the Klipkraal 1 site, corresponding with the Eastern Upper Karoo vegetation type. No species of concern were observed within this habitat type and it is considered low sensitivity.

5 TERRESTRIAL BIODIVERSITY THEME SENSITIVITY.

The overall combined Terrestrial Biodiversity theme indicates that the site consists largely of low sensitivity areas with some areas of Very High sensitivity along the margins of the affected area, associated with areas classified as CBA 2, ESA and FEPA Subcatchments (Figure 6 and Table 4). Since these are anthropogenic conservation planning-based features, it is not really possible

to verify these features in the field, apart from an assessment of their condition and characteristics. Based on the presence of these features within the site, a full terrestrial biodiversity assessment is required.

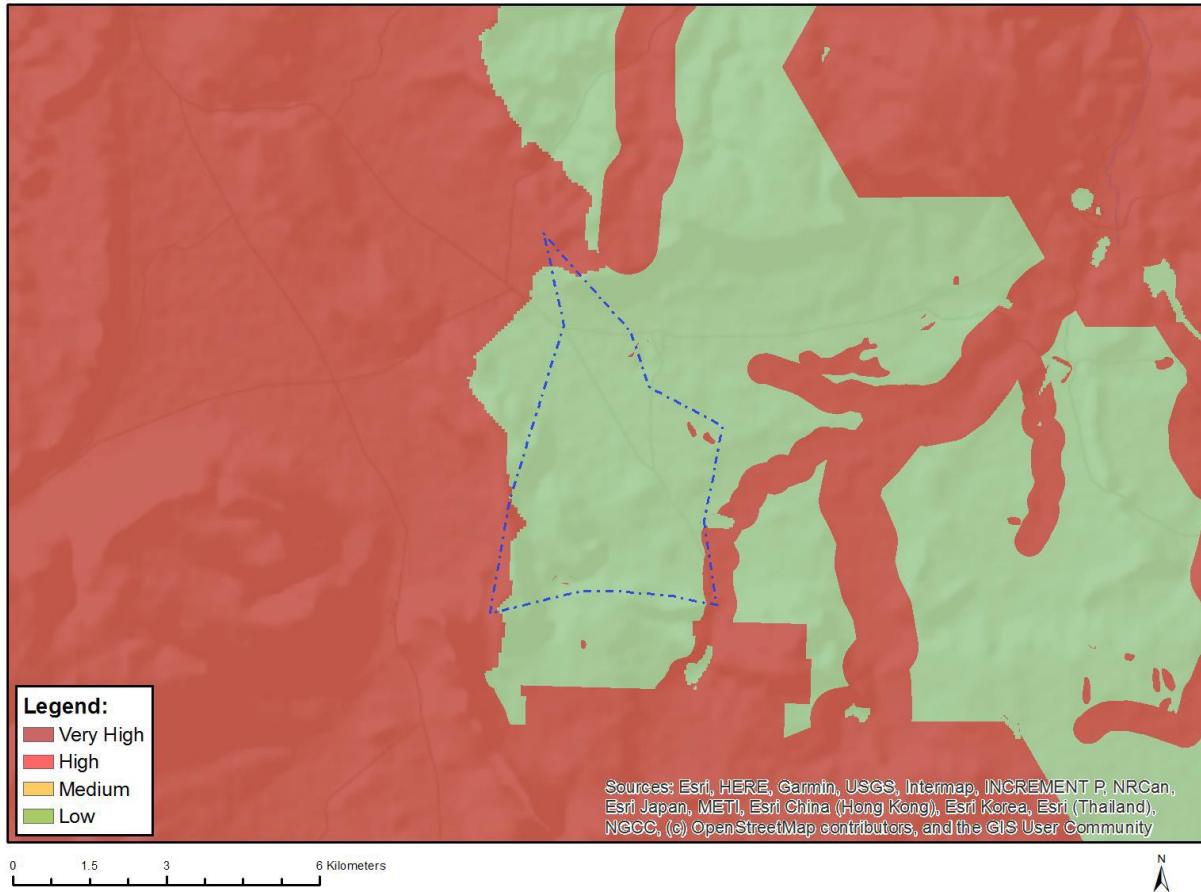


Figure 6. Terrestrial Biodiversity Theme Sensitivity Map of the Klipkraal 1 site and surrounds.

Table 4. Terrestrial Biodiversity Theme Features for the Klipkraal 1 study area.

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical biodiversity area 2
Very High	Ecological support area
Very High	FEPA Subcatchments

6 CONCLUSIONS & IMPLICATIONS OF THE SITE VERIFICATION

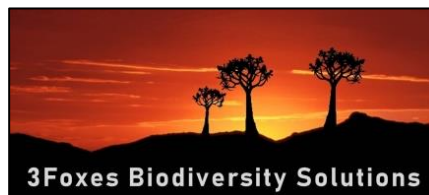
Based on the results of the site verification for the Klipkraal 1 WEF, the following studies are required in the EIA process for terrestrial ecology:

- Karoo Dwarf Tortoise Species Assessment
- Plant Species Compliance Statement
- Terrestrial Biodiversity Assessment

FAUNA & FLORA SPECIALIST SCOPING STUDY: KLIPKRAAL WIND ENERGY FACILITY 1



PRODUCED FOR SIVEST ON BEHALF OF AURA DEVELOPMENT COMPANY (PTY) LTD



Simon.Todd@3foxes.co.za

First Draft - August 2022

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) – REPORTING REQUIREMENTS FOR SPECIALIST THEMES

GN 320 of 20 March 2020: Terrestrial Biodiversity Assessment Report (Very High Sensitivity)	Section of Report
3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	P8
3.1.2 a signed statement of independence by the specialist;	P10
3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 2.5
3.1.4 a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 2.5
3.1.5 a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 2.7
3.1.6 a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 4
3.1.7 additional environmental impacts expected from the proposed development;	Section 5; Section 6
3.1.8 any direct, indirect and cumulative impacts of the proposed development;	Section 5; Section 6
3.1.9 the degree to which impacts and risks can be mitigated;	Section 6
3.1.10 the degree to which the impacts and risks can be reversed;	Section 6
3.1.11 the degree to which the impacts and risks can cause loss of irreplaceable resources;	Section 6
3.1.12 proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 6
3.1.13 a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 [of GN 320 of 20 March 2020] that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	Section 2.8
3.1.14 a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Section 7
3.1.15 any conditions to which this statement is subjected.	Section 7

GN 1150 of 30 October 2020: Terrestrial Animal Species Specialist Assessment Report (Very High or High Sensitivity)	Section of Report
3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	P8
3.1.2 a signed statement of independence by the specialist;	P10
3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 2.5
3.1.4 a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Section 2.5
3.1.5 a description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 2.5
3.1.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 2.7
3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 3.2
3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Section 2.4; Section 2.8; Section 3.2
3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;	Section 4
3.1.10 a discussion on the cumulative impacts;	Section 3.4
3.1.11 impact management actions and impact management outcomes proposed	Section 6
3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Section 7
3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above [of GN 1150 of 30 October 2020] that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.	Section 2.8

GN 1150 of 30 October 2020: Terrestrial Plant Species Compliance Statement (Low Sensitivity)	Section of Report
5.3.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	P8
5.3.2 a signed statement of independence by the specialist;	P10
5.3.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section.2.5
5.3.4 a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	Section 2.5
5.3.5 where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	Section 6
5.3.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 2.7
5.3.7 the mean density of observations/ number of samples sites per unit area; and	Section 2.3
5.3.8 any conditions to which the compliance statement is subjected.	Section 7

TABLE OF CONTENTS

Table of Contents	5
List of Figures	6
Short CV/Summary of Expertise – Simon Todd	7
Specialist Declaration	9
1 Introduction	10
2 Methodology.....	10
2.1 Scope of Study.....	10
2.2 Approach & Assessment Philosophy.....	11
2.3 Relevant Aspects of the Development.....	14
2.4 Data Sourcing and Review	15
2.5 Site Visits & Field Assessment.....	16
2.6 Sensitivity Mapping & Assessment	17
2.7 Limitations & Assumptions	19
3 Description of the Affected Environment – Klipkraal WEF 1	20
3.1 Vegetation Types	20
3.2 Faunal Communities	27
3.3 Critical Biodiversity Areas & Broad-Scale Processes.....	32
3.4 Cumulative Impacts	33
4 Klipkraal Wind Energy Facility 1 Constraints.....	34
5 Impacts and Issues Identification.....	35
5.1 Identification of Potential Impacts	35
6 PRE-APPLICATION Phase Assessment of Impacts – Klipkraal WEF 1	37
6.1 Construction Phase Impacts	38
6.2 Operational Phase Impacts	43
6.3 Decommissioning Phase Impacts.....	46
6.4 Cumulative Impacts – Klipkraal WEF 1 and Associated Infrastructure	48
6.5 No-go alternative	50
7 Conclusion & Recommendations.....	50
7.1 Plan of Study for the EA Phase.....	51
8 References	53
9 Annex 1. List of Plant Species.....	55
10 Annex 2. List of Mammals.....	74

LIST OF FIGURES

Figure 1. Satellite image showing the location of the proposed Klipkraal Wind Energy Facility 1 within the greater Klipkraal WEF cluster. The preliminary turbine layout for the Klipkraal WEF 1 is depicted.....	15
Figure 2. The national vegetation map (SANBI 2018 Update) for the Klipkraal Wind Farms and surrounding area	21
Figure 3. Typical open plains present in the Klipkraal WEF 1, corresponding with the Eastern Upper Karoo vegetation type. The typical plains of the study area are considered low sensitivity and considered suitable for wind farm development.....	22
Figure 4. Typical open shrubland on plains representing Western Upper Karoo with occasional scattered grasses from the Klipkraal 1 site.....	23
Figure 5. Typical example of a dolerite ridge from within the Klipkraal site, representative of the Upper Karoo Hardeveld vegetation type. These areas are considered more sensitive than the surrounding plains as they create a wide variety of habitats for both fauna and flora.....	24
Figure 6. Riparian area within the Klipkraal Wind Energy Facility 1. These areas are important for fauna generally, but do have the correct structure for Riverine Rabbits.....	25
Figure 7. Map showing the location of Riverine Rabbit habitat and associated turbine buffers based on observations at the site.	27
Figure 8. Riverine Rabbit image captured by a camera trap located within the Klipkraal project site.	28
Figure 9. Namib Giant Ground Gecko <i>Chondrodactylus angulifer</i> observed at the Klipkraal site.	32
Figure 10. Extract of the Northern Cape CBA map for the greater Klipkraal project area.	33
Figure 11. Ecological sensitivity map for turbines on the Klipkraal WEF 1.	35

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

 <p>3Foxes Biodiversity Solutions ECOLOGICAL SPECIALIST SERVICES Assessment/Management/Research</p>	<p>Simon Todd Pr.Sci.Nat Director & Principle Scientist C: 082 3326502 Simon.Todd@3foxes.co.za</p> <p>23 De Villiers Road Kommetjie 7975</p>	<p>Ecological Solutions for People & the Environment</p>
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Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.
- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.
- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town

- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Recent Specialist Ecological Studies in the Vicinity of the Current Site

Environmental Impact Assessment for the Proposed Komsberg East and Komsberg West Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment. Arcus Consulting 2014.

Proposed Rietkloof & Brandvallei Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. EOH 2016.

Proposed Gunstfontein Wind Farm and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. Savannah Environmental 2016.

Mainstream South Africa Dwarsrug Wind Energy Facility: Fauna & Flora Specialist Impact Assessment Report. Sivist 2014.

Phezukomoya and San Kraal Wind Energy Facilities and associated grid connection. Fauna and Flora specialist studies. Arcus Consulting 2018.

Kokerboom Wind Energy Facilities (1-4) and associated grid connections. Fauna and Flora specialist studies. Aurecon 2017.

SPECIALIST DECLARATION

I, ..Simon Todd....., as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- 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 have no vested interest in the proposed activity proceeding;
- 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;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:  _____

Name of Specialist: ____Simon Todd_____

Date: ____20 January 2022_____

1 INTRODUCTION

Aura Development Company (Pty) Ltd is proposing to develop the Klipkraal Wind Energy Facility 1 on a ca. 7600 ha site situated about 30km southeast of Fraserburg, within the Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape. The development would have a maximum output of 200MW and a maximum of 31 turbines. The proposed wind farm would make up part of a larger wind energy facility (WEF) (with associated BESS) which will be referred to as the Klipkraal WEF, consisting of up to seven (7) phases, with a combined generation capacity of up to approximately 1 400 MW. SIVEST are conducting the required EA process and 3Foxes Biodiversity Solutions has been appointed by SiVest provide a specialist terrestrial fauna and flora specialist pre-application study of the proposed wind farm as part of the EA application.

The purpose of the Klipkraal Wind Energy Facility 1 Terrestrial Biodiversity Report is to describe and detail the ecological features of the proposed wind farm site; provide an assessment of the ecological sensitivity of the affected area and identify the likely impacts that may be associated with the development of the Wind Farm and associated infrastructure. Several site visits (detailed in Section 2.5) as well as a desktop review of the available ecological information for the area was conducted in order to identify and characterise the ecological features of the site. This information is used to derive an ecological sensitivity map that presents the ecological constraints for the development and which have been used to inform the initial layout of the development. A preliminary assessment is provided in which impacts are assessed for the pre-construction, construction, operation, and decommissioning phases of the development. A variety of avoidance and mitigation measures associated with each identified impact are recommended in order to reduce the likely impact of the development, which should be included in the EMP for the development. Finally, a statement is made as to the general ecological acceptability of the Klipkraal Wind Energy Facility 1 and whether or not the development should proceed to the impact assessment phase is made.

2 METHODOLOGY

2.1 SCOPE OF STUDY

The study includes the following activities:

- a description of the environment that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of environmental issues and potential impacts (including assessment of direct, indirect and cumulative impacts) that have been identified;
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts;

- an indication of the methodology used in determining the significance of potential environmental impacts;
- an assessment of the significance of direct, indirect and cumulative impacts of the development;
- a description and comparative assessment of all alternatives including cumulative impacts;
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr);
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- a description of any assumptions uncertainties and gaps in knowledge; and
- an environmental impact statement which contains:
 - a summary of the key findings of the environmental impact assessment;
 - an assessment of the positive and negative implications of the proposed activity; and
 - a comparative assessment of the positive and negative implications of identified alternatives.

General Considerations for the study included the following:

- Disclose any gaps in information (and limitations in the study) or assumptions made.
- Identify recommendations for mitigation measures to minimise impacts.
- Outline additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the EMPr for faunal or flora related issues.
- The assessment of the potential impacts of the development and the recommended mitigation measures provided have been separated into the following project phases:
 - Planning and Construction
 - Operational
 - Decommissioning

2.2 APPROACH & ASSESSMENT PHILOSOPHY

This assessment is conducted according to the 2014 EIA Regulations (Government Notice Regulation 982, as amended) in terms of the National Environmental Management Act (Act 107 of 1998) as amended (NEMA), as well as the recently promulgated notice issued in terms of NEMA, *“National Environmental Management Act, 1998 (Act No. 107 Of 1998): Procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation [G 43110 – GN 320]”*¹

¹ Please see Appendix x for Site Sensitivity Verification Report

In terms of NEMA, this assessment demonstrates how the proponent intends to comply with the principles contained in Section 2 of NEMA, which amongst other things, indicates that environmental management should:

- (In order of priority) aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment;
- Avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

Furthermore, in terms of best practice guidelines as outlined by Brownlie (2005) and De Villiers *et al.* (2005), a precautionary and risk-averse approach should be adopted for projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. CBAs/ESAs (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas (FEPA).

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:

- The study includes data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:
 - The broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc.*).

Species level²

- Species of Conservation Concern (SCC) (giving location if possible, using GPS);
- The viability of an estimated population size of the SCC species that are present (including the degree of confidence in prediction based on availability of information and specialist knowledge, i.e., High=70-100% confident, Medium 40-70% confident, low 0-40% confident);
- The likelihood of other Red Data Book species, or SCC, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development;
- Conduct a faunal³ assessment that can be integrated into the ecological study;
- Describe the existing impacts of current land use as they affect the fauna;
- Clarify species of special concern and that are known to be:
 - endemic to the region;
 - that are considered to be of conservational concern;
 - that are in commercial trade (CITES listed species); or
 - are of cultural significance.
- Provide monitoring requirements as input into the EMP_r for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity’.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified and/or described:

- The key ecological “drivers” of ecosystems on the site and in the vicinity, such as fire.
- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e., *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries).
- Any possible changes in key processes, e.g., increased fire frequency or drainage/artificial recharge of aquatic systems.

² Species level assessments for Riverine Rabbit (*Bunolagus monticularis*) and Karoo Padloper Tortoise (*Chersobius boulengeri*) are addressed and integrated in this Terrestrial Ecology report . Birds identified in the Animal Theme are addressed in the Avifaunal report.

³ Excluding Avifauna and Bat Species

- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

2.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The Klipkraal Wind Energy Facility 1 is part of the Klipkraal Cluster and is located approximately 30 km southeast of Fraserburg in the Northern Cape. The layout and location of the Klipkraal Wind Energy Facility 1 is illustrated below in Figure 1 and includes up to 60 potential turbine locations with a maximum output of 300 MW. The estimated total permanent footprint of the Klipkraal Wind Energy Facility 1 is estimated at 120ha. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV/400kV overhead power line. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks. The electricity generated by the proposed wind farm projects will be fed into the national grid via 132kV/400kV power lines (part of the separate BA process, which will be undertaken in parallel to the respective EIA processes), majority of which are situated within one (1) of the Strategic Transmission Corridors, namely the Central Corridor (as defined and in terms of the procedures laid out in Government Notice No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively). There are currently two powerline routes that will be included as part of the Basic Assessment.

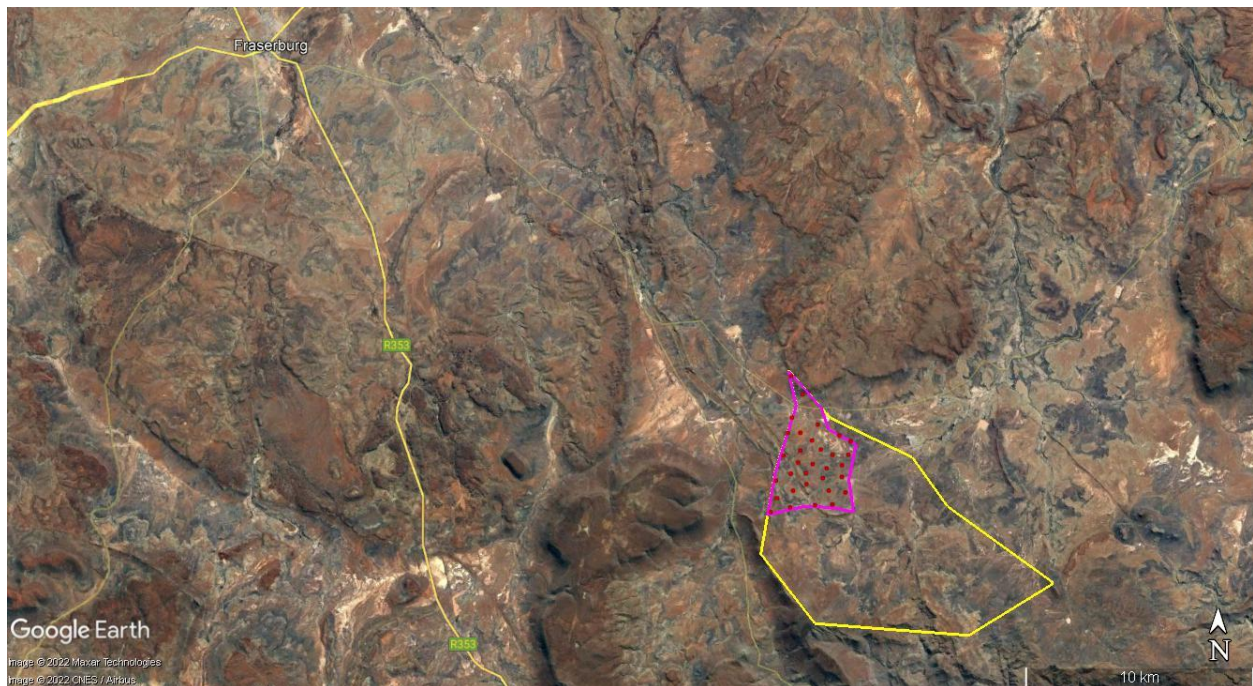


Figure 1. Satellite image showing the location of the proposed Klipkraal Wind Energy Facility 1 within the greater Klipkraal WEF cluster. The preliminary turbine layout for the Klipkraal WEF 1 is depicted.

