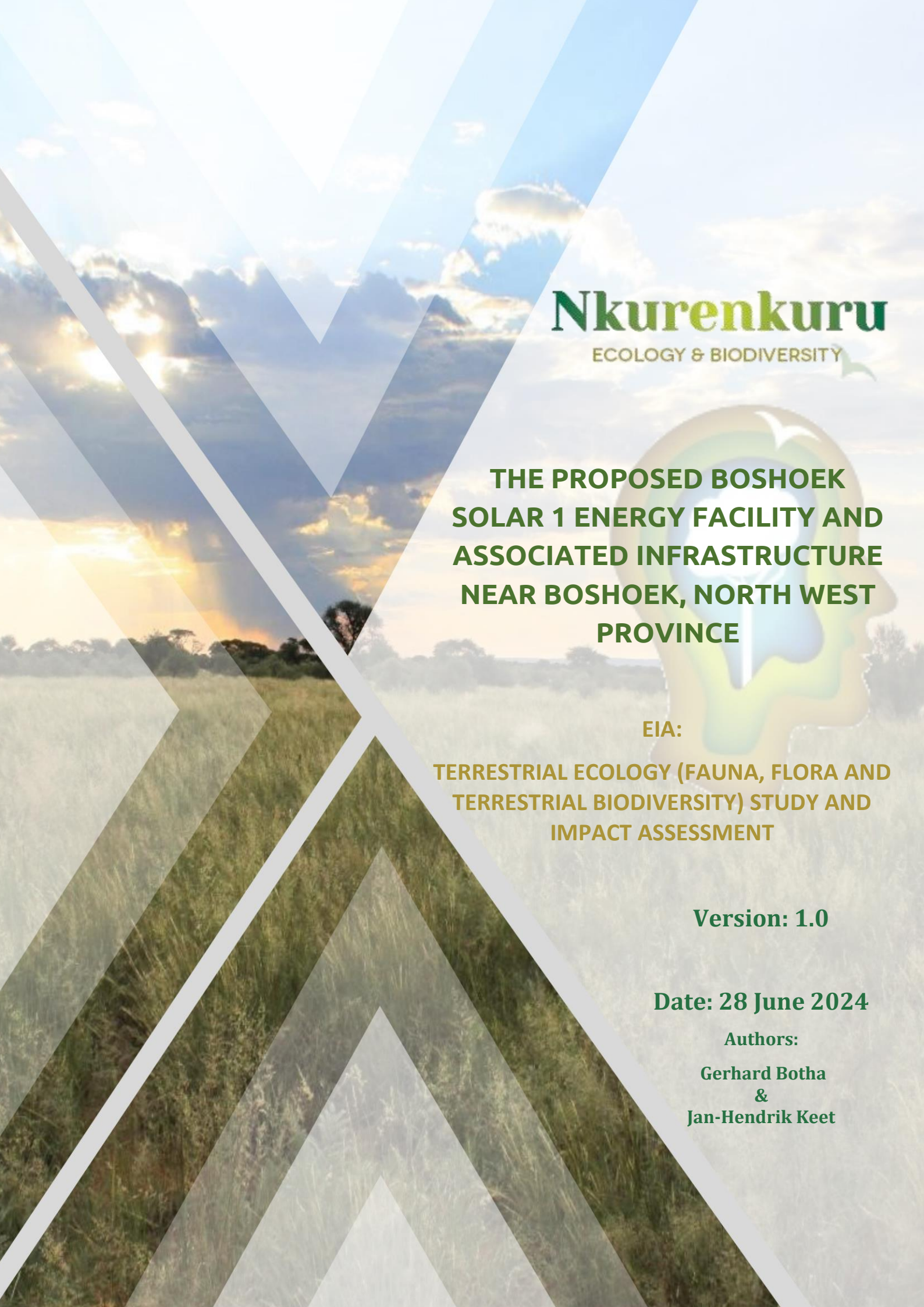

Nkurenkuru
ECOLOGY & BIODIVERSITY

THE PROPOSED BOSHOEK SOLAR 1 ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR BOSHOEK, NORTH WEST PROVINCE

EIA:

TERRESTRIAL ECOLOGY (FAUNA, FLORA AND TERRESTRIAL BIODIVERSITY) STUDY AND IMPACT ASSESSMENT

Version: 1.0

Date: 28 June 2024

Authors:

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&
Jan-Hendrik Keet

Report Title: The Proposed Boshoek Solar 1 Energy Facility and Associated Infrastructure near Boshoek, North West Province: Biodiversity (Fauna and Flora) and Ecological Scoping/Screening Phase Assessment.

Authors: Mr. Gerhard Botha and Dr. Jan-Hendrik Keet

Project Name: The Proposed Boshoek Solar 1 Energy Facility and Associated Infrastructure near Boshoek, North West Province.

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I. DECLARATION OF CONSULTANT INDEPENDENCE

The consultants hereby declare that they:

- Are independent specialists in this application;
- Regard the information contained in this report as it relates to specialist input/study to be true and correct at the time of publication;
- Do not, and will not, have any financial interest(s) in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA Environmental Impact Assessment Regulations, 2014, and any specific environmental management Act;
- Do not, and will not, have any vested interest(s) in the proceedings of the proposed activities;
- Have disclosed, to the applicant, EAP, and competent authority(-ies), any information that have, or may have, the potential to influence the decision of the competent authority(-ies) or the objectivity of any report, plan, or document required in terms of the NEMA Environmental Impact Assessment Regulations 2014, and any specific environmental management Act;
- Are fully aware of, and meet, the responsibilities in terms of the NEMA Environmental Impact Assessment Regulations 2014 (specifically in terms of regulation 13 of GN No. R. 326), and any specific environmental management Act, and that failure to comply with these requirements may result in disqualification;
- Have provided the competent authority(-ies) with access to all necessary information at their disposal at the time of publication regarding the application, whether such information is favourable to the applicant or not; and
- Are aware that a false declaration is an offense in terms of regulation 48 of GN No. R. 326.

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June 2024

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June 2024

II. LIST OF ABBREVIATIONS

CARA:	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA:	Critical Biodiversity Area
CITES:	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CR:	Critically Endangered (threat status)
DAFF:	Department of Agriculture, Forestry, and Fisheries (Now DFFE, *see below*)
DDD:	Data Deficient — Insufficient Information (threat status)
DDT:	Data Deficient — Taxonomically Problematic (threat status)
DEA:	Department of Environmental Affairs (Now DFFE, *see below*)
DFFE:	Department of Forestry, Fisheries, and the Environment
EIA:	Environmental Impact Assessment: EIA regulations promulgated under section 24(5) of NEMA and published in Government Notice R. 543 in Government Gazette 33306 of 18 June 2010
EN:	Endangered (threat status)
EO:	Environmental Officer
ESA:	Ecological Support Area
EW:	Extinct in the Wild (threat status)
EX:	Extinct (threat status)
FEPA:	Freshwater Ecosystem Priority Area
IAPs:	Invasive Alien Plant species
IUCN:	International Union for Conservation of Nature
LC:	Least Concern (threat status)
MAL:	Maximum Acceptable Loss
MAP:	Mean Annual Precipitation
MAT:	Mean Annual Temperature
NE:	Not Evaluated (threat status)
NEM:BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEMA:	National Environmental Management Act (Act 107 of 1998)
NFA:	National Forest Act 1998 (No. 84 of 1998)
NFEPA:	National Freshwater Ecosystem Priority Areas; identified to meet national freshwater conservation targets (CSIR, 2011)
NT:	Near Threatened (threat status)
POSA:	Plants of southern Africa (online database)
QDGC:	Quarter Degree Grid Cell
RE:	Regionally Extinct (threat status)
RLE:	Red List of Ecosystems for South Africa

SANBI: South African National Biodiversity Institute

SoCC: Species of Conservation Concern

VegMap: National Vegetation Map of Southern Africa, Lesotho, and Swaziland (as per Mucina and Rutherford, 2006, with subsequent updates, e.g., 2018).

VU: Vulnerable (threat status)

III. LIST OF DEFINITIONS

Alien (also called "exotic"): A species occurring outside its natural distribution range. Often originating from another country or continent, the term is commonly used to describe plants not indigenous to South Africa, and which have become problematic (e.g., spreading rapidly and threatening existing biodiversity). Note that this concept is, however, based on political, rather than ecological bounders. The latter is preferred. "Alien" is used interchangeably with "exotic.

Bare soil: Soil surface devoid of vegetation and unaltered by humans.

Biodiversity: The diversity (richness and abundance) of plant and animal species occurring in their natural environment (habitats). The term encompasses different ecosystems, landscapes, communities, populations, and genes, as well as the ecological processes that allow these elements to persist over time.

Biome: A broad ecological spatial unit representing major life zones of large natural areas, and defined mainly by vegetation structure, climate, and major large-scale disturbance factors (e.g., fire) (Mucina and Rutherford, 2006).

Climax: The vegetation type or plant community structure at the end of the seral cycle. Climax communities may, or may not, be the final endpoint of succession: frequent or even rare events, such as fire, frost, harvesting, or hurricanes, may indefinitely hold communities in a stable subclimax.

Conservation: The safeguarding of biodiversity and its processes (often referred to as "Biodiversity Conservation").

Connectivity: The measure of how connected or spatially continuous a corridor, network, or matrix is. For example, a forested landscape (the matrix) with fewer gaps in forest cover (open patches) will have higher connectivity

Corridors: Have important functions as strips of a landscape differing from adjacent land on both sides. Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as "steppingstones" that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.

Cumulative Impacts: The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The project's impact is therefore one part of the total cumulative impact on the environment. The analysis of a project's incremental impacts combined with the effects of other projects can often give a more accurate understanding of the likely results of the project's presence than just considering its impacts in isolation (BBOP).

Degraded Habitat/Land: Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.

Disturbance: An event that significantly alters the pattern of variation in the structure or function of a system, while fragmentation is the breaking up of a habitat, ecosystem,

or land-use type into smaller parcels. Disturbance is generally considered a natural process.

Ecosystem: The combination of biota within a given area, together with a suitable environment that sustains the biota and their interactions. It can have a spatial unit of any size, but shows some degree of homogeneity as far as structure, function, and species composition is concerned. Small-scale ecosystems typically link up to large-scale ecosystems, and both contribute to ecosystem functioning and services at the landscape-scale.

Ecological Function: How each of the elements in the landscape interacts based on its life cycle events [Producers, Consumers, Decomposers Transformers]. Includes the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly.

Ecosystem Goods and Services: The goods and benefits mankind obtains from natural ecosystems. Various ecosystem types provide a range of ecosystem goods and services. For example, aquatic ecosystems, such as rivers and wetlands, provide forage for livestock, grazing or sedges for craft production, and services such as pollutant trapping and flood attenuation. They also provide a habitat for a range of aquatic biota.

Ecological Pattern: The contents and internal order of the landscape, or its spatial (and temporal) components. May be homogenous or heterogenous. Result from the ecological processes that produce them.

Ecological Process: Includes Physical processes [Climate (precipitation, insolation), hydrology, geomorphology]; Biological processes [Photosynthesis, respiration, reproduction]; Ecological processes [Competition, predator-prey interactions, environmental gradients, life histories].

Ecological Processes: Ecological processes typically only function well where natural vegetation remains, and where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.

Ecological Rehabilitation: The process of assisting the recovery of a degraded or damaged ecosystem in a trajectory that aims to render the ecosystem fully functional, stable, and able to develop further, but not necessarily returning to the original, historical state.

Ecological Restoration: The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed, in a trajectory that ultimately returns the ecosystem to its natural successional stage.

Ecological Structure: The composition, or configuration, and the proportion of different patches across the landscape. Relates to species diversity, the greater the diversity,

the more complex the structure. A description of the organisms and physical features of environment including nutrients and climatic conditions.

Endemic: Refers to a species, or a specific vegetation type, that is naturally restricted to a particular, usually small, region (not to be confused with indigenous). A plant or animal species may, for example, be endemic to South Africa, in which case it occurs naturally anywhere in the country, or endemic only to a specific geographical area within the country, and is then restricted only to that area.

Ephemeral: Refers to the life-form of an annual plant that makes occasional appearances in favourable seasons.

Exotic: See Alien.

Forb: A plant without secondary xylem/thickening (i.e., non-woody or herbaceous), usually living for only one or two seasons.

Function/functioning/functional: Used here to describe natural ecosystems working or operating in a healthy way, as opposed to being dysfunctional and working poorly or in an unhealthy way.

Geophyte/-ic: Pertaining to a plant with underground storage organs such as bulbs, corms, tubers, or rhizomes, and which resprouts during the growing season, while completely dying back aboveground during the dormant season.

Graminoid: Pertaining to a herbaceous growth form characterised by a "grass-like" appearance (e.g., tufted growth, usually long and narrow leaves, secondary root system). Examples include grasses (Poaceae), restios (Restionaceae), sedges (Cyperaceae), and rushes (Juncaceae).

Habitat: The general features of an area, inhabited by animals and/or plants, which are essential to their survival (i.e., the natural "home" of a plant or animal species).

Indigenous: Refers to a species that occurs naturally within a specific, though generally large, area. "Indigenous" is used interchangeably with "native".

Infrastructure: This can either specifically or generally refer to any developmental processes, whether permanent or temporary. Examples include, but are not limited to, buildings, roads, wind turbines, solar panels, batching plants, bridges, parking areas for vehicles, storage areas for equipment, and fences, among other things.

Intact: Used here to describe a natural environment that is not seriously damaged, and which functions properly.

Invasive Plant: A plant which has been declared as invasive under NEM:BA, and includes all propagules of the plant (seeds and any vegetative parts capable of reproducing asexually).

Land Type: Map unit denoting land over which a marked uniformity of climate, terrain form, soil, and vegetation exists. These are usually mapped based upon satellite imagery.

Landscape: Consists of a mosaic of two or more ecosystems that exchange organisms, energy, water, and nutrients.

Mitigate/Mitigation: Mitigating impacts refers to reactive practical actions that minimize or reduce *in situ* impacts. Examples of mitigation include "changes to the scale, design, location, siting, process, sequencing, phasing, and management and/or monitoring of the proposed activity, as well as restoration or rehabilitation of sites". Mitigation actions can take place anywhere, as long as it reduces site effects where a change in ecological character is likely, or the values of the site are affected by those changes (Ramsar Convention, 2012).

Rehabilitation: in an EIA context, repairing a habitat/ecosystem for functional processes and productivity maintenance. The original habitat/ecosystem condition might not necessarily be fully restored (in contrast to "restoration"). Rehabilitation is easier than restoration — especially if the pre-impacted ecological state was pristine — since the aim is not necessarily reversion to the pre-impacted ecological state. Compare with "restoration".

Risk: A prediction of the likelihood and impact of an outcome; usually referring to the likelihood of a variation from the intended or desired outcome.

Restoration: in an EIA context, recovering/restoring a degraded or destroyed habitat/ecosystem to its pre-impacted ecological state, that is, prior to the activity/action that caused the degradation or destruction. This is more difficult to achieve than "rehabilitation", especially if the pre-impacted ecological state was pristine. Compare with "rehabilitation".

Soil Erosion: A natural process whereby the ground level is lowered by wind or water action, and may occur as a result of, among other things, chemical processes and/or physical transport on the land surface.

Species Richness: The number of species occurring within a delimited area, for example, a plot or vegetation/land type. Species richness does not include individual abundance.

Succession: A series of stages in which different plants and animals colonise an area following some kind of disturbance. The final stage of succession is called the "climax", but various disturbances may prevent the vegetation from attaining its potential climax.

Threat Status: Threat status (of a species or community type) is a simple but highly integrated indicator of vulnerability. It contains information about past loss (of numbers and/or habitat), the number and intensity of threats, and current prospects as indicated by recent population growth or decline. Any one of these metrics could be used to measure vulnerability. One much-used example of a threat status classification system is the IUCN Red List of Threatened Species (BBOP, 2009).

Threatened Ecosystem: In the context of this document, this refers to Critically Endangered, Endangered, or Vulnerable ecosystems.

Topsoil: Uppermost soil layer; in natural vegetation maximally 30 cm deep; in cultivated landscapes the total depth of cultivation, containing a layer of humus, seeds, and nutrients. Topsoil applied to landscapes requiring rehabilitation must be free of refuse, large roots and branches, stones, alien weeds, and/or any other agents that would adversely affect the topsoil's suitability for revegetation.

Transformation: The conversion of a specific ecosystem or land use type to a different ecosystem or land use type.

Turnover: Turnover related to the concept of "unique species", or species unique to specific areas/types/plots, and is a measure of community compositional change — that is, beta diversity. Specifically, the beta diversity of specific areas can differ between each other in the components of turnover and nestedness (Baselga, 2013, 2010a, 2010b). A high species turnover indicates that species are replaced on going from one area to another (high number of unique biodiversity), whereas a low turnover (also termed high nestedness) indicates that species form subsets of a larger community when going from one area to another (low number of unique biodiversity).

Watercourse: A river or spring, or a natural channel in which water flows regularly or intermittently, or a wetland, lake, or dam into which, or from which, water flows; any

collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks (National Water Act, 1998).

Weed: A plant that grows where it is unwanted; it can, therefore, be either indigenous or alien.

Wetland: Refers to land which is transitional between terrestrial and aquatic systems, where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports, or would support, vegetation typically adapted to life in water saturated soil (National Water Act, 1998).

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1. INTRODUCTION

1.1. Applicant

Boshoek Solar 1 (Pty) Ltd.

1.2. Project

The project will be known as Boshoek Solar 1, and the entire study area with its collection of sites will generally be referred to either as the "study area" or the "study site".

1.3. Proposed Activity

Boshoek Solar 1 (Pty) Ltd proposes the establishment of a solar photovoltaic (PV) cluster (including associated grid connection and infrastructure) near Boshoek, in the North West Province (Figure 1 and **Error! Reference source not found.**).

The facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 150 MW. The development area is situated approximately 33 km north west of Rustenburg within the Rustenburg Local Municipality and the Bojanala District Municipality, in the North West Province.

The development area for the PV facility and associated infrastructure will be located on the following properties:

Farm Name	Farm No.	Portion No.
Boshoek Solar 1 PV Facility		
Farm Rhenosterdoorns	531	0
Farm Zwaarverdiend	234	1
Boshoek Solar 1 PV Grid Connection		
Zwaarverdiend 234 JP	234	18
Paul Bodenstein Landgoed 571 JG	571	RE
Elandsfontein 102 JG	102	1
Onderstepoort 98 JG	98	RE

The project is planned as part of a larger cluster, which includes two additional PV facilities (Boshoek Solar 2 and Boshoek Solar 3) up to 150 MW and 50 MW respectively.

An assessment area of approximately 290 ha is being assessed as part of this EIA process and the infrastructure associated with the 150 MW facility includes:

- » PV modules (mono- or bifacial) and mounting structures;
- » Inverters and transformers;
- » Battery Energy Storage System (BESS);
- » Site access road;
- » Internal access roads;
- » Auxiliary buildings (switch room, gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- » Temporary and permanent laydown area; and
- » Grid connection infrastructure, including:
    - Underground medium-voltage cabling between the project components and the facility substation;
    - Up to 132kV facility substation;
    - Switching station;
    - A single circuit 132 kV power line from the switching station to the future planned Eskom collector switching station ~3.5 km north-east of the site.

The EA applications for the solar facility and grid connection infrastructure are being undertaken simultaneously as the proposed infrastructure is co-dependent, i.e., one will not be developed without the other.

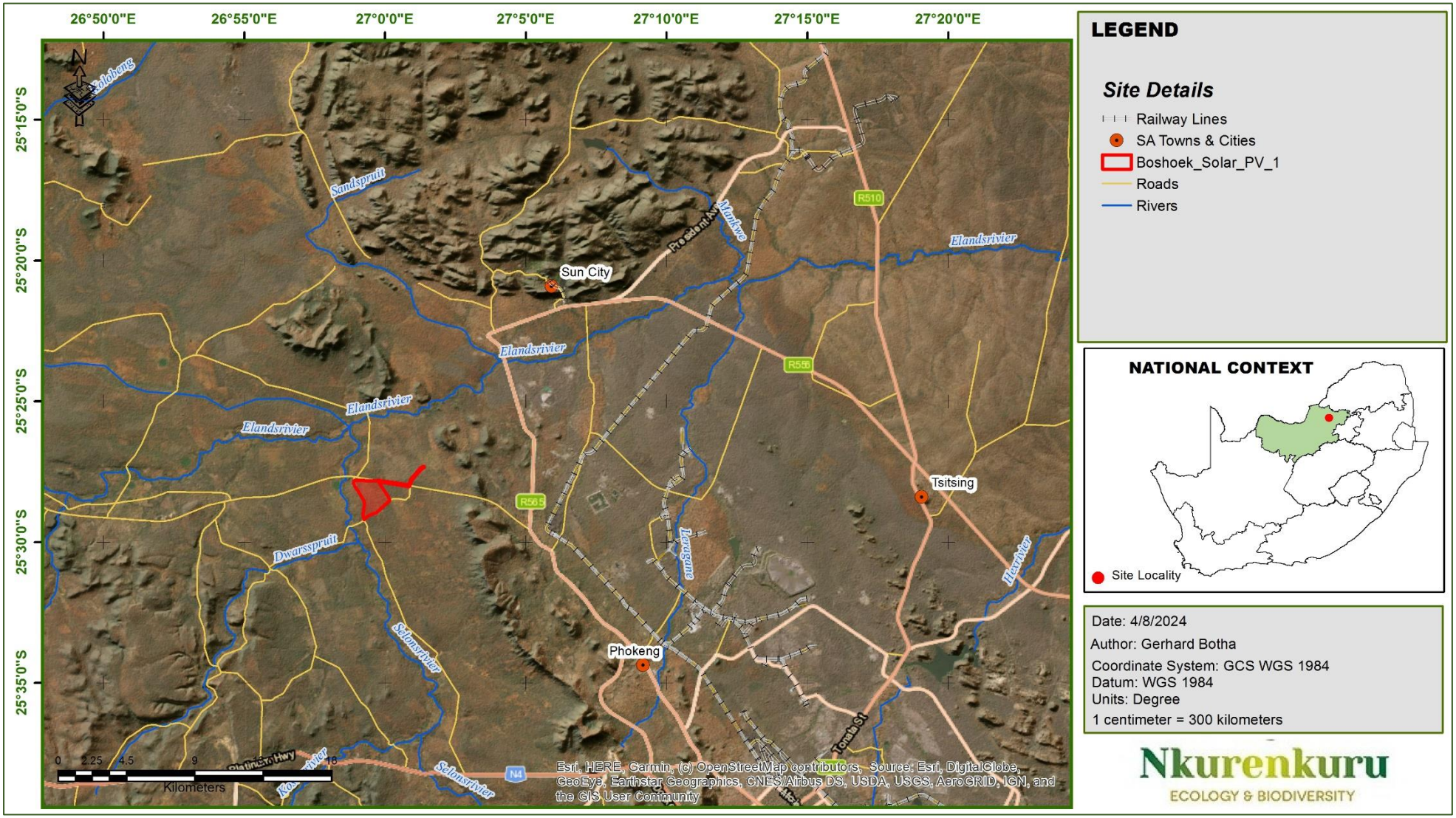


Figure 1: Locality of the project site earmarked for the development of the Boshoek Solar 1 facility, west of Boshoek and north-west of Phokeng in the North West Province.

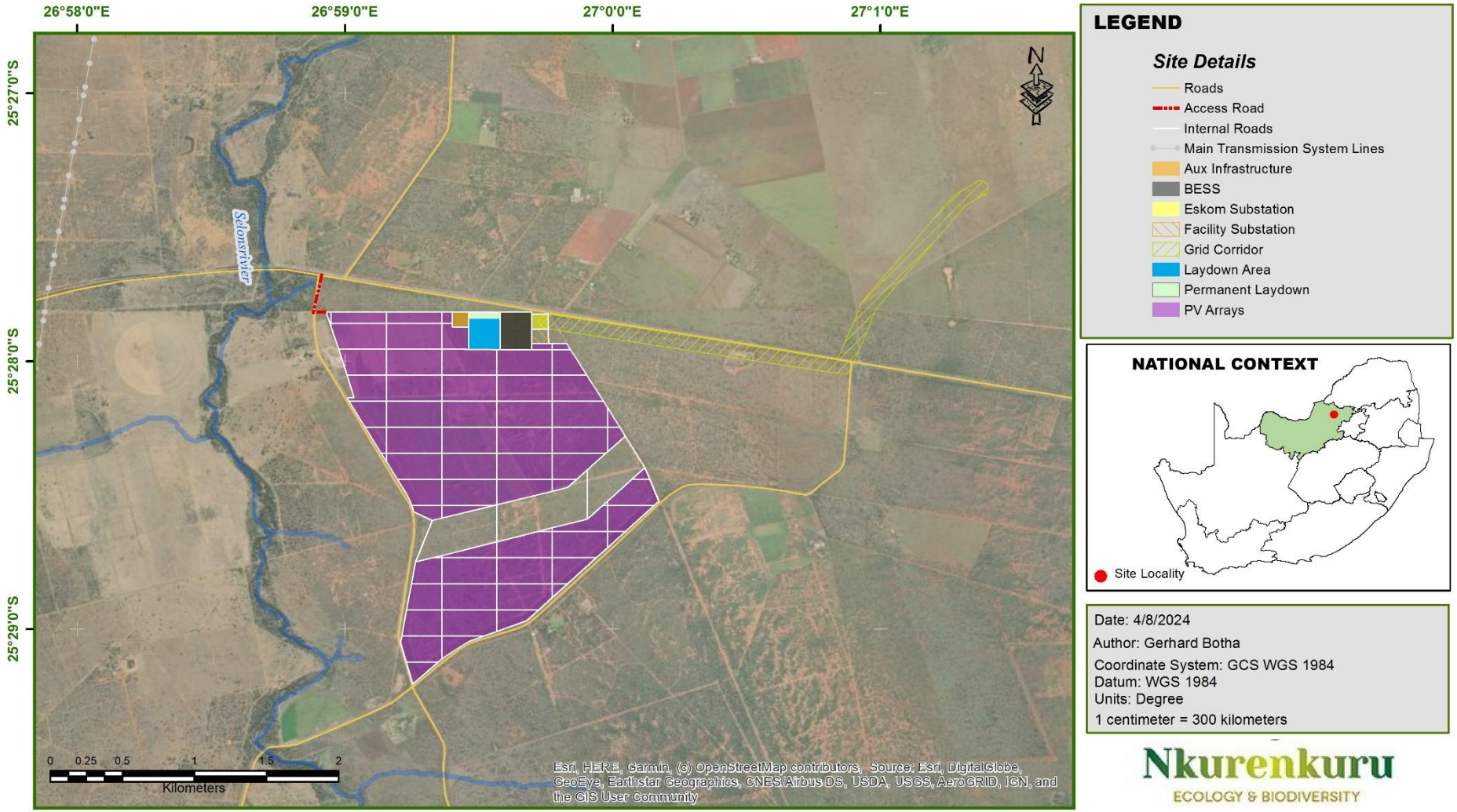


Figure 2: Locality of the project site earmarked for the development of the Boshoek Solar 1 facility, west of Boshoek and north-west of Phokeng in the North West Province. This map is specifically zoomed in to give a higher resolution.

1.4. Terms of Reference (ToR)

To conduct a detailed site terrestrial biodiversity sensitivity and impact assessment, including the following:

- Desktop analysis;
- On-site investigation;
- Detailed compilation of a terrestrial ecological impact assessment report which adheres to the following (this list is not exhaustive):
    - The report will be compiled to fulfil the requirement for a Terrestrial Biodiversity Assessment as per the 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 NEMA (GNR 320), as gazetted on 20 March 2020.
    - This report is undertaken as supporting information as part of a greater environmental application process and is compliant in terms of the requirements in the above regulations in terms of Terrestrial Biodiversity.
    - In terms of the 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 NEMA, gazetted on 30 October 2020, relating to requirements relating specifically to the Terrestrial Plant and Animal (species) themes, this report includes these requirements.
    - Identification of any discrepancies with the environmental sensitivity as identified on the national web based environmental screening tool;
    - Refine / confirm the delineation of CBAs;
    - Identification of sensitive areas to be avoided (including corresponding spatial data);
    - Identification of sensitive species (Species of Conservation Concern and Protected Species) that occur on site;
    - An assessment of all potential impacts associated with the development, including impact significance ratings;
    - Recommendations regarding potential development areas for solar PV within the project site (including acceptable footprint limit); and
    - Recommendations regarding the scope and timeframe for further assessment.

1.5. Conditions of this Report

All findings, recommendations, and conclusions provided in this report are based on the author(s) best scientific and professional knowledge, as well as information available at the time of compilation. This report, or any part or form thereof, may not be amended or extended in any way without the prior written consent of the author(s). Any recommendations, statements, or conclusions drawn from, or based on, this report, must clearly cite or make reference to this report. Whenever such recommendations,

statements, or conclusions form part of another report, whether main or other, relating to the current investigation, this report must be included in its entirety.

1.6. Relevant Legislation

The following legislation was taken into account whilst compiling this report:

1.6.1. Provincial

The Transvaal Nature Conservation Ordinance (No. 12 of 1983) in its entirety, with special reference to:

- Schedule 2: Protected Game
- Schedule 3: Specially Protected Game
- Schedule 4: Protected Wild Animals
- Schedule 5: Wild Animals
- Schedule 7: Invertebrates
- Schedule 11: Protected Plants
- Schedule 12: Specially Protected Plants

The Bophuthatswana Nature Conservation Act (Act 3 of 1973) in its entirety, with special reference to:

- Schedule 1: Protected Game
- Schedule 1A: Specially Protected Game
- Schedule 2: Ordinary Game
- Schedule 3: Wild Animals in Respect Of Which The Provision Of Section 3 (a) (ii) Apply
- Schedule 4: Wild Animals To Which The Provisions Of Section 4 (1) (b) Do Not Apply
- Schedule 7: Protected Plants
- Schedule 7: Specially Protected Plants

The above-mentioned Nature Conservation Acts are regarded by North West Provincial Legislature, as the legally binding provincial document, providing regulations, guidelines, and procedures for the sustainable utilisation of wild animals, aquatic biota and plants, the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and also, the general conservation of flora and fauna, and the destruction of problematic (vermin and invasive) species.

1.6.2. National

» National Environmental Management Act / NEMA (Act No 107 of 1998), and all amendments and supplementary listings and/or regulations.

- » Environmental Conservation Act (ECA) (No 73 of 1989) and amendments.
- » National Environmental Management: Biodiversity Act / NEM:BA (Act No. 10 of 2004) and amendments.
- » National Forest Act 1998 / NFA (No 84 of 1998).
- » National Veld and Forest Fire Act (Act No. 101 of 1998).
- » Conservation of Agricultural Resources Act / CARA (Act No. 43 of 1983) and amendments.

1.6.3. International

- » Convention on International Trade in Endangered Species of Fauna and Flora (CITES; https://cites.org/eng).
- » The Convention on Biological Diversity (CBD; https://www.cbd.int/).
- » The Convention on the Conservation of Migratory Species of Wild Animals (CMS; https://www.cms.int/).

2. METHODOLOGY

2.1. Terrestrial Potential Area of Influence (PAOI)

The proposal is to develop a solar PV facility on site, along with associated infrastructure. Anticipated impacts will mostly occur during the construction phase, with few discernible effects anticipated during operation. These impacts are not expected to extend beyond the boundaries of the infrastructure footprint within the study area. The PAOI for terrestrial biodiversity is therefore treated here as the development footprint within which direct impacts will occur (Figure 2). For the powerline, a corridor approximately 100 m wide is assumed, but real impacts will only occur at the footprint of each tower structure, as well as within any service road that is established.

One impact that could possibly extend beyond the study area boundary is water runoff, which usually results in hydrological changes to drainage areas and their associated habitats. Due to the dense vegetation coverage, especially graminoids, as well as the flat topography of the area (slope <1%), it is unlikely that a change in runoff will impact an extensive area outside of the development footprint, and as such the potential area of influence for this impact are thus the development footprint as well as a buffer area of 200m, downslope of the development footprint.

2.2. Assessment Approach and Philosophy

This terrestrial biodiversity assessment and report has been undertaken as per the requirements of the 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 (GN 320, 20 March 2020). It also follows the most up to date *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, 2020), as well as the *Ecosystem Environmental Assessment Guideline: Draft* (http://opus.sanbi.org/jspui/handle/20.500.12143/7624).

The assessment was furthermore conducted according to the 2014 EIA Regulations, as amended on 7 April 2017.

This includes adherence to the following broad principles:

» That a precautionary and risk-averse approach be adopted towards 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, namely: Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans, or Bioregional Plans) and Freshwater Ecosystem Priority Areas.
» Demonstrate how the proponent intends on complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (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 environmental degradation;
    - Avoid jeopardising ecosystem integrity;
    - Pursue the best practical 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.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent(s) to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by NEMA.

To adhere to the above principles and best-practice guidelines, the basis for the study approach and assessment philosophy included baseline data collection, desktop studies, and site walkovers/field surveys of the property, describing:

» The broad botanical 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 patterns, the following were studied:

Community and ecosystem level:

» The main vegetation types and plant communities (Dayaram et al., 2018; Mucina and Rutherford, 2006), their aerial extents, and interaction with neighbouring types, soils, or topography.
» Threatened or Vulnerable ecosystems (cf. new South African vegetation map/National Spatial Biodiversity Assessment1, fine-scale systematic conservation plans, etc.) (South African National Biodiversity Institute, 2019).

Species-level:

» Species of Conservation Concern (SoCC: Red List and protected species), giving GPS location, if possible (Raimondo et al., 2009).
» Estimated population sizes and viabilities of SoCC present on site (including, if possible, 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).
» Probability of other SoCC occurring in the region of the site (include degree of confidence).

Other pattern issues:

» Any significant landscape features, or rare or important vegetation associations, such as seasonal wetlands, alluviums, seeps, sandstone outcroppings, steep southern aspects, drainage lines, etc., in the vicinity.
» The extent of alien plant cover within the site, and whether any infestations are the result of prior disturbance, for example ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than an infestation of undisturbed sites).
» The condition of the site in terms of current or previous land uses.

In terms of process, the following was studied:

» The key ecological "drivers" of ecosystems in the study area and its vicinity.
» Any mapped spatial components of ecological processes that may occur in the study area or 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.

If any further studies may be required during or after the EIA process, they will be outlined, together with all relevant legislation, permits, and standards that would apply to the development.

The opportunities and constraints for development is described and shown graphically on an aerial photograph, satellite image, or map delineated at an appropriate level of spatial accuracy.

2.3. Data Exploration and Review

Data sources from the literature and GIS spatial information were consulted and used where necessary, and include the following (see Figure 3 for the area used to compile a plant species list, and

Table 1 for a summary):

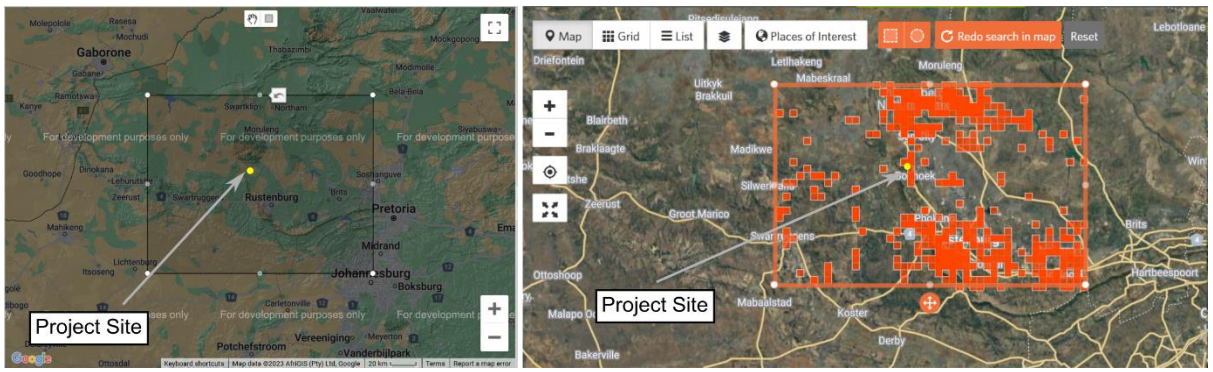


Figure 3: The area used to extract data from POSA (left) and iNaturalist (right). Extracted data was used to compile a list of plant species that may potentially occur within the study area, as well as the surrounding area, and provide an indication of potential Species of Conservation Concern that may be found within this area.

Vegetation:

- » South African National Vegetation Map (Mucina and Rutherford, 2006) and National List of Threatened Ecosystems (2011): vegetation types and their respective conservation statuses. The latest version of the National Vegetation Map was also consulted to check for any updates of the respective regions (Dayaram et al., 2018; South African National Biodiversity Institute, 2018).
- » Botanical Database of Southern Africa (BODATSA), hosted by the South African National Biodiversity Institute (SANBI; https://posa.sanbi.org; also referred as POSA: Plants of Southern Africa). The area used is a much larger area than required and is a conservative approach ensuring that all species possibly occurring within the study area have been represented. It also accounts for the fact that the study area itself might not be well represented in national databases.
- » Threatened Species Programme, Red List of South African Plants (Version 2017.1; http://redlist.sanbi.org/): The IUCN conservation statuses of all listed species were extracted from this database.
- » iNaturalist: this is a comprehensive online platform (https://www.inaturalist.org/) to which numerous citizen scientists contribute distribution records of biodiversity, mostly in the form of photos. Although many of the users are not professional botanists, various recognized botanical experts from across the globe assist in accurate species identification, and the platform is therefore an invaluable source of information regarding biodiversity. Nevertheless, to ensure a higher data reliability (i.e., only relevant/accurate records), the following parameters were used to extract records for this project: Quality Grade = "Research"; Identifications = "most agree"; Captive / Cultivated = "no". Records were specifically extracted from a very large area surrounding the actual proposed development site.

Ecosystem:

- » Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment (NFEPA; Nel et al., 2011). This includes rivers, wetlands, and catchments defined in the study area.

- » Important catchments and protected area expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES; Government of South Africa, 2008).
- » Critical Biodiversity Areas for the site and surroundings (obtained from SANBI Biodiversity GIS (BGIS).

Fauna:

The list of mammal and herpetofauna species predicted to occur in the region, and their respective likelihood of occurrence within the study area, was generated based on known distributions and habitat suitability from online and literature sources such as MammalMap, ReptileMap, FrogMap, and the ReptileAtlas, as well as field guides such as, Skinner & Chimimba (2005), Apps (ed. 2012), Stuart & Stuart (1998), Bates *et al* (2014), Minter *et al*. (2004), Branch (2009), and Du Preez and Carruthers (2009). The literature study focussed on querying online databases to generate species lists for the relevant Quarter Degree Squares (QDS).

The predicted list is typically heavily influenced by factors other than distribution or biome type. Factors such as habitat suitability, current land use, current levels of disturbance, and structural integrity of the habitats all influence the potential for predicted species to occur in the vicinity of the study area. A high likelihood thus exists that not all mammal species known to occur within the region will be located within the study area and surrounding areas. Therefore, a 'Likelihood of Occurrence' (LOO) and a 'Species of Conservation Concern' review will be applied to any potential omissions in the data set. For the LOO analysis, a full summary of Red List faunal species (IUCN, 2021); (SANBI, 2021), as well as other SCC will be tabulated, with a LOO applied.

LOO will be based upon available spatial imagery, and more specifically:

- » Habitat suitability;
- » Overlap with known distributions;
- » Rarity of the species; and
- » Current Impacts.

Mammal distribution data were obtained from the following sources:

- » The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- » The 2016 Red List of Mammals of South Africa, Lesotho and Swaziland (www.ewt.org.za) (EWT, 2016);
- » Animal Demography Unit (ADU) - MammalMap Category (MammalMap, 2017) (mammalmap.adu.org.za);
- » Stuarts' Field Guide to Mammals of Southern Africa – Including Angola, Zambia & Malawi (Suart & Stuart, 2015)
- » A Field Guide to the Tracks and Signs of Southern, Central and East African Wildlife (Stuart & Stuart, 2013).

» Smither's Mammals of Southern Africa (Apps, ed. 2012)

Herpetofauna distribution and species data were obtained from the following sources:

» South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
» A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
» Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
» Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates et al.,
» 2014);
» A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
» Animal Demography Unit (ADU) - FrogMAP (frogmap.adu.org.za);
» Atlas and Red Data Book of Frogs of South Africa, Lesotho and Swaziland (Mintner et
» al., 2004); and
» Ensuring a future for South Africa's frogs (Measey, 2011).

Table 1: Information and data coverages used to inform the ecological assessment.

	Data/Coverage Type	Relevance	Source
Biophysical Context	**Colour Aerial Photography**	Desktop mapping of habitat/ecological features	National Geo-Spatial Information (NGI)
	Latest Google Earth™ imagery	To supplement available aerial photography	Google Earth™ On-line
	1:50 000 River Line (GIS Coverage)	Highlight potential on-site and local rivers and wetlands and map local drainage network.	CSIR (2011)
	National Land-Cover	Shows the land-use and disturbances/transformations within and around the impacted zone.	DEA (2015)
	South African Vegetation Map (GIS Coverage)	Classify vegetation types and determination of reference primary vegetation	Mucina & Rutherford (2012; 2018); Dayaram et al., 2018
	NFEPA: river and wetland inventories (GIS Coverage)	Highlight potential on-site and local rivers and wetlands	CSIR (2011)
Conservation and Distribution Context	**National Biodiversity Assessment – Threatened Ecosystems** (GIS Coverage)	Determination of national threat status of local vegetation types	SANBI (2011)
	North West Biodiversity Sector Plan: Critical Biodiversity Areas (GIS Coverage)	Determination of provincial terrestrial/freshwater conservation priorities and biodiversity buffers	SANBI (2016)
	SANBI's PRECIS (National Herbarium Pretoria Computerized Information System) electronic database	Determination of plant species composition within the region as well as potential conservation important plants.	http://posa.sanbi.org
	Red Data Books (Red Data Lists of Plants)	Determination of endangered and threatened plants,	Red List of South African Plants (2011); http://redlist.sanbi.org/
	Animal Demography Unit	Compilation of a species list.	Apps (ed.) 2012
	Smither's Mammals of Southern Africa	Compilation of a species list.	Skinner & Chimimba (2005)
	The Mammals of the Southern African Subregion	Compilation of a species list.	Branch (1998)
	Field guide to snakes and other reptiles of southern Africa	Compilation of a species list.	Apps (ed.) 2012

2.4. Botany: Methods Followed during Assessment

The survey periods occurred from 27th to the 29th of March 2023 (early autumn) and from 23rd to 24th of January 2024 (summer) (refer to Figure 5 for GPS Tracks). During the site visits the vegetation was in optimal survey conditions; and the majority of plants were easily identifiable. According to the BRAHMS online database, the optimal botanical survey period for the savanna biome is between October and April and may even slightly extend into May (Figure 4), and as such these surveys occurred within the suggested optimal survey period and the current condition of the vegetation surveyed did not pose a limitation that would influence the outcome of this study.

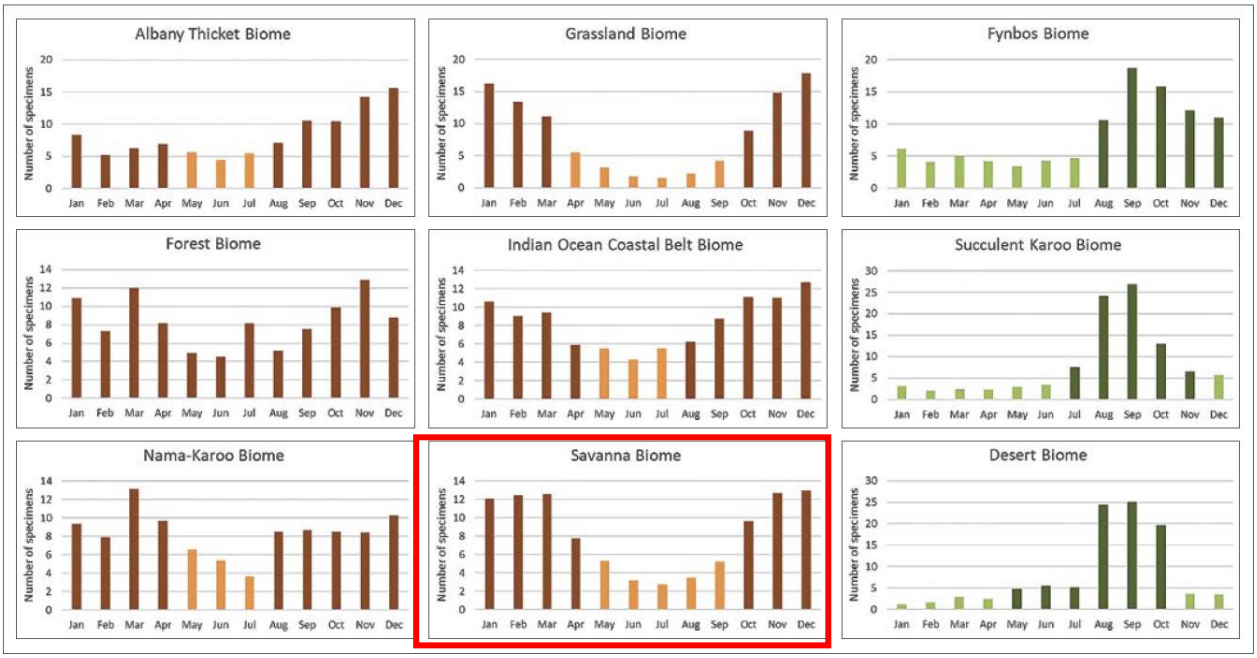


Figure 4: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The site is within the Grassland Biome.

A Garmin eTrex Touch 35 GPS was used to log the tracks and are illustrated in Figure 5.

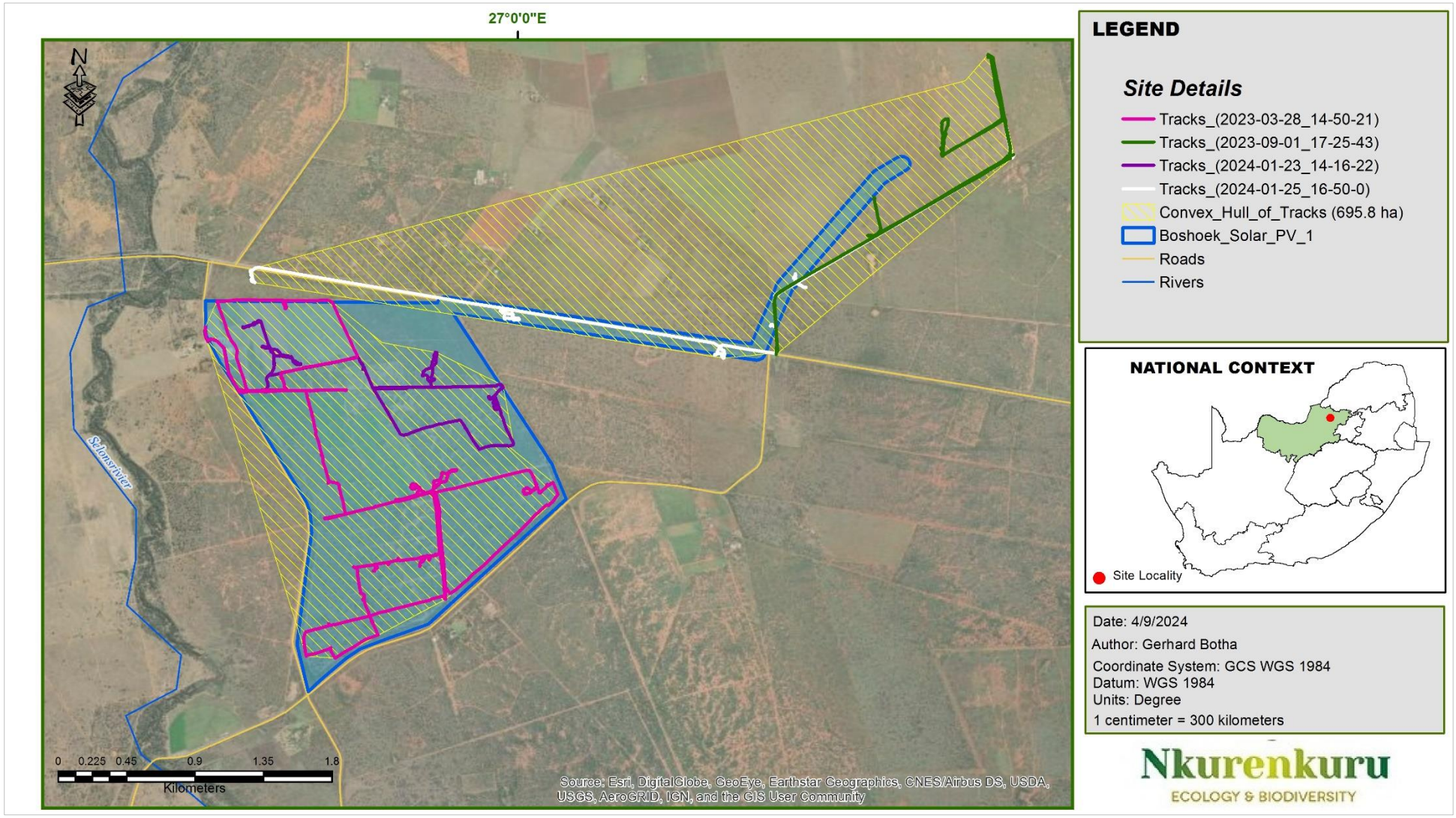


Figure 5: Tracks (relative to the project site) that were recorded during the various site visits.

Surveying was done within specifically targeted areas that were perceived as ecologically distinct and/or sensitive based on the results obtained from the desktop assessment of plant community types. This was to optimize coverage and to perform a rapid, but efficient, vegetation and ecological assessment at each survey area.

The botanical assessment was conducted by surveying fixed-point plots of sufficient size within each community type, which were also supplemented with timed meanders within the respective community types. The combination of single fixed-point plots, supplemented with timed random meanders, are highly efficient for conducting floristic analyses. This allows plant species coverages and SoCC occurrences to be rapidly estimated, as well as the compilation of adequate plant species lists, thereby giving a prompt indication of botanical diversity. Other useful observations were also recorded within each community type, examples of which include ecological condition and current impacts (examples of which could include the presence of invasive alien plant species, livestock grazing, degree of erosion, etc.), general vegetation density and physiognomic characteristics, habitat notes, and the presence of any sensitive features (e.g., wetlands, seepages, and drainage lines) where applicable. Finally, any opportunistic observations were also made while surveying.

The equipment used during surveying included a Canon EOS D7 MarkII DSLR camera with an EFS Canon 18-55mm lens (as well as a Canon EFS 150 – 300mm zoom lens), a Garmin E-Trex Touch GPS (accuracy: 4 - 5 m), Leica 10x42 Ultravid HD-Plus Binoculars to scan for any useful observations.