2.4 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (2018 update).
- Information on plant and animal species recorded for the wider area was extracted from the South African Biodiversity Information Facility (SABIF)/ SANBI Integrated Biodiversity Information System (SIBIS) database hosted by the South African National Biodiversity Institute (SANBI). Data was extracted for a significantly larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has not been well sampled in the past.
- The International Union for Conservation of Nature (IUCN) conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2021).

Ecosystem:

- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel *et al.* 2011) as well as the 2018 NBA.
- Critical Biodiversity Areas (CBAs) in the study area were obtained from Northern Cape Conservation Plan (Oosthuysen & Holness 2016).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases (ReptileMap, Frogmap and MammalMap) <http://vmus.adu.org.za>.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, EWT & SANBI (2016) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as an assessment of the availability and quality of suitable habitat at the site.
- The conservation status of mammals is based on the IUCN Red List Categories (EWT/SANBI 2016), while reptiles are based on the South African Reptile Conservation Assessment (Bates *et al.* 2013) and amphibians on Minter *et al.* (2004) as well as the IUCN (2020).

2.5 SITE VISITS & FIELD ASSESSMENT

The Klipkraal cluster site was visited on two occasions for the current study, from 22-28 June 2021 and 05 September 2021. The initial site visit included putting camera traps out across the Klipkraal site with the aim of verifying the presence of the Riverine Rabbit but also other fauna more generally. During the site visits, the wind farm site was extensively investigated in the field. Potentially sensitive features within the site were investigated, validated and characterised in the field including any pans, rocky outcrops and major drainage features that were observed in the field or from satellite imagery of the site. Particular attention was paid to the integrity of habitats present as well as the broader ecological context in terms of connectivity and broad-scale ecological processes likely to be operating at the site.

In terms of the actual sampling approaches that were used, the vegetation of the site was characterised through walk-through surveys distributed across the site, in which plant species lists for the different habitats observed were compiled. Specific attention was paid to the possible presence of species of conservation concern (SCC) as well as other species which are considered to be of ecological significance. In terms of fauna, active searches were conducted for reptiles and amphibians across the site, within habitats where such species are likely to be encountered. In addition, all reptiles and amphibians encountered while doing other field work were recorded. As the Riverine Rabbit is a species of particular concern at the site, camera trapping was extensively used across the Klipkraal site to establish the presence or absence of the Riverine Rabbit and also to characterise the fauna of the site more generally. A total of 30 camera traps

were distributed across the Klipkraal 1-3 cluster. The camera traps were concentrated within riparian and floodplain areas identified as the most favourable potential habitat for this species. This amounted to approximately two-thirds of the cameras and the remainder were located in other habitats. In order to increase the number of fauna captured, the cameras were placed along paths, fences etc. where fauna are likely to pass and be captured by the cameras. The cameras were placed in the field in June 2021 and retrieved in September 2021, giving rise to nine weeks of camera trapping to inform the current study.

2.6 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the results of the site visits with the available ecological and biodiversity information in the literature and various spatial databases as described above. As a starting point, mapped sensitive features such as wetlands, drainage lines, rocky hills and pans were collated and buffered where appropriate to comply with legislative requirements or ecological considerations. Additional sensitive areas were then identified from the satellite imagery of the site and delineated. All the different layers created were then merged to create a single coverage. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the scale as indicated below.

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high potential impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution (such as specific consideration of the footprint within these areas and field verification of the acceptability of development within these potentially sensitive areas) as it may not be possible to mitigate all impacts appropriately.
- **Very High/No-Go** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are usually no-go areas from a developmental perspective and must be avoided.

For the current development, sensitivity mapping was differentiated between different types of infrastructure based on their potential impacts. For example, turbines generate noise and movement which is not the same as the noise and disturbance generated by the wind farm service

roads. For this purpose, turbines, substations, the BESS and other built infrastructure are considered separately from roads and underground cabling and two different sensitivity maps are produced for each category of infrastructure.

Limits of Acceptable Change

Over and above the sensitivity rating mapping, a further level of impact reduction is applied by using limits of acceptable change within each of these sensitivity ratings. Limits of acceptable change for each sensitivity category are indicated below and refer to the extent of on-site habitat loss within each sensitivity category that is considered acceptable before significant ecological impact that is difficult to mitigate and which may compromise the development is likely to occur. The limits of acceptable change are better assessed in a cumulative approach and have thus been determined considering the outer boundaries of the three wind farms that comprise the Klipkraal 1-3 Wind Farm Cluster. As the sensitive habitats are not defined by each individual wind farm boundary but run across these ecologically arbitrary boundaries it makes more sense from an ecological perspective to look at the three adjacent wind farms together when looking at limits of acceptable change as this would be assessing the worst-case scenario for such change. If one of the wind farms does not go ahead for some reason, then there will be less habitat loss than is being assumed here which ensures that this assessment represents a worst-case scenario in terms of habitat loss within each sensitivity category. This provides a guide for the developer in terms of ensuring that the spatial distribution of impact associated with the development is appropriate with respect to the sensitivity of the site. In addition, it provides a benchmark against which impacts can be assessed and represents an explicit threshold that when exceeded indicates that potentially unacceptable impacts may have occurred. In terms of this latter criterion, exceeding the limits of acceptable change for either High or Very High/No-Go sensitivity areas is considered to represent an immediate fatal flaw, while the limits within either Low or Medium sensitivity areas could potentially be exceeded, provided that the total footprint in these two areas combined does not exceed the overall combined acceptable loss within these classes. However, in the latter case, this would raise significant concern regarding the suitability of the development and the exact spatial configuration of the development and the likely impacts on ecological processes would need to be considered.

It is important to note that irrespective of the limits of acceptable change and whether the development is within the limits, the specialist may still identify areas within the site that are unacceptable for development and will require the turbines and/or infrastructure to be moved outside these areas. This is further discussed in Section 5.

Table 1. Limits of acceptable change associated with the wind farm development, within each of the sensitivity categories as defined below.

Sensitivity	Acceptable Loss	Description
Low	5%	Units with a low sensitivity where there is likely to be a low impact on ecological processes and terrestrial biodiversity. This category represents transformed or natural areas where the impact of development is likely to be local in nature and of low significance with standard mitigation measures.
Medium	2%	Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impacts such as erosion low. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
High	1%	Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution. Where roads are required through these areas, existing access roads should preferably be used as this reduces both the impact and the footprint of any access roads.
Very High/No Go	<0.1%	Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas represent no-go areas from a developmental perspective and should be avoided.

2.7 LIMITATIONS & ASSUMPTIONS

The current study is based on several site visits as well as an associated desktop study. This significantly reduces the assumptions required for the current study and in particular the sensitivity mapping. The vegetation during the site visits was relatively dry and the current sampling period follows an extended drought in the area, with the result that the vegetation of the site was not all in a good growing condition. However, there do not appear to be many significant constraints regarding plant species, with the result that this is not likely to have significantly affected the current study to a significant degree.

In terms of fauna, the presence of some fauna is difficult to verify in the field as these may be shy or rare and their potential presence at the site must be evaluated based on the literature and available databases. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. As many remote areas have not been well sampled, the species lists derived for the area do not always adequately reflect the actual fauna and flora present at the site. In order to reduce this limitation, and ensure a conservative approach, the species lists derived for the project site from the literature were obtained from an area significantly larger than the study site. Although there are some limitations regarding the fauna at the site and the

possibility that some species present will be overlooked, overall, this would be restricted to a low number of species and is not likely to be of significance given that the general approach is to take a conservative approach and avoid all identified important faunal habitats.

Due to the fact that the site contains areas of High sensitivity in terms of the Animal Species Theme and Very High sensitivity in terms of the Terrestrial Biodiversity Theme, a Terrestrial Animal Species Impact Assessment and a Terrestrial Biodiversity Impact Assessment as outlined within the “*The Assessment And Reporting Of Impacts On Terrestrial Animal Species For Activities Requiring Environmental Authorisation*” and “*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity*”, respectively, must be undertaken and the protocols for these assessments should be followed. In terms of the Plant Species Protocol, since the site is located in a low sensitivity area, a terrestrial plant species compliance statement must be compiled unless plant species of concern are detected on site, in which case a full assessment would be required.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT – KLIPKRAAL WEF 1

3.1 VEGETATION TYPES

The national vegetation map (Mucina & Rutherford 2006 & SANBI 2018 update) for the study area is depicted below in Figure 2. There are several vegetation types within the greater Klipkraal site including Eastern Upper Karoo, Western Upper Karoo, Roggeveld Shale Renosterveld, Upper Karoo Hardeveld and Bushmanland Vloere. Of these only Eastern Upper Karoo and Western Upper Karoo fall within the Klipkraal WEF 1 development area. The extent of Upper Karoo Hardeveld in the area has not been well captured by the VegMap and there is significantly more of this vegetation type present within the site than the VegMap would indicate. These vegetation types are described and illustrated briefly below as observed at the site.

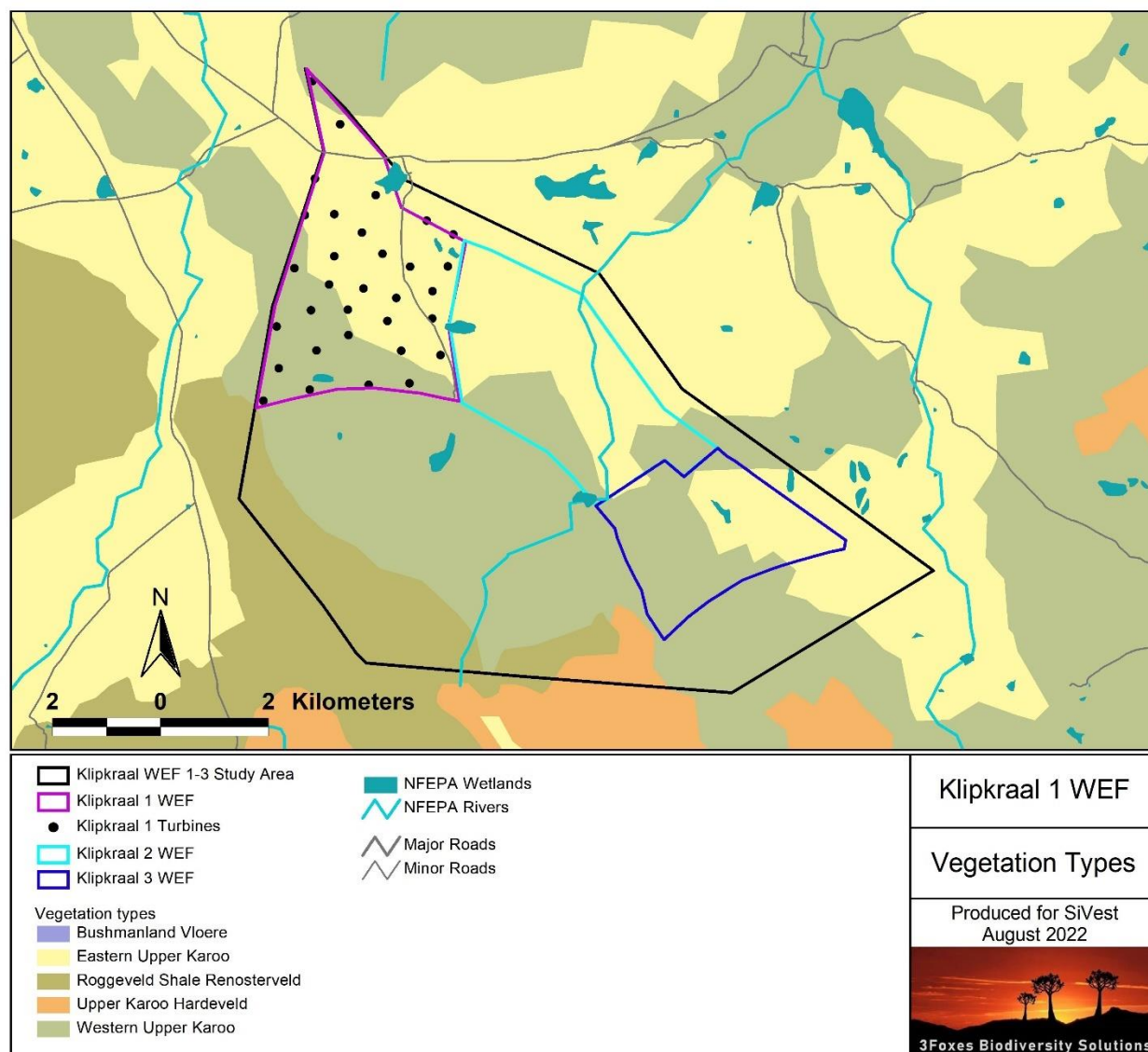


Figure 2. The national vegetation map (SANBI 2018 Update) for the Klipkraal Wind Energy Facility 1 and surrounding area.

Eastern Upper Karoo

Eastern Upper Karoo dominates the northern section of the Klipkraal 1 development area, where it occupies the typical open plains and low hills of the site. Eastern Upper Karoo has an extent of 49 821 km² and is the most extensive vegetation type in South Africa and forms a large proportion of the central and eastern Nama Karoo Biome. This vegetation type is classified as Least Threatened, and about 2% of the original extent has been transformed largely for intensive agriculture. Eastern Upper Karoo is however poorly protected and less than 1% of the 21% target has been formally conserved. Mucina & Rutherford (2006) list eight endemic species for this vegetation type, which considering that it is the most extensive unit in the country, is not very high. As a result, this is not considered to represent a sensitive vegetation type.

In general, the areas of Eastern Upper Karoo are represented by large tracts of fairly homogenous landscapes of low plant diversity. Dominant and characteristic species include low woody shrubs such as *Pentzia globosa*, *Rosenia humulis*, *Asparagus capensis*, *Eriocephalus ericoides*, *Pteronia sordida*, *Pteronia incana*, *Plinthus karooicus*, *Helichrysum luciloides*, *Felicia muricata*, with a varying density of low succulent shrubs such as *Zygophyllum lichtensteinii*, *Aridaria noctiflora* and *Ruschia spinosa*, with a variable grass layer dominated by *Stipagrostis ciliata*, *Stipagrostis obtusa*, *Enneapogon desvauxii* and *Tragus berteronianus*.



Figure 3. Typical open plains present in the Klipkraal WEF 1, corresponding with the Eastern Upper Karoo vegetation type. The typical plains of the study area are considered low sensitivity and considered suitable for wind farm development.

Western Upper Karoo

The Western Upper Karoo vegetation type occurs in the Northern Cape Province and a small part in the Western Cape and occurs on plains from the Fish River and upper reaches of the Renoster River in the west as far as Fraserburg and Carnarvon in the east, sandwiched between the Bushmanland Basin in the north and the Roggeveld Karoo and edges of the Great Escarpment in the south. In the southwest the dissected landscape is associated with the tributaries of the upper catchment of the Sak River (e.g. Renoster River, Riet River, Klein Sak River) and is often rocky. It is a mixture of small-leaved shrubs and shrubby succulents (*Brownanthus*, *Drosanthemum*, *Ruschia* etc.) with drought-resistant (mostly 'white') grasses a determinant feature of the vegetation structure.

Within the Klipkraal site, there is not a lot of difference between the areas of Western Upper Karoo and Eastern Upper Karoo and there are not usually a distinct boundary between these vegetation

types. However, in general, the lower elevation and southern, warmer areas consist of Western Upper Karoo, while the northern and colder areas consist of Eastern Upper Karoo. Common and dominant shrub species include *Lycium cinereum*, *Tripteris sinuata*, *Chrysocoma ciliata*, *Eriocephalus ericoides* subsp. *ericoides*, *Helichrysum lucilioides*, *Pentzia globosa*, *Tetragonia arbuscula*, *Asparagus capensis* var. *capensis*, *Berkheya annectens*, *Eriocephalus decussatus*, *Euryops multifidus*, *Felicia muricata*, *Hermannia cuneifolia*, *H. spinosa*, *Melolobium candicans*, *Pegolettia retrofracta*, *Pentzia incana*, *Pteronia adenocarpa*, *P. glauca*, *P. mucronata*, *P. sordida*, *Rosenia glandulosa*, *Selago albida* and *Zygophyllum microphyllum*. Succulent shrubs include *Ruschia intricata*, *Aridaria noctiflora* subsp. *straminea*, *Brownanthus ciliata* subsp. *ciliatus*, *Drosanthemum lique*, *Euphorbia rectirama*, *Galenia sarcophylla*, *Salsola calluna*, *S. glabrescens*, *S. rabieana*, *S. tuberculata*, *Sarcocaulon patersonii* and *Psilocaulon coriarium*. Grasses include *Aristida congesta*, *Enneapogon desvauxii*, *Stipagrostis ciliata*, *S. obtusa*, *Aristida adscensionis*, *A. diffusa*, *Eragrostis obtusa*, *Fingerhuthia africana*, *Tragus berteronianus* and *T. koelerioides*. Although there are some communities present such as the halophytic plains habitat depicted below in **Error! Reference source not found.** that are considered sensitive, in general, this is not considered to represent a sensitive vegetation type.



Figure 4. Typical open shrubland on plains representing Western Upper Karoo with occasional scattered grasses from the Klipkraal 1 site.

Upper Karoo Hardeveld

The areas mapped under the VegMap as Upper Karoo Hardeveld within the site are very coarsely mapped and there are some additional areas of Upper Karoo Hardeveld present within the

Klipkraal Cluster that have not been mapped. The Upper Karoo Hardeveld vegetation type is associated with 11 734 km² of the steep slopes of koppies, buttes mesas and parts of the Great Escarpment covered with large boulders and stones. The vegetation type occurs as discrete areas associated with slopes and ridges from Middelpos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east, as well as most south-facing slopes and crests of the Great Escarpment between Teekloofpas and eastwards to Graaff-Reinet. Altitude varies from 1000-1900m. Mucina & Rutherford (2006) list 17 species known to be endemic to the vegetation type. This is a high number given the wide distribution of most karoo species and illustrates the relative sensitivity of this vegetation type compared to the surrounding Eastern Upper Karoo.