The inspection was conducted by a combination of vehicle surveying (with regular stops) and walking to assess the plant communities present. A Garmin® GPS was used to log any special features, SoCC, or other important observations. All plants observed at the various stops were recorded, with attention given to observing the potential presence of SoCC.

The aims were to:

- Inspect the various habitats, vegetation, and landscapes present at the study area, and to correlate such observations with the results of the desktop study.
- Identify all observed species recorded within the study area.
- Provide a list of Species of Conservation Concern (SoCC; i.e., protected and Red List species).
- Note the presence of sensitive habitats, for example drainage lines and unique edaphic environments.

Aspects of biodiversity used to guide the interpretation and assessment of the study area are summarized in Table 2.

Table 2: Summary of the different aspects of biodiversity considered in the assessment of the study area.

Intrinsic / Ecological Values
Species-Level Aspects of Biodiversity
» Protected plant species; » Threatened plant species (Red List); » Keystone species performing a key ecological role; » Large or congregatory species populations; » Endemic species or species with restricted ranges; » Previously unknown species.
Community and Ecosystem-Level Aspects of Biodiversity
» Distinct or diverse communities or ecosystems; » Unique ecosystems; » Locally adapted communities or assemblages; » Species-rich or diverse ecosystems; » Communities with a high proportion of endemic species or species with restricted ranges; » Communities with a high proportion of threatened and/or declining species; » The main uses and users of the area and its ecosystem goods and services: important ecosystem services, valued ecosystem goods, valued cultural areas.
Landscape-Level Aspects of Biodiversity
» Key ecological processes (e.g., seed dispersal, pollination, primary production, carbon sequestration); » Areas with large congregations or species and/or breeding grounds; » Migration routes/corridors; » Importance as a link or corridor to other fragments of the same habitat, to protected, or threatened, or valued biodiversity areas; » Importance and role in the landscape with regards to arrangement of spatial components of ecological processes, comprising processes tied to fixed physical features (e.g., soil or vegetation interfaces, river or sand movement corridors, upland-lowland interfaces) and flexible processes (e.g., upland-lowland gradients and macro-climatic gradients), as well as important movement or migration corridor for species.

2.5. Fauna: Methods followed during Field Sampling and Assessment

The survey periods occurred from 27th to the 29th of March 2023 (early autumn) and from 23rd to 24th of January (summer) (refer to Figure 5 for GPS Tracks). Conditions for the faunal survey were regarded as acceptable.

For faunal habitat surveying, surveys were done within specifically targeted areas that were perceived as ecologically distinct and/or sensitive based on the results obtained from the desktop assessment of plant community- and distinct landscape/geomorphological types. This was to optimize coverage and to perform a rapid, but efficient, faunal habitat and ecological assessment at each survey area.

The equipment used during surveying included a Canon EOS D7 MarkII DSLR camera with an EFS Canon 18-55mm lens (as well as a Canon EFS 150 – 300mm zoom lens), a Garmin E-Trex Touch GPS (accuracy: 4 - 5 m), Leica 10x42 Ultravid HD-Plus Binoculars to scan for any useful observations, thirty 24MP Prime Low Glow Bushnell CameraTraps/FieldCamers.

Likelihood of Occurrence

There is a high likelihood that not all mammal species known to occur within the study area and surrounding areas will be located during the survey. Therefore, a 'Likelihood of Occurrence' (LOO) and a 'Species of Conservation Consideration (SCC)' review was applied to any potential omissions in the data set. For the LOO analysis, a full summary of Red List mammals (IUCN, 2017), as well as other SCC was tabulated, with a LOO applied. The relevant species of special consideration were addressed separately based on the data collected during fieldwork, in the context of development and the effects on the species (both ecologically and spatially).

Likelihood of Occurrences are based upon:

- Habitat suitability;
- Overlap with known distributions;
- Rarity of the species; and
- Current Impacts.

Spoor Tracking

Spoor tracking enabled detailed sampling of mammalian species without the need for trapping or direct observation. All spoor, including footprints, den sites, burrows, hairs, scrapings, and diggings were recorded and documented by detailed geo-referenced photography. Spoor tracking was performed during general fieldwork, during specific timed spoor tracking drives/transects, and at carefully chosen locations such as roads and other areas with highly trackable substrates. In addition, all camera trap sites (see below) were subjected to spoor tracking.

Scat (animal faecal matter) and Pellets (carnivore regurgitations)

Scats and pellets, namely those from small predators and owls, have proven highly efficacious for the identification of rodent populations inhabiting a designated research site. This methodology hinges upon the examination of intact or regurgitated jawbones, which are subsequently cross-referenced against established reference specimens housed at the University of Pretoria for precise species determination. Notably, this approach offers a valuable adjunct to traditional Sherman trapping methods. During routine fieldwork, a total of two jackal scats were opportunistically collected.

Direct Observations (Daytime)

All mammals observed during the sampling period, their geographic coordinates and the surrounding habitat were recorded. This data was used to supplement the overall habitat analysis to give context to the area. Animals were encountered through driving, normal routine movement through the study area and active searching of refugia.

Roadkill

All mammals observed dead on the roads were examined, geo-referenced and catalogued. Dead mammals were only recorded either on the farm itself or within major road arteries in the area of influence (i.e., R59).

Herpetofaunal Assessment:

Due to the limited time available for the field survey, no trapping was performed in order to maximise prime active searching time by eliminating the need to install, service, and dismantle the traps. Instead, the survey aimed to focus on intensive active searching.

Active Searching

Herpetofauna were searched for on foot within the study area. Specific habitat types were selected, beforehand, where active sampling was intentionally focused (point samples). The habitats of these point samples were also described and photographed. Active searching for reptiles occurred for approximately 30 minutes per point sample and involved:

- » Photographing active reptiles from a distance with a telephoto lens (300 m telephoto lens);
- » Lifting up and searching under debris, rocks, or logs (rocks and logs were always returned to their original positions);
- » Scanning for any signs of reptiles such as shed skins, the positive identification of which was taken as an observation of that species; and
- » Catching observed reptiles by hand. All captured reptiles were photographed and released unharmed.

For amphibian species, positive identification of acoustic signals (males call to attract females) were also used as a means of identifying amphibians.

Opportunistic Sampling

Reptiles, especially snakes, are incredibly elusive and difficult to observe. Consequently, all possible opportunities to observe reptiles were taken in order to augment the standard sampling procedures described above. As a result, other participating biodiversity specialists assisted through opportunistically taking photographs of reptiles and amphibians within the study area. These images were copied for proper identification and added to the list of random observations unless a specific location of the observation was provided.

2.6. Assessing Species of Conservation Concern

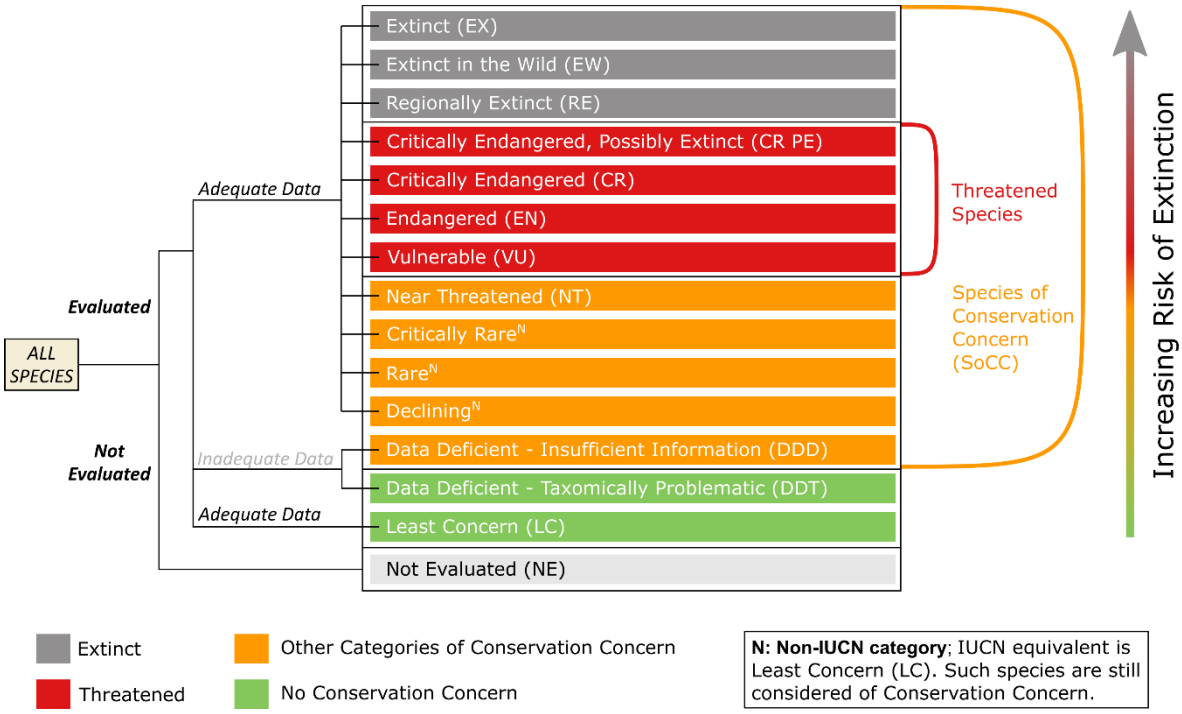


Figure 6: Red List categories used in this report as delineated according to SANBI's Red List of South African Plants (version 2020; http://redlist.sanbi.org/redcat.php).

Species of Conservation Concern (SoCC) are taxa (plants or animals) that have a significant conservation importance in terms of preserving South Africa's high biological diversity.

SoCC[1] have a high conservation importance in terms of preserving South Africa's high floristic diversity, and include threatened species (CR, EN, and VU), as well as NT or DD, and also includes range-restricted species which are not declining and are nationally listed as "Rare" or "Extremely Rare" (also referred to in some Red Lists as Critically Rare; see Figure 6) (South African National Biodiversity Institute, 2020). Note that SANBI divides the IUCN category DD into "Data Deficient: Insufficient Information (DDD)", and "Data Deficient: Taxonomically Problematic (DDT)". When SoCC occur in a proposed development site or PAOI, the proposed activities could impact them and result in significant biodiversity loss — the loss of SoCC populations might either increase the extinction risk of the respective species, or might even contribute toward their extinction.

[1] Note that all South African plants have been assessed (i.e., assigned a red list category, or "redlisted") by the Red List of South African Plants. Therefore, using the terms "redlist" or "red list" specifically for Threatened or other conservation concern species is not accurate (even though it remains popular). The term "Species of Conservation Concern" (or SoCC) is preferable, or "Threatened" where applicable.

As such, it is very important to note that a permit must be obtained from the relevant local authorities to destroy or relocate any SoCC (or even protected species).

A population of an SoCC occurring on a proposed development area serves to indicate that the proposed activities could result in significant biodiversity loss. The loss of such subpopulations will either increase the species' extinction risk, or may even contribute to its extinction. A description of the different SANBI Red List categories (http://redlist.sanbi.org/) is provided by Table 3.

Table 3: South African Red List Categories for Species of Conservation Concern (adapted from http://redlist.sanbi.org/redcat.php).

Present State			
Species of Conservation Concern (SoCC)		Extinct (EX)	A species is Extinct when there is no reasonable doubt that the last individual has died. Species are classified as Extinct only after exhaustive surveys throughout the species' known range have failed to record an individual.
		Extinct in the Wild (EW)	A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside of its natural and historical range.
		Regionally Extinct (RE)	A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.
	Threatened Species	Critically Endangered, Possibly Extinct (CR PE)	Possibly Extinct is a special tag associated with the category Critically Endangered, for species that are highly likely to be extinct, but exhaustive surveys required for classifying the species as Extinct have not yet been completed. A small chance remains that such species may still be rediscovered.
		Critically Endangered (CR)	A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
		Endangered (EN)	A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
		Vulnerable (VU)	A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
		Near Threatened (NT)	A species is Near Threatened when available evidence indicates that it almost meets any one of the IUCN criteria for Vulnerable, and is, therefore, likely to become at risk of extinction in the near future.
		Critically Rare [non-IUCN]	A species is Critically Rare when it is known to occur at a single site, but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.
		Rare [non-IUCN]	A species is Rare when it meets at least one of four South African criteria for rarity, but is not exposed to any direct or plausible potential threat, and does not qualify for a category of threat according to one of the five IUCN criteria.
		Declining	A species is Declining when it does not meet or almost meet any one of the five IUCN criteria, and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened, but there are threatening processes causing a continuing decline of the species.
		Data Deficient – Insufficient Information	A species is DDD when there is inadequate information to make an assessment of its extinction risk, but the species is well defined. Listing of species in this category indicates that more information is required and that future research

		(DDD) [non-IUCN]	could show that a threatened classification is appropriate.
Other		Data Deficient – Taxonomically Problematic (DDT) [non-IUCN]	A species is DDT when taxonomic problems hinder its distribution range and habitat from being well defined so that an assessment of risk of extinction is not possible.
		Least Concern (LC)	A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.
		Not Evaluated (NE)	A species is Not Evaluated when it has not been evaluated against the criteria. The national Red List of South African plants is a comprehensive assessment of all South African indigenous plants, and therefore all species are assessed and given a national Red List status. However, some species included in Plants of southern Africa: an Online Checklist, are species that do not qualify for national listing because they are naturalized aliens, hybrids (natural or cultivated), or synonyms. These species are given the status Not Evaluated and the reasons why they have not been assessed are included in the assessment justification.

SoCC likely to occur in the various habitats of the study area were assessed at a desktop level using the outputs of POSA and iNaturalist. This information was used to identify potential habitats in the study area that could support these SoCC. Special attention was given to the identification of any Threatened species, as well as suitable habitats for Threatened species, observed during field investigations.

2.7. Ecological Mapping

Mapping was done via available Google-Earth Satellite Imagery. Due to the intricate mosaics and often gradual mergers of vegetation units, generalisations were made and delineations are therefore approximate. Mapped units thus indicate potential dominant vegetation, but smaller vegetation types invariably exist within dominant units, and could not be mapped separately. The latter would require a supervised classification of georeferenced raw SPOT or similar satellite imagery (with full reflectance data), which was not available for this project due to a limited budget. Although supervised classification of georeferenced raw SPOT or similar satellite imagery was not conducted due to budget constraints, it's essential to highlight that the analysis and classification methods employed within this study maintain a high standard. The conducted analyses are comprehensive, detailed, and robust enough to yield informed findings, make sound decisions, and provide reliable recommendations. The absence of supervised classification does not compromise the quality or integrity of the study's outcomes. Maps were created with QGIS (version 3.20).

2.8. Terrestrial Site Ecological Importance (SEI)

The most current site sensitivity methodology, namely the Site Ecological Importance (SEI), was also followed here, as proposed by the *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, 2020).

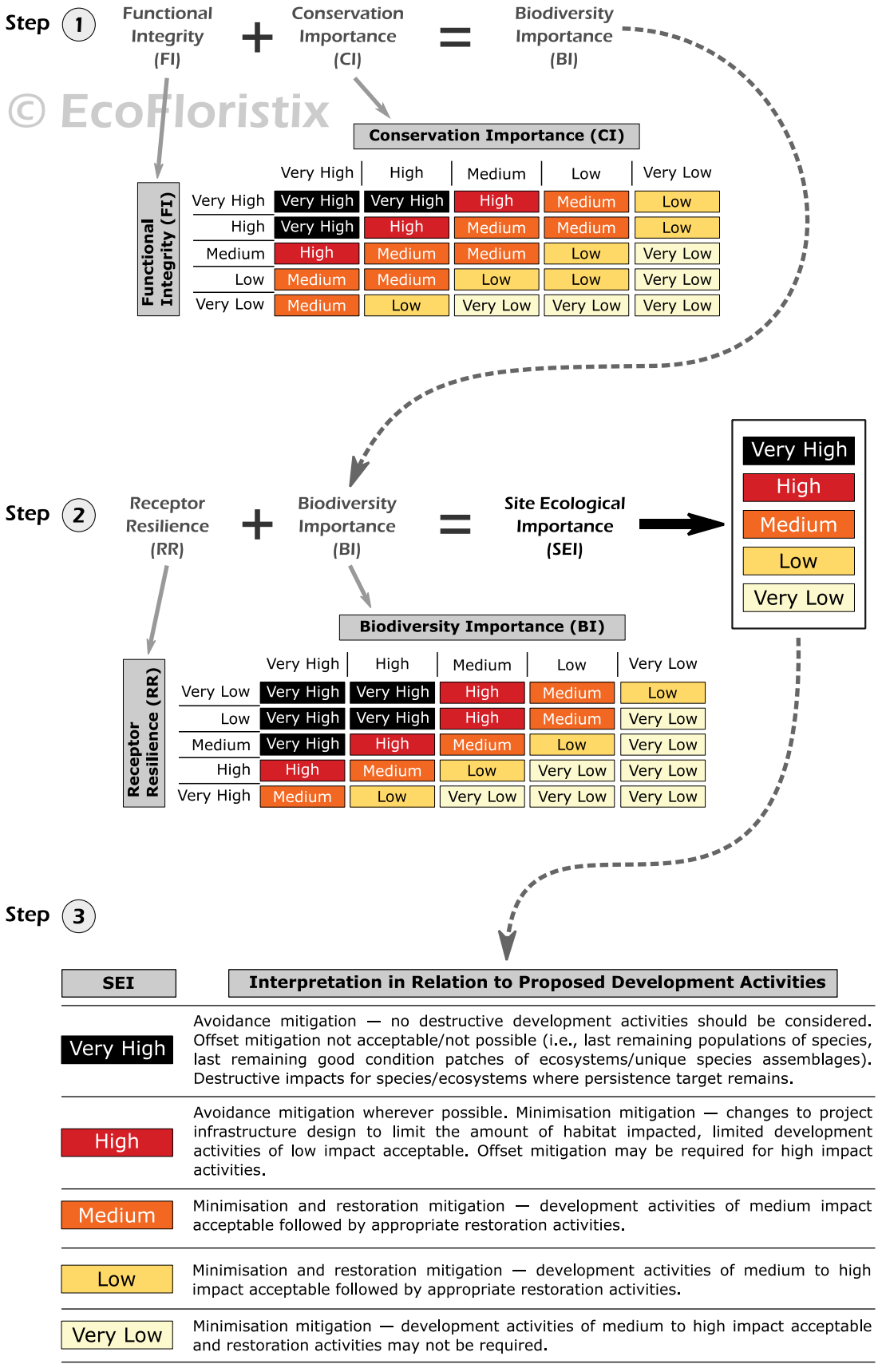
The different plant community types within the study area were delineated and identified based on field observations and satellite imagery. These plant community types were assigned SEI categories based on various factors, such as ecological integrity, conservation value, functionality, ecosystem processes, and the presence/absence of SCC, among other things.

Specifically, SEI is a function of two factors (Figure 7):

- The Biodiversity Importance (BI) of the receptor (e.g., SoCC, the vegetation/fauna community, or habitat type) and
- Receptor Resilience (RR; the resilience of the receptor to impacts).

BI is in turn a function of Conservation Importance (CI; the importance of a site for supporting biodiversity features of conservation concern that are present) and the Functional Integrity (FI; the receptors' current ability to maintain its structure and functions, compared to its known or predicted state under ideal conditions) of the receptor.

BI and SEI are both calculated using respective risk matrices. BI, FI, and RR categories are all circumscribed by various criteria (see Table 4, Table 5, and Table 6). The various criteria per category may be applied in combination or in isolation. See Figure 7 for guidelines on interpreting the resulting SEI categories. SEI is usually evaluated per plant community type / vegetation type.



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

Figure 7: Calculations, scores, process, and guidelines for calculating and interpreting Site Ecological Importance (SEI) categories (South African National Biodiversity Institute, 2020).

Table 4: Details regarding Conservation importance (CI) categories (South African National Biodiversity Institute, 2020).

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

Table 5: Details regarding Functional Integrity (FI) categories (South African National Biodiversity Institute, 2020).

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

Table 6: Details regarding Receptor Resilience (RR) categories (South African National Biodiversity Institute, 2020).

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

2.9. Impact Assessment Methodology

The impact assessment methodology is in accordance with the recently revised 2014 EIA regulations (as specified within the protocols for the applicable themes) and is based on the significance ranking approach as described by Hacking. The significance of environmental impacts is a function of the present environmental aspects that are to be impacted on, the probability of an impact occurring, and the consequence of such an impact occurring before, and after, implementation of proposed mitigation measures.

The determination and ranking of the importance of environmental factors can be achieved by evaluating the criteria outlined in Table 7. In certain instances, conducting an impact assessment may be required to establish the significance of a specific factor. Consequently, a reasonable amount of iteration is an integral part of the assessment procedure.

The process of identifying and prioritizing aspects primarily serves as a screening procedure, aiming to exclude aspects with minimal potential for causing significant impacts. Aspects categorized as "high" or "moderate" are considered significant, necessitating a thorough assessment of their potential impacts. On the other hand, aspects rated as "low" are not deemed worthy of further scrutiny.

When determining the significance of these aspects, it's crucial to base the ranking on the assumption that the recommended management practices outlined in the Environmental Impact Assessment (EIA) will be in place. This assumption reflects the scenario the project proponent intends to have considered for approval. Additionally, it's essential to identify the environmental aspects linked to the proposed project activities across various phases, such as construction, operation, and closure where applicable. The assessment should also consider how different project alternatives might influence the significance of these aspects.

While it may be advantageous to conduct a ranking exercise without assuming any management practices, as it highlights the sensitivity of key risk areas to management decisions and priorities, it presents a dilemma. Deciding on the extent of management to include in this scenario is challenging. For instance, in the case of a mining project, should one assume the complete absence of a tailings dam or merely poor operation? A general guideline is to presume that all the management required for operational purposes will be in place, while any management specifically dedicated to environmental control will be absent. However, it's important to note that presenting a ranking scenario without any management in an EIA report may not align with the scenario the project proponent seeks approval for.

Table 7: Criteria used to determine the significance of environmental aspects.

Significance Ranking	Negative Aspects	Positive Aspects
H (High)	Will always/often exceed legislation or standards. Has characteristics that could cause significant negative impacts.	Compliance with all legislation and standards. Has characteristics that could cause significant positive impacts.
M (Moderate)	Has characteristics that could cause negative impacts.	Has characteristics that could cause positive impacts.
L (Low)	Will never exceed legislation or standards. Unlikely to cause significant negative impacts.	Will always comply with all legislation and standards. Unlikely to cause significant positive impacts.

The significance of environmental impacts is to be assessed by means of the criteria of nature (descriptive), extent (scale), duration, magnitude (severity), probability (certainty), and direction (negative, neutral, or positive). Summarized briefly:

NATURE (IMPACT DESCRIPTION)		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced[2].		
Low	Localised	The impact will only affect the area within the site boundary.
Medium	Local/district	Will affect a fairly widespread area (local) beyond the site boundary.
High	Province/regional/national	Will affect the entire province or region. Widespread, far beyond the site boundary.
PROBABILITY		
This describes the chance of occurrence of an impact.		
Low	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
Medium	Possible to Probable	The impact may or will likely occur (Between a 25% to 70% chance of occurrence).
High	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).

[2] Where the severity of an impact varies with distance, the severity should be determined at the point of compliance or the point at which sensitive receptors will be encountered. This position corresponds to the spatial extent of the impact.

DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
Low	Short term	Quickly reversible. The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for a period less than the project life (typically for a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years)).
Medium	Medium term	Reversible over time. The impact will continue for the duration of the project life.
High	Long term	The impact and its effects will last beyond site closure or even risk being permanent.
SEVERITY		
The severity of an environmental impact refers to the extent and degree of harm or adverse changes that a particular activity, project, or event can cause to the environment. It encompasses the magnitude of the negative effects on ecosystems, natural resources, human health, and overall environmental quality. Assessing the severity helps in understanding and prioritizing the potential consequences and determining appropriate mitigation measures to minimize harm and promote sustainable practices.[3]		
Bio-physical Environment (Ecology and Biodiversity)	Low	Disturbance of areas that are degraded, have little conservation value or are unimportant to humans as a resource. Minor change in species variety or prevalence.
	Medium	Disturbance of areas that have some conservation value or are of some potential use to humans. Complete change in species variety or prevalence.
	High	Disturbance of areas that are pristine, have conservation value or are an important resource to humans. Destruction of rare or endangered species.
CONSEQUENCE		
The consequence of impacts can be described by considering the severity, spatial extent and duration of the impact. Having ranked the severity, duration and spatial extent, the overall consequence of impacts can be determined using the following qualitative guidelines:		

[3] Only the severity of impacts on the biophysical environment, and more specifically the ecological and biodiversity aspects pertaining to the biophysical environment, will be addressed during this assessment. The severity of impacts on aquatic/wetland drivers, functions and services will be addressed within a separate assessment.

Severity			Low (L)			Medium (M)			High (H)		
Spatial Scale			L	M	H	L	M	H	L	M	H
Duration	Long Term	H	M	M	M	M	H	H	H	H	H
	Medium Term	M	L	L	M	M	M	H	M	M	H
	Short Term	L	L	L	M	L	M	M	M	M	H

Significance

The significance of the impacts associated with the significant aspects can be determined by considering the risk:

Significance of Environmental Impact (Risk) = Probability x Consequence

Subsequently, the overall significance of impacts can be determined using the following qualitative guidelines:

CONSEQUENCE			Low (L)	Medium (M)	High (H)
PROBABILITY	Definite/Continuous	H	M	M	H
	Possible/Frequent	M	M	M	H
	Unlikely/Seldom	L	L	L	M

1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.

CUMULATIVE EFFECT

This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.

1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

2.10. Assumptions and Limitations

This report deals exclusively with a specifically defined area (the potential area of influence or the "study area"), and the impacts upon plant and animal biodiversity and natural ecosystems in that area. As such:

- All relevant project information provided by the applicant and/or Environmental Impact Assessment practitioner(s) to the biodiversity specialist(s) was assumed to be correct and valid at the time that it was provided.
- Probably the most significant potential limitation associated with the methodology is the narrow temporal window of sampling.

Temporal variation plays an important role in the structure and patterns of plant biodiversity, communities, and species occurrences. One site visit might, therefore, not fully catalogue plant species diversity in an area (for example, due to seasonal vegetation variation). The site was surveyed in a dry period, and outside of the peak flowering season. However, most plants were easily identifiable. Thus, the vegetation of the area was likely reasonably well documented.

Nevertheless, some annual, short-lived, ephemeral (plants surviving unfavourable conditions as seeds), geophytic (species with underground storage organs), or other cryptic species might not have been observed/detected. For example, some plant species of the families Amaryllidaceae, Colchicaceae, Eriospermaceae, Hyacinthaceae, Hypoxidaceae, Iridaceae, and Orchidaceae, among others, are known to completely die back during certain times of the year, depending on respective life strategies. Thus, during these times such species remain unobservable/undetectable and survive only as dormant bulbs, corms, tubers, or rhizomes below the soil surface. Together with this, rare and threatened plant species are generally uncommon and/or localised, and can easily be overlooked. Even multiple site visits might therefore fail to locate such species.

Furthermore, flowers and fruits are crucial for the complete and accurate identification of plant species, and any absence of such flowers and fruits might prevent the complete and accurate identification of such plant species. Flowering and fruiting times are species specific, and there are invariably always some plant species not flowering and/or fruiting during surveying. This not only impacts identifiability, but also detectability/visibility.

Finally, in principle, it is impossible to survey any area to its full extent, both physically and temporally. The total number of plant species recorded in any area is, therefore, almost always an underestimate of the potential number of species that could occur in such an area.

Considering all of the aforementioned, the author(s) declare a gap in knowledge as to: the potential presence of plant species that might not have been observed/detected on site during the time of surveying, as a result of their potential annual, short-lived, dormant, cryptic, or ephemeral nature, their rare and localised distributions on site, or the

incomplete and inaccurate identification of plant species which lacked flowers and/or fruits and/or other characteristic features. A list of SoCC known to occur in the study area (as per SANBI online databases) was used to supplement the list of species recorded during the survey(s). This final combined list is likely sufficiently conservative and cautious to account for the aforementioned study limitations.

3. THE IMPORTANCE OF BIODIVERSITY AND CONSERVATION

The term "biodiversity" is used to describe the wide variety (richness and abundance) of plant and animal species occurring in their natural environment or "habitat". Biodiversity not only encompasses all living things, but also the series of interactions that sustain them, which are termed "ecological processes".

South Africa's biodiversity provides an important basis for economic growth and development; keeping biodiversity intact is thus vital for ensuring the on-going provision of ecosystem services, for example the production of clean water through comprehensive catchment management practices. The role of biodiversity in combating climate change is also well recognised and further emphasises the key role that biodiversity management plays on a global scale (South African National Biodiversity Institute, 2019).

Typical pressures that natural ecosystems face from human activities include the loss and degradation of natural habitat, invasive alien species, pollution and waste, and climate change (South African National Biodiversity Institute, 2019). High levels of infrastructural and agricultural development typically restrict the connectivity of natural ecosystems, and maintaining connectivity is considered critical for the long-term persistence of both ecosystems and species, in the face of human development and global climate change.

Biodiversity loss places aspects of South Africa's economy and quality of life at risk, and reduces socioeconomic options for future generations. In essence, then, sustainable development is not possible without a healthy biodiversity.

4. STUDY AREA

4.1. Land Use

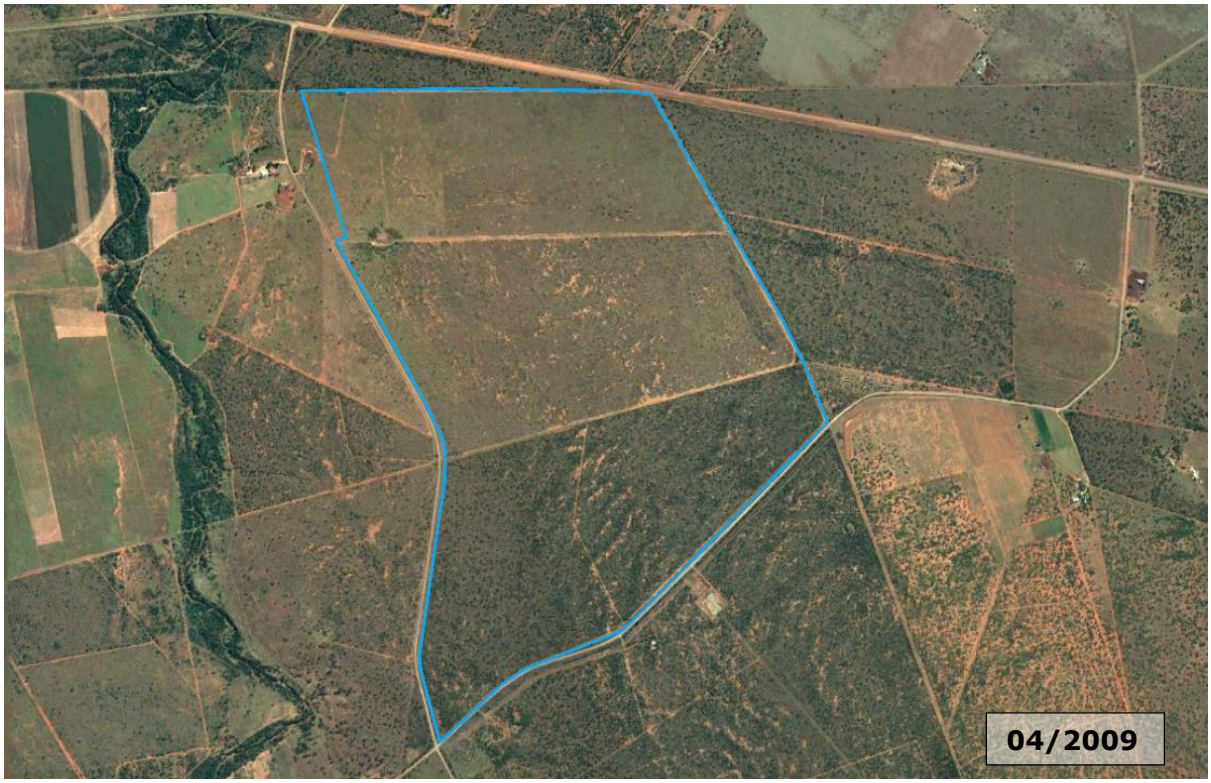
The affected properties are almost entirely used for game ranching with very limited infrastructure, mainly restricted to access roads, bomas, kraals, water and feeding points for game and livestock, and the occasional homestead. Land-use within the surrounding properties are also similarly and predominantly utilized for game ranching.

Livestock farming was historically the main land use practise within the area, with varying stocking rates and grazing regimes implemented. It however appears that the farms were historically fairly small and utilized as grazing for predominantly cattle and occasionally a

mixture between cattle and sheep. Stocking rates appears to have varied between moderate to high rates with continuous grazing to rotational grazing systems utilized, with the exclusion of fire (natural or as a management tool). This has likely resulted in the current overgrazed and transformed situation observed on certain properties, with bare, exposed soils locally present and subjected to soil capping and sheet erosion. These historical management practices have also resulted in the encroachment of small to shrubby, thorny bushes, which have been occasionally cleared and thinned out over the last 30 – 50 years (these management practices are present within almost all of the properties). However, since the transition to game breeding, large areas have been subjected to significant modifications, with the areas being cordoned off in small game breeding camps, with large scale bush clearing and in some areas the ripping, tilling and planting of palatable grasses such as Cenchrus ciliaris, *Urochloa mosambicensis, Digitaria argyrograpta* and *Dichanthium annulatum.* These areas should rather be regarded as pastures than natural grazing lands.

Based on the results obtained from the site visit, only 4% of the project site resembles near natural Zeerust Thornveld (vegetation type within which the project site is located) whilst 60% of the project site have been subjected to moderate levels of modifications, most notable bush clearance and overgrazing. A total of 31% of the project site have been subjected to significant levels of modifications and include extensive bush clearance and the planting of palatable grazing grass species (pastures) (Figure 8).

The Google Images below also illustrates how the vegetation structure and compositions have changed over time.



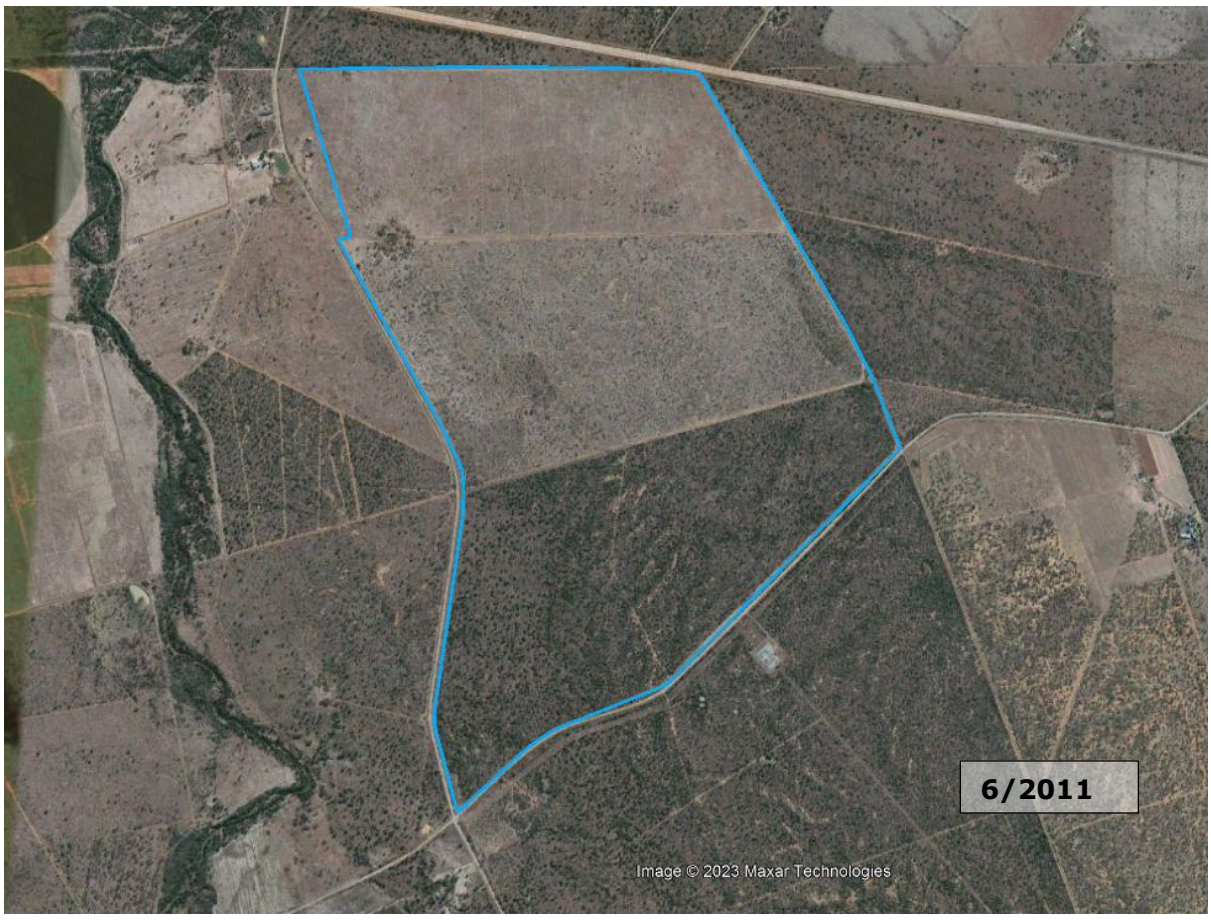

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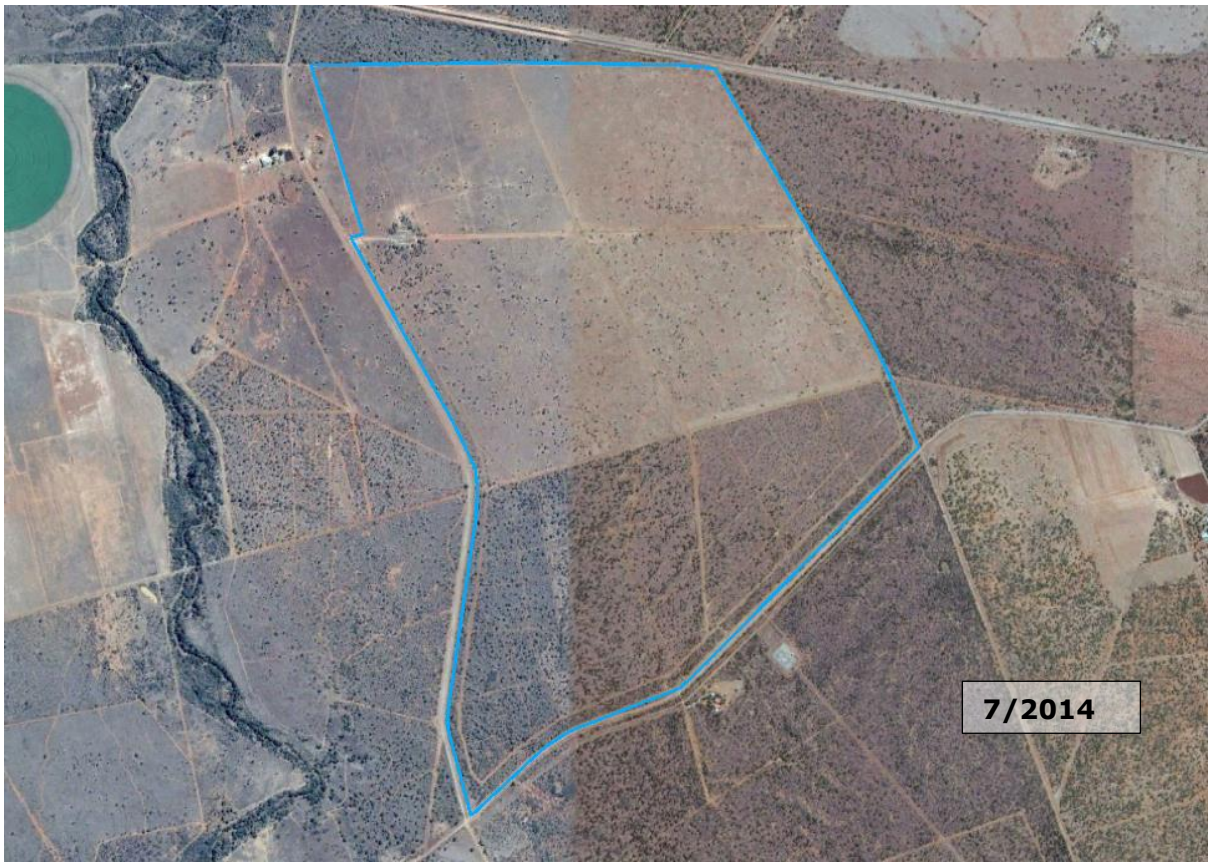
Image © 2023 Maxar Technologies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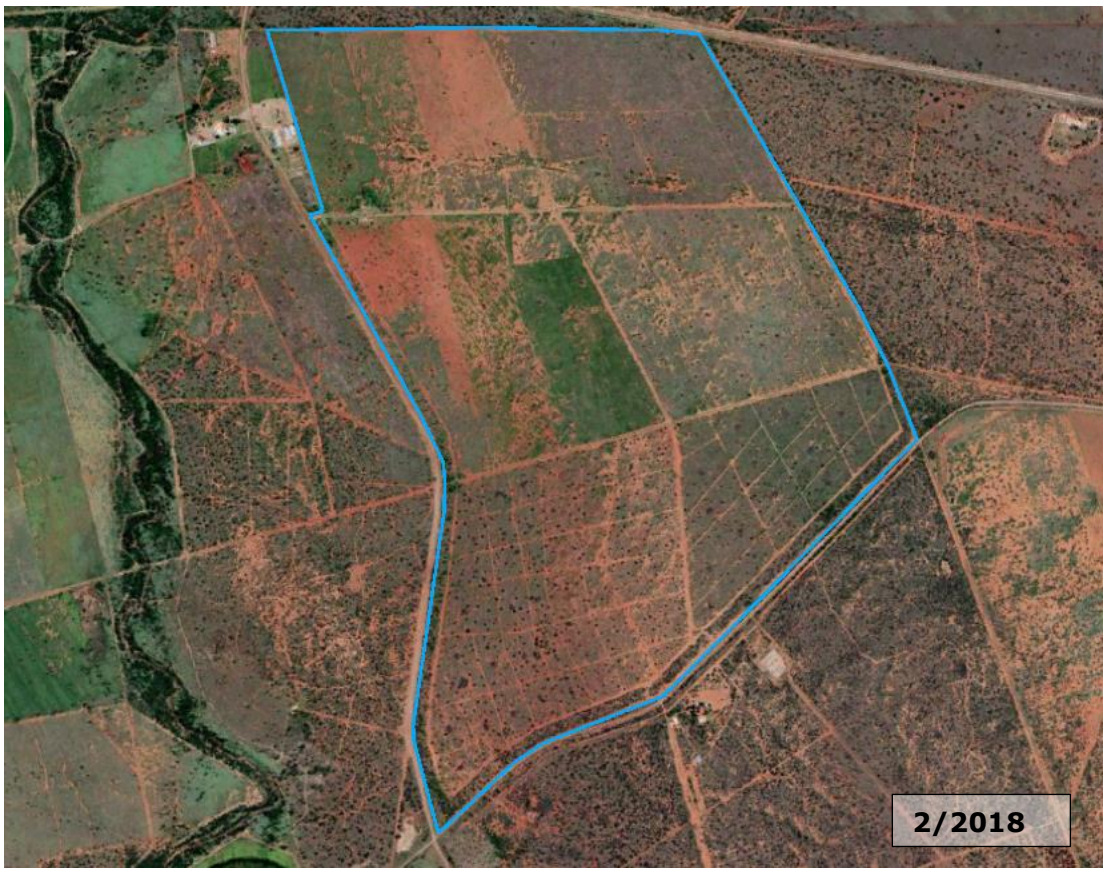
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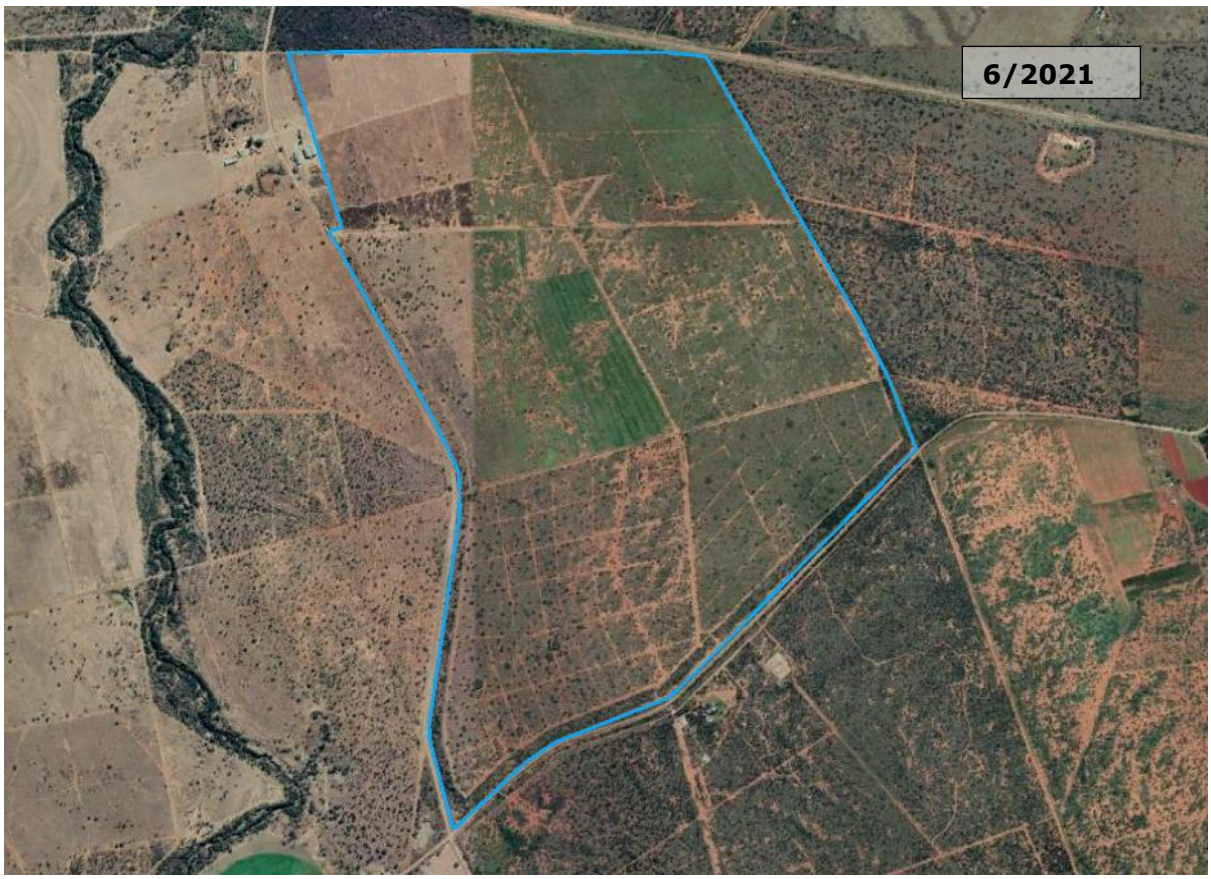
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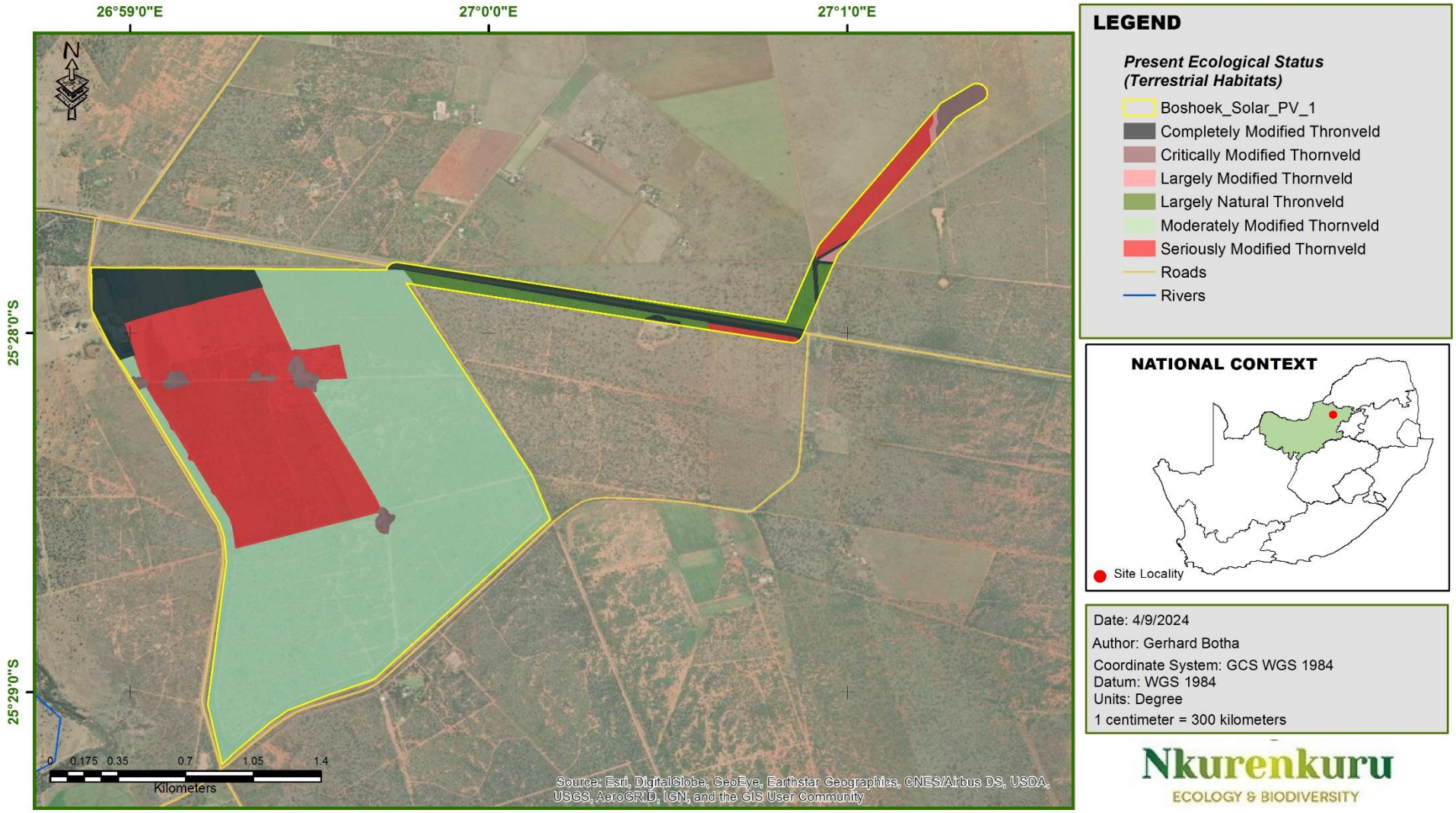

Figure 8: Present Ecological Status of terrestrial habitats as identified during the site survey.