Most of the hills, outcrops and steep slopes within the Klipkraal Cluster site consist of Upper Karoo Hardeveld and this unit has been under-mapped within the national vegetation map. This vegetation type usually consists of very rocky ground and is often associated with steep slopes, with the result that it is considered vulnerable to disturbance but is also an important habitat for fauna. It also contains a higher abundance of protected plant species than the adjacent areas of Eastern Upper Karoo. Consequently, it is generally considered higher ecological sensitivity than the surrounding areas. This habitat creates a wide variety of microhabitats for fauna and flora and the areas with large amounts of exposed rock have therefore been mapped as high sensitivity. The steep slopes and areas with very large fractured boulders have been mapped as no-go areas for turbines and roads.



Figure 5. Typical example of a dolerite ridge from within the Klipkraal site, representative of the Upper Karoo Hardeveld vegetation type. These areas are considered more sensitive than the surrounding plains as they create a wide variety of habitats for both fauna and flora.

Southern Karoo Riviere

Although not all areas associated with this vegetation type have been mapped in the VegMap, the vegetation along the major rivers within the site corresponds with the Southern Karoo Riviere vegetation type. In the area, the riparian areas are mapped as Bushmanland Vloere in the VegMap, but this is not an appropriate designation for these areas and the riparian areas within the site, correspond better with the Southern Karoo Riviere vegetation type. The Southern Karoo Riviere vegetation type is associated with the rivers of the central karoo such as the Buffels, Bloed, Dwyka, Gamka, Sout, Kariega and Sundays Rivers. About 12% has been transformed as a result of intensive agriculture and the construction of dams. Although it is classified as Least Threatened, it is associated with rivers and drainage lines and as such represents areas that are considered ecologically significant. Common and dominant species in the drainage lines and within the adjacent floodplain vegetation include *Sporobolus ioclados*, *Helichrysum pentzioides*, *Drosanthemum lique*, *Pentzia globosa*, *Salsola aphylla*, *Tribulis terrestris*, *Felicia muricata*, *Atriplex vestita*, *Zygophyllum retrofractum*, *Cynodon dactylon*, *Chrysocoma ciliata*, *Stipagostis namaquensis*, *Lycium pumilum*, *Lycium cinereum*, *Artemisia africana*, *Tripteris spinescens*, *Exomis microphylla* and *Derris denudata*.



Figure 6. Riparian area within the Klipkraal Wind Energy Facility 1. These areas are important for fauna generally, but do not have the correct structure for Riverine Rabbits.

Although, the majority of drainage features within the Klipkraal site are small with poorly developed riparian vegetation, the larger features such as the Damfontein se Rivier however do have some areas of floodplain with a composition and structure indicative of favourable habitat for Riverine Rabbits. This habitat suitability was confirmed by the camera trapping and Riverine

Rabbits have been confirmed present at three camera trap locations all situated within dense riparian habitat. None of these observations are from the Klipkraal WEF 1 and the presence of this species within the Klipkraal WEF 1 development footprint is considered unlikely.

Listed Plant Species

According to the DFFE Screening Tool, there are three plant species of concern that may occur within the Klipkraal 1 site. These are listed and briefly described below in Table 2. None of these species was observed at the site and it is considered unlikely to very unlikely that they are present within the Klipkraal 1 site. There are however numerous provincially protected species present on the site including all *Aloe* species present, all *Amaryllidaceae*, all *Asclepiadaceae*, all *Iridaceae*, all *Mesembryanthemaceae* and any other species as listed in the Northern Cape Nature Conservation Act 9 of 2009.

Table 2. Sensitive Species as listed by the DFFE Screening Tool for the Klipkraal 1 site and the likely presence of these species within the site.

DFFE Site Status	Name	IUCN Status	Possible presence within the Klipkraal cluster site
Medium	Sensitive species 484	Rare	This small cryptic succulent occurs from the Roggeveld Escarpment to the Nuweveld Mountains. As this species is localised habitat specialist it is possible that it was overlooked within the site. However, as it was not observed despite searching within suitable habitat, it is assumed absent from the site.
Medium	Sensitive species 886	Rare	This asteraceous shrub grows on the Roggeveld and Hantamsberg Mountains. The habitat is considered to represent steep or gentle slopes of a mainly southern aspect in low karroid scrub. This species was not observed within the site and it is assumed to be absent from the site.
Medium	<i>Cliffortia arborea</i>	VU	This is a conspicuous species that grows on cliffs from the Hantamsberg Mountain to the Nuweveld Mountains. There is little suitable habitat for this species at the site and it can be confirmed that this species is not present within the site.

3.2 FAUNAL COMMUNITIES

Mammals

As many as 70 mammals are listed for the wider study area in the MammalMap database, but many of these are introduced or conservation dependent and approximately 48 can be considered to be free-roaming and potentially impacted by the development (Annex 2). This includes several red-listed species including the Riverine Rabbit *Bunolagus monticularis* (CR), Black-footed Cat *Felis nigripes* (VU), Grey Rhebok *Pelea capreolus* (NT), Mountain Reedbuck *Redunca fulvorufula* (EN) and Brown Hyena *Hyaena brunnea* (NT). Based on the camera trapping conducted on the site, the Grey Rhebok is confirmed present within the wider Klipkraal site, but not within the Klipkraal WEF 1 site. The camera trapping also picked up the Riverine Rabbit within the greater Klipkraal site (Figure 8) but not within the Klipkraal WEF 1 project area. This suggests that while this species is present in the wider area, there is not sufficient suitable habitat within the Klipkraal 1 site and the footprint can be considered low sensitivity for this species.

In terms of the sensitivity mapping relating more generally to mammals, the riparian areas have been classified as Very High sensitivity based on their value as Riverine Rabbit habitat but also as a result of their general ecological significance. The rocky hills and steep slopes have been classified as Very High sensitivity on account of the value of these areas as habitat for mammals associated with rocky areas and the more general ecological value of these areas.

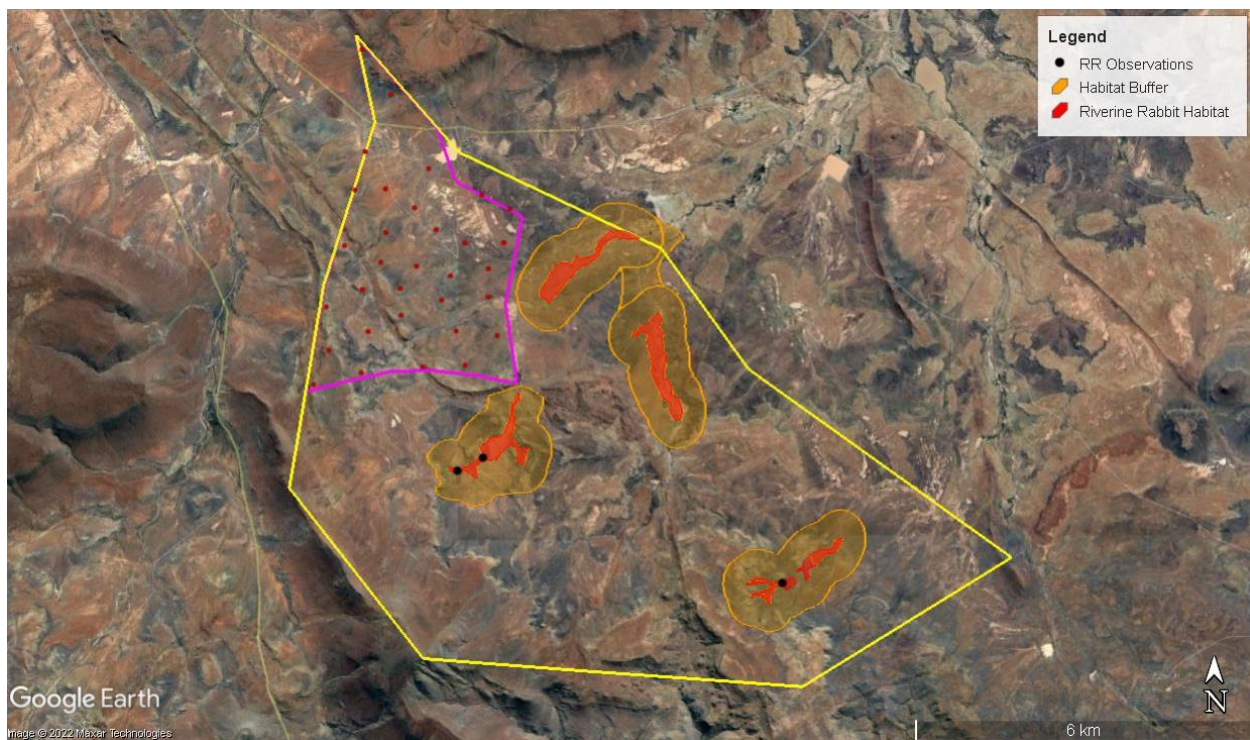


Figure 7. Map showing the location of Riverine Rabbit habitat and associated turbine buffers based on observations at the site.

The Riverine Rabbit is potentially of concern for the Klipkraal WEF Cluster. The areas of potentially suitable habitat have been mapped in Figure 7 above and buffered by up to 500m depending on the landscape context and the potential for impact on Riverine Rabbit due to turbine noise and flicker. Currently, under the layout provided for the Klipkraal Wind Energy Facility 1, there are no turbines within the mapped habitat or buffer areas, with the result that impacts on this species from the current project are expected to be low.



Figure 8. Riverine Rabbit image captured by a camera trap located within the Klipkraal project site.

Table 3. Red-listed mammals known from the broad area and their likely presence in the Klipkraal site and the likely consequence thereof.

Species	Status	Likely Presence & Consequence	
		Wider Klipkraal Project Area	Klipkraal WEF 1
Riverine Rabbit <i>Bunolagus monticularis</i>	CR	Confirmed present in the area, especially along the larger drainage systems of the area where there is typical riparian habitat present.	No observed within the Klipkraal WEF 1 site and as there is little suitable habitat within the Klipkraal WEF 1 project area, it seems unlikely to be present within the Klipkraal 1 area despite being confirmed present within the Klipkraal 2 WEF project area.
Black-footed Cat <i>Felis nigripes</i> (VU)	VU	There are historical records from the Klipkraal area and it is considered to be possibly present within the Karoo National Park but not confirmed.	This is a secretive species and while it may be present in the area, this species was not detected by the camera traps and it is not likely present within the site.
Grey Rhebok <i>Pelea capreolus</i>	NT	This species is confirmed present in the area and can commonly be seen in most areas of high-lying ground in the Karoo and along the Great escarpment.	This species was detected by the camera traps on the Klipkraal site, this was in the far south of the greater Klipkraal project area, well outside of the Klipkraal WEF 1 project area. As such it considered present in the area and probably moves through the site and uses parts of the site on occasion. However, as this species has a wide distribution in the country, the wind farm is not likely to generate a significant impact on the local population of this species.
Mountain Reedbuck <i>Redunca fulvorufula</i>	EN	This species is confirmed present in the wider area, both within the Karoo National Park and more generally in the area, in high-lying areas with good grass cover.	This species was not captured by the camera traps with the result that it is considered unlikely to be present within the Klipkraal 1 site, but may move through the area on occasion. But as for the Grey Rhebok, this species has a large range and it is not likely that the development would generate a large impact on this species.

Brown Hyena <i>Hyaena brunnea</i>	NT	This species occurs at a naturally low density within the Karoo and is known from a few records from the Karoo National Park but may also roam freely on farmland.	Although this species may pass through the area on occasion, it is considered unlikely to be present on the site on a regular basis.
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Reptiles

Reptile diversity in the wider area is relatively high which can be ascribed to the diversity of habitats present, especially along the Nuweveld escarpment south of the site. Approximately 63 reptile species are known from the general region and may potentially occur within the study area, with 14 being of confirmed occurrence, 45 of probable occurrence and four of possible occurrence. Species of potential concern include the local endemic, Braack's Pygmy Gecko and the Karoo Padloper. Braack's Pygmy Gecko *Goggia braacki* is a Western Cape endemic with an extremely restricted distribution range. Most of its distribution is associated with a section of the Hoogland Mountains range within the Karoo National Park. It is however not currently red-listed, but it can perhaps be regarded as the reptile icon for the Hoogland/Beaufort West region. It has thus far, not been recorded in the Klipkraal project study area, but it may possibly (not probably) be present within the wind farm area. The only threatened (Red Listed) reptile species in this region is the Karoo Dwarf Tortoise (EN). This small tortoise is seldom observed, even when specifically targeted during herpetofaunal surveys as it is active for only very short parts of the day and may also aestivate for extended periods during unfavourable environmental conditions. They are associated with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes. Threats to this species include habitat degradation due to agricultural activities and overgrazing, and predation by the Pied Crows which in recent decades have expanded in distribution range. While there is certainly suitable habitat within the Klipkraal development cluster this species has not been observed within the site thus far. Nevertheless, it is considered likely that this species is present at the site, within areas of suitable habitat. Tortoises are however one of the few groups of reptiles that have been specifically studied with regards to their responses to wind energy development and no significant negative impacts have been detected within population's resident on wind farms (Agha *et al.* 2015, Lovich *et al.* 2011). Consequently, habitat loss for this species is likely to be the major avenue of potential impact resulting from the wind farm development. Specific attention to potential habitat loss for this species was paid during the sensitivity mapping and all areas which represent highly favourable habitat for this species have been mapped as high sensitivity or no-go areas for turbines. There would however, still be some impact on the smaller ridges due to turbines and access roads and hence some degree of habitat loss for this species.



Figure 9. Namib Giant Ground Gecko *Chondrodactylus angulifer* observed at the Klipkraal site.

Amphibians

The diversity of amphibians in the study area is relatively low with only 11 species having been recorded in the area. Species observed at the vicinity of the Klipkraal site include the Karoo Toad, Clawed Toad and Poynton's River Frog. There are no listed amphibian species known from the area although the Giant Bull Frog *Pyxicephalus adspersus* was previously listed as Near Threatened but has revised to Least Concern. This species is associated with temporary pans in the Karoo, Grassland and Savannah Biomes, but is not commonly recorded in the study area and its presence at the site is considered unlikely. Within the site, there are several drainage lines that would have temporary pools that can be used by toads and frogs for seasonal breeding purposes. But given that these areas are considered important for Riverine Rabbits and other ecological considerations, areas important for amphibians are captured through other sensitivities and there are no areas that would need to be avoided on specific account of amphibians. Given the localised nature of important amphibian habitats at the site as well as the generally arid nature of the site and the low overall abundance of amphibians, a significant long-term impact on amphibians is unlikely.

3.3 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

There are several CBAs within the Klipkraal Cluster study area (Figure 10). However, within the Klipkraal WEF 1 project area, there is only a single CBA that marginally projects into the project area. There are no turbines or other infrastructure within the CBA. As a result, the development

of the Klipkraal WEF 1 would generate minimal direct impact on CBA's, ESA'S and PAES Focus Areas. As such, the development of the Klipkraal WEF 1 on CBA's is not considered to be a significant issue with regards to the development of the Klipkraal WEF 1 and the development is considered acceptable in this regard.

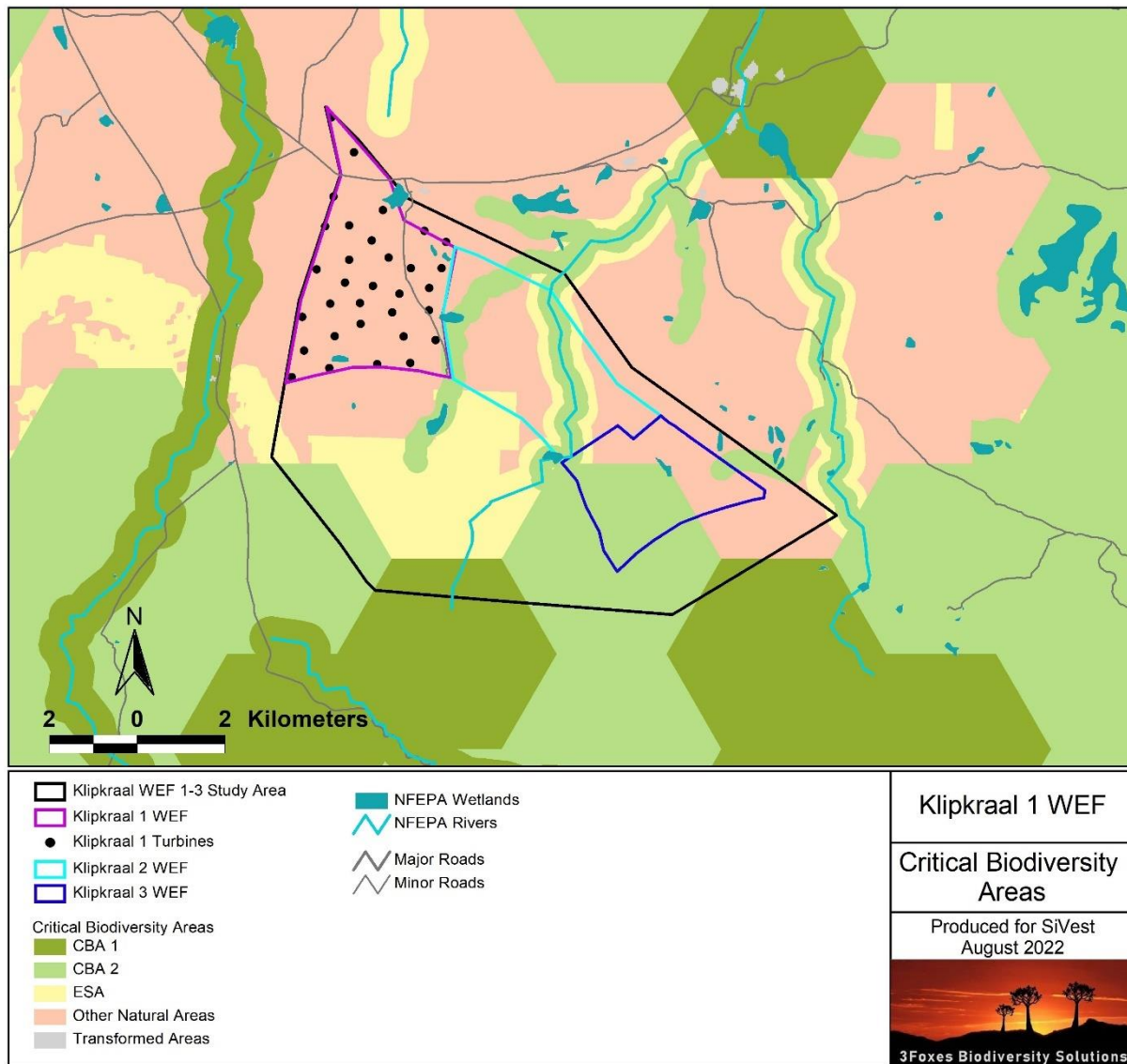


Figure 10. Extract of the Northern Cape CBA map for the greater Klipkraal project area.

3.4 CUMULATIVE IMPACTS

Where other renewable energy developments occur within 30km of a site, a cumulative impact assessment is required. This includes a general assessment of cumulative impact as well as an assessment of different potential cumulative impact sources and an indication of the size or extent of the identified cumulative impact.

In terms of cumulative impacts in and around the Klipkraal WEF 1 site, there are no existing or approved wind energy facilities in the area. As such, the current Klipkraal suite of projects would be the primary contributors to cumulative impact in the area. Assuming that each of the Klipkraal projects has a footprint of approximately 100 ha, the current Klipkraal project would contribute 100 ha to an overall development impact of approximately 700 ha. Since this would be concentrated to a relatively small area around the site, local-level cumulative impacts would be relatively high. However, the broader area is still little impacted by transformation from any sources and the contribution of the whole suite of Klipkraal projects to cumulative impact in the broader area would be relatively low. The primary areas of concern regarding cumulative impact would be cumulative impact on the Riverine Rabbit and the Karoo Dwarf Tortoise and their associated habitats. In terms of the contribution of the Klipkraal WEF 1 to cumulative impact on these two species, the contribution would be low as there is minimal habitat for either species within the Klipkraal WEF 1 site. As such, the contribution of the Klipkraal WEF 1 to cumulative impact is considered to be low and acceptable.