4.2. Conservation Planning / Context

Understanding the conservation context and importance of the study area and surroundings is important to inform decision making regarding the management of the aquatic resources in the area. In this regard, available national, provincial, and regional conservation planning information was used to obtain an overview of the study site (Table 8).

Table 8: Information and data coverages used to inform the ecological assessment.

Conservation Planning Dataset		Relevant Conservation Feature	Location in Relationship to Project Site	Conservation Planning Status
NATIONAL LEVEL CONSERVATION PLANNING	**National Protected Areas Expansion Strategy**	Focus Area	Small portion of PAOI included as part of a NPAES Focus Area (0.086 ha).	NPAES Focus Area
	Protected Areas and Conservation Areas (PACA) Database	South African Conservation Area (SACA) and South African Protected Area (SAPA)	Well outside of any SACA and SAPA: » Nearest SAPA (Pilanesberg Nature Reserve) located approximately 11.8 km to the north-east. » Nearest SACA (Magaliesberg Biosphere Reserve) located approximately 21.8 km to the sout-east.	Not Classified
	Vegetation Types	Zeerust Thornveld	» Entire project site	Least Threatened
	Threatened Ecosystems	Not listed	» N/A: the entire project footprint overlaps with LC ecosystems according to RLE 2021 Spatial Data.	N/A
Conservation and Distribution Context	**NWBSP 2015: Critical Biodiversity Areas**	Terrestrial Critical Biodiversity Areas CBA1 and CBA2	Critical Biodiversity Areas 2 (CBA2) » T9 (Biodiversity Node) 4.6 ha (1%) of PAOI	CBA 2
		Terrestrial Ecological Support Areas ESA1 and ESA 2	Ecological Support Areas 1 (ESA1) » T7 (Natural Corridor) ○ 267.3 ha (78%) of PAOI.	ESA 1
			Ecological Support Areas 2 (ESA2) » T7 (Non-Natural Corridor) ○ 70.6 ha of PAOI. » T11 (Corridor – Cultivated areas) ○ 7.2 ha of PAOI.	ESA 2

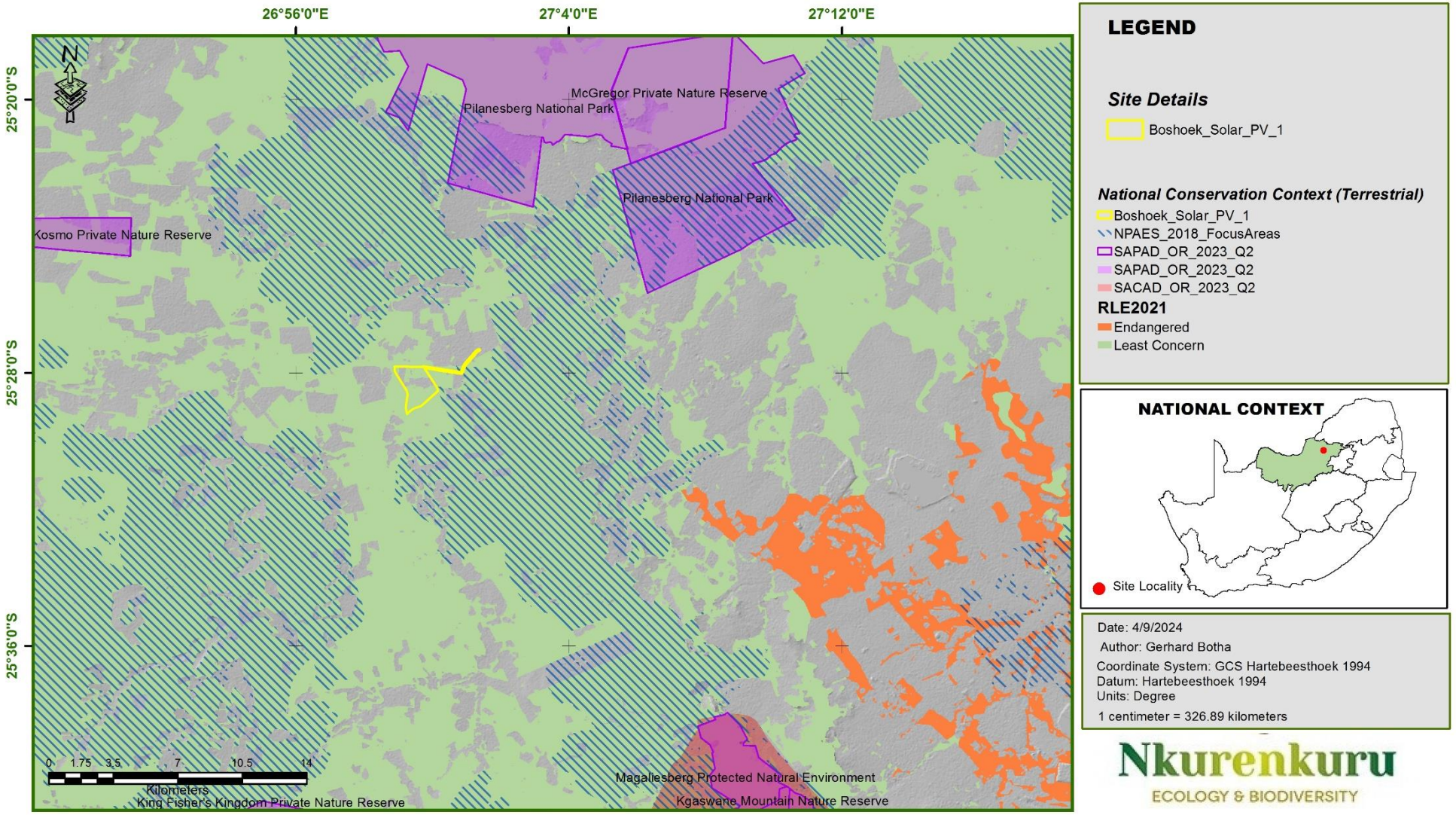

Figure 9: Nationally identified terrestrial conservation priority areas found within the greater surroundings of the project site.

National Protected Areas Expansion Strategy

The goal of the NPAES is to achieve cost effective protected area expansion for improved ecosystem representation, ecological sustainability and resilience to climate change. It sets protected area targets, maps priority areas for protected area expansion, and makes recommendations on mechanisms to achieve this (DEA, 2018)

Such protected areas are vital for ecological sustainability and climate change adaptation, serving as nodes in our ecological infrastructure network, protected the ecosystems that deliver important ecosystem services to people.

Land-based protected area expansion targets include large, intact, and unfragmented areas of high importance for biodiversity representation and ecological persistence, which are suitable for the creation or expansion of large protected areas. Such areas were identified through a systematic biodiversity planning process undertaken as part of the development of the National Protected Area Expansion Strategy 2008 (NPAES). They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES, and were designed with a strong emphasis on climate change resilience and requirements for protecting terrestrial and freshwater ecosystems (FEPA: Freshwater Ecosystem Priority Areas). These areas should not be seen as future boundaries of protected areas, since in many cases only a portion of a particular focus area would be required to meet the protected area targets set in NPAES. They are also not a replacement for fine-scale planning, which may identify a range of different priority sites based on local requirements, constraints, and opportunities (DEA, 2018).

Within the North West Province, the identification of priority areas is largely based on the province's conservation plan, where identified Critical Biodiversity Areas, in particular priority areas such as corridors and priority corridor nodes have been selected as the spatial priorities. The proposed project site is located within such a corridor linkage, primarily (directly) linking the Pilanesberg Nature Reserve with the Magaliesberg Biosphere Reserve and indirectly with the Marico Biosphere Reserve via a corridor between the two biosphere reserves. In addition, some important finer scale corridors are prioritised through the few remaining intact linkages in the centre of the province (DEA, 2018).

Key pressures on these priority areas include commercial dryland agriculture (dominant pressure in the province), mining pressures and subsistence farming (DEA, 2018).

A very small portion of the project site (along the eastern boundary of the project site) falls within a NPAES Focus Area (0.086 ha or 0.03% of project site) (**Error! Reference source not found.**). In terms of this small area being classified as a NPAES Focus Area, this is rather due to an error that occurred during the processing of the spatial data used to generate the Focus Area map. This Focus Area is associated with the adjacent property to the east but has slightly extended to areas outside of this property. However, none the

less, a loss of an area this small will not have any bearing on future conservation targets and thus the loss of this area is deemed expectable.

Furthermore, the extent and significance of any impacts can be significantly reduced to acceptable levels with the implementation of relevant mitigation measures.

The following management plans and mitigation measures should be considered;

- Storm Water and Erosion Management Plan;
- A Plant Rehabilitation and Invasive Alien Plant Management Plan;
- Mitigation measures that allow/maintain landscape connectivity.

In terms of Protected (SAPA) and Conservation (SACA) Areas, the site is not located within any SACAs and SAPAs. The project site is located approximately 11.8 km south of the northern reserve portion (main conservation area) of the Pilanesberg Nature Reserve, and 12.8 km south-west of the McGregor Private Nature Reserve. The project site is located well away from any SACA, with the closest SACAs being the Magaliesberg- and Marico Biosphere Reserves, located 21.8 km south of the proposed project site.

The proposed development won't have any impact on any protected- and/or conservation areas. Subsequently, the development is regarded, in terms of this systematic planning framework, as acceptable.

National Level of Conservation Priorities (Threatened Ecosystems)

South Africa's vegetation types have been assigned a conservation status according to their respective degrees of transformation and rates of conservation. The conservation status of a habitat or vegetation type is based on the amount of its original area that currently remains intact relative to various thresholds. On a national scale, these thresholds are arranged from Least Threatened to Critically Endangered (Figure 10), as determined by the best available scientific approaches (Driver et al., 2005; South African National Biodiversity Institute, 2019). The level at which an ecosystem becomes Critically Endangered depends on biodiversity targets, and therefore differs from one ecosystem to another, varying from 16% to 36%.

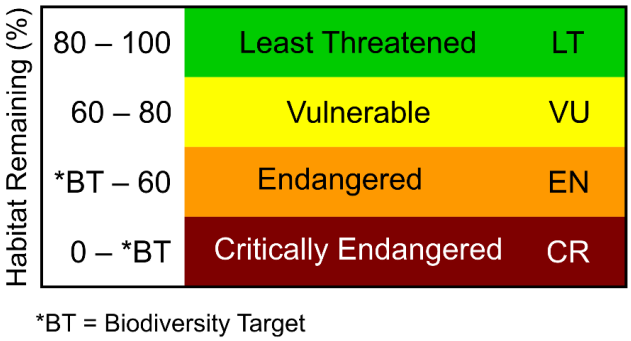

Figure 10: Ecosystem threat status categories (Driver et al., 2005). The biodiversity target represents the minimum conservation requirement.

Nationally, threatened ecosystems that are currently under threat of being transformed by other land uses have been identified and listed. The first national list of threatened terrestrial ecosystems for South Africa was gazetted on 9 December 2011 (NEM:BA National list of ecosystems that are threatened and in need of protection, G 34809, GoN 1002, 9 December 2011). The primary purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function, and composition of threatened ecosystems (SANBI, 2011). NEM:BA lists threatened or protected ecosystems in one of five categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or protected; Least Threatened ecosystems are not listed. There are four main implications of listing ecosystems:

- Planning related implications which are linked to the requirement in the Biodiversity Act (Act 10 of 2004) for listed ecosystems to be taken into account in municipal IDPs and SDFs;
- Environmental authorisation implications in terms of NEMA and the EIA regulations;
- Proactive management implications in terms of the National Biodiversity Act;
- Monitoring and reporting implications in terms of the Biodiversity Act.

The proposed development site includes one vegetation type (Zeerust Thornveld - SVcb3) and is located in close proximity to a second vegetation type (Gold Reef Mountain Bushveld - SVcb9), as currently mapped by the National Vegetation Map 2018 (see section 5.1.1 as well as Figure 13), namely;

Both of these vegetation types are listed as Least Threatened (**Error! Reference source not found.**), and thus no listed ecosystems occur on site.

Zeerust Thornveld (SVcb3): Conservation: LC according to RLE. Target: 19% according to NBA 2018. Less than 4% is statutorily conserved, and is spread between four reserves, including the Pienaar and Marico Bushveld Nature Reserves. Some 16% is transformed mainly by cultivation, with some constructed area in between. A few areas have scattered plants of the alien *Cereus jamacaru*, and several other alien species occur very scattered elsewhere. Erosion is mainly very low to low (Mucina & Rutherford, 2006). The unit is

currently mapped to cover an extensive area size of approximately 4136.5 km^2 (SANBI, 2018).

Gold Reef Mountain Bushveld (SVcb9): Conservation: LC according to RLE. Target: 24% according to NBA 2018. About 22% of this unit is statutorily conserved, mainly in the Magaliesberg Nature Area, and smaller proportions in the Rustenberg, Wonderboom, and Suikerbosrand Nature Reserves. At least an additional 1% is conserved in other reserves. The total conserved area is therefore close to the target. About 15% is transformed mainly by cultivation and constructed areas. Some areas have dense stands of alien *Melia azedarach*, but which is often associated with drainage lines or alluvia (i.e., azonal vegetation) embedded within this unit. Erosion is very low to low. A few small ridges of this unit in the Pretoria area have not yet been mapped (Mucina & Rutherford, 2006). The unit is currently mapped to cover an extensive area size of approximately 2034.7 km^2 (SANBI, 2018).

Table 9: Conservation status of the vegetation type occurring in and around the study area.

Vegetation Type	Target (%)	Transformed (%)	Conserved (Statutorily & other reserves)	Conservation Status	
				National Vegetation Map (2018)	National Ecosystem List (NEMA:BA)
Zeerust Thornveld (SVcb3)	19%	16%	4%	LC	LC
Gold Reef Mountain Bushveld (SVcb9)	24%	15%	22%	LC	LC

The proposed project site, as mentioned is solely located within the Zeerust Thornveld. However, based on the results obtained from the site visits, only 4% of the project site resembles near natural Zeerust Thornveld whilst 60% of the project site have been subjected to moderate levels of modifications, most notable bush clearance and overgrazing. A total of 31% of the project site have been subjected to significant levels of modifications and include extensive bush clearance and the planting of palatable grazing grass species (pastures) (Figure 8).

Thus, it is highly unlikely that this development will have an impact on the functionality, ecological integrity and conservation targets set out for the Ecosystems as well as Vegetation Types:

- Due to the vast extent of intact, natural vegetation, resembling Zeerust Thornveld, still present within the area;
- Due to the small extent of remaining natural vegetation within the project site that will be impacted, compared to the vast extent of modified and degraded areas that will be impacted.

Critical Biodiversity Areas and Broad Scale Ecological Processes

Critical Biodiversity Areas (CBA) have been identified for all municipal areas of the North West Province and are published by SANBI (http://bgis.sanbi.org/). This biodiversity assessment identifies CBAs representing biodiversity priority areas that should be maintained in a natural to near-natural state. CBA maps show the most efficient selection and classification of land portions to be safeguarded so that ecosystem functioning is maintained and national biodiversity objectives are met (see Table 10 for CBA land management objectives)

- According to the North West Biodiversity Conservation Plan (2018), Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (READ, 2015).
- Ecological Support Areas (ESAs) are terrestrial and aquatic areas that are not essential for meeting biodiversity representation targets (thresholds), but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree or extent of restriction on land use and resource use in these areas may be lower than that recommended for CBAs (READ, 2015).

From a land use planning perspective, it is useful to think of the difference between CBAs and ESAs in terms of where in the landscape the biodiversity impact of any land use activity action is most significant:

- In CBAs where a change in land use results in a change from the desired ecological state, the impact on biodiversity as a result of this change is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat).
- In ESAs, however, a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway. For example, removing a corridor results in a population going extinct elsewhere in the landscape due to loss of connectivity, or a new plantation locally results in a reduction in stream flow at the exit to the catchment, which affects downstream biodiversity.

Other categories included in the CBA Map are:

- Protected Areas are declared and formally protected under the Protected Areas Act, such

as National Parks, legally declared Nature Reserves, World Heritage Sites and Protected Environments that are secured by appropriate legal mechanisms.

- Other Natural Areas are areas that still contain natural habitat but that are not required to meet biodiversity targets.
- No Natural Habitat Remaining includes areas without intact habitat remaining.

Table 10: Relationship between Critical Biodiversity Areas categories (CBAs) and land management objectives.

CBA category	Land Management Objective
Protected Areas (PA) & CBA 1	***Natural landscapes:*** » Ecosystems and species are fully intact and undisturbed. » Areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost then targets will not be met. » Landscapes that are at or past their limits of acceptable change. ***Maintain in a natural or near-natural state that maximises the retention of biodiversity pattern and ecological process.***
CBA 2	***Near-natural landscapes:*** » Ecosystems and species largely intact and undisturbed. » Areas with intermediate irreplaceability or some flexibility in terms of the area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising the ability to achieve targets. » Landscapes that are approaching but have not passed their limits of acceptable change. ***Maintain in a natural or near-natural state that maximises the retention of biodiversity pattern and ecological process.***
ESA 1	***Functional landscapes:*** » Ecosystem still in a natural, near-natural state or semi-natural state, and has not been previously developed. » Ecosystem moderately to significantly disturbed but still able to maintain basic functionality. » Individual species or other biodiversity indicators may be severely disturbed or reduced. » Areas with low irreplaceability with respect to biodiversity pattern targets only. ***Maintain in at least a semi-natural state as ecologically functional landscapes that retain basic natural attributes.***
ESA 2	***Functional landscapes***: » Maintain current land use or restore area to a natural state. » Ecosystem NOT in a natural or near-natural state, and has been previously developed (e.g. ploughed). » Ecosystems significantly disturbed but still able to maintain some ecological functionality. » Individual species or other biodiversity indicators are severely disturbed or reduced. » These are areas with low irreplaceability with respect to biodiversity pattern targets only.

	» These areas are required to maintain ecological processes especially landscape connectivity. ***Maintain as much ecological functionality as possible (generally these areas have been substantially modified):***
ONA (Other Natural Areas) and Transformed	***Production landscapes***: » Manage land to optimise sustainable utilisation of natural resources.

In terms of terrestrial CBAs the project site spans a combination of CBA2, ESA1, and ESA2 areas (Figure 11). A description of the biodiversity categories located within the project site as well as the features underlying these categories and remarks, are provided below.

4.2.1.1. Biological Corridors (Selected planning units and cultivated areas):

Provincial-level biodiversity network aimed at retaining connectivity between all geographic areas in the province.

» At 'n broad geographical scale this corridor, along with other corridors connects (directly) the Pilanesberg Nature Reserve with the Magaliesberg Biosphere Reserve, and indirectly with the Marico Biosphere Reserve (indirectly via a corridor between the two Biosphere Reserves) and furthermore, these corridors insure connectivity between these conservation/protected areas and important geographical features such as the Selons and Elands River valleys as well as the Crocodile River valley (the Elands River is an important tributary of the Crocodile River) (**Error! Reference source not found.**).

» At a smaller geographical scale this corridor ensures;

- Longitudinal connectivity along the length of the Selons River;
- Lateral connectivity between the Selons River and its associated wetlands.
- Lateral connectivity between the Selons River and the surrounding terrestrial habitats; and
- Connectivity between the Selons River and associated larger tributaries, as well, as mentioned, connectivity between this river and the Elands River and eventually with the Crocodile River.

All natural areas within this corridor are regarded as ESA1, whilst all non-natural areas are regarded as ESA2.

» T7 Corridors (selected planning units)

- ESA 1 (Natural areas within Corridor): Approximately 271.9 ha (79%) ha of the Project Site (Figure 12).

- ESA 2 (Non-Natural areas within Corridor): Approximately 70.6 ha (21%) of the Project Site.

» T11 Corridors (cultivated areas within the corridor)
- ESA 2 (Non-Natural areas within Corridor): Approximately 7.2 ha (2%) of the Project Site.

Direct impact on these ESAs will be unavoidable, however, during the site visit it was found that a much larger extent, than indicated within the CBA map have been modified and/or transformed and subsequently these areas should be downgraded to ESA 2 areas. Based on the findings of the site visit (Figure 8):

» 31% (105.6 ha) of the project site has been seriously to critically modified and should rather be regarded as ESA 2;
» 8% (27.5 ha) of the project site has been completely modified/transformed and cannot be regarded as either ESA1 or ESA2.
» 58% (198.5 ha) of the project site has been moderately modified but is still capable of ecological functions of a natural ESA 1 and should therefore still be regarded as such.
» Only 3% (11.6 ha) of the project site can be regarded as large rely natural thornveld with minimal modifications.

The potential of this area to functions as a biological corridor has been severely impacted through agricultural practices. Due to extensive exotic game farming/breeding within the region, natural movement have been significantly impacted, within this corridor, as most of farms in the area (including the affected property) comprise of small game breeding camps cordoned off with high, impenetrable game fences, which also is regularly electrified. These wildlife breeding activities have resulted in significant fracturing of the landscape. Furthermore, historically, large areas have been subjected to extensive tree and shrub removal, ploughing, and subsequent reseeding with pasture grasses, all aimed at enhancing the grazing potential of the area. Follow-up, ripping and reseeding of localised areas within these pastures, occur at irregular intervals.

Subsequently it can be concluded that the proposed development within the affected area will not significantly impact the integrity, functions and services associated with the natural biodiversity corridors within the area.

4.2.1.2. Biological Corridors Nodes:

A biodiversity corridor node, refers to a specific natural location within a biodiversity corridor that holds particular ecological significance. Biodiversity corridors, are linear strips of habitat that connect two or more larger natural habitat areas. They are designed to facilitate the movement of various species between isolated or fragmented habitats, allowing for gene flow, migration, and access to resources.

A biodiversity corridor node typically has several characteristics:

» High Ecological Value: It is an area within the corridor that exhibits a high level of biodiversity or is particularly important for the survival and reproduction of specific species. This could be due to the presence of critical resources such as food, water, or breeding sites.
» Connectivity Hub: It serves as a key point for connecting different habitat patches. Nodes often link multiple corridors together, enhancing the overall connectivity of the landscape and providing pathways for wildlife movement.
» Restoration and Conservation Focus: Conservation efforts in biodiversity corridor nodes often prioritize habitat restoration and protection. These areas may receive special attention and resources to ensure their ecological integrity.
» Research and Monitoring: Nodes are frequently selected for scientific research and monitoring activities to assess the effectiveness of the corridor in facilitating species movement and conserving biodiversity.
» Conflict Resolution: In some cases, nodes may also be sites where human-wildlife conflicts are addressed and mitigated to ensure the coexistence of wildlife and local communities.

The identification and protection of biodiversity corridor nodes are crucial for the success of corridor conservation initiatives. By focusing on these key locations, conservationists can maximize the benefits of corridors in maintaining genetic diversity, supporting wildlife populations, and ultimately preserving ecosystems in fragmented landscapes.

This biodiversity corridor node is a natural area where several important regional corridors converge, ensuring connectivity, particularly between significant river systems and their adjacent terrestrial areas. These river systems include the Elands River, Sand River, Selons River, Koedoespruit River, and Dwarsspruit River. Furthermore, this node serves as a crucial linkage between the Pilanesberg Nature Reserve to the north and the Magaliesberg Biosphere Reserve to the south, facilitating connectivity between these two reserves.

» T9 Corridor Node

    - CBA 2 (Natural areas within node): Approximately 4.6 ha (1%) of the Project Site (Figure 12).

A very small portion (0.08 ha) of the project site (along the eastern boundary of the project site) falls within this CBA2 Corridor. In terms of this small area being classified as a CBA 2, this is rather due to an error that occurred during the processing of the spatial data used to generate the CBA map. This CBA 2 area is rather associated with the adjacent property to the east but has slightly extended to areas outside of this property and into the effected property. As mentioned above (ESA Corridors), the "naturalness" and connectivity of the affected property, as well as surrounding properties, have been severely impacted through current and historical land use activities, and current land use activities have resulted in the fragmentation of the landscape, with natural areas being isolated from each other.

A very small portion of the proposed grid connection corridor (4.52 ha) will traverse this biodiversity corridor node. Taking into account the small extent of this component of the proposed development and the typical nature of such a linear development, as well as the extent of remaining natural and intact biodiversity surrounding the proposed development footprint, the construction and operation of the grid connection infrastructure should not affect the functions and services associated with this biodiversity corridor node (CBA 2), as well as the conservation targets set out for this area.

Impacts on this Biodiversity Corridor node can furthermore, be significantly reduced with the meticulous and careful implementation of relevant mitigation measures including:

- Minimizing the development footprint as far as possible and rehabilitating disturbed areas that are no longer required by the operational phase of the development.
- Limited vegetation removal around the pylons, as well as the removal of trees underneath the power line (trim only and/or avoid large tree specimens where possible).
- Using existing roads, farm tracks, watercourse crossings and fire breaks as far as possible for access with new access roads being small twin tracks, and only deviating from the existing roads to the pylon locations (shortest distance).
- Apart from using existing watercourse crossings, no other infrastructure may take place within the freshwater resource features as well as their buffer areas (as delineated and recommended within the separate Freshwater Resource Assessment)
- The implementation of best management practices (BMPs) for erosion/sediment control and abatement of pollutant loading will minimizing secondary impacts to adjoining communities and habitats.
- Best management practices and invasive species control measures should be implemented to control and prevent the colonization and spread of terrestrial invasive plants within the project site as well as the surrounding natural habitats.

Text Box 1

What is Ecological Connectivity and why is it important?

The loss of natural habitats leads to fragmented landscapes with isolated habitat "islands." When these islands lose functionality, essential ecological processes are disrupted, and migration becomes impossible. To conserve biodiversity and ecosystem services, we need an ecological continuum to mitigate land use and climate change. Scaling up ecosystem restoration is vital for climate action, food security, water supply, and biodiversity (CMS, 2020).

Ecological Connectivity and Ecosystem Restoration are interdependent. Maintaining or restoring connectivity is crucial for healthy ecosystems, and habitat restoration enhances landscape connectivity. It's essential for ecological functionality, species survival, genetic diversity, and climate adaptation across all biomes and scales (CMS, 2020).

Connectivity conservation responds to habitat destruction and fragmentation. It safeguards habitats, biodiversity, and ecosystem functions, including migration, hydrology, nutrient cycling, and climate resilience (IUCN, 2020).

Migratory species depend on well-connected natural areas for feeding, reproduction, and survival. They connect habitats across countries, facing anthropogenic threats. Maintaining connectivity is vital for their survival (CMS, 2020).

Connectivity is critical for biodiversity's long-term persistence in the face of climate change. Large corridors, like river systems and ridges, act as highways for migration. Sustainability aims to interlink ecological processes, offering the best design for species migrations. Landscape corridors protect river sources, endangered species, and ecosystem services (READ, 2015).

Connectivity is key for planning protected areas and conservation networks to support functional needs (CMS, 2020).

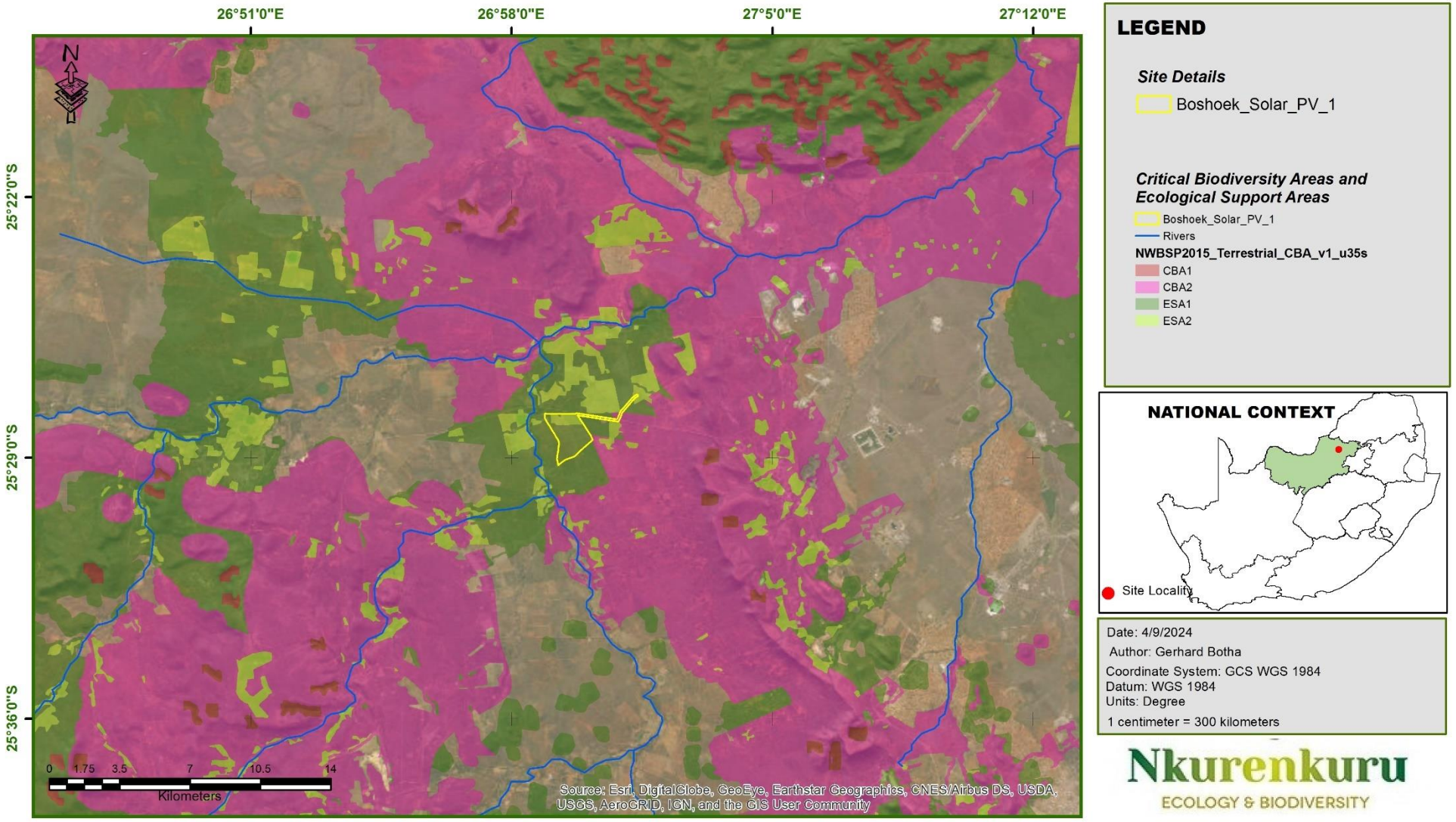

Figure 11: Terrestrial Critical biodiversity areas (CBA) found within the greater surroundings of the Boshoek Solar 1 project site.

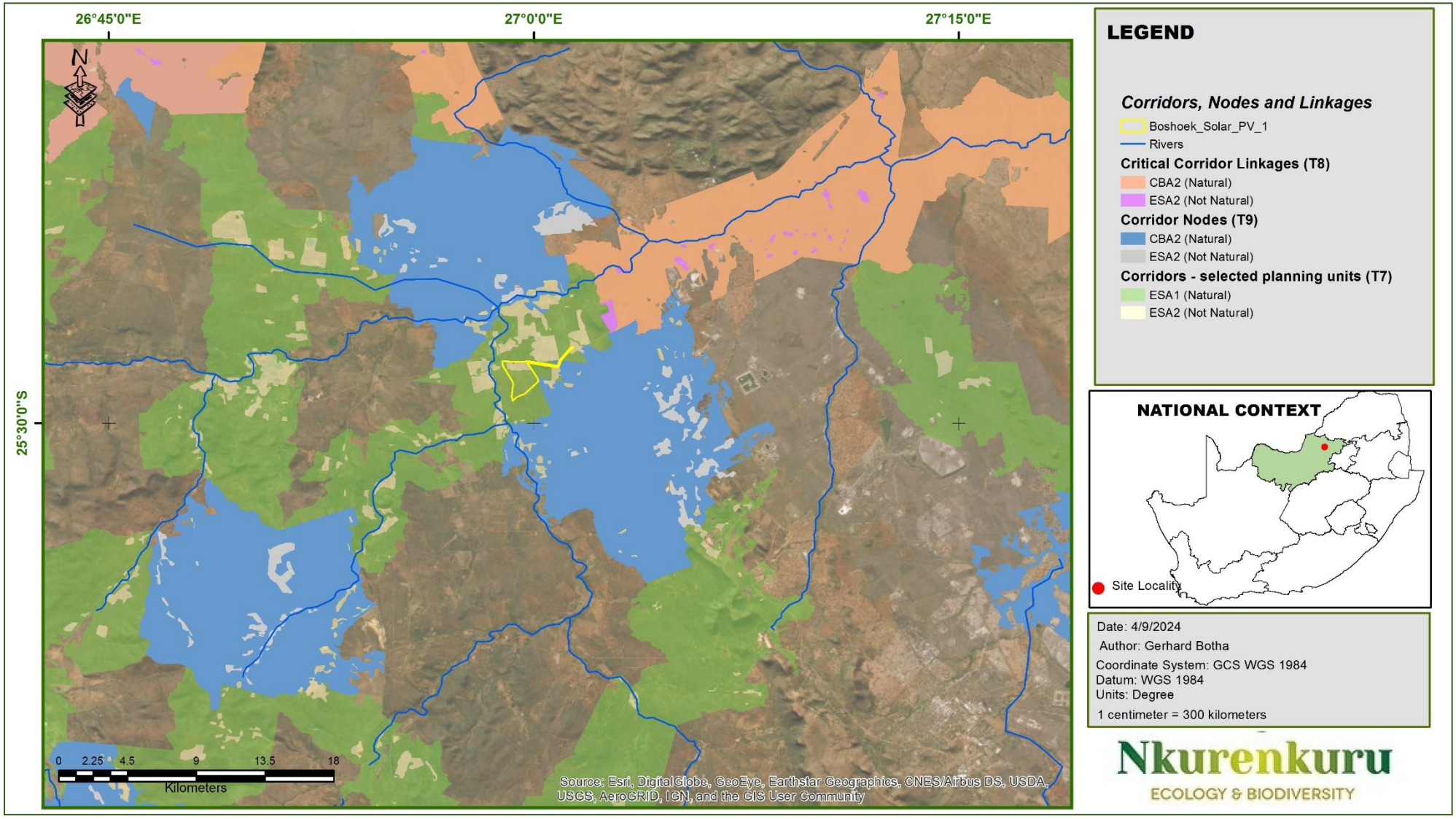

Figure 12: Biodiversity corridors, critical corridor linkages and nodes found within the greater surroundings of the project site.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT – BASELINE

5.1. Broad-Scale Vegetation Patterns

This section deals with vegetation types as described in the National Vegetation Map of Southern Africa, which will be used interchangeably with the term "VegMap" (Dayaram et al., 2018; Mucina and Rutherford, 2006 and 2018).

Note that the latest VegMap was used, namely 2018. Although vegetation descriptions are as per VegMap 2006, these units were cross-validated with VegMap 2018 to ensure their extents remained the same.

The entire study area is mapped as Gold Reef Mountain Bushveld (SVcb9) and Zeerust Thornveld (SVcb3). The only other vegetation type occurring near the proposed development site is Pilanesberg Mountain Bushveld (SVcb5). Since the latter vegetation type is unique, remnants of it will not occur within or near the proposed development site, and as such it is not described here. Only the first two vegetation types are described (Figure 13 and Figure 14). Refer to Table 11 below, for a summary of total area covered by the mapped units as per VegMap).

Table 11: Total area sizes (approximately) for vegetation types occurring within, or near, the study area, as mapped by the National Vegetation Map 2018.

Vegetation Type	Total Area (km^2)	Total Area (ha)	Threat Status
Zeerust Thornveld (SVcb3)	4 136.5	413 653	Least Concerned
Gold Reef Mountain Bushveld (SVcb9)	2 034.7	203 481.4	Least Concerned

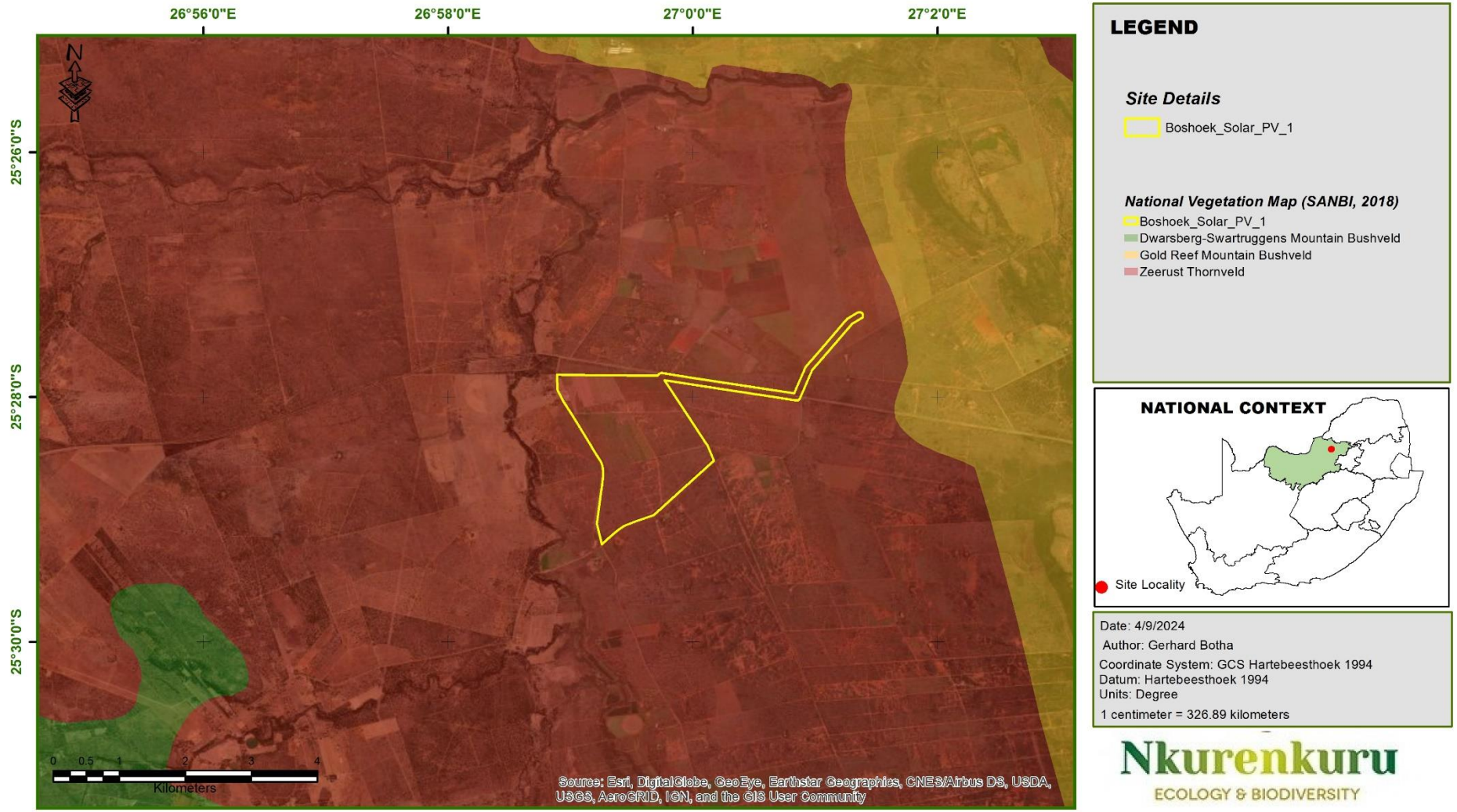

Figure 13: Map illustrating the different vegetation types, according to VegMap 2018, for the study area, as well as the general region.

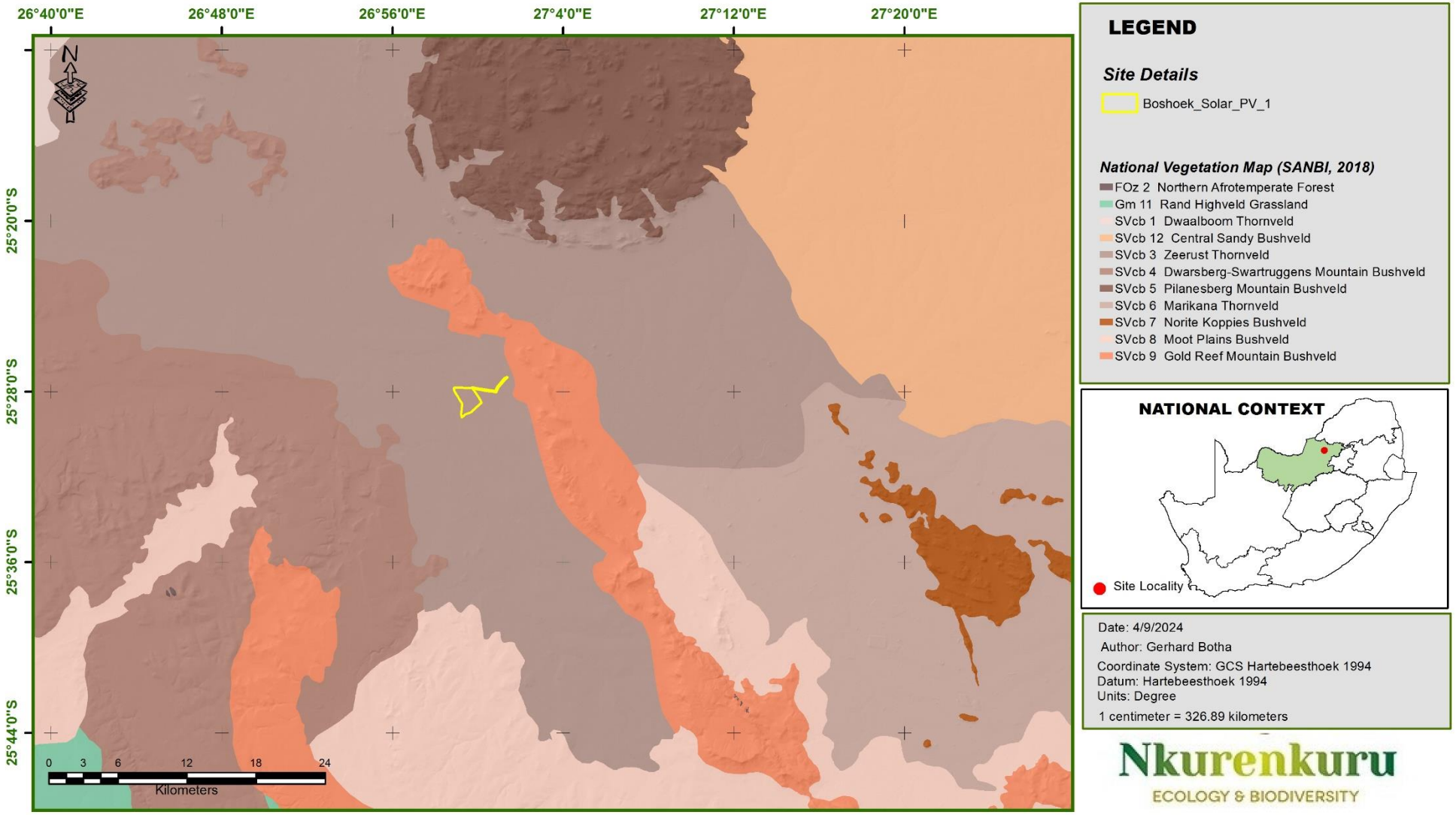

Figure 14: Map illustrating the different vegetation types, according to VegMap 2018, for the study area, as well as the general region. This map is zoomed out to show the larger extents of each of the vegetation types.

5.1.1. Zeerust Thornveld (SVcb 3)

This vegetation type is distributed in the North West Province and extends along the plains from the Lobatsi River in the west via Zeerust, Groot Marico, and Mabaalstad to the flats between the Pilanesberg and western end of the Magaliesberg in the east (including the valley of the lower Selons River).

It is characterized by deciduous, open to dense short thorny woodland, dominated by *Senegalia* and *Vachellia* (synonym *Acacia*) species, with a herbaceous layer of mainly grasses on deep, high base-status and some clay soils on plains and lowlands. It also occurs between rocky ridges of SVcb 4 Dwarsberg Swartruggens Mountain Bushveld. It is also characterized by sediments of the Pretoria Group (Transvaal Supergroup), particularly the Silverton and Rayton Formations, are mostly shale with less quartzite and conglomerate. Carbonates, volcanic rocks, breccias, and diamictites also occur in the Pretoria Group. Bronzite, harzburgite, gabbro, and norite of the Rustenburg Layered Suite (Bushveld Igneous Complex) are also encountered.

Conservation: LC according to RLE. Target: 19% according to NBA 2018. Less than 4% is statutorily conserved, and is spread between four reserves, including the Pienaar and Marico Bushveld Nature Reserves. Some 16% is transformed mainly by cultivation, with some constructed area in between. A few areas have scattered plants of the alien *Cereus jamacaru*, and several other alien species occur very scattered elsewhere. Erosion is mainly very low to low.

Table 12: Key species associated with Zeerust Thornveld (SVcb 3).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Tall Trees	*Senegalia burkei (d), Vachellia erioloba (d)*
Small Trees	*Senegalia mellifera subsp. detinens (d), Vachellia nilotica (d), V. tortilis subsp. heteracantha (d), Searsia lancea (d), Vachellia fleckii, Peltophorum africanum, Terminalia sericea*
Tall Shrubs	*Diospyros lycioides subsp. lycioides, Grewia flava, Mystroxylon aethiopicum subsp. burkeanum*
Low Shrubs	*Agathisanthemum bojeri, Chaetacanthus costatus, Clerodendrum ternatum, Indigofera filipes, Searsia grandidens, Sida Chrysantha, Stylosanthes fruticosa*
Graminoids	*Eragrostis lehmanniana (d), Panicum maximum (d), Aristida congesta, Cymbopogon pospischilii*
Herbs	*Blepharis integrifolia, Chamaecrista absus, C. mimosoides, Cleome maculata, Dicoma anomala, Kyphocarpa angustifolia, Limeum viscosum, Lophiocarpus tenuissimus*
ENDEMIC SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Low Shrub	*Searsia maricoana*

5.1.2. Gold Reef Mountain Bushveld (SVcb 9)

This vegetation type is distributed in the North West, Gauteng, Free State, and Mpumalanga Provinces, and mainly occurs along rocky quartzite ridges of the Magaliesberg and the parallel ridge to the south, from around Boshoek and Koster in the west to near Bronkhorstspruit in the east. It includes the west-east-trending ridge of the Witwatersrand from around Krugersdorp in the west, through Roodepoort and Johannesburg to Bedfordview, as well as inner ridges (e.g. Dwarsberg and Witkop) of the Vredefort Dome on the Vaal River northwest of Parys, and part of the Suikerbosrand and some other hills around Heidelberg.

The unit has an altitudinal range of 1 200 – 1 750 m, and is characterized by rocky hills and ridges, often west-east trending, with more dense woody vegetation often occurring on the south facing slopes associated with distinct floristic differences, for example a preponderance of *Senegalia caffra* on southern slopes. Tree cover can be variable, and the tree and shrub layers are often continuous, whereas the herbaceous layer is dominated by grasses. The geology consists predominantly of quartzites, conglomerates, and some shale horizons of the Magaliesberg, Daspoort, and Silverton Formations (Vaalian Pretoria Group), and the Hospital Hill, Turffontein, and Government Subgroups (Randian Witwatersrand Supergroup). Soils are shallow, gravel lithosols of the Mispah and Glenrosa forms Land types mainly Ib and Fb.

Conservation: LC according to RLE. Target: 24% according to NBA 2018. About 22% of this unit is statutorily conserved, mainly in the Magaliesberg Nature Area, and smaller proportions in the Rustenberg, Wonderboom, and Suikerbosrand Nature Reserves. At least an additional 1% is conserved in other reserves. The total conserved area is therefore close to the target. About 15% is transformed mainly by cultivation and constructed areas. Some areas have dense stands of alien *Melia azedarach*, but which is often associated with drainage lines or alluvia (i.e., azonal vegetation) embedded within this unit. Erosion is very low to low. A few small ridges of this unit in the Pretoria area have not yet been mapped.

Table 13: Key species associated with Gold Reef Mountain Bushveld (SVcb 9).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Small Trees	*Senegalia caffra (d), Combretum mole (d), Protea caffra (d), Celtis africana, Dombeya rotundifolia, Englerophytum magalismontanum, Ochna pretoriensis, Searsia leptodictya, Vangueria infausta, V. parvifolia, Ziziphus mucronata*
Tall Shrubs	*Canthium gilfillanii, Ehretia rigida subsp. rigida, Grewia occidentalis, Gymnosporia buxifolia, Mystroxylon aethiopicum subsp. burkeanum*
Low Shrubs	*Athrixia elata, Pearsonia cajanifolia, Searsia magalismontana subsp. magalismontana, S. rigida var. rigida*
Woody Climber	*Ancylobothrys capensis*

Graminoids	*Loudetia simplex (d), Panicum natalense(d), Schizachyrium sanguineum (d), Trachypogon spicatus (d), Alloteropsis semialata subsp. eckloniana, Bewsia biflora, Digitaria tricholaenoides, Diheteropogon amplectens, Sporobolus pectinatus, Tristachya biseriata, T. leucothrix*
Herbs	*Helichrysum nudifolium, H. rugulosum, Pentanisia angustifolia, Senecio venosus, Xerophyta retinervis*
Geophytic Herbs	*Cheilanthes hirta, Hypoxis hemerocallidea, Pellaea calomelanos*
ENDEMIC SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Succulent Shrub	*Aloe peglerae*
Succulent Herb	*Frithia pulchra*

5.2. Botanical (Plant) Screening Assessment

5.2.1. POSA Plant Species Observations

A list was obtained from the SANBI database (POSA — Plants of southern Africa; http://posa.sanbi.org/) containing all plant species that have been recorded to date from the surroundings of the study area (see section 2.3 for the extent of the area used for gathering records). POSA generated species lists also contain updated Red List information according to the Red List of South African Plants (Raimondo et al., 2009; updated online version: http://redlist.sanbi.org/). Species listed as protected were also identified in the list. Therefore, only SoCC that may potentially occur in the study area, and the broader surrounds, have been listed within the baseline study section of this report. The field survey(s) aimed to validate which of these species occur within the study area, and whether any additional species that may not yet have been recorded in official databases, are present.