4 KLIPKRAAL WIND ENERGY FACILITY 1 CONSTRAINTS

The constraints/sensitivity map for the Klipkraal Wind Energy Facility 1 is depicted below in Figure 11. There are numerous constraints operating across the site, associated largely with the drainage features of the area, Riverine Rabbit habitat and their associated applied buffers and also steep slopes and dolerite outcrops, which represent Karoo Dwarf Tortoise habitat. Although these occupy a significant proportion of the site, there are also extensive open plains and low hills present across the site that are considered low to moderate sensitivity and which are suitable for wind energy development. The overall degree of conflict between the development and the features of high importance appears to be fairly low as under the draft layout for scoping there is only 1 turbine (T28) located within an area considered unsuitable for turbines. It is recommended that this turbine is relocated outside of the no-go area. Although there are 5 turbines in areas considered to be high sensitivity, these have been individually checked and reviewed and are considered acceptable. However, it would be important that the access roads to these turbines avoid or minimise the high sensitivity areas as much as possible. Overall, the draft turbine layer is considered acceptable and would generate low to moderate impacts on fauna and flora.

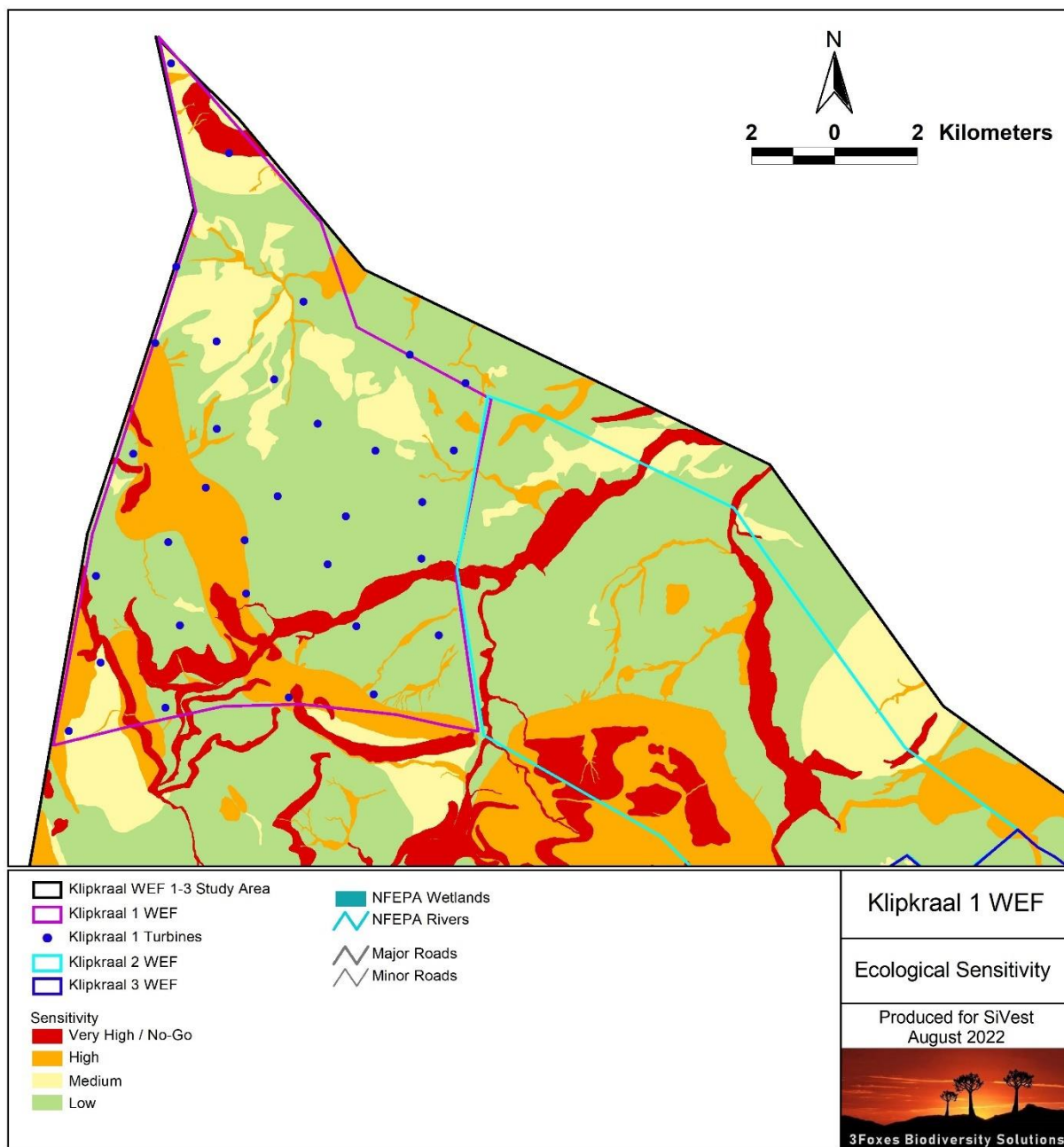


Figure 11. Ecological sensitivity map for turbines on the Klipkraal WEF 1.

5 IMPACTS AND ISSUES IDENTIFICATION

5.1 IDENTIFICATION OF POTENTIAL IMPACTS

The development of the Klipkraal Wind Energy Facility 1 is likely to result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat during construction. During operation, the impacts would be reduced and restricted largely to potential noise impacts and occasional disturbance from operational activities. The following

impacts are identified as the major impacts that are likely to be associated with the development of the Klipkraal Wind Energy Facility 1.

Impact 1. Impacts on vegetation and listed or protected plant species

The development would require vegetation clearing for turbines, roads, underground cabling and substations with associated battery facility, as well as for temporary site camp and general laydown areas. In addition, it is likely that the turbine foundations and some roads would require blasting which would generate dust and debris fallout near these locations. Apart from the direct loss of vegetation within the development footprint, listed and protected species are likely to be impacted. These impacts would occur during the construction phase of the development, with additional vegetation impacts during operation likely to be low. Although the abundance of plant species of concern appears to be low, there are numerous provincially protected species present.

Impact 2. Direct Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed if proper management and monitoring is not in place. Traffic at the site during all phases of the project would pose a risk of collisions with fauna. Slower types such as tortoises, snakes and certain mammals would be most susceptible, and the impact would be largely concentrated to the construction phase when vehicle activity is high. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.

Impact 3. Impact on the Riverine Rabbit

The Riverine Rabbit is confirmed present within the greater Klipkraal site as well as in the broader area, with the result that it is likely that there would be some degree of impact on this species. During construction, the increased levels of traffic to and from the site as well as within the site would increase collision risk with rabbits, which is a known major cause of mortality for this species. Furthermore, the noise and disturbance associated with construction may deter rabbits from the affected areas where these are in close proximity to areas where Rabbits are present. During operation, impacts would be reduced, but noise from the turbines would potentially impact this species, resulting in local habitat degradation within and adjacent to the site. The habitat degradation would result largely from turbine noise which is likely to reduce the ability of fauna such as Riverine Rabbits to hear their predators, with the result that the habitat becomes less favourable overall for species vulnerable to predation.

Impact 4. Impact on the Karoo Dwarf Tortoise

Although the Karoo Dwarf Tortoise has not yet been confirmed present within the site, it is considered highly likely to be present based on the availability of suitable habitat. The construction of the development would result in some habitat loss within these areas as well as

increase collision and poaching risk during construction. During operation, the anthropogenic activity on site would be reduced, but the turbine access roads and increased traffic on the site would increase the risk of vehicle-related mortality for this species as well as leave them vulnerable to predation when crossing roads and other open areas.

Impact 5. Increased Erosion Risk

The large amount of disturbance created during construction would leave the affected areas vulnerable to wind and water erosion. Some parts of the site are steep and specific mitigation and avoidance would be necessary to reduce this impact to acceptable levels. This impact is also of concern given the significance of the drainage lines in the area as Riverine Rabbit habitat and the consequent need to prevent and limit impact on these features.

Impact 6. Impacts on CBAs and broad-scale ecological processes

Although the footprint within the CBAs would be minimal, there would potentially be some degradation of habitat quality within the nearby CBAs and ESAs of the site due to noise and other sources of anthropogenic disturbance. In addition, the development would cause general habitat fragmentation and pose some impact on broad-scale ecological processes in the area. These impacts cannot be well mitigated and there is likely to be some residual impact on broad-scale ecological processes.

Impact 7. Cumulative Impacts

The development of the Klipkraal wind farm cluster would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. Although the area currently experiences a relatively low level of impact, the concentration of development in the Klipkraal area would potentially generate significant local impacts on fauna, flora and habitats of concern, with cumulative impacts on the Riverine Rabbit and Karoo Dwarf Tortoise being highlighted as particular concerns.

6 PRE-APPLICATION PHASE ASSESSMENT OF IMPACTS – KLIPKRAAL WEF 1

A preliminary, summary assessment of the likely significance of each impact identified above is made below for the Klipkraal WEF 1. It should be noted that this is preliminary assessment and since a full layout is not yet available, significant changes to the assessment may occur depending on the details of the final assessed layout. However, the purpose is to identify and highlight the most likely sources of significant impact associated with the development and provide a focus on those issues where specific attention is required to ensure that impacts are reduced to an acceptable level.

6.1 CONSTRUCTION PHASE IMPACTS

Impacts associated with the operational phase of the Klipkraal WEF 1 are assessed below.

Table 4: Impact on Vegetation and Plant SCC due to construction

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Vegetation and protected plant species	Vegetation clearing for access roads, turbines and their service areas and other infrastructure will impact on vegetation and protected plant species.	2	4	2	2	3	3	39	-	Medium	See Below	2	4	2	1	3	2	24	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) There should be no turbines within the Very High Sensitivity areas. 2) The footprint within drainage lines should be minimized as much as possible. 3) Preconstruction walk-through of the approved development footprint to ensure that sensitive habitats and species are avoided where possible. 4) Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. 5) Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 6) A large proportion of the impact of the development stems from the access roads and the number of roads should be reduced to the minimum possible and routes should also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-through survey. 7) Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 8) Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna. 																			

Table 5: Impact on fauna due to construction activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL BEFORE MITIGATION						SIGNIFICANCE			RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL AFTER MITIGATION						SIGNIFICANCE		
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Faunal disturbance and habitat loss	Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed.	2	4	2	2	2	3	36	-	Medium	See Below	2	4	2	1	2	3	33	-	Medium
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Preconstruction walk-through of the facility to micro-site roads and turbines. 2) During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 3) The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site. 4) No fires should be allowed within the site as there is a risk of runaway veld fires. 5) No fuelwood collection should be allowed on-site. 6) If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards. 7) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 8) No unauthorized persons should be allowed onto the site and site access should be strictly controlled 9) All construction vehicles should adhere to a low-speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site. 																			

	10) All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and snakes which are often persecuted out of fear or superstition.
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Table 6: Impact on the Riverine Rabbit as a result of construction activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Riverine Rabbit disturbance and habitat loss	Impacts on Riverine Rabbit as a result of construction phase activities, including vehicle collisions, disturbance and habitat loss.	2	3	2	2	2	2	22	-	Low	See Below	2	3	2	1	2	2	20	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) All construction vehicles should adhere to a low speed limit (30km/h on site and 40km/h) in areas where Riverine Rabbits are likely to be active, both within the wind farm as well as on the public roads to the site. 2) During construction, driving between sunset and sunrise should be reduced as far possible as this is when Riverine Rabbits are most active and the risk of collisions is highest. 3) No dogs should be allowed on site and precautions to ensure that there is poaching or other direct faunal disturbance on site should be implemented. 4) Where any new roads, cabling and/or overhead lines traverse areas mapped as High Riverine Rabbit habitat sensitivity, the route should be micro-sited by a suitably qualified ecological specialist before construction commences to ensure any potential impacts are minimised. Existing tracks through these areas should be used where present. 																			

Table 7: Impact on the Karoo Dwarf Tortoise as a result of construction activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Karoo Dwarf Tortoise disturbance and habitat loss	Impacts on Karoo Dwarf Tortoise as a result of construction phase activities, including vehicle collisions, disturbance and habitat loss.	2	3	2	2	2	2	22	-	Low	See Below	2	3	2	1	2	2	20	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Avoidance of areas identified as potential Padloper habitat at the planning and design phase. This has been implemented via the sensitivity mapping which has included areas of likely potential habitat as high or very high sensitivity. 2) Limiting access to areas outside the construction footprint during construction to ensure that poaching and similar impact is minimised. 3) Search and rescue for the Padloper and other reptiles within the development footprint prior to clearing within areas that have been identified as potential habitat. 4) All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. 5) Construction staff should remain within the construction footprint and access routes and should not be allowed to wander into the veld. 6) No fauna including tortoises should be disturbed or removed from the veld. 7) No holes or trenches should be left open for extended periods as tortoises may fall in and become trapped. 																			

Table 8: Impact on CBAs and ESAs due to Construction Phase habitat loss

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Negative impact on ESAs, CBAs and broad-scale ecological processes.	Transformation and presence of the facility will contribute to cumulative habitat loss within CBAs and impacts on broad-scale ecological processes such as fragmentation.	1	2	3	2	3	2	22	-	Low	See Below.	1	2	2	2	3	2	20	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Minimise the development footprint within the high sensitivity areas. 2) There should be an integrated management plan for the development area during operation, which is beneficial to fauna and flora. 3) All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. 4) Noise and disturbance on the site should be kept to a minimum during operation and maintenance activities. 5) Avoid impact to restricted and specialised habitats such as pans, wetlands and rock pavements. The final development footprint to be authorised should be checked for such sensitive features in the field, such that there is a high degree of confidence that the final layout avoids such features so that significant changes to turbines or roads are not required at the preconstruction phase. 6) Minimise the development footprint near watercourses and other ecologically significant features. 																			

6.2 OPERATIONAL PHASE IMPACTS

Impacts associated with the operational phase of the Klipkraal WEF 1 are assessed below.

Table 9: Impacts on fauna due to operational activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Faunal disturbance and habitat degradation	Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	2	3	2	2	3	3	36	-	Medium	See Below.	2	3	2	2	3	2	24	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Management of the site should take place within the context of an Open Space Management Plan. 2) No unauthorized persons should be allowed onto the site. 3) Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. 4) The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone except landowners or other individuals with the appropriate permits and permissions where required. 5) If any parts of the site need to be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs or HPS bulbs) as far as possible, which do not attract insects. 6) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 7) All vehicles accessing the site should adhere to a reduced speed limit (30km/h for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 8) If parts of the facility such as the substation are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside. 																			

Table 10: Impacts on the Karoo Dwarf Tortoise due to operational activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Impact on the Karoo Dwarf Tortoise	There would potentially be impact on Karoo Dwarf Tortoises at the site during operation due to operational activities (vehicles/disturbance) as well as predation by crows.	2	3	2	2	3	3	36	-	Medium	See Below.	2	3	2	2	3	2	24	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Any overhead lines used on site should have pylons with a design that discourages the use of the pylons for nesting by crows. 2) Conduct annual inspections along internal overhead powerlines to monitor the extent of corridors nesting on these structures, and to check for tortoise carcasses below these nesting sites. Crow nests should be removed as they are often used repeatedly. 3) Maintain a log of tortoise roadkill mortalities. This log must be reviewed annually to inform operational management and mitigation measures. 																			

Table 11: Increased erosion risk during operation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL BEFORE MITIGATION									SIGNIFICANCE	RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL AFTER MITIGATION									SIGNIFICANCE
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S			E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	
Operation Phase																						
Increased potential for soil erosion	Following construction, the site will remain vulnerable to soil erosion for some time due to the disturbance created by site clearing and likely low natural revegetation of disturbed areas thereafter. It is important to note that while the site is arid, such areas can experience significant soil erosion as plant cover is low and occasional heavy showers generate large amounts of runoff.	2	3	2	2	3	3	36	-	Medium	See Below.	2	2	2	2	2	2	20	-	Low		
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. 2) All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 3) Regular monitoring for erosion post construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. Monitoring should take place every 6 months in the first year after construction and annually thereafter. 4) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 5) All cleared areas should be revegetated with indigenous perennial shrubs and succulents from the local area. Dead material from site clearing can be used to encourage this process and can be set aside during clearing and later placed on the cleared areas to encourage recovery. 																					

Table 12: Increased alien plant invasion during operation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Ecological degradation due to alien plant invasion.		1	3	2	2	3	3	33	-	Medium	See Below.	1	2	1	1	2	2	14	-	Low
Recommended Mitigation Measures	<p>1) There should be regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. Monitoring every 6 months for the first 2 years post-construction is recommended, followed by annual monitoring thereafter.</p> <p>2) Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.</p>																			

6.3 DECOMMISSIONING PHASE IMPACTS

Impacts associated with the decommissioning phase of the Klipkraal WEF 1 are assessed below.

Table 13: Impact on fauna due to decommissioning activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Faunal disturbance and habitat loss	Fauna will be negatively affected by the decommissioning of the wind farm due to the human disturbance, the presence and operation of vehicles and heavy machinery on the site and the noise generated.	1	4	1	2	1	3	27	-	Medium	See Below	1	3	1	1	1	3	21	-	Low

Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities. 2) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 3) All vehicles accessing the site should adhere to a low-speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. 4) No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. 5) All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.
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Table 14: Increased erosion risk due to decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL BEFORE MITIGATION							SIGNIFICANCE		RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL AFTER MITIGATION							SIGNIFICANCE	
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Increased potential for soil erosion	Following decommissioning, the site will be highly vulnerable to soil erosion due to the disturbance created by the removal of infrastructure from the site.	2	3	2	2	3	3	36	-	Medium	See Below.	2	2	2	2	2	2	20	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 2) There should be regular monitoring (annual) for erosion for at least 5 years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 3) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 4) All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. 																			

Table 15: Increased alien plant invasion following decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Ecological degradation due to alien plant invasion.		1	3	2	2	3	3	33	-	Medium	See Below.	1	2	1	1	2	2	14	-	Low
Recommended Mitigation Measures	<ol style="list-style-type: none"> 1) Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. 2) Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. 3) Annual monitoring for alien plants within the disturbed areas for at least three years after decommissioning or until alien invasives are no longer a problem at the site. 4) Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible. 																			

6.4 CUMULATIVE IMPACTS – KLIPKRAAL WEF 1 AND ASSOCIATED INFRASTRUCTURE

Table 16: Cumulative impact on ecological processes

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Cumulative Phase																				
Cumulative impacts on fauna and flora	Wind energy development in the wider area around the Klipkraal 1 site will generate cumulative impacts on habitat loss	2	3	2	2	3	2	24	-	Medium	See Below	2	2	2	2	3	2	22	-	Low

	and fragmentation for fauna and flora.																																
	<ol style="list-style-type: none"> 1) There should be no turbines within the Very High Sensitivity areas 2) Adhere to the sensitivity maps and limits of acceptable change provided within this assessment when determining the final layout of the Wind Farm and associated infrastructure. 3) Demarcate sensitive habitats as no-go areas during construction and at decommissioning. The footprint within drainage lines should be minimized as much as possible. 4) Preconstruction walk-through of the approved development footprint to ensure that sensitive habitats and species are avoided where possible. 5) Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. 6) Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 7) A large proportion of the impact of the development stems from the access roads and the number of roads should be reduced to the minimum possible and routes should also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-through survey. 8) Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 9) Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna. 																																

6.5 NO-GO ALTERNATIVE

Under the 'no-go' alternative, the current land use, consisting of extensive livestock grazing, would continue. When applied correctly, such livestock grazing is considered to be largely compatible with long-term biodiversity conservation, although in practice there are some negative effects associated with such land use, such as predator control and negative impacts on habitat availability for the larger ungulates that would historically have utilised the area. Under the current circumstances, the 'no-go' alternative is considered to represent a low long-term negative impact on the environment. The current development is however not an alternative land use for the site, but rather represents an additional stressor that would additively and cumulatively contribute to ecological impacts on the site.

7 CONCLUSION & RECOMMENDATIONS

The Klipkraal WEF 1 is located within a relatively heterogenous area with several vegetation types present including Eastern Upper Karoo, Western Upper Karoo, Upper Karoo Hardeveld and Southern Karoo Riviere. The open plains and low hills which comprise the majority of the Klipkraal 1 site are however relatively homogenous in terms of vegetation, with few species or habitats of concern present. These areas are considered low sensitivity in terms of vegetation and are considered suitable for the development of the wind farm. There are however, also numerous constraints operating across the site, associated largely with the drainage features of the area, Riverine Rabbit habitat and their associated applied buffers and the steep slopes and dolerite outcrops which occur across site and which represent Karoo Dwarf Tortoise habitat. In terms of fauna, there are several listed mammals which occur in the wider area and which would potentially be impacted by the development. This includes the Riverine Rabbit, Black-footed Cat, Brown Hyena, Grey Rhebok, Mountain Reedbuck and Karoo Padloper. The Riverine Rabbit is of greatest potential concern as it has the highest threat status and is confirmed present within the wider Klipkraal site based on camera trap observations.

The impact of the Klipkraal Wind Energy Facility 1 on CBAs and ESAs would be low as there are no turbines within the CBAs or ESAs within this project area. As such, the potential impact of the Klipkraal WEF 1 on CBAs and ESAs is considered low and acceptable. In terms of potential cumulative impacts in and around the Klipkraal Cluster the, cluster itself represents the only major development within 30km of the site. The total development footprint of the whole project is estimated at approximately 700ha of which the Klipkraal WEF 1 would contribute approximately 100 ha. As the broader area is still largely intact with no existing renewable energy facilities present, general cumulative impacts on ecological processes associated with the current project are considered acceptable. Local impacts on the Riverine Rabbit and the Karoo Dwarf Tortoise are however a potential concern. The overall negative impact on these two species will depend on the extent to which the other wind farms which make up the greater Klipkraal project can avoid

their respective habitats. The Klipkraal WEF 1 however has little suitable habitat for either species within its' project area with the result that the contribution of the Klipkraal WEF 1 towards cumulative impacts on these two species would be low.

Based on the results of the current study, the impacts associated with the Klipkraal Wind Energy Facility 1 are likely to be medium to low after mitigation. Although the presence of the Riverine Rabbit on the wider site is a concern, the distribution of this species in the area shows a high fidelity for specific associated habitat and as such, can be reliably mapped and hence avoided where necessary. Impacts on CBAs, ESAs and cumulative impacts associated with the development are considered low and acceptable. As a result, and with the application of the recommended mitigation and avoidance measures, the impact of the Klipkraal WEF 1 is considered acceptable and hence, from an ecological perspective, the development should be allowed to proceed to the impact assessment phase. A plan of study to inform the EA to address outstanding areas of uncertainty is detailed below.

7.1 PLAN OF STUDY FOR THE EA PHASE

Although a significant amount of field work has been conducted to date on the Klipkraal 1 site, there are still a few areas of uncertainty that would be addressed to inform the Impact Assessment phase of the development. The following activities and outcomes are anticipated:

- Engage with EWT regarding the Riverine Rabbit and what corridors, buffers and mitigation should be implemented at the site in order to ensure a minimal and acceptable impact on this species.
- The conditions on the site to date have been relatively dry with the result that vegetation surveys conducted to date are not likely to have captured the full suite of species present. Additional detailed vegetation surveys across the site will be conducted. Particular attention will also be paid to the presence of rare or specialised habitats on the site. To date, no species of high conservation concern have been observed and should the situation remain the same, the site sensitivity in terms of flora would be low and a compliance statement would be the appropriate level of study for vegetation in the EA phase.
- Clarify to a greater extent the distribution and quality of Karoo Dwarf Tortoise habitat on the site. Additional surveys for this species will be conducted within favourable areas and used to inform the likely presence of this species on the site and the extent of avoidance and mitigation that is likely to be required for this species.
- Verify the final footprint of the development in the field to ensure that it avoids the sensitive features of the site and to confirm site sensitivity from a terrestrial biodiversity perspective.
- Identify in the field and based on the Wind Farm layout any additional impacts that may occur as a result of the development that have not been identified thus far.

- Identify any additional mitigation and avoidance measures for inclusion in the EMP that should be implemented to further reduce the impacts of the development on terrestrial biodiversity.
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8 REFERENCES

- Agha M, Lovich JE, Ennen JR, Augustine B, Arundel TR, Murphy M, Meyer-Wilkins K, Bjurlin C, Delaney D, Briggs J, Austin M, Madrak SV, Price SJ. 2015. Turbines and terrestrial vertebrates: variation in tortoise survivorship between a wind energy facility and an adjacent undisturbed wildland area in the Desert Southwest (USA). *Environmental Management* 56, 332–341.
- Alexander, G. & Marais, J. 2007. *A Guide to the Reptiles of Southern Africa*. Struik Nature, Cape Town.
- Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J. & de Villiers, M. S. 2013. *Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland*. Strelitzia 32. SANBI, Pretoria.
- Branch W.R. 1998. *Field guide to snakes and other reptiles of southern Africa*. Struik, Cape Town.
- Burger, M. 2021. *Herpetofaunal Study of the Nuweveld Wind Farms*. Sungazer Faunal Surveys for Zutari South Africa.
- Department of Environmental Affairs and Tourism, 2007. *National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of lists of Critically Endangered, Endangered, Vulnerable and Protected Species*. Government Gazette, Republic of South Africa.
- Du Preez, L. & Carruthers, V. 2009. *A Complete Guide to the Frogs of Southern Africa*. Struik Nature., Cape Town.
- Lovich JE, Ennen JR, Madrak S, Meyer K, Loughran C, Bjurlin C, Arundel T, Turner W, Jones C, Groenendaal GM. 2011 Effects of wind energy production on growth, demography, and survivorship of a desert tortoise (*Gopherus agassizii*) population in southern California with comparisons to natural populations. *Herpetological Conservation and Biology* 6, 161–174.
- Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. *Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.
- Mucina L. & Rutherford M.C. (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L.

- and Nienaber, S. (2011). Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.
- Skinner, J.D. & Chimimba, C.T. 2005. The mammals of the Southern African Subregion. Cambridge University Press, Cambridge.
- South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.2020.
- Taylor A, Avenant N, Schulze E, Viljoen P, Child MF. 2016. A conservation assessment of *Redunca fulvorufula fulvorufula*. 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
- Todd, S.W. 2021. Fauna and Flora Specialist Study for the Nuweveld North, East and West WEFs. 3Foxes Biodiversity Solutions for Zutari South Africa.

9 ANNEX 1. LIST OF PLANT SPECIES

List of plant species recorded from the broad vicinity of the Klipkraal Wind Farm Cluster site site, based on the SANBI Plants of southern Africa (POSA) database.

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Acanthaceae	<i>Acanthopsis</i>	<i>hoffmannseggiana</i>			DD
Acanthaceae	<i>Barleria</i>	<i>stimulans</i>			LC
Acanthaceae	<i>Blepharis</i>	<i>mitrata</i>			LC
Acanthaceae	<i>Blepharis</i>	<i>capensis</i>			LC
Acanthaceae	<i>Justicia</i>	<i>incana</i>			
Acanthaceae	<i>Justicia</i>	<i>orchioides</i>	subsp.	<i>glabrata</i>	LC
Acanthaceae	<i>Justicia</i>	<i>spartioides</i>			
Achariaceae	<i>Guthriea</i>	<i>capensis</i>			LC
Achariaceae	<i>Kiggelaria</i>	<i>africana</i>			LC
Aizoaceae	<i>Aizoon</i>	<i>glinoides</i>			LC
Aizoaceae	<i>Chamatophyllum</i>	<i>stanleyi</i>			LC
Aizoaceae	<i>Chamatophyllum</i>	<i>maninum</i>			DD
Aizoaceae	<i>Delosperma</i>	sp.			
Aizoaceae	<i>Drosantheum</i>	<i>parvifolium</i>			LC
Aizoaceae	<i>Drosantheum</i>	<i>floribundum</i>			LC
Aizoaceae	<i>Drosantheum</i>	<i>lique</i>			LC
Aizoaceae	<i>Drosantheum</i>	<i>subcompressum</i>			LC
Aizoaceae	<i>Drosantheum</i>	<i>hispidum</i>			LC
Aizoaceae	<i>Drosantheum</i>	<i>archeri</i>			LC
Aizoaceae	<i>Drosantheum</i>	sp.			
Aizoaceae	<i>Galenia</i>	<i>pubescens</i>			LC
Aizoaceae	<i>Galenia</i>	<i>africana</i>			LC
Aizoaceae	<i>Galenia</i>	<i>fruticosa</i>			LC
Aizoaceae	<i>Galenia</i>	<i>secunda</i>			LC
Aizoaceae	<i>Galenia</i>	<i>glandulifera</i>			LC
Aizoaceae	<i>Galenia</i>	<i>pallens</i>			DD
Aizoaceae	<i>Galenia</i>	<i>sarcophylla</i>			LC
Aizoaceae	<i>Galenia</i>	<i>squamulosa</i>			LC
Aizoaceae	<i>Hereroa</i>	<i>concava</i>			DD
Aizoaceae	<i>Malephora</i>	<i>thunbergii</i>			LC
Aizoaceae	<i>Malephora</i>	<i>purpureo-crocea</i>			LC
Aizoaceae	<i>Mesembryanthemum</i>	<i>splendens</i>	subsp.	<i>pentagonum</i>	
Aizoaceae	<i>Mesembryanthemum</i>	<i>junceum</i>			

⁴ IUCN Threat Status

1	DD	Data Deficient	3	NT	Near Threatened	5	EN	Endangered	7	EW	Extinct In The Wild
2	LC	Least Concern	4	VU	Vulnerable	6	CR	Critically Endangered	8	EX	Extinct

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Aizoaceae	<i>Mesembryanthemum</i>	<i>noctiflorum</i>	subsp.	<i>stramineum</i>	
Aizoaceae	<i>Mesembryanthemum</i>	<i>geniculiflorum</i>			
Aizoaceae	<i>Mesembryanthemum</i>	<i>stenandrum</i>			LC
Aizoaceae	<i>Mesembryanthemum</i>	<i>oubergense</i>			LC
Aizoaceae	<i>Mesembryanthemum</i>	<i>tetragonum</i>			
Aizoaceae	<i>Mesembryanthemum</i>	sp.			
Aizoaceae	<i>Mesembryanthemum</i>	<i>coriarium</i>			
Aizoaceae	<i>Mesembryanthemum</i>	<i>nodiflorum</i>			LC
Aizoaceae	<i>Mesembryanthemum</i>	<i>emarcidum</i>			
Aizoaceae	<i>Mesembryanthemum</i>	<i>crystallinum</i>			LC
Aizoaceae	<i>Mestoklema</i>	<i>tuberosum</i>			LC
Aizoaceae	<i>Mestoklema</i>	<i>arboriforme</i>			LC
Aizoaceae	<i>Pleiospilos</i>	<i>compactus</i>	subsp.	<i>canus</i>	LC
Aizoaceae	<i>Pleiospilos</i>	<i>compactus</i>	subsp.	<i>compactus</i>	LC
Aizoaceae	<i>Plinthus</i>	<i>cryptocarpus</i>			LC
Aizoaceae	<i>Plinthus</i>	<i>karooicus</i>			LC
Aizoaceae	<i>Ruschia</i>	<i>intricata</i>			LC
Aizoaceae	<i>Ruschia</i>	sp.			
Aizoaceae	<i>Ruschia</i>	<i>spinosa</i>			LC
Aizoaceae	<i>Ruschia</i>	<i>pauciflora</i>			DD
Aizoaceae	<i>Stomatium</i>	sp.			
Aizoaceae	<i>Stomatium</i>	<i>suaveolens</i>			LC
Aizoaceae	<i>Stomatium</i>	<i>villetii</i>			LC
Aizoaceae	<i>Tetragonia</i>	<i>arbuscula</i>			LC
Aizoaceae	<i>Tetragonia</i>	<i>spicata</i>			LC
Aizoaceae	<i>Tetragonia</i>	<i>glauca</i>			LC
Aizoaceae	<i>Tetragonia</i>	<i>fruticosa</i>			LC
Aizoaceae	<i>Tetragonia</i>	<i>sarcophylla</i>			LC
Aizoaceae	<i>Trianthes</i>	<i>parvifolia</i>	var.	<i>parvifolia</i>	LC
Aizoaceae	<i>Trichodiadema</i>	sp.			
Aizoaceae	<i>Trichodiadema</i>	<i>obliquum</i>			DD
Aizoaceae	<i>Trichodiadema</i>	<i>intonsum</i>			LC
Aizoaceae	<i>Trichodiadema</i>	<i>barbatum</i>			LC
Aizoaceae	<i>Trichodiadema</i>	<i>densum</i>			LC
Aizoaceae	<i>Trichodiadema</i>	<i>setuliferum</i>			LC
Alliaceae	<i>Tulbaghia</i>	<i>nutans</i>			LC
Alliaceae	<i>Tulbaghia</i>	<i>leucantha</i>			LC
Amaranthaceae	<i>Amaranthus</i>	<i>schinzianus</i>			LC
Amaranthaceae	<i>Amaranthus</i>	<i>deflexus</i>			
Amaranthaceae	<i>Atriplex</i>	<i>semibaccata</i>			
Amaranthaceae	<i>Atriplex</i>	<i>lindleyi</i>	subsp.	<i>inflata</i>	
Amaranthaceae	<i>Atriplex</i>	<i>nummularia</i>	subsp.	<i>nummularia</i>	