From the POSA and iNaturalist databases, a combined total of 1955 plant species have been recorded within the broader area. The top three representative families were Poaceae (230 spp.), Asteraceae (193 spp.), and Fabaceae (186 spp.). This list included a total of 35 SCC, (1 CR, 5 EN, 5 VU, 13 NT, 1 Critically Rare, 3 Rare, and 7 DDT) species.

Finally, A total of 221 alien plant species have been recorded within the extracted area, with 84 of them being listed invasive species within the NEM:BA A&IS Regulations, namely:

- *Acacia baileyana* (Bailey's wattle; Category 3)
- *Acacia cyclops* (Red eye; Category 1b)
- *Acacia dealbata* (Silver wattle; Category 2)
- *Acacia decurrens* (Green wattle; Category 2)
- *Acacia elata* (Pepper tree wattle; Category 1b)
- *Acacia longifolia* (Long-leaved wattle; Category 1b)
- *Agave sisalana* (Sisal hemp, Sisal; Category 2)
- *Ageratina adenophora* (Crofton weed; Category 1b)
- *Ageratum houstonianum* (Mexican ageratum; Category Multi)

- *Agrimonia procera* (Scented agrimony; Category 1b)
- *Alisma plantago-aquatica* (Mud plantain, Water alisma; Category 1b)
- *Anredera cordifolia* (Madeira vine, Bridal wreath; Category 1b)
- *Araujia sericifera* (Moth catcher; Category 1b)
- *Arundo donax* (Giant reed, Spanish reed; Category 1b)
- *Azolla filiculoides* (Azolla, Red water fern; Category 1b)
- *Campuloclinium macrocephalum* (Pompom weed; Category 1b)
- *Canna indica* (Indian shot; Category 1b)
- *Casuarina cunninghamiana* (Beefwood; Category Multi)
- *Catharanthus roseus* (Madagascar periwinkle; Category Multi)
- *Cereus jamacaru* (Queen of the night; Category 1b)
- *Cestrum aurantiacum* (Orange cestrum; Category 1b)
- *Cirsium vulgare* (Spear thistle, Scotch thistle; Category 1b)
- *Coreopsis lanceolata* (Tickseed; Category 1b)
- *Cortaderia selloana* (Pampas grass; Category 1b)
- *Cotoneaster pannosus* (Silver leaf cotoneaster; Category 1b)
- *Cuscuta campestris* (Common dodder; Category 1b)
- *Datura ferox* (Large thorn apple; Category 1b)
- *Datura stramonium* (Common thorn apple; Category 1b)
- *Duchesnea indica* (Wild strawberry; Category 1b)
- *Duranta erecta* (Forget-me-not-tree, Pigeon berry; Category Multi)
- *Eichhornia crassipes* (Water hyacinth; Category 1b)
- *Eucalyptus camaldulensis* (River red gum; Category Multi)
- *Eucalyptus grandis* (Saligna gum, Rose gum; Category Multi)
- *Flaveria bidentis* (Smelter's-bush; Category 1b)
- *Gleditsia triacanthos* (Honey locust; Category 1b)
- *Ipomoea indica* (Blue morning glory; Category 1b)
- *Ipomoea purpurea* (Purple morning glory; Category 1b)
- *Jacaranda mimosifolia* (Jacaranda; Category Multi)
- *Jatropha curcas* (Physic nut; Category 2)
- *Leptospermum laevigatum* (Australian myrtle; Category 1b)
- *Ligustrum japonicum* (Japanese wax-leaved privet; Category Multi)
- *Ligustrum sinense* (Chinese privet; Category Multi)
- *Malvastrum coromandelianum* (Prickly malvastrum; Category 1b)
- *Melia azedarach* (Syringa; Category Multi)
- *Mirabilis jalapa* (Four-o'clock, Marvel-of -Peru; Category 1b)
- *Myriophyllum aquaticum* (Parrot's feather; Category 1b)
- *Nasturtium officinale* (Watercress; Category 2)
- *Nerium oleander* (Oleander; Category 1b)
- *Nicandra physalodes* (Apple-of-Peru; Category 1b)
- *Nicotiana glauca* (Wild tobacco; Category 1b)
- *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi)
- *Opuntia robusta* (Blue-leaf cactus; Category Multi)
- *Opuntia salmiana* (Bur cactus; Category 1a)
- *Parthenium hysterophorus* (Famine weed; Category 1b)
- *Passiflora edulis* (Purple granadilla, Passion fruit; Category Multi)
- *Pennisetum setaceum* (Fountain grass; Category Multi)
- *Persicaria capitata* (Knotweed; Category 1b)
- *Phytolacca dioica* (Belhambra; Category 3)
- *Phytolacca octandra* (Forest inkberry; Category 1b)
- *Psidium guajava* (Guava; Category Multi)
- *Pyracantha angustifolia* (Yellow firethorn; Category 1b)
- *Pyracantha crenulata* (Himalayan firethorn; Category 1b)
- *Robinia pseudoacacia* (Black locust; Category 1b)
- *Rosa rubiginosa* (Eglantine, Sweetbriar; Category 1b)
- *Rubus cuneifolius* (American bramble; Category 1b)

- *Salsola kali* (Tumbleweed; Category 1b)
- *Salvia tiliifolia* (Lindenleaf sage; Category 1b)
- *Salvinia molesta* (Kariba weed, Salvinia; Category 1b)
- *Senna occidentalis* (Stinking weed, Wild coffee; Category 1b)
- *Senna septemtrionalis* (Arsenic bush, Smooth senna; Category 1b)
- *Sesbania punicea* (Red sesbania; Category 1b)
- *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)
- *Solanum pseudocapsicum* (Jerusalem cherry; Category 1b)
- *Solanum sisymbriifolium* (Wild tomato, Dense- thorned bitter apple; Category 1b)
- *Sorghum halepense* (Johnson grass, Aleppo grass; Category 2)
- *Tamarix ramosissima* (Pink tamarisk; Category 1b)
- *Tithonia diversifolia* (Mexican sunflower; Category 1b)
- *Tithonia rotundifolia* (Red sunflower; Category 1b)
- *Verbena bonariensis* (Wild verbena, Tall verbena, Purple top; Category 1b)
- *Verbena brasiliensis* (Brazilian verbena; Category 1b)
- *Vinca major* (Greater periwinkle; Category 1b)
- *Xanthium spinosum* (Spiny cocklebur; Category 1b)
- *Xanthium strumarium* (Large cocklebur; Category 1b)

5.2.2. Plant Species of Conservation Concern (SCC)

Furthermore, the POSA list included a total of three SoCC, namely two Data Deficient Species (*Acalypha caperonioides var. caperonioides* and *Myrothamnus flabellifolius*) and one Endangered Species (*Sensitive Species 1147*). The initial screening report also revealed the potential presence (Medium Sensitive) of this *Sensitive Species 1147* (for their protection, the identities of these species will not made public).

- » *Aloe peglerae* (CR)
- » *Ceropegia insignis* (EN; Protected [Provincial Schedule 2])
- » *Encephalartos eugene-maraisii* (EN)
- » *Habenaria mossii* (EN)
- » *Leucospermum saxosum* (EN)
- » *Nanobubon hypogaeum* (EN)
- » *Anacampseros decapitata* (VU; Protected [Provincial Schedule 2])
- » *Cullen holubii* (VU)
- » *Indigofera hybrida* (VU)
- » *Melolobium subspicatum* (VU)
- » *Prunus africana* (VU; Nationally Protected Tree)
- » *Adromischus umbraticola subsp. umbraticola* (NT)
- » *Cineraria austrotransvaalensis* (NT; Protected [Provincial Schedule 2])
- » *Cleome conrathii* (NT; Protected [Provincial Schedule 2])
- » *Delosperma leendertziae* (NT; Protected [Provincial Schedule 2])
- » *Drimia sanguinea* (NT; Protected [Provincial Schedule 2])
- » *Elaeodendron transvaalense* (NT)
- » *Habenaria barbertoni* (NT)
- » *Habenaria kraenzliniana* (NT)
- » *Holothrix randii* (NT)
- » *Kniphofia typhoides* (NT; Protected [Provincial Schedule 2])
- » *Pearsonia bracteata* (NT)
- » *Protea compacta* (NT)
- » *Stenostelma umbelluliferum* (NT; Protected [Provincial Schedule 2])
- » *Crassula cymbiformis* (Critically Rare)
- » *Frithia pulchra* (Rare; Protected [Provincial Schedule 2])
- » *Plectranthus oertendahlii* (Rare)
- » *Tylophora coddii* (Rare)
- » *Acalypha caperonioides var. caperonioides* (DDT)

- » *Commelina bella* (DDT; Protected [Provincial Schedule 2])
- » *Drimia elata* (DDT)
- » *Euphorbia perangusta* (DDT; Protected [Provincial Schedule 2])
- » *Indigofera leendertziae* (DDT)
- » *Myrothamnus flabellifolius* (DDT)
- » *Tragia physocarpa* (DDT)

A total of 12 of these SCC are protected. Apart from these, a further 34 species are also protected (thus yielding a total of 46 protected plant species). The protected species, excluding those already listed under SoCC, were:

- *Barringtonia racemosa* (LC; Nationally Protected Tree)
- *Berchemia zeyheri* (LC; Nationally Protected Tree)
- *Blepharis angusta* (LC; Protected [Provincial Schedule 2])
- *Boscia albitrunca* (LC; Nationally Protected Tree)
- *Brachystelma barberae* (LC; Protected [Provincial Schedule 2])
- *Brachystelma circinatum* (LC; Protected [Provincial Schedule 2])
- *Brachystelma foetidum* (LC; Protected [Provincial Schedule 2])
- *Brachystelma gracile* (LC; Protected [Provincial Schedule 2])
- *Brachystelma oianthum* (LC; Protected [Provincial Schedule 2])
- *Combretum imberbe* (LC; Nationally Protected Tree)
- *Erythrophysa transvaalensis* (LC; Nationally Protected Tree)
- *Euphorbia cooperi* (LC; Protected [Provincial Schedule 2])
- *Euphorbia davyi* (LC; Protected [Provincial Schedule 2])
- *Euphorbia excelsa* (LC; Protected [Provincial Schedule 2])
- *Euphorbia heterophylla* (Not Evaluated; Protected [Provincial Schedule 2])
- *Euphorbia hirta* (Not Evaluated; Protected [Provincial Schedule 2])
- *Euphorbia inaequilatera* (LC; Protected [Provincial Schedule 2])
- *Euphorbia indica* (Not Evaluated; Protected [Provincial Schedule 2])
- *Euphorbia natalensis* (LC; Protected [Provincial Schedule 2])
- *Euphorbia neopolycnemoides* (LC; Protected [Provincial Schedule 2])
- *Euphorbia prostrata* (Not Evaluated; Protected [Provincial Schedule 2])
- *Euphorbia pseudotuberosa* (LC; Protected [Provincial Schedule 2])
- *Euphorbia pubescens* (Not Evaluated; Protected [Provincial Schedule 2])
- *Euphorbia pulcherrima* (Not Evaluated; Protected [Provincial Schedule 2])
- *Euphorbia schinzii* (LC; Protected [Provincial Schedule 2])
- *Euphorbia spartaria* (LC; Protected [Provincial Schedule 2])
- *Euphorbia striata* (LC; Protected [Provincial Schedule 2])
- *Euphorbia tirucalli* (LC; Protected [Provincial Schedule 2])
- *Ledebouria atrobrunnea* (LC; Protected [Provincial Schedule 2])
- *Ledebouria confusa* (LC; Protected [Provincial Schedule 2])
- *Nuxia glomerulata* (LC; Protected [Provincial Schedule 2])
- *Pittosporum viridiflorum* (LC; Nationally Protected Tree)
- *Sclerocarya birrea subsp. caffra* (LC; Nationally Protected Tree)
- *Spirostachys africana* (LC; Protected [Provincial Schedule 2])

Finally, the DFFE Environmental Screening Report also revealed the potential presence (Medium Sensitive) of *Cullen holubii* (Vulnerable and range restricted).

C. holubii, is a range restricted, South African endemic species, known form only eight locations (still extant at only five of these locations). This species preferers savanna/bushveld habitats on sandy plains (major habitats include Zeerust Thornveld and Springbokvlakte Thornveld).

Approximately 60% of this species preferred habitat has been transformed, mainly due to agricultural activities, but also likely due to ongoing habitat loss due to expanding rural settlements, overgrazing and alien invasive encroachment (Mucina & Rutherford, 2006). Subsequently, the populations size is in decline (due to habitat loss and degradation) and warrants its status as a Vulnerable species.

This species was not confirmed during the site visits. Furthermore, the area within the project site that is deemed as medium sensitive for this species, has undergone significant modifications and are not deemed suitable habitat for *C. holubii*. However, small patches of natural, suitable habitat are interspersed between the transformed/modified areas and are regarded as more suitable habitat. Subsequently there is a Moderate Likelihood of Occurrence (LoOC) within these natural sandy-loam areas.

5.3. Faunal Screening Assessment

The IUCN Red List Spatial Data lists a total of 260 invertebrate species that could be expected to occur within the project site, with 28 amphibian- (represented across 10 families), 133 mammal- (represented across 14 families) and 99 reptile species (represented across 24 families) (Table 14). Of these 259 animal species, 24 have been listed as SoCC within the IUCN Red List (1 Critically Endangered-, 2 Endangered-, 9 Near Threatened- and 11 Vulnerable species). According to the Regional Red List (SANBI, 2018), a total of 27 SoCC may occur within the region (1 Critically Endangered-, 1 Data Deficient-, 4 Endangered-, 8 Near Threatened- and 13 Vulnerable species) (Table 14 and Figure 15).

Table 14: Potential faunal (invertebrate) diversity within the region, as well as the amount of species of conservation concern (SoCC) that may occur within the region (Abbreviations: CE = Critically Endangered; EN = Endangered; LC = Least Concern; NT = Near Threatened; VU = Vulnerable and DD = Data Deficient).

Class	Families	Species	IUCN Red List					Regional Red List (SANBI, 2017)					
			CE	EN	LC	NT	VU	CR	DD	EN	LC	NT	VU
AMPHIBIA	10	28			28						28		
MAMMALIA	14	133	1	2	111	9	10	1		4	109	8	11
REPTILIA	24	99			98		1		1		96		2
Grand Total	**48**	**260**	**1**	**2**	**237**	**9**	**11**	**1**	**1**	**4**	**233**	**8**	**13**

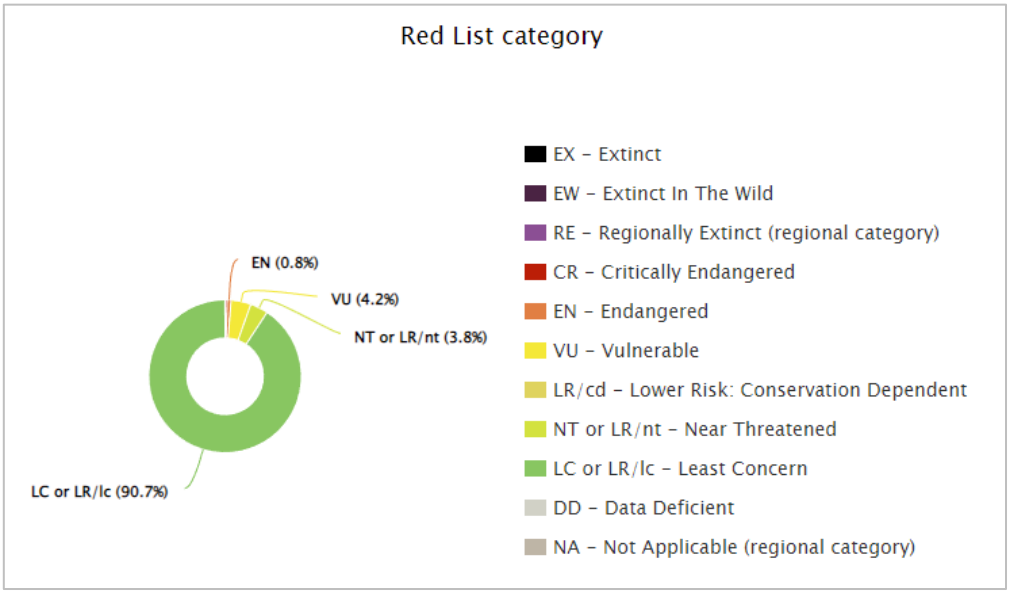

Figure 15: Pie chart showing the various red list categories, and the distribution of the species, found within the region (according to the IUCN Red List database), within these various categories.

Furthermore, in terms of the presence/distribution of various faunal species across the various ecosystems and habitats (according the IUCN Red List data base), within the region, the bulk of the faunal species are associated with terrestrial ecosystems (>74% or 236 species) (Figure 16), especially Dry Savanna (206 species), Subtropical Shrubland (136 species), and Subtropical/Tropical Dry Grassland (122 species) habitats (Figure 17). Faunal diversity within freshwater, aquatic and wetland systems were fairly low (>22% or 72 species), and where associated with Moist Savanna and Seasonal/Intermittent Rivers/Streams. Approximately, 53 faunal species were able to inhabit/utilize Artificial Terrestrial Habitats (arable land and rural gardens) (Figure 16 and Figure 17).

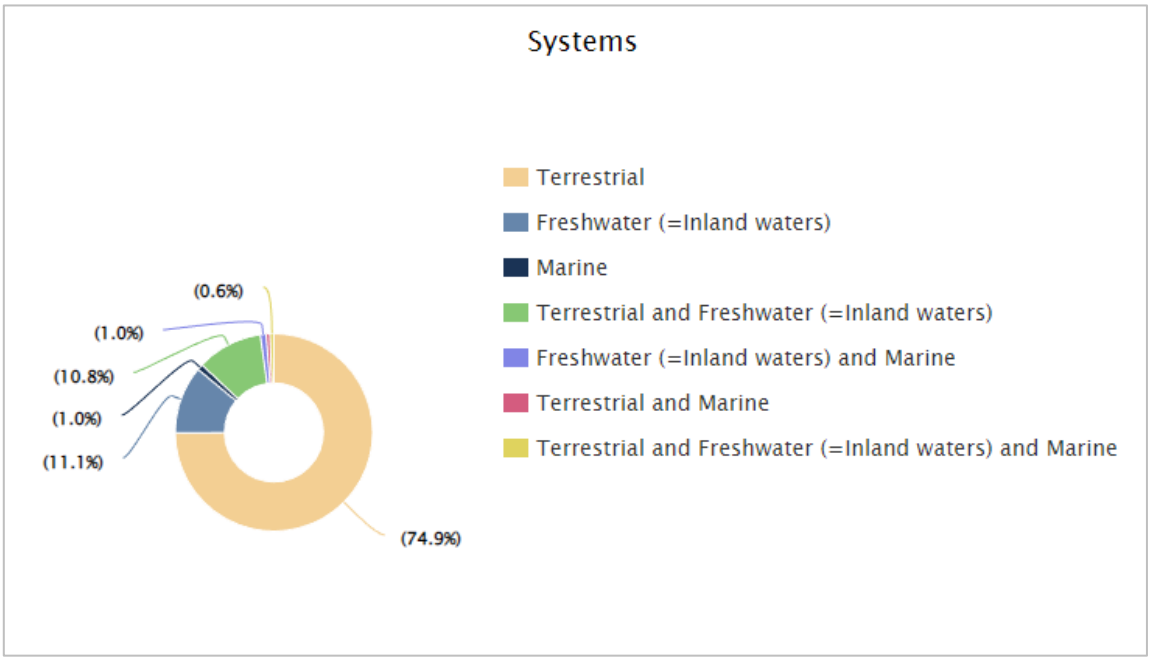

Figure 16: Pie chart showing the faunal diversity within the various ecosystems found within the region (according to the IUCN Red List database).

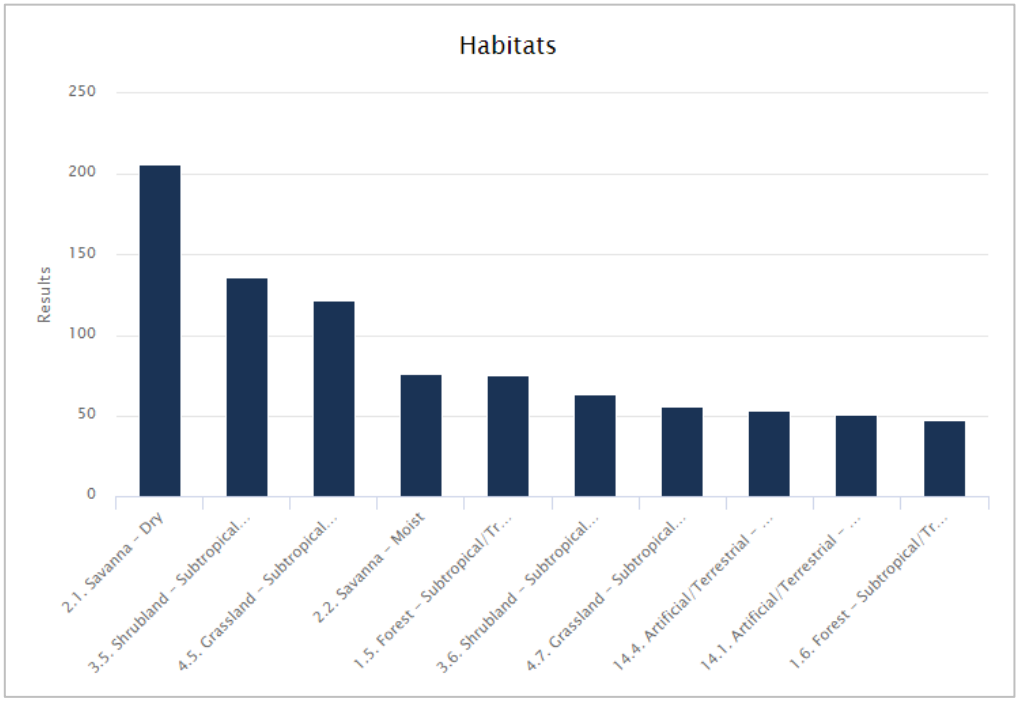

Figure 17: Bar chart showing the faunal diversity within the various habitats found within the region (according to the IUCN Red List database). 2.1 = Savanna (Dry); 3.5 = Shrubland (Subtropical/Tropical Dry); 4.5 = Grassland (Subtropical/Tropical Dry); 2.2 = Savanna (Moist); 1.5 = Forest (Subtropical/Tropical Dry); 3.6 = Shrubland (Subtropical/Tropical Moist); 4.7 = Grassland (Subtropical/Tropical High Altitude); 14.4 = Artificial/Terrestrial (Rural Gardens); 14.1 = Artificial/Terrestrial (Arable Land); and 1.6 = Forest (Subtropical/Tropical Moist Lowland).

According to the IUCN Red List data base (Figure 18) the most significant threats to faunal diversity within the region include:

- Intentional Use (hunting, trapping and persecution) with approximately 80 species threatened through direct/intentional use;
- Residential and commercial development; and
- Livestock farming and ranching (small holder grazing, farming or ranching);
- Agro-industrial farming (annual and perennial non-timber crops); and
- Small-holder farming (annual and perennial non-timber crops)

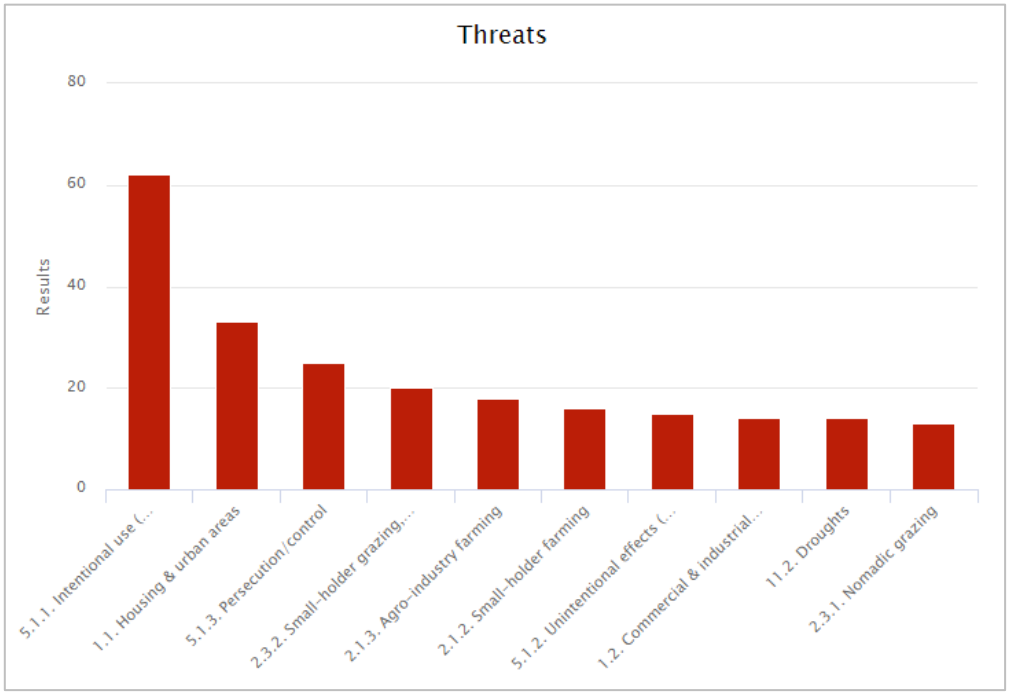

Figure 18: Bar chart showing the various threats to faunal diversity within the region (according to the IUCN Red List database). 5.1.1 = Intentional Use (Hunting and Trapping); 1.1 = Residential and Commercial Development (Housing and Urban areas); 5.1.3 = Persecution/Control; 2.3.2 = Livestock Farming and Ranching (Small-holder grazing/farming/ranching); 2.1.3 = Agro-Industrial Farming (Annual and perennial non-timber crops); 2.1.2 = Small-holder farming (Annual and perennial non-timber crops); 5.1.2 = Unintentional effects (hunting and trapping – species are not the target); 1.2 = Commercial and Industrial Development; 11.2 = Climate Change and Severe Weather (Droughts); and 2.3.1 = Livestock Farming and Ranching (Nomadic grazing).