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Amaranthaceae	<i>Atriplex</i>	<i>vestita</i>	var.	<i>appendiculata</i>	LC
Amaranthaceae	<i>Bassia</i>	<i>salsoloides</i>			LC
Amaranthaceae	<i>Chenopodium</i>	<i>album</i>			
Amaranthaceae	<i>Chenopodium</i>	<i>schraderianum</i>			
Amaranthaceae	<i>Dysphania</i>	<i>carinata</i>			
Amaranthaceae	<i>Kyphocarpa</i>	<i>angustifolia</i>			LC
Amaranthaceae	<i>Salsola</i>	<i>kali</i>			
Amaranthaceae	<i>Salsola</i>	<i>calluna</i>			LC
Amaranthaceae	<i>Salsola</i>	<i>aphylla</i>			LC
Amaranthaceae	<i>Sericocoma</i>	<i>avolans</i>			LC
Amaranthaceae	<i>Suaeda</i>	<i>inflata</i>			LC
Amaranthaceae	<i>Suaeda</i>	<i>fruticosa</i>			LC
Amaryllidaceae	<i>Gethyllis</i>	<i>villosa</i>			LC
Amaryllidaceae	<i>Gethyllis</i>	<i>longistyla</i>			LC
Anacampserotaceae	<i>Anacampseros</i>	<i>ustulata</i>			LC
Anacampserotaceae	<i>Anacampseros</i>	<i>albidiflora</i>			LC
Anacardiaceae	<i>Searsia</i>	<i>pyroides</i>			
Anacardiaceae	<i>Searsia</i>	<i>pyroides</i>	var.	<i>pyroides</i>	LC
Anacardiaceae	<i>Searsia</i>	<i>longispina</i>			LC
Anacardiaceae	<i>Searsia</i>	<i>undulata</i>			LC
Anacardiaceae	<i>Searsia</i>	<i>lancea</i>			LC
Anacardiaceae	<i>Searsia</i>	<i>burchellii</i>			LC
Apiaceae	<i>Annesorhiza</i>	<i>filicaulis</i>			EN
Apiaceae	<i>Apium</i>	<i>graveolens</i>			
Apiaceae	<i>Berula</i>	<i>thunbergii</i>			LC
Apiaceae	<i>Chamarea</i>	<i>longipedicellata</i>			LC
Apiaceae	<i>Conium</i>	<i>chaerophylloides</i>			LC
Apiaceae	<i>Deverra</i>	<i>denudata</i>	subsp.	<i>aphylla</i>	LC
Apiaceae	<i>Heteromorpha</i>	<i>arborescens</i>	var.	<i>arborescens</i>	LC
Apiaceae	<i>Notobubon</i>	<i>ferulaceum</i>			LC
Apiaceae	<i>Notobubon</i>	<i>laevigatum</i>			LC
Apocynaceae	<i>Asclepias</i>	sp.			
Apocynaceae	<i>Carissa</i>	<i>bispinosa</i>			LC
Apocynaceae	<i>Duvalia</i>	<i>maculata</i>			LC
Apocynaceae	<i>Duvalia</i>	<i>angustiloba</i>			LC
Apocynaceae	<i>Gomphocarpus</i>	<i>filiformis</i>			LC
Apocynaceae	<i>Gomphocarpus</i>	<i>fruticosus</i>	subsp.	<i>fruticosus</i>	LC
Apocynaceae	<i>Huernia</i>	<i>thuretii</i>			LC
Apocynaceae	<i>Huernia</i>	<i>humilis</i>			LC
Apocynaceae	<i>Huernia</i>	<i>barbata</i>	subsp.	<i>barbata</i>	LC
Apocynaceae	<i>Microloma</i>	<i>armatum</i>	var.	<i>armatum</i>	LC
Apocynaceae	<i>Schizoglossum</i>	<i>bidens</i>	subsp.	<i>atrorubens</i>	LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Apocynaceae	<i>Stapelia</i>	<i>grandiflora</i>	var.	<i>grandiflora</i>	LC
Apocynaceae	<i>Xysmalobium</i>	<i>gomphocarpoides</i>	var.	<i>gomphocarpoides</i>	LC
Araliaceae	<i>Cussonia</i>	<i>paniculata</i>	subsp.	<i>paniculata</i>	LC
Asparagaceae	<i>Asparagus</i>	<i>mucronatus</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>laricinus</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>exuvialis</i>	forma	<i>exuvialis</i>	NE
Asparagaceae	<i>Asparagus</i>	<i>racemosus</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>capensis</i>	var.	<i>capensis</i>	LC
Asparagaceae	<i>Asparagus</i>	<i>striatus</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>burchellii</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>retrofractus</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>aethiopicus</i>			LC
Asparagaceae	<i>Asparagus</i>	<i>suaveolens</i>			LC
Asphodelaceae	<i>Aloe</i>	<i>grandidentata</i>			LC
Asphodelaceae	<i>Aloe</i>	<i>claviflora</i>			LC
Asphodelaceae	<i>Astroloba</i>	sp.			
Asphodelaceae	<i>Astroloba</i>	<i>congesta</i>			LC
Asphodelaceae	<i>Bulbine</i>	<i>lagopus</i>			LC
Asphodelaceae	<i>Bulbine</i>	sp.			
Asphodelaceae	<i>Bulbine</i>	<i>frutescens</i>			LC
Asphodelaceae	<i>Gonialoe</i>	<i>variegata</i>			LC
Asphodelaceae	<i>Haworthia</i>	<i>semiviva</i>			LC
Asphodelaceae	<i>Haworthia</i>	<i>marumiana</i>	var.	<i>marumiana</i>	NE
Asphodelaceae	<i>Haworthiopsis</i>	<i>fasciata</i>			
Asphodelaceae	<i>Kniphofia</i>	<i>uvaria</i>			LC
Asphodelaceae	<i>Trachyandra</i>	<i>karrooica</i>			LC
Asphodelaceae	<i>Trachyandra</i>	<i>acocksii</i>			LC
Aspleniaceae	<i>Asplenium</i>	<i>cordatum</i>			LC
Asteraceae	<i>Amellus</i>	<i>tridactylus</i>	subsp.	<i>olivaceus</i>	LC
Asteraceae	<i>Arctotis</i>	<i>dimorphocarpa</i>			LC
Asteraceae	<i>Arctotis</i>	<i>microcephala</i>			LC
Asteraceae	<i>Arctotis</i>	<i>perfoliata</i>			LC
Asteraceae	<i>Arctotis</i>	<i>leiocarpa</i>			LC
Asteraceae	<i>Athanasia</i>	<i>microcephala</i>			LC
Asteraceae	<i>Athanasia</i>	<i>linifolia</i>			LC
Asteraceae	<i>Berkheya</i>	<i>spinosa</i>			LC
Asteraceae	<i>Berkheya</i>	<i>glabrata</i>			LC
Asteraceae	<i>Berkheya</i>	<i>pinnatifida</i>	subsp.	<i>pinnatifida</i>	LC
Asteraceae	<i>Berkheya</i>	<i>carlinifolia</i>			
Asteraceae	<i>Berkheya</i>	sp.			
Asteraceae	<i>Berkheya</i>	<i>spinosissima</i>	subsp.	<i>spinosissima</i>	LC
Asteraceae	<i>Caputia</i>	<i>tomentosa</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Asteraceae	<i>Centaurea</i>	<i>melitensis</i>			
Asteraceae	<i>Chrysocoma</i>	<i>obtusata</i>			LC
Asteraceae	<i>Chrysocoma</i>	<i>ciliata</i>			LC
Asteraceae	<i>Chrysocoma</i>	sp.			
Asteraceae	<i>Cichorium</i>	<i>intybus</i>	subsp.	<i>intybus</i>	
Asteraceae	<i>Cineraria</i>	<i>vagans</i>			EN
Asteraceae	<i>Cineraria</i>	<i>lobata</i>	subsp.	<i>lobata</i>	LC
Asteraceae	<i>Cineraria</i>	<i>mollis</i>			LC
Asteraceae	<i>Cineraria</i>	<i>aspera</i>			LC
Asteraceae	<i>Cineraria</i>	<i>lobata</i>	subsp.	<i>lasiocaulis</i>	LC
Asteraceae	<i>Cirsium</i>	<i>vulgare</i>			
Asteraceae	<i>Conyza</i>	<i>scabrída</i>			
Asteraceae	<i>Cotula</i>	<i>microglossa</i>			LC
Asteraceae	<i>Cotula</i>	<i>coronopifolia</i>			LC
Asteraceae	<i>Crassothonna</i>	<i>capensis</i>			LC
Asteraceae	<i>Crassothonna</i>	<i>protecta</i>			LC
Asteraceae	<i>Curio</i>	<i>hallianus</i>			LC
Asteraceae	<i>Cuspidia</i>	<i>cernua</i>	subsp.	<i>annua</i>	LC
Asteraceae	<i>Dicerotheramnus</i>	<i>rhinocerotis</i>			
Asteraceae	<i>Dicoma</i>	<i>capensis</i>			LC
Asteraceae	<i>Dimorphotheca</i>	<i>cuneata</i>			LC
Asteraceae	<i>Eriocephalus</i>	<i>microphyllus</i>	var.	<i>microphyllus</i>	LC
Asteraceae	<i>Eriocephalus</i>	<i>eximius</i>			LC
Asteraceae	<i>Eriocephalus</i>	<i>microcephalus</i>			LC
Asteraceae	<i>Eriocephalus</i>	<i>brevifolius</i>			LC
Asteraceae	<i>Eriocephalus</i>	<i>tenuifolius</i>			LC
Asteraceae	<i>Eriocephalus</i>	<i>ericoides</i>	subsp.	<i>ericoides</i>	LC
Asteraceae	<i>Eriocephalus</i>	<i>decussatus</i>			LC
Asteraceae	<i>Eriocephalus</i>	<i>spinescens</i>			LC
Asteraceae	<i>Eriocephalus</i>	sp.			
Asteraceae	<i>Eumorphia</i>	<i>corymbosa</i>			LC
Asteraceae	<i>Euryops</i>	<i>nodosus</i>			LC
Asteraceae	<i>Euryops</i>	<i>lateriflorus</i>			LC
Asteraceae	<i>Euryops</i>	<i>anthemoides</i>	subsp.	<i>anthemoides</i>	LC
Asteraceae	<i>Euryops</i>	<i>imbricatus</i>			LC
Asteraceae	<i>Euryops</i>	<i>empetrifolius</i>			LC
Asteraceae	<i>Euryops</i>	<i>oligoglossus</i>	subsp.	<i>oligoglossus</i>	LC
Asteraceae	<i>Euryops</i>	<i>oligoglossus</i>	subsp.	<i>racemosus</i>	LC
Asteraceae	<i>Euryops</i>	<i>subcarnosus</i>	subsp.	<i>vulgaris</i>	LC
Asteraceae	<i>Euryops</i>	<i>abrotanifolius</i>			LC
Asteraceae	<i>Felicia</i>	<i>namaquana</i>			LC
Asteraceae	<i>Felicia</i>	<i>lasiocarpa</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Asteraceae	<i>Felicia</i>	<i>muricata</i>	subsp.	<i>muricata</i>	LC
Asteraceae	<i>Felicia</i>	<i>ovata</i>			LC
Asteraceae	<i>Felicia</i>	<i>filifolia</i>	subsp.	<i>schaeferi</i>	LC
Asteraceae	<i>Felicia</i>	<i>filifolia</i>	subsp.	<i>filifolia</i>	LC
Asteraceae	<i>Felicia</i>	<i>hirsuta</i>			LC
Asteraceae	<i>Felicia</i>	<i>rogersii</i>			LC
Asteraceae	<i>Garuleum</i>	<i>bipinnatum</i>			LC
Asteraceae	<i>Gazania</i>	<i>lichtensteinii</i>			LC
Asteraceae	<i>Gazania</i>	<i>krebsiana</i>			
Asteraceae	<i>Gazania</i>	<i>krebsiana</i>	subsp.	<i>serrulata</i>	LC
Asteraceae	<i>Gazania</i>	<i>serrata</i>			LC
Asteraceae	<i>Gazania</i>	<i>krebsiana</i>	subsp.	<i>arctotoides</i>	LC
Asteraceae	<i>Geigeria</i>	<i>obtusifolia</i>			LC
Asteraceae	<i>Geigeria</i>	<i>filifolia</i>			LC
Asteraceae	<i>Geigeria</i>	<i>ornativa</i>	subsp.	<i>ornativa</i>	LC
Asteraceae	<i>Gnaphalium</i>	<i>confine</i>			LC
Asteraceae	<i>Gorteria</i>	<i>alienata</i>			
Asteraceae	<i>Helichrysum</i>	<i>albertense</i>			DD
Asteraceae	<i>Helichrysum</i>	<i>cerastioides</i>	var.	<i>cerastioides</i>	LC
Asteraceae	<i>Helichrysum</i>	<i>rugulosum</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>pumilio</i>	subsp.	<i>pumilio</i>	LC
Asteraceae	<i>Helichrysum</i>	<i>dregeanum</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>lineare</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>zeyheri</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>pentzioides</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>lucilioides</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>trilineatum</i>			LC
Asteraceae	<i>Helichrysum</i>	<i>rosum</i>	var.	<i>arcuatum</i>	LC
Asteraceae	<i>Hertia</i>	<i>cluytiifolia</i>			LC
Asteraceae	<i>Ifloga</i>	<i>glomerata</i>			LC
Asteraceae	<i>Kleinia</i>	<i>longiflora</i>			LC
Asteraceae	<i>Lactuca</i>	<i>inermis</i>			LC
Asteraceae	<i>Lasiopogon</i>	<i>glomerulatus</i>			LC
Asteraceae	<i>Lasiopogon</i>	<i>muscoides</i>			LC
Asteraceae	<i>Leysera</i>	<i>tenella</i>			LC
Asteraceae	<i>Leysera</i>	<i>gnaphalodes</i>			LC
Asteraceae	<i>Macledium</i>	<i>spinosum</i>			LC
Asteraceae	<i>Mantiscalca</i>	<i>salmantica</i>			
Asteraceae	<i>Oedera</i>	<i>spinescens</i>			
Asteraceae	<i>Oedera</i>	<i>oppositifolia</i>			
Asteraceae	<i>Oedera</i>	<i>humilis</i>			
Asteraceae	<i>Oedera</i>	<i>glandulosa</i>			

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Asteraceae	<i>Oncosiphon</i>	<i>grandiflorus</i>			LC
Asteraceae	<i>Oncosiphon</i>	<i>piluliferus</i>			LC
Asteraceae	<i>Osteospermum</i>	<i>scariosum</i>	var.	<i>scariosum</i>	NE
Asteraceae	<i>Osteospermum</i>	<i>calendulaceum</i>			LC
Asteraceae	<i>Osteospermum</i>	<i>scariosum</i>	var.	<i>integrifolium</i>	NE
Asteraceae	<i>Osteospermum</i>	<i>spinescens</i>			LC
Asteraceae	<i>Osteospermum</i>	<i>sinuatum</i>			
Asteraceae	<i>Osteospermum</i>	<i>leptolobum</i>			LC
Asteraceae	<i>Osteospermum</i>	<i>microphyllum</i>			LC
Asteraceae	<i>Othonna</i>	<i>eriocarpa</i>			LC
Asteraceae	<i>Othonna</i>	<i>furcata</i>			LC
Asteraceae	<i>Othonna</i>	<i>pavonia</i>			LC
Asteraceae	<i>Pegolettia</i>	<i>retrofracta</i>			LC
Asteraceae	<i>Pentzia</i>	<i>tortuosa</i>			LC
Asteraceae	<i>Pentzia</i>	<i>globosa</i>			LC
Asteraceae	<i>Pentzia</i>	<i>quinquefida</i>			LC
Asteraceae	<i>Pentzia</i>	<i>lanata</i>			LC
Asteraceae	<i>Pentzia</i>	<i>punctata</i>			LC
Asteraceae	<i>Pentzia</i>	<i>incana</i>			LC
Asteraceae	<i>Pentzia</i>	sp.			
Asteraceae	<i>Phymaspermum</i>	<i>aciculare</i>			LC
Asteraceae	<i>Phymaspermum</i>	<i>thymelaeoides</i>			
Asteraceae	<i>Phymaspermum</i>	<i>parvifolium</i>			LC
Asteraceae	<i>Pseudognaphalium</i>	<i>undulatum</i>			LC
Asteraceae	<i>Pseudognaphalium</i>	<i>luteoalbum</i>			LC
Asteraceae	<i>Pteronia</i>	<i>adenocarpa</i>			LC
Asteraceae	<i>Pteronia</i>	<i>staehelinoides</i>			LC
Asteraceae	<i>Pteronia</i>	<i>membranacea</i>			LC
Asteraceae	<i>Pteronia</i>	<i>glaucescens</i>			LC
Asteraceae	<i>Pteronia</i>	<i>glauca</i>			LC
Asteraceae	<i>Pteronia</i>	<i>paniculata</i>			LC
Asteraceae	<i>Pteronia</i>	<i>viscosa</i>			LC
Asteraceae	<i>Pteronia</i>	<i>glomerata</i>			LC
Asteraceae	<i>Rhynchosidium</i>	<i>sessiliflorum</i>			LC
Asteraceae	<i>Senecio</i>	<i>hastatus</i>			LC
Asteraceae	<i>Senecio</i>	<i>angustifolius</i>			LC
Asteraceae	<i>Senecio</i>	<i>reptans</i>			LC
Asteraceae	<i>Senecio</i>	<i>striatifolius</i>			LC
Asteraceae	<i>Senecio</i>	<i>articulatus</i>			
Asteraceae	<i>Senecio</i>	<i>asperulus</i>			LC
Asteraceae	<i>Senecio</i>	sp.			
Asteraceae	<i>Senecio</i>	<i>burchellii</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Asteraceae	<i>Senecio</i>	<i>cordifolius</i>			LC
Asteraceae	<i>Senecio</i>	<i>cotyledonis</i>			LC
Asteraceae	<i>Senecio</i>	<i>achilleifolius</i>			LC
Asteraceae	<i>Senecio</i>	<i>incomptus</i>			LC
Asteraceae	<i>Senecio</i>	<i>madagascariensis</i>			LC
Asteraceae	<i>Senecio</i>	<i>pinnulatus</i>			LC
Asteraceae	<i>Senecio</i>	<i>niveus</i>			LC
Asteraceae	<i>Sonchus</i>	<i>asper</i>	subsp.	<i>asper</i>	
Asteraceae	<i>Sonchus</i>	<i>tenerrimus</i>			LC
Asteraceae	<i>Symphotrichum</i>	<i>squamatum</i>			
Asteraceae	<i>Tarhonanthus</i>	<i>minor</i>			LC
Asteraceae	<i>Tragopogon</i>	<i>dubius</i>			
Asteraceae	<i>Troglophyton</i>	<i>capillaceum</i>	subsp.	<i>capillaceum</i>	LC
Asteraceae	<i>Ursinia</i>	<i>nana</i>	subsp.	<i>nana</i>	LC
Asteraceae	<i>Vellereophyton</i>	<i>niveum</i>			LC
Asteraceae	<i>Vellereophyton</i>	<i>dealbatum</i>			LC
Bignoniaceae	<i>Rhigozum</i>	<i>obovatum</i>			LC
Bignoniaceae	<i>Rhigozum</i>	<i>trichotomum</i>			LC
Boraginaceae	<i>Amsinckia</i>	<i>menziesii</i>			
Boraginaceae	<i>Anchusa</i>	sp.			
Boraginaceae	<i>Anchusa</i>	<i>riparia</i>			LC
Boraginaceae	<i>Heliotropium</i>	<i>supinum</i>			
Boraginaceae	<i>Lappula</i>	<i>heteracantha</i>			
Boraginaceae	<i>Lobostemon</i>	<i>stachydeus</i>			LC
Boraginaceae	<i>Trichodesma</i>	<i>africanum</i>			LC
Brassicaceae	<i>Erucastrum</i>	<i>strigosum</i>			LC
Brassicaceae	<i>Heliophila</i>	sp.			
Brassicaceae	<i>Heliophila</i>	<i>suavissima</i>			LC
Brassicaceae	<i>Heliophila</i>	<i>minima</i>			LC
Brassicaceae	<i>Heliophila</i>	<i>trifurca</i>			LC
Brassicaceae	<i>Heliophila</i>	<i>crithmifolia</i>			LC
Brassicaceae	<i>Lepidium</i>	<i>africanum</i>	subsp.	<i>africanum</i>	LC
Brassicaceae	<i>Lepidium</i>	<i>englerianum</i>			
Brassicaceae	<i>Lepidium</i>	<i>desertorum</i>			LC
Brassicaceae	<i>Sisymbrium</i>	<i>burchellii</i>	var.	<i>burchellii</i>	LC
Brassicaceae	<i>Sisymbrium</i>	<i>capense</i>			LC
Bryaceae	<i>Bryum</i>	<i>alpinum</i>			
Campanulaceae	<i>Wahlenbergia</i>	<i>cernua</i>			LC
Campanulaceae	<i>Wahlenbergia</i>	<i>capillacea</i>	subsp.	<i>capillacea</i>	LC
Campanulaceae	<i>Wahlenbergia</i>	<i>nodosa</i>			LC
Capparaceae	<i>Cadaba</i>	<i>aphylla</i>			LC
Caryophyllaceae	<i>Cerastium</i>	<i>capense</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Caryophyllaceae	<i>Dianthus</i>	<i>namaensis</i>	var.	<i>dinteri</i>	LC
Caryophyllaceae	<i>Dianthus</i>	<i>micropetalus</i>			LC
Caryophyllaceae	<i>Pollichia</i>	<i>campestris</i>			LC
Caryophyllaceae	<i>Polycarpon</i>	<i>tetraphyllum</i>			
Caryophyllaceae	<i>Silene</i>	<i>burchellii</i>	subsp.	<i>modesta</i>	LC
Caryophyllaceae	<i>Silene</i>	<i>undulata</i>	subsp.	<i>undulata</i>	LC
Caryophyllaceae	<i>Silene</i>	<i>burchellii</i>	subsp.	<i>pilosellifolia</i>	
Caryophyllaceae	<i>Silene</i>	<i>undulata</i>			
Caryophyllaceae	<i>Spergularia</i>	sp.			
Caryophyllaceae	<i>Spergularia</i>	<i>media</i>			
Celastraceae	<i>Gymnosporia</i>	<i>buxifolia</i>			LC
Colchicaceae	<i>Colchicum</i>	<i>melanthoides</i>			
Colchicaceae	<i>Colchicum</i>	<i>burkei</i>			LC
Colchicaceae	<i>Colchicum</i>	<i>asteroides</i>			LC
Colchicaceae	<i>Colchicum</i>	<i>albomarginatum</i>			LC
Colchicaceae	<i>Colchicum</i>	<i>striatum</i>			LC
Colchicaceae	<i>Ornithoglossum</i>	<i>dinteri</i>			LC
Colchicaceae	<i>Ornithoglossum</i>	<i>undulatum</i>			LC
Convolvulaceae	<i>Convolvulus</i>	<i>dregeanus</i>			LC
Convolvulaceae	<i>Convolvulus</i>	<i>sagittatus</i>			LC
Crassulaceae	<i>Adromischus</i>	<i>maculatus</i>			LC
Crassulaceae	<i>Adromischus</i>	<i>humilis</i>			LC
Crassulaceae	<i>Adromischus</i>	<i>hemisphaericus</i>			LC
Crassulaceae	<i>Cotyledon</i>	<i>cuneata</i>			LC
Crassulaceae	<i>Cotyledon</i>	<i>papillaris</i>			LC
Crassulaceae	<i>Cotyledon</i>	<i>orbiculata</i>	var.	<i>oblonga</i>	LC
Crassulaceae	<i>Crassula</i>	<i>corallina</i>	subsp.	<i>corallina</i>	LC
Crassulaceae	<i>Crassula</i>	<i>capitella</i>	subsp.	<i>thyrsiflora</i>	LC
Crassulaceae	<i>Crassula</i>	<i>pubescens</i>	subsp.	<i>pubescens</i>	LC
Crassulaceae	<i>Crassula</i>	<i>subaphylla</i>	var.	<i>subaphylla</i>	LC
Crassulaceae	<i>Crassula</i>	<i>rupestris</i>	subsp.	<i>rupestris</i>	LC
Crassulaceae	<i>Crassula</i>	<i>natans</i>	var.	<i>minus</i>	LC
Crassulaceae	<i>Crassula</i>	<i>montana</i>	subsp.	<i>quadrangularis</i>	LC
Crassulaceae	<i>Crassula</i>	<i>tetragona</i>	subsp.	<i>tetragona</i>	LC
Crassulaceae	<i>Crassula</i>	<i>natans</i>			
Crassulaceae	<i>Crassula</i>	<i>garibina</i>	subsp.	<i>glabra</i>	LC
Crassulaceae	<i>Crassula</i>	<i>corallina</i>	subsp.	<i>macrorrhiza</i>	LC
Crassulaceae	<i>Crassula</i>	<i>muscosa</i>	var.	<i>muscosa</i>	NE
Crassulaceae	<i>Crassula</i>	<i>deltoidea</i>			LC
Cucurbitaceae	<i>Citrullus</i>	<i>lanatus</i>			LC
Cucurbitaceae	<i>Cucumis</i>	<i>africanus</i>			LC
Cucurbitaceae	<i>Cucumis</i>	<i>zeyheri</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Cucurbitaceae	<i>Cucumis</i>	<i>myriocarpus</i>	subsp.	<i>leptodermis</i>	LC
Cyperaceae	<i>Afroscirpoides</i>	<i>dioeca</i>			
Cyperaceae	<i>Bulbostylis</i>	<i>humilis</i>			LC
Cyperaceae	<i>Cyperus</i>	<i>longus</i>	var.	<i>tenuiflorus</i>	NE
Cyperaceae	<i>Cyperus</i>	<i>bellus</i>			LC
Cyperaceae	<i>Cyperus</i>	<i>capensis</i>			LC
Cyperaceae	<i>Cyperus</i>	<i>marginatus</i>			LC
Cyperaceae	<i>Cyperus</i>	<i>laevigatus</i>			LC
Cyperaceae	<i>Cyperus</i>	<i>usitatus</i>			LC
Cyperaceae	<i>Ficinia</i>	<i>ramosissima</i>			LC
Cyperaceae	<i>Fuirena</i>	<i>coerulescens</i>			LC
Cyperaceae	<i>Isolepis</i>	<i>setacea</i>			LC
Cyperaceae	<i>Isolepis</i>	<i>expallescens</i>			VU
Cyperaceae	<i>Isolepis</i>	<i>karroica</i>			LC
Cyperaceae	<i>Pseudoschoenus</i>	<i>inanis</i>			LC
Cyperaceae	<i>Schoenoxiphium</i>	sp.			
Dipsacaceae	<i>Scabiosa</i>	<i>columbaria</i>			LC
Ditrichaceae	<i>Ceratodon</i>	<i>purpureus</i>	subsp.	<i>stenocarpus</i>	
Ebenaceae	<i>Diospyros</i>	<i>lycioides</i>	subsp.	<i>lycioides</i>	LC
Ebenaceae	<i>Diospyros</i>	<i>austro-africana</i>	var.	<i>austro-africana</i>	LC
Ebenaceae	<i>Diospyros</i>	<i>austro-africana</i>	var.	<i>microphylla</i>	LC
Ebenaceae	<i>Euclea</i>	<i>crispa</i>	subsp.	<i>ovata</i>	LC
Euphorbiaceae	<i>Euphorbia</i>	<i>peplus</i>			NE
Euphorbiaceae	<i>Euphorbia</i>	<i>serpens</i>			NE
Euphorbiaceae	<i>Euphorbia</i>	<i>stellispina</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	<i>rhombifolia</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	<i>hypogaea</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	<i>inaequilatera</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	<i>spartaria</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	sp.			
Euphorbiaceae	<i>Euphorbia</i>	<i>clavarioides</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	<i>mauritanica</i>			LC
Euphorbiaceae	<i>Euphorbia</i>	<i>cylindrica</i>			LC
Euphorbiaceae	<i>Ricinus</i>	<i>communis</i>	var.	<i>communis</i>	NE
Fabaceae	<i>Argyrolobium</i>	<i>argenteum</i>			LC
Fabaceae	<i>Argyrolobium</i>	sp.			
Fabaceae	<i>Aspalathus</i>	<i>acicularis</i>	subsp.	<i>acicularis</i>	LC
Fabaceae	<i>Aspalathus</i>	<i>aciphylla</i>			LC
Fabaceae	<i>Dichilus</i>	<i>gracilis</i>			LC
Fabaceae	<i>Indigastrum</i>	<i>niveum</i>			
Fabaceae	<i>Indigofera</i>	<i>meyeriana</i>			LC
Fabaceae	<i>Indigofera</i>	<i>alternans</i>	var.	<i>alternans</i>	LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Fabaceae	<i>Indigofera</i>	<i>alternans</i>			
Fabaceae	<i>Indigofera</i>	<i>exigua</i>			LC
Fabaceae	<i>Indigofera</i>	<i>sessilifolia</i>			LC
Fabaceae	<i>Indigofera</i>	sp.			
Fabaceae	<i>Indigofera</i>	<i>heterophylla</i>			LC
Fabaceae	<i>Lessertia</i>	<i>inflata</i>			LC
Fabaceae	<i>Lessertia</i>	<i>pauciflora</i>			
Fabaceae	<i>Lessertia</i>	<i>frutescens</i>	subsp.	<i>microphylla</i>	LC
Fabaceae	<i>Lessertia</i>	<i>frutescens</i>	subsp.	<i>frutescens</i>	LC
Fabaceae	<i>Lessertia</i>	<i>annularis</i>			LC
Fabaceae	<i>Listia</i>	<i>heterophylla</i>			LC
Fabaceae	<i>Lotononis</i>	<i>carnosa</i>	subsp.	<i>carnosa</i>	LC
Fabaceae	<i>Lotononis</i>	<i>azureoides</i>			LC
Fabaceae	<i>Lotononis</i>	<i>pungens</i>			LC
Fabaceae	<i>Lotononis</i>	<i>falcata</i>			LC
Fabaceae	<i>Lotononis</i>	<i>caerulescens</i>			LC
Fabaceae	<i>Lotononis</i>	<i>rabenaviana</i>			LC
Fabaceae	<i>Medicago</i>	<i>sativa</i>			NE
Fabaceae	<i>Melilotus</i>	<i>indicus</i>			NE
Fabaceae	<i>Melolobium</i>	<i>canescens</i>			LC
Fabaceae	<i>Melolobium</i>	<i>candicans</i>			LC
Fabaceae	<i>Melolobium</i>	<i>obcordatum</i>			LC
Fabaceae	<i>Prosopis</i>	<i>glandulosa</i>	var.	<i>glandulosa</i>	NE
Fabaceae	<i>Trifolium</i>	<i>africanum</i>	var.	<i>africanum</i>	NE
Fabaceae	<i>Vachellia</i>	<i>karroo</i>			LC
Fumariaceae	<i>Fumaria</i>	<i>muralis</i>	subsp.	<i>muralis</i>	
Funariaceae	<i>Funaria</i>	<i>hygrometrica</i>			
Gentianaceae	<i>Chironia</i>	<i>palustris</i>	subsp.	<i>palustris</i>	LC
Gentianaceae	<i>Sebaea</i>	<i>natalensis</i>			LC
Geraniaceae	<i>Erodium</i>	<i>cicutarium</i>			
Geraniaceae	<i>Geranium</i>	<i>dregei</i>			LC
Geraniaceae	<i>Monsonia</i>	<i>camdeboensis</i>			LC
Geraniaceae	<i>Monsonia</i>	<i>crassicaulis</i>			LC
Geraniaceae	<i>Monsonia</i>	<i>salmoniflora</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>tragacanthoides</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>aridum</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>abrotanifolium</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>minimum</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>glutinsum</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>pseudofumarioides</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>alternans</i>	subsp.	<i>alternans</i>	LC
Geraniaceae	<i>Pelargonium</i>	<i>ramosissimum</i>			LC

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Geraniaceae	<i>Pelargonium</i>	<i>nervifolium</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>griseum</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>senecioides</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>articulatum</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>odoratissimum</i>			LC
Geraniaceae	<i>Pelargonium</i>	<i>multicaule</i>	subsp.	<i>multicaule</i>	LC
Gisekiaceae	<i>Gisekia</i>	<i>pharnaceoides</i>			
Gisekiaceae	<i>Gisekia</i>	<i>pharnaceoides</i>	var.	<i>pharnaceoides</i>	LC
Grubbiaceae	<i>Grubbia</i>	<i>rosmarinifolia</i>	subsp.	<i>rosmarinifolia</i>	NE
Hyacinthaceae	<i>Albuca</i>	<i>suaveolens</i>			LC
Hyacinthaceae	<i>Albuca</i>	<i>exuviata</i>			LC
Hyacinthaceae	<i>Albuca</i>	<i>prasina</i>			
Hyacinthaceae	<i>Albuca</i>	<i>virens</i>	subsp.	<i>arida</i>	LC
Hyacinthaceae	<i>Albuca</i>	sp.			
Hyacinthaceae	<i>Albuca</i>	<i>glandulosa</i>			LC
Hyacinthaceae	<i>Daubenya</i>	<i>marginata</i>			LC
Hyacinthaceae	<i>Dipcadi</i>	<i>ciliare</i>			LC
Hyacinthaceae	<i>Dipcadi</i>	<i>viride</i>			LC
Hyacinthaceae	<i>Drimia</i>	<i>anomala</i>			LC
Hyacinthaceae	<i>Drimia</i>	sp.			
Hyacinthaceae	<i>Drimia</i>	<i>intricata</i>			LC
Hyacinthaceae	<i>Drimia</i>	<i>platyphylla</i>			LC
Hyacinthaceae	<i>Ledebouria</i>	<i>apertiflora</i>			LC
Hyacinthaceae	<i>Ledebouria</i>	<i>revoluta</i>			LC
Hyacinthaceae	<i>Massonia</i>	<i>echinata</i>			LC
Hyacinthaceae	<i>Ornithogalum</i>	<i>juncifolium</i>			LC
Hyacinthaceae	<i>Ornithogalum</i>	<i>flexuosum</i>			LC
Hyacinthaceae	<i>Veltheimia</i>	<i>capensis</i>			LC
Hypoxidaceae	<i>Empodium</i>	<i>gloriosum</i>			LC
Hypoxidaceae	<i>Empodium</i>	<i>elongatum</i>			LC
Iridaceae	<i>Babiana</i>	<i>bainesii</i>			LC
Iridaceae	<i>Gladiolus</i>	<i>permeabilis</i>	subsp.	<i>edulis</i>	LC
Iridaceae	<i>Lapeirousia</i>	<i>plicata</i>	subsp.	<i>foliosa</i>	
Iridaceae	<i>Moraea</i>	<i>unguiculata</i>			LC
Iridaceae	<i>Moraea</i>	sp.			
Iridaceae	<i>Moraea</i>	<i>miniata</i>			LC
Iridaceae	<i>Moraea</i>	<i>ciliata</i>			LC
Iridaceae	<i>Romulea</i>	<i>atrandra</i>	var.	<i>esterhuyseniae</i>	LC
Iridaceae	<i>Tritonia</i>	<i>karooica</i>			LC
Juncaceae	<i>Juncus</i>	<i>punctorius</i>			LC
Juncaceae	<i>Juncus</i>	<i>capensis</i>			LC
Juncaceae	<i>Juncus</i>	<i>dregeanus</i>	subsp.	<i>dregeanus</i>	LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Juncaceae	<i>Juncus</i>	<i>oxycarpus</i>			LC
Juncaceae	<i>Juncus</i>	<i>exsertus</i>			LC
Juncaceae	<i>Juncus</i>	<i>rigidus</i>			LC
Kewaceae	<i>Kewa</i>	<i>salsoloides</i>			LC
Lamiaceae	<i>Ballota</i>	<i>africana</i>			LC
Lamiaceae	<i>Lamium</i>	<i>amplexicaule</i>			
Lamiaceae	<i>Mentha</i>	<i>longifolia</i>	subsp.	<i>capensis</i>	LC
Lamiaceae	<i>Salvia</i>	<i>disermas</i>			LC
Lamiaceae	<i>Salvia</i>	<i>stenophylla</i>			
Lamiaceae	<i>Salvia</i>	<i>verbenaca</i>			LC
Lamiaceae	<i>Stachys</i>	<i>cuneata</i>			LC
Lamiaceae	<i>Stachys</i>	<i>linearis</i>			LC
Lamiaceae	<i>Stachys</i>	<i>rugosa</i>			LC
Lamiaceae	<i>Teucrium</i>	<i>trifidum</i>			LC
Lentibulariaceae	<i>Utricularia</i>	<i>bisquamata</i>			LC
Leucobryaceae	<i>Campylopus</i>	<i>introflexus</i>			
Limeaceae	<i>Limeum</i>	<i>aethiopicum</i>	var.	<i>intermedium</i>	NE
Limeaceae	<i>Limeum</i>	<i>aethiopicum</i>	var.	<i>aethiopicum</i>	NE
Linaceae	<i>Linum</i>	<i>thunbergii</i>			LC
Lobeliaceae	<i>Lobelia</i>	<i>erinus</i>			LC
Lobeliaceae	<i>Lobelia</i>	<i>thermalis</i>			LC
Lobeliaceae	<i>Lobelia</i>	<i>dregeana</i>			LC
Loranthaceae	<i>Moquiniella</i>	<i>rubra</i>			LC
Loranthaceae	<i>Septulina</i>	<i>glauca</i>			LC
Lycopodiaceae	<i>Lycopodium</i>	<i>clavatum</i>			LC
Lythraceae	<i>Nesaea</i>	<i>anagalloides</i>			LC
Malvaceae	<i>Abutilon</i>	<i>sonneratianum</i>			LC
Malvaceae	<i>Anisodontea</i>	<i>malvastroides</i>			LC
Malvaceae	<i>Anisodontea</i>	<i>scabrosa</i>			LC
Malvaceae	<i>Anisodontea</i>	sp.			
Malvaceae	<i>Anisodontea</i>	<i>capensis</i>			LC
Malvaceae	<i>Anisodontea</i>	<i>triloba</i>			LC
Malvaceae	<i>Grewia</i>	<i>robusta</i>			LC
Malvaceae	<i>Hermannia</i>	<i>alnifolia</i>			LC
Malvaceae	<i>Hermannia</i>	<i>grandiflora</i>			LC
Malvaceae	<i>Hermannia</i>	<i>paucifolia</i>			LC
Malvaceae	<i>Hermannia</i>	<i>filifolia</i>	var.	<i>filifolia</i>	NE
Malvaceae	<i>Hermannia</i>	<i>stipulacea</i>			LC
Malvaceae	<i>Hermannia</i>	<i>pulchella</i>			LC
Malvaceae	<i>Hermannia</i>	<i>coccocarpa</i>			LC
Malvaceae	<i>Hermannia</i>	<i>filifolia</i>	var.	<i>grandicalyx</i>	NE
Malvaceae	<i>Hermannia</i>	<i>cuneifolia</i>	var.	<i>glabrescens</i>	LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Malvaceae	<i>Hermannia</i>	<i>cuneifolia</i>	var.	<i>cuneifolia</i>	LC
Malvaceae	<i>Hermannia</i>	<i>vestita</i>			LC
Malvaceae	<i>Hermannia</i>	<i>burkei</i>			LC
Malvaceae	<i>Hermannia</i>	sp.			
Malvaceae	<i>Hermannia</i>	<i>erodioides</i>			LC
Malvaceae	<i>Hermannia</i>	<i>desertorum</i>			LC
Malvaceae	<i>Hermannia</i>	<i>spinosa</i>			LC
Malvaceae	<i>Hermannia</i>	<i>abrotanoides</i>			LC
Malvaceae	<i>Hermannia</i>	<i>althaeifolia</i>			LC
Malvaceae	<i>Hermannia</i>	<i>pulverata</i>			LC
Malvaceae	<i>Hermannia</i>	<i>linearifolia</i>			LC
Malvaceae	<i>Hermannia</i>	<i>comosa</i>			LC
Malvaceae	<i>Hermannia</i>	<i>bicolor</i>			LC
Malvaceae	<i>Hibiscus</i>	<i>pusillus</i>			LC
Malvaceae	<i>Malva</i>	<i>parviflora</i>	var.	<i>parviflora</i>	
Malvaceae	<i>Melhania</i>	<i>rehmannii</i>			LC
Malvaceae	<i>Radyera</i>	<i>urens</i>			LC
Melianthaceae	<i>Melianthus</i>	<i>comosus</i>			LC
Menispermaceae	<i>Cissampelos</i>	<i>capensis</i>			LC
Molluginaceae	<i>Pharnaceum</i>	<i>confertum</i>	var.	<i>brachyphyllum</i>	LC
Molluginaceae	<i>Pharnaceum</i>	<i>detonsum</i>			LC
Nyctaginaceae	<i>Boerhavia</i>	<i>cordobensis</i>			
Oleaceae	<i>Menodora</i>	<i>juncea</i>			LC
Ophioglossaceae	<i>Ophioglossum</i>	<i>polyphyllum</i>	var.	<i>polyphyllum</i>	LC
Orchidaceae	<i>Eulophia</i>	<i>hians</i>	var.	<i>nutans</i>	LC
Orobanchaceae	<i>Harveya</i>	sp.			
Oxalidaceae	<i>Oxalis</i>	<i>obtusa</i>			LC
Oxalidaceae	<i>Oxalis</i>	<i>pes-caprae</i>	var.	<i>pes-caprae</i>	LC
Oxalidaceae	<i>Oxalis</i>	<i>heterophylla</i>			LC
Oxalidaceae	<i>Oxalis</i>	<i>setosa</i>			DD
Oxalidaceae	<i>Oxalis</i>	<i>psilopoda</i>			LC
Papaveraceae	<i>Papaver</i>	<i>aculeatum</i>			LC
Pedaliaceae	<i>Sesamum</i>	<i>capense</i>			LC
Peraceae	<i>Clutia</i>	sp.			
Peraceae	<i>Clutia</i>	<i>thunbergii</i>			LC
Plantaginaceae	<i>Plantago</i>	<i>lanceolata</i>			LC
Plantaginaceae	<i>Plantago</i>	<i>major</i>			
Plantaginaceae	<i>Veronica</i>	<i>persica</i>			NE
Plantaginaceae	<i>Veronica</i>	<i>anagallis-aquatica</i>			LC
Plumbaginaceae	<i>Limonium</i>	<i>sinuatum</i>	subsp.	<i>sinuatum</i>	
Poaceae	<i>Agrostis</i>	<i>lachnantha</i>	var.	<i>lachnantha</i>	LC
Poaceae	<i>Aristida</i>	<i>diffusa</i>	subsp.	<i>diffusa</i>	LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Poaceae	<i>Aristida</i>	<i>diffusa</i>	subsp.	<i>burkei</i>	LC
Poaceae	<i>Aristida</i>	<i>adscensionis</i>			LC
Poaceae	<i>Brachiaria</i>	<i>marlothii</i>			LC
Poaceae	<i>Brachypodium</i>	<i>bolusii</i>			LC
Poaceae	<i>Bromus</i>	<i>catharticus</i>			NE
Poaceae	<i>Bromus</i>	<i>pectinatus</i>			LC
Poaceae	<i>Cenchrus</i>	<i>ciliaris</i>			LC
Poaceae	<i>Chaetobromus</i>	<i>involucratus</i>	subsp.	<i>dregeanus</i>	LC
Poaceae	<i>Cymbopogon</i>	<i>dieterlenii</i>			LC
Poaceae	<i>Cymbopogon</i>	<i>prolixus</i>			LC
Poaceae	<i>Cymbopogon</i>	<i>nardus</i>			LC
Poaceae	<i>Cynodon</i>	<i>dactylon</i>			LC
Poaceae	<i>Cynodon</i>	<i>incompletus</i>			LC
Poaceae	<i>Digitaria</i>	<i>argyrograpta</i>			LC
Poaceae	<i>Digitaria</i>	<i>sanguinalis</i>			NE
Poaceae	<i>Digitaria</i>	<i>eriantha</i>			LC
Poaceae	<i>Echinochloa</i>	<i>colona</i>			LC
Poaceae	<i>Ehrharta</i>	<i>dura</i>			LC
Poaceae	<i>Ehrharta</i>	<i>erecta</i>	var.	<i>erecta</i>	LC
Poaceae	<i>Ehrharta</i>	<i>calycina</i>			LC
Poaceae	<i>Ehrharta</i>	<i>delicatula</i>			LC
Poaceae	<i>Enneapogon</i>	<i>desvauxii</i>			LC
Poaceae	<i>Enneapogon</i>	<i>cenchroides</i>			LC
Poaceae	<i>Enneapogon</i>	<i>scaber</i>			LC
Poaceae	<i>Eragrostis</i>	<i>chloromelas</i>			LC
Poaceae	<i>Eragrostis</i>	<i>lehmanniana</i>	var.	<i>lehmanniana</i>	LC
Poaceae	<i>Eragrostis</i>	<i>bicolor</i>			LC
Poaceae	<i>Eragrostis</i>	<i>procumbens</i>			LC
Poaceae	<i>Eragrostis</i>	<i>obtusa</i>			LC
Poaceae	<i>Eragrostis</i>	<i>homomalla</i>			LC
Poaceae	<i>Eragrostis</i>	<i>cilianensis</i>			LC
Poaceae	<i>Eragrostis</i>	<i>curvula</i>			LC
Poaceae	<i>Eragrostis</i>	<i>mexicana</i>	subsp.	<i>virescens</i>	NE
Poaceae	<i>Festuca</i>	<i>scabra</i>			LC
Poaceae	<i>Fingerhuthia</i>	<i>sesleriiformis</i>			LC
Poaceae	<i>Fingerhuthia</i>	<i>africana</i>			LC
Poaceae	<i>Helictotrichon</i>	<i>hirtulum</i>			LC
Poaceae	<i>Helictotrichon</i>	sp.			
Poaceae	<i>Heteropogon</i>	<i>contortus</i>			LC
Poaceae	<i>Hordeum</i>	<i>capense</i>			LC
Poaceae	<i>Hordeum</i>	<i>murinum</i>	subsp.	<i>glaucum</i>	NE
Poaceae	<i>Hyparrhenia</i>	<i>hirta</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Poaceae	<i>Leptochloa</i>	<i>fusca</i>			LC
Poaceae	<i>Lolium</i>	<i>rigidum</i>			NE
Poaceae	<i>Lolium</i>	<i>perenne</i>			NE
Poaceae	<i>Lolium</i>	<i>multiflorum</i>			NE
Poaceae	<i>Melica</i>	<i>racemosa</i>			LC
Poaceae	<i>Melica</i>	<i>decumbens</i>			LC
Poaceae	<i>Oropetium</i>	<i>capense</i>			LC
Poaceae	<i>Panicum</i>	<i>maximum</i>			LC
Poaceae	<i>Panicum</i>	sp.			
Poaceae	<i>Paspalum</i>	<i>dilatatum</i>			NE
Poaceae	<i>Pennisetum</i>	<i>sphacelatum</i>			LC
Poaceae	<i>Pentameris</i>	<i>airoides</i>	subsp.	<i>airoides</i>	LC
Poaceae	<i>Pentameris</i>	<i>aristifolia</i>			LC
Poaceae	<i>Phragmites</i>	<i>australis</i>			LC
Poaceae	<i>Polypogon</i>	<i>monspeliensis</i>			NE
Poaceae	<i>Schismus</i>	<i>barbatus</i>			LC
Poaceae	<i>Setaria</i>	<i>verticillata</i>			LC
Poaceae	<i>Setaria</i>	<i>sphacelata</i>	var.	<i>torta</i>	LC
Poaceae	<i>Sorghum</i>	sp.			
Poaceae	<i>Sporobolus</i>	<i>ioclados</i>			LC
Poaceae	<i>Sporobolus</i>	<i>fimbriatus</i>			LC
Poaceae	<i>Sporobolus</i>	<i>tenellus</i>			LC
Poaceae	<i>Sporobolus</i>	<i>fourcadii</i>			LC
Poaceae	<i>Stipagrostis</i>	<i>ciliata</i>	var.	<i>capensis</i>	LC
Poaceae	<i>Stipagrostis</i>	<i>obtusa</i>			LC
Poaceae	<i>Stipagrostis</i>	<i>namaquensis</i>			LC
Poaceae	<i>Tenaxia</i>	<i>disticha</i>			
Poaceae	<i>Tetrachne</i>	<i>dregei</i>			LC
Poaceae	<i>Themeda</i>	<i>triandra</i>			LC
Poaceae	<i>Tragus</i>	<i>koelerioides</i>			LC
Poaceae	<i>Tragus</i>	<i>racemosus</i>			LC
Poaceae	<i>Tragus</i>	<i>berteronianus</i>			LC
Poaceae	<i>Tribolium</i>	<i>purpureum</i>			LC
Poaceae	<i>Tricholaena</i>	<i>capensis</i>	subsp.	<i>capensis</i>	LC
Polygalaceae	<i>Muraltia</i>	<i>macrocarpa</i>			LC
Polygalaceae	<i>Polygala</i>	<i>leptophylla</i>	var.	<i>leptophylla</i>	LC
Polygalaceae	<i>Polygala</i>	<i>ephedroides</i>			LC
Polygalaceae	<i>Polygala</i>	sp.			
Polygalaceae	<i>Polygala</i>	<i>hottentotta</i>			LC
Polygalaceae	<i>Polygala</i>	<i>ericaefolia</i>			LC
Polygalaceae	<i>Polygala</i>	<i>asbestina</i>			LC
Polygonaceae	<i>Polygonum</i>	<i>aviculare</i>			

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Polygonaceae	<i>Rumex</i>	<i>crispus</i>			
Polygonaceae	<i>Rumex</i>	<i>lanceolatus</i>			LC
Portulacaceae	<i>Portulaca</i>	<i>oleracea</i>			
Potamogetonaceae	<i>Potamogeton</i>	<i>pusillus</i>			LC
Potamogetonaceae	<i>Zannichellia</i>	<i>palustris</i>			LC
Pteridaceae	<i>Adiantum</i>	<i>capillus-veneris</i>			LC
Pteridaceae	<i>Cheilanthes</i>	<i>hirta</i>	var.	<i>brevipilosa</i>	
Pteridaceae	<i>Cheilanthes</i>	<i>hirta</i>	var.	<i>hirta</i>	LC
Pteridaceae	<i>Cheilanthes</i>	<i>induta</i>			LC
Pteridaceae	<i>Cheilanthes</i>	<i>eckloniana</i>			LC
Pteridaceae	<i>Pellaea</i>	<i>calomelanos</i>	var.	<i>calomelanos</i>	LC
Pteridaceae	<i>Pellaea</i>	<i>rufa</i>			LC
Ranunculaceae	<i>Clematis</i>	<i>brachiata</i>			LC
Ranunculaceae	<i>Ranunculus</i>	<i>multifidus</i>			LC
Ranunculaceae	<i>Ranunculus</i>	<i>trichophyllus</i>			LC
Ricciaceae	<i>Riccia</i>	<i>albovestita</i>			
Rosaceae	<i>Rubus</i>	<i>ludwigii</i>	subsp.	<i>ludwigii</i>	LC
Rubiaceae	<i>Anthospermum</i>	<i>rigidum</i>	subsp.	<i>pumilum</i>	LC
Rubiaceae	<i>Anthospermum</i>	<i>dregei</i>	subsp.	<i>dregei</i>	LC
Rubiaceae	<i>Galium</i>	<i>capense</i>	subsp.	<i>capense</i>	LC
Rubiaceae	<i>Kohautia</i>	<i>caespitosa</i>	subsp.	<i>brachyloba</i>	LC
Rubiaceae	<i>Kohautia</i>	<i>cynanchica</i>			LC
Rubiaceae	<i>Nenax</i>	<i>microphylla</i>			LC
Ruscaceae	<i>Eriospermum</i>	<i>corymbosum</i>			LC
Rutaceae	<i>Agathosma</i>	<i>cerefolium</i>			LC
Rutaceae	<i>Ruta</i>	<i>graveolens</i>			
Salicaceae	<i>Populus</i>	<i>nigra</i>	var.	<i>italica</i>	
Salicaceae	<i>Salix</i>	<i>mucronata</i>	subsp.	<i>mucronata</i>	LC
Santalaceae	<i>Lacomucinaea</i>	<i>lineata</i>			
Santalaceae	<i>Thesium</i>	<i>sonderianum</i>			DD
Santalaceae	<i>Thesium</i>	<i>junceum</i>	var.	<i>junceum</i>	LC
Santalaceae	<i>Thesium</i>	<i>disciflorum</i>			LC
Santalaceae	<i>Viscum</i>	<i>hoolei</i>			LC
Santalaceae	<i>Viscum</i>	<i>rotundifolium</i>			LC
Santalaceae	<i>Viscum</i>	<i>continuum</i>			LC
Scrophulariaceae	<i>Aptosimum</i>	<i>procumbens</i>			LC
Scrophulariaceae	<i>Aptosimum</i>	<i>spinescens</i>			LC
Scrophulariaceae	<i>Aptosimum</i>	<i>indivisum</i>			LC
Scrophulariaceae	<i>Buddleja</i>	<i>glomerata</i>			LC
Scrophulariaceae	<i>Buddleja</i>	<i>salviifolia</i>			LC
Scrophulariaceae	<i>Chaenostoma</i>	<i>archeri</i>			LC
Scrophulariaceae	<i>Chaenostoma</i>	<i>halimifolium</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Scrophulariaceae	<i>Chaenostoma</i>	sp.			
Scrophulariaceae	<i>Chaenostoma</i>	<i>macrosiphon</i>			LC
Scrophulariaceae	<i>Chaenostoma</i>	<i>pauciflorum</i>			LC
Scrophulariaceae	<i>Chaenostoma</i>	<i>revolutum</i>			LC
Scrophulariaceae	<i>Chaenostoma</i>	<i>rotundifolium</i>			LC
Scrophulariaceae	<i>Cromidon</i>	<i>decumbens</i>			LC
Scrophulariaceae	<i>Cromidon</i>	sp.			
Scrophulariaceae	<i>Diascia</i>	sp.			
Scrophulariaceae	<i>Diascia</i>	<i>capsularis</i>			LC
Scrophulariaceae	<i>Diascia</i>	<i>alonsooides</i>			LC
Scrophulariaceae	<i>Gomphostigma</i>	<i>virgatum</i>			LC
Scrophulariaceae	<i>Gomphostigma</i>	<i>incomptum</i>			LC
Scrophulariaceae	<i>Hebenstretia</i>	<i>glaucescens</i>			LC
Scrophulariaceae	<i>Jamesbrittenia</i>	sp.			
Scrophulariaceae	<i>Jamesbrittenia</i>	<i>filicaulis</i>			LC
Scrophulariaceae	<i>Jamesbrittenia</i>	<i>tysonii</i>			LC
Scrophulariaceae	<i>Jamesbrittenia</i>	<i>atropurpurea</i>	subsp.	<i>atropurpurea</i>	LC
Scrophulariaceae	<i>Jamesbrittenia</i>	<i>atropurpurea</i>			
Scrophulariaceae	<i>Limosella</i>	<i>grandiflora</i>			LC
Scrophulariaceae	<i>Manulea</i>	<i>karrooica</i>			LC
Scrophulariaceae	<i>Manulea</i>	<i>chrysantha</i>			LC
Scrophulariaceae	<i>Nemesia</i>	<i>cynanchifolia</i>			LC
Scrophulariaceae	<i>Nemesia</i>	sp.			
Scrophulariaceae	<i>Nemesia</i>	<i>fruticans</i>			LC
Scrophulariaceae	<i>Nemesia</i>	<i>linearis</i>			LC
Scrophulariaceae	<i>Peliostomum</i>	<i>leucorrhizum</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>rigida</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>albida</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>saxatilis</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>acocksii</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>centralis</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>gracilis</i>			LC
Scrophulariaceae	<i>Selago</i>	sp.			
Scrophulariaceae	<i>Selago</i>	<i>magnakarooica</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>geniculata</i>			LC
Scrophulariaceae	<i>Selago</i>	<i>divaricata</i>			LC
Scrophulariaceae	<i>Zaluzianskya</i>	sp.			
Scrophulariaceae	<i>Zaluzianskya</i>	<i>venusta</i>			LC
Solanaceae	<i>Lycium</i>	<i>oxycarpum</i>			LC
Solanaceae	<i>Lycium</i>	<i>schizocalyx</i>			LC
Solanaceae	<i>Lycium</i>	<i>hirsutum</i>			LC
Solanaceae	<i>Lycium</i>	<i>bosciifolium</i>			LC

Family	Genus	Species	Rank	Subspecies	IUCN Status ⁴
Solanaceae	<i>Lycium</i>	<i>cinereum</i>			LC
Solanaceae	<i>Lycium</i>	<i>horridum</i>			LC
Solanaceae	<i>Nicotiana</i>	<i>glauca</i>			
Solanaceae	<i>Solanum</i>	<i>burchellii</i>			LC
Solanaceae	<i>Solanum</i>	<i>nigrum</i>			
Solanaceae	<i>Solanum</i>	<i>retroflexum</i>			LC
Solanaceae	<i>Solanum</i>	<i>capense</i>			LC
Solanaceae	<i>Solanum</i>	<i>tomentosum</i>			
Solanaceae	<i>Withania</i>	<i>somnifera</i>			LC
Thymelaeaceae	<i>Gnidia</i>	<i>meyeri</i>			LC
Thymelaeaceae	<i>Lasiosiphon</i>	<i>deserticola</i>			LC
Thymelaeaceae	<i>Passerina</i>	<i>obtusifolia</i>			LC
Thymelaeaceae	<i>Passerina</i>	<i>corymbosa</i>			LC
Urticaceae	<i>Forsskaolea</i>	<i>candida</i>			LC
Urticaceae	<i>Urtica</i>	<i>urens</i>			
Urticaceae	<i>Urtica</i>	<i>dioica</i>			
Verbenaceae	<i>Chascanum</i>	<i>pumilum</i>			LC
Verbenaceae	<i>Chascanum</i>	<i>pinnatifidum</i>	var.	<i>pinnatifidum</i>	LC
Zygophyllaceae	<i>Augea</i>	<i>capensis</i>			LC
Zygophyllaceae	<i>Roepera</i>	<i>incrustedata</i>			
Zygophyllaceae	<i>Roepera</i>	<i>foetida</i>			
Zygophyllaceae	<i>Roepera</i>	<i>lichtensteiniana</i>			
Zygophyllaceae	<i>Tetraena</i>	<i>chrysopteron</i>			
Zygophyllaceae	<i>Tetraena</i>	<i>microcarpa</i>			
Zygophyllaceae	<i>Tribulus</i>	<i>terrestris</i>			LC

10 ANNEX 2. LIST OF MAMMALS

List of mammals which are likely to occur in the broad vicinity of the Klipkraal Wind Farm Cluster study area. Records are based on the MammalMap Database from the ADU (<http://mammalmap.adu.org.za>), while conservation status is from the IUCN Red Lists 2016. Species in bold are those confirmed present or observed at the site.

Family	Scientific name	Common name	Red list	Records
Bathyergidae	<i>Cryptomys hottentotus</i>	Southern African Mole-rat	Least Concern	3
Bovidae	<i>Antidorcas marsupialis</i>	Springbok	Least Concern	978
Bovidae	<i>Oreotragus oreotragus</i>	Klipspringer	Least Concern	503
Bovidae	<i>Pelea capreolus</i>	Grey Rhebok	Near Threatened	357
Bovidae	<i>Raphicerus campestris</i>	Steenbok	Least Concern	76
Bovidae	<i>Redunca fulvorufula</i>	Mountain Reedbuck	Near Threatened	91
Bovidae	<i>Sylvicapra capra</i>	Common Duiker	Least Concern	18
Bovidae	<i>Tragelaphus strepsiceros</i>	Greater Kudu	Least Concern	624
Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern	51
Canidae	<i>Otocyon megalotis</i>	Bat-eared Fox	Least Concern	12
Canidae	<i>Vulpes chama</i>	Cape Fox	Least Concern	4
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	Least Concern	1
Cercopithecidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern	57
Chrysochloridae	<i>Chlorotalpa sclateri</i>	Sclater's Golden Mole	Least Concern	14
Felidae	<i>Caracal caracal</i>	Caracal	Least Concern	2
Felidae	<i>Felis nigripes</i>	Black-footed Cat	Vulnerable	17
Felidae	<i>Felis silvestris</i>	Wildcat	Least Concern	3
Gliridae	<i>Graphiurus ocularis</i>	Spectacled African Dormouse	Least Concern	1
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern	2
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	Least Concern	6
Herpestidae	<i>Herpestes pulverulentus</i>	Cape Gray Mongoose	Least Concern	7
Herpestidae	<i>Suricata suricatta</i>	Meerkat	Least Concern	5
Hyaenidae	<i>Hyaena brunnea</i>	Brown Hyena	Near Threatened	2
Hyaenidae	<i>Proteles cristata</i>	Aardwolf	Least Concern	4
Hystriidae	<i>Hystrix africae australis</i>	Cape Porcupine	Least Concern	4
Leporidae	<i>Bunolagus monticularis</i>	Riverine Rabbit	Critically Endangered	11
Leporidae	<i>Lepus capensis</i>	Cape Hare	Least Concern	2
Leporidae	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern	3
Macroscelididae	<i>Macroscelides proboscideus</i>	Short-eared Elephant Shrew	Least Concern	6

Muridae	<i>Aethomys granti</i>	Grant's Rock Mouse	Least Concern	2
Muridae	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern	29
Muridae	<i>Desmodillus auricularis</i>	Cape Short-tailed Gerbil	Least Concern	2
Muridae	<i>Gerbilliscus paeba</i>	Paeba Hairy-footed Gerbil	Least Concern	13
Muridae	<i>Mastomys coucha</i>	Southern African Mastomys	Least Concern	1
Muridae	<i>Mastomys natalensis</i>	Natal Mastomys	Least Concern	6
Muridae	<i>Otomys unisulcatus</i>	Karoo Bush Rat	Least Concern	12
Muridae	<i>Parotomys brantsii</i>	Brants's Whistling Rat	Least Concern	2
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	Least Concern	51
Mustelidae	<i>Ictonyx striatus</i>	Striped Polecat	Least Concern	3
Mustelidae	<i>Mellivora capensis</i>	Honey Badger	Least Concern	3
Nesomyidae	<i>Malacothrix typica</i>	Large-eared African Desert Mouse	Least Concern	2
Nesomyidae	<i>Petromyscus collinus</i>	Pygmy Rock Mouse	Least Concern	2
Nesomyidae	<i>Saccostomus campestris</i>	Southern African Pouched Mouse	Least Concern	15
Orycteropodidae	<i>Orycteropus afer</i>	Aardvark	Least Concern	3
Procaviidae	<i>Procavia capensis</i>	Cape Rock Hyrax	Least Concern	13
Sciuridae	<i>Xerus inauris</i>	South African Ground Squirrel	Least Concern	1
Soricidae	<i>Myosorex varius</i>	Forest Shrew	Least Concern	13
Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern	2