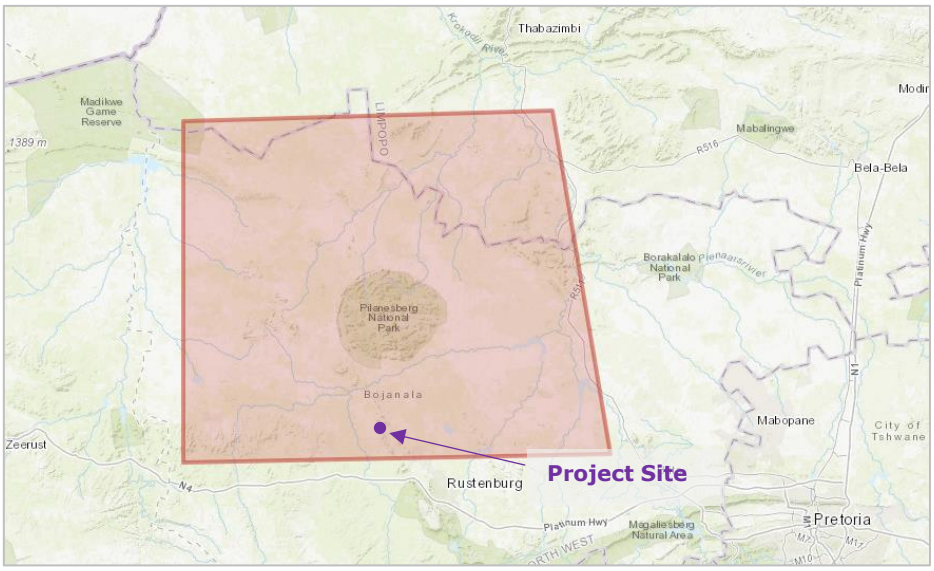

Figure 19: The area used to extract faunal data from the IUCN Red List data base. Extracted data was used to compile a list of faunal species that may potentially occur within the study area, as well as the surrounding area, and provide an indication of potential Species of Conservation Concern that may be found within this area.

5.3.1. Mammal Diversity and Habitats

The IUCN Red List Spatial Data lists 133 mammal species that could be expected to occur within the vicinity of the project site. This is regarded as a moderate mammal species diversity.

Of these species, 22 are medium to large conservation dependant species, or species that had a historical range that included the project area, but with natural populations since becoming locally "extinct" in these areas. These species are now generally restricted to protected areas such as game reserves and protected areas, with most of these species being re-introduced in these areas (e.g. Pilanesberg Nature Reserve). Most of the larger antelope species have been re-introduced within game ranches, especially scarce specimens, and those with exotic variations. These species are extensively bred within small game camps and movement are very strictly controlled, as such these antelope species should rather be seen as part of the agricultural environment rather than natural occurring populations.

Table 15, below provides a list of these species, which can be excluded from the list of natural occurring mammal species/populations, that potentially may inhabit or move naturally across the project site or surrounding areas.

Table 15: List of mammal species that do not occur "naturally" within the area but are rather species that are dependent on human intervention, and the creation of specific conservation/"agricultural" areas within which these mammal species can persist (IUCN, 2017; SANBI, 2016). Abbreviations: NT = Near Threatened; VU = Vulnerable; LC = Least Concern; EN = Endangered; CE = Critically Endangered and DD = Data Deficient.

Species	Common Name	Red Data Categories	
		Regional Red List	IUCN Red List
Damaliscus lunatus lunatus	Tsessebe	VU	LC
Giraffa camelopardalis giraffa	South African Giraffe	LC	VU
Hippopotamus amphibius	Hippopotamus	LC	VU
Hippotragus equinus	Roan Antelope	EN	LC
Hippotragus niger	Sable Antelope	VU	LC
Kobus ellipsiprymnus ellipsiprymnus	Common Waterbuck	LC	LC
Oryx gazella	Gemsbok	LC	LC
Redunca arundinum	Southern Reedbuck	LC	LC
Tragelaphus oryx	Eland	LC	LC
Crocuta crocuta	Spotted Hyaena	LC	LC
Panthera leo	Lion	LC	VU
Aepyceros melampus melampus	Impala	LC	LC
Alcelaphus buselaphus caama	Red Hartebeest	LC	LC
Antidorcas marsupialis	Springbok	LC	LC
Connochaetes taurinus	Blue Wildebeest	LC	LC
Damaliscus pygargus phillipsi	Blesbok	LC	LC
Syncerus caffer	Southern Savannah Buffalo	LC	NT
Tragelaphus sylvaticus	Southern Bushbuck	LC	LC
Ceratotherium simum	Square-lipped Rhinoceros	NT	NT
Diceros bicornis	Black Rhinoceros	CE	CE
Equus quagga	Burchell's Zebra	LC	NT

Following the removal of these mammal species listed in Table 15 above, 111 mammal natural occurring mammal species could be expected to occur within the vicinity of the project site. This is still regarded as a moderate mammal species diversity. These mammal species are grouped within 12 mammal families, with Rodentia (rodents) being the most divers family (29 species), followed by Carnivore (carnivores) with 26 species, Chiroptera (bats) with 22 species and Eulipotyphla (shrews, moles, hedgehogs, sengis and allies) with 11 species.

According to the ADU database 132 mammals have been previously recorded within the larger survey area (Quarter Degree Grids: 2527AC; AA; AB; BA; BC; DA; AD; CB; CA; AC; 2526BD; DB and BB). This includes some of the conservation dependent and/or exotic game species that have been primarily introduced by game farmers. As mentioned above, most of these species are confined by fences and should be considered as part of the farming/agricultural system (game farming, reserves and hunting farms) rather than as wildlife per se. As mentioned, some of these species are indigenous to South African but do not have a natural distribution that include this area. For examples of such introduced or conservation dependant mammal species, refer to Table 15.

Furthermore, according to the Animal Demographic Unit (ADU) database the following indigenous, natural occurring mammal species have been frequently observed within the relevant QDGs:

- Greater Kudu - *Tragelaphus strepsiceros* (No. of Records 294);
- Leopard - *Panthera pardus* (No. of Records 295);
- Scrub Hare - *Lepus saxatilis* (No. of Records 164);
- Steenbok - *Raphicerus campestris* (No. of Records 94);
- Bushbuck - *Tragelaphus scriptus* (No. of Records 82);
- Black-backed Jackal - *Canis mesomelas* (No. of Records 136);
- Slender Mongoose - *Herpestes sanguineus* (No. of Records 103);
- Brown Hyena *Parahyaena brunnea* (No. of Records 147);
- Common Warthog - *Phacochoerus africanus* (No. of Records 75);
- Mountain Reedbuck - *Redunca fulvorufula* (No. of Records 65);
- Bush Duiker - *Sylvicapra grimmia* (No. of Records 58);
- Vervet Monkey - *Chlorocebus pygerythrus* (No. of Records 41);
- Chacma Baboon - *Papio ursinus* (No. of Records 41);
- Cheetah - *Acinonyx jubatus* (No. of Records 52);
- Tete Veld Aethomys - *Aethomys ineptus* (No. of Records 57);
- Namaqua Rock Mouse - *Aethomys namaquensis* (No. of Records 48); and
- Natal Mastomys - *Mastomys natalensis* (No. of Records 41)

5.3.2. Mammal Species of Conservation Concern (SCC)

SCCs include those species listed within the Regional (2016) and Global (2015) Red Data Lists, and indicate severe recent population declines, as well as those species, or populations of species, that are highly range restricted.

The initial screening report revealed that three mammal SCC have a distribution range that include the project site and may potentially inhabit the project site namely; Sensitive Species 5 (for their protection, the identities of these species will not made public); *Crocidura maquassiensis* (Makwassie musk shrew), and *Lycaon pictus* (African wild dog). Subsequently, the project site has been classified as Medium Sensitive within the screening tool.

During the site survey it was determined that there is a very low likelihood of occurrence (LoOC) for all three mammal species to occur within the project site. Due to livestock and intensive game breeding activities within the area, *Lycaon pictus* (African wild dog) and Species 5 these species will likely also not be tolerated within the area, there movement within the area would also be highly restricted due to numerous impenetrable, and frequently electrified game fences. Furthermore, *Crocidura maquassiensis* (Maquassie Musk Shrew) prefers densely vegetated, moist grassland/wetland habitats, and no such habitats are present within the project site.

During the site surveys, no species of conservation concern (SoCC) was observed. Due to a general low habitat and structural complexity, as well as the fact that more than 40% of the project site have been significantly degraded and transformed, the site is likely to have a low faunal diversity, including other potential SoCC. Other SoCC which have a distribution that include the development site and are likely (high likelihood) to occur within the development site due to favourable habitat, include:

» South African Hedgehog – *Atelerix frontalis* (Near Threatened)

In terms of the generated IUCN Red List Spatial Data lists, of the remaining 111 small- to medium sized mammal species, that have a natural distribution range that include the project site and have a likelihood of occurring within the project site, 23 are listed as being of conservation concern on a regional or global basis (Table 16).

The list of potential species includes:

- At a global scale (IUCN Red List):
  - Two (2) species listed as Endangered;
  - Six (6) species listed as Near Threatened;
  - Six (6) species listed as Vulnerable;
  - Five (5) that are listed as Vulnerable (VU) on a regional basis; and
- At a regional scale:
  - SANBI 2016:
    - Four (4) species listed as Endangered;
    - Seven (7) species as Near Threatened;
    - Eight (8) species as Vulnerable;
  - TOPS
    - Four (4) species as Near Threatened;
    - Four (4) species as Vulnerable;
    - One (1) species as Endangered.

Table 16: List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2016; TOPS)

Species	Common Name	Conservation Status			Likelihood of Occarance (LoOC)
		Red Data	IUCN	TOPS	
Lycaon pictus	African Wild Dog	EN	EN	EN	Very Low
Redunca fulvorufula fulvorufula	Mountain Reedbuck	EN	EN		Very Low
Aonyx capensis	Cape Clawless Otter	NT	NT	NT	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	NT	Very Low
Pelea capreolus	Grey Rhebok	NT	NT		Very Low
Hydrictis maculicollis	Spotted-necked Otter	NT	VU	VU	Very Low
Eidolon helvum	African Straw-coloured Fruit Bat	NT	LC		Moderate
Rhinolophus smithersi	Smithers's Horseshoe Bat	NT	LC		Low
Panthera pardus	Leopard	VU	VU	VU	Low
Acinonyx jubatus	Cheetah	VU	VU	VU	Very Low

Species	Common Name	Conservation Status			Likelihood of Occarance (LoOC)
		Red Data	IUCN	TOPS	
Felis nigripes	Back-footed Cat	VU	VU	VU	Moderate
Smutsia temminckii	Temminck's Ground Pangolin	VU	VU		Low
Chrysospalax villosus	Rough-haired Golden Mole	VU	VU		Low
Mystromys albicaudatus	White-tailed Mouse	VU	VU		Moderate
Ourebia ourebi	Oribi	LC	EN		Very Low
Cloeotis percivali	Short-eared Trident Bat	LC	EN		Moderate
Atelerix frontalis	South African Hedgehog	LC	NT		High
Rhinolophus blasii	Peak-saddle Horseshoe Bat	LC	NT		Low
Crocidura mariquensis	Swamp Musk Shrew	LC	NT		Very Low
Dasymys incomtus	African Marsh Rat	LC	NT		Very Low
Crocidura maquassiensis	Makwassie Musk Shrew	LC	VU		Very Low

Atelerix frontalis (South African Hedgehog) has a tolerance of a degree of habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), *A. frontalis* populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Very limited and fractured suitable habitat exists within the project site as well as the region, however the larger extent of natural to moderately modified habitat within the project site may provide suitable habitat for this species and as such the likelihood of occurrence in the natural grassland areas are rated as **High**.

5.3.3. Protected Mammal Species

Protected mammal species are either protected nationally within TOPS (Threatened and Protected Species Issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004) or provincially within Schedule 2, 2A and 4 of the Transvaal Nature Conservation Ordinance Act No 12 of 1983 (TNCO).

TOPS Regulations:

- The Threatened or Protected Species (TOPS) regulations, 2007, provide a national approach to the sustainable use of species threatened with extinction, or in need of national protection, while ensuring the survival of the species in the wild, thus ensuring the conservation of the species.
- The TOPS regulations address multiple issues including: unethical hunting practices such as hunting in confined spaces, or hunting of tranquilised animals or by means of bait; activities related to the management of damage-causing animals; hybridisation and spreading diseases as a result of translocation; activities threatening cycad populations; and registration of captive breeding and keeping facilities.

- NEMBA enables the Minister to prohibit activities that may impact on the survival of species in the wild, and to regulate activities to ensure the sustainable use of indigenous biological resources.
- According to the definitions provided within the TOPS regulations (Section 56 (1)):
    - a Protected Species (56(1)(d)) is any indigenous species which is of high conservation value or national importance, or requires regulation in order to ensure that the species is managed in an ecologically sustainable manner. Furthermore, all indigenous species listed within CITES (Conservation on International Trade in Endangered Species of Wild Fauna and Flora) are also automatically listed as Protected Species within TOPS.

Schedule 2, and 2A and 4 of the Transvaal Nature Conservation Ordinance Act No 12 of 1983 (MPNCA):

- The aim/purpose of the Act is to provide for;
    - the sustainable utilisation of wild animals, aquatic biota, and plants;
    - to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora;
    - to provide for offences and penalties for contravention of the Act;
    - to provide for the appointment of nature conservators to implement the provisions of the Act;
    - to provide for the issuing of permits and other authorisations; and
    - to provide for matters connected therewith.

In terms of the generated IUCN Red List Spatial Data lists, of the remaining 111 small- to medium sized mammal species, that have a natural distribution range that include the project site and have a likelihood of occurring within the project site, 14 are regarded as provincially protected species (Schedule 2 and 4 of the TNCO), whilst no TOPS protected species have been listed within the IUCN species list (Table 17).

The list of species includes:

- Twelve (12) species protected within Schedule 2 (Protected Game – Section 15(1)(a) of the TNCO)); and
- Two (2) species protected within Schedule 4 (Protected Wild Animals – Section 15(1)(c) of the TNCO))

Table 17: List of Protected mammal species (according to national provincial regulations) that have a distribution that include the study area.

Species	Common Name	CITES	TNCO Schedule 2	TNCO Schedule 4	Likelihood of Occurrence (LoOC)
Panthera pardus	Leopard	I		Protected	Low
Acinonyx jubatus	Cheetah	I		Protected	Very Low

Species	Common Name	CITES	TNCO Schedule 2	TNCO Schedule 4	Likelihood of Occurrence (LoOC)
Felis nigripes	Back-footed Cat	I			Moderate
Galago moholi	Southern Lesser Galago	II	Protected		Moderate
Otolemur crassicaudatus	Thick-tailed Bushbaby	II	Protected		Low
Aonyx capensis	Cape Clawless Otter	II			Very Low
Hydrictis maculicollis	Spotted-necked Otter	II			Very Low
Leptailurus serval	Serval	II			High
Caracal caracal	Caracal	II			Low
Felis silvestris	African Wildcat	II			High
Mellivora capensis	Honey Badger	II			Low
Chlorocebus pygerythrus	Vervet Monkey	II			High
Papio ursinus	Chacma Baboon	II			Moderate
Proteles cristata	Aardwolf	III	Protected		Moderate
Civettictis civetta	African Civet	III			Low
Redunca fulvorufula fulvorufula	Mountain Reedbuck		Protected		Very Low
Parahyaena brunnea	Brown Hyaena		Protected		Very Low
Pelea capreolus	Grey Rhebok		Protected		Very Low
Smutsia temminckii	Temminck's Ground Pangolin		Protected		Low
Ourebia ourebi	Oribi		Protected		Very Low
Atelerix frontalis	South African Hedgehog		Protected		High
Oreotragus oreotragus	Klipspringer		Protected		Very Low
Raphicerus campestris	Steenbok		Protected		Confirmed
Orycteropus afer	Aardvark		Protected		High
Lycaon pictus	African Wild Dog			Protected	Very Low

5.3.4. Reptile and Amphibian Diversity

Based on the IUCN Red List Spatial Data (IUCN, 2017), 99 reptilian species can be expected to occur within the vicinity of the project site, whist according to the distribution maps of Bates et al. (2014) a total of 102 terrestrial reptilian species may be found within the region. Due to the fairly moderate spatial heterogeneity (especially in terms of geomorphology) of the study area, it is expected that the diversity within the study area itself will be low-moderate.

These reptile species are grouped within 24 reptile families, with Gekkonidae (geckos) and Scincidae (skinks) being the most divers families (11 species each), followed by Colubirdae (herald snakes, egg-eaters, green snakes, tiger snakes, twig snakes and boomslang) with nine species and then Elapidae (cobras, mambas and rinkhals) as well as Psammophiidae (house snakes, grass snakes, harlequin snakes, file snakes sand- and grass snakes and allies) with 7 species each.

Of these 102 reptile species, 66 have been previously recorded within the larger survey area (Quarter Degree Grids: 2527AC; AA; AB; BA; BC; DA; AD; CB; CA; AC; 2526BD; DB

and BB) according to the Animal Demographic Unit (ADU) database. Species that has been frequently observed within the these QDGs are:

- Speckled Rock Skink - *Trachylepis punctatissima* (No. of Records: 58);
- Common Variable Skink - *Trachylepis varia sensu lato* (No. of Records: 56);
- Southern Rock Agama - *Agama atra* (No. of Records: 54);
- Common Dwarf Gecko - *Lygodactylus capensis* (No. of Records: 44);
- Common Girdled Lizard - *Cordylus vittifer* (No. of Records: 38);
- Transvaal Gecko - *Pachydactylus affinis* (No. of Records: 38);
- Yellow-throated Plated Lizard - *Gerrhosaurus flavigularis* (No. of Records: 30);
- Serrated Hinged Terrapin - *Pelusios sinuatus* (No. of Records: 29);
- Water Monitor - *Varanus niloticus* (No. of Records: 27);
- Southern Tree Agama - *Acanthocercus atricollis* (No. of Records: 26);
- Striped Grass Snake - *Psammophylax tritaeniatus* (No. of Records: 26);
- Leopard Tortoise - Stigmochelys pardalis (No. of Records: 25); and
- Short-snouted Grass Snake - *Psammophis brevirostris* (No. of Records: 24)

Based on the IUCN Red List Spatial Data (IUCN, 2017), 28 amphibian species can be expected to occur within the vicinity of the project site, whist according to the distribution maps of Du Preez & Carruthers (2009) and Minter *et a*l. (2004) a total of 30 amphibian species may be found within the region.

These amphibian species are grouped within 10 amphibia families, with Pyxicephalidae (river frogs, cacos, bullfrogs, stream frogs, sand frogs and allies) being the most divers family (10 species), followed by Bufonidae (toads) with eight species.

Of the 30 amphibian species, 29 have been previously recorded within the larger survey area (Quarter Degree Grids: 2527AC; AA; AB; BA; BC; DA; AD; CB; CA; AC; 2526BD; DB and BB) according to the Animal Demographic Unit (ADU) database. Species that has been frequently observed within the these QDGs are:

- Red Toad - *Schismaderma carens* (No. of Records: 83);
- Bubbling Kassina - *Kassina senegalensis* (No. of Records: 68);
- Common Caco - *Cacosternum boettgeri* (No. of Records: 55);
- Banded Rubber Frog - *Phrynomantis bifasciatus* (No. of Records: 54);
- Plain Grass Frog - *Ptychadena anchietae* (No. of Records: 43);
- Tremelo Sand Frog - *Tomopterna cryptotis* (No. of Records: 37);
- Natal Sand Frog - *Tomopterna natalensis* (No. of Records: 36);
- Olive Toad - *Sclerophrys garmani* (No. of Records: 31);
- Delalande's River Frog - *Amietia delalandii* (No. of Records: 31);
- Guttural Toad - *Sclerophrys gutturalis* (No. of Records: 29);
- Snoring Puddle Frog - *Phrynobatrachus natalensis* (No. of Records: 27);
- Northern Pygmy Toad - *Poyntonophrynus fenoulheti* (No. of Records: 19); and
- Southern Foam Nest Frog - *Chiromantis xerampelina* (No. of Records: 19)

5.3.5. Reptile and Amphibian Species of Conservation Concern (SCC)

SCCs include those species listed within the Regional Red Data List (2017), Global Red Data List (2015), that have experienced severe recent population declines, as well as those species, or populations of species, that are highly range restricted.

In terms of the generated IUCN Red List Spatial Data lists, of the 99 reptile and 28 amphibian species, that have a natural distribution range that include the project site and have a likelihood of occurring within the project site, three (3) reptile species have been listed as being of conservation concern on a regional or global basis (Table 18), whilst no amphibian species have been listed as of conservation concern (least concern).

The list of potential species includes:

- At a global scale (IUCN Red List):
  - One (1) reptile species listed as Vulnerable (VU);
- At a regional scale:
  - SANBI 2016:
    - Two (2) reptile species listed as Vulnerable (VU).

Table 18: List of reptile species of conservation concern that may occur in the project area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2016; TOPS)

Species	Common Name	Conservation Status			Likelihood of Occurance (LoOC)
		Red Data	IUCN	TOPS	
Kinixys lobatsiana	Lobatse Hinge-back Tortoise	VU	VU		Low
Crocodylus niloticus	Nile Crocodile	LC	VU		Very Low

5.3.6. Protected Reptile and Amphibian Species

These are species that are either protected nationally within TOPS (Threatened and Protected Species Issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004) or provincially within Schedule 2 and 4 of the Transvaal Nature Conservation Ordinance (No 12 of 1983).

According to the Transvaal Nature Conservation Ordinance all species of reptiles excluding Water Monitor (*Varanus niloticus*), Rock Monitor (*Varanus albigularis*), and all species of snakes (Sub-Order Serpentes) are protected within Schedule 2 (thus a total of 46 reptile species are protected according to Schedule 2). Furthermore, in terms of Amphibians, only the Giant Bullfrog (Pyxicephalus adspersus) is protected within Schedule 2.

In terms of TOPS, only one reptile species that has a distribution range that include the project site, is protected namely, the Southern African Python (*Python natalensis).* In terms of amphibian species, the Giant Bullfrog (*Pyxicephalus adspersus*) and African

Bullfrog (*Pyxicephalus edulis*) have a distribution range that include the project site and are protected according to the TOPS Regulations.

Table 19: List of Protected reptile and amphibian species (according to national provincial regulations) that have a distribution that include the study area.

Species	Common Name	CITES	TOPS	TNCO Schedule 2	TNCO Schedule 4	Likelihood of Occurance (LoOC)
Class: Reptilia						
All reptile species apart excluding Water Monitor (*Varanus niloticus*), Rock Monitor (*Varanus albigularis*), and all species of snakes (Sub-Order Serpentes)				Protected		High
Python natalensis	Southern African Rock Python	II	Protected			Low
Crocodylus niloticus	Nile Crocodile	II		Protected		Very Low
Kinixys lobatsiana	Lobatse Hinge-back Tortoise	II		Protected		Low
Cordylus jonesii	Jones' Girdled Lizard	II		Protected		Very Low
Cordylus vittifer	Common Girdled Lizard	II		Protected		Very Low
Stigmochelys pardalis	Bergskilpad	II		Protected		High
Chamaeleo dilepis	Flap-necked Chameleon	II				High
Varanus albigularis	Rock Monitor	II				High
Varanus niloticus	Nile Monitor	II				Very Low
Class: Amphibia						
Pyxicephalus adspersus	Giant Bullfrog		Protected	Protected		Very Low
Pyxicephalus edulis	African Bullfrog		Protected			Very Low

6. FINDINGS OF THE BOTANICAL ASSESSMENT

6.1. Site Specific Vegetation Description – Fine Scale Vegetation Patterns

This section describes the different habitats and vegetation patterns observed within the study area. As these are field-based observations taken directly from the study area, they are of greater reliability and pertinence than the coarsely mapped results of the National Vegetation Map, which does not adequately represent such finer details.

According to the National Vegetation Map 2018, the entire study area is mapped as Zeerust Thornveld (SVcb3), with some Gold Reef Mountain Bushveld (SVcb9) occurring nearby (see Figure 13).

Small-scale plant diversity and ecological condition of vegetation varied exceptionally across the development site between natural/near natural and disturbed areas. However, within these areas themselves (within the natural/near natural areas as well as the disturbed areas) small-scale plant diversity and ecological condition of vegetation varied

very little. The primary ecological drivers are anthropogenic activities, most notable ploughing and cultivation as well as grazing regimes (within natural/near-natural areas).

A total distance of ± 47.2 km (convex hull = 695.8 ha) was surveyed on foot across the proposed development site and the broader surrounding areas, as well as by vehicle.

The following plant community types were found in the proposed development site and surrounds (see **Error! Reference source not found.** for species totals within each plant community type, and Figure 26 and Figure 27 for representative community photos; also see Figure 29 and Figure 30 for photos of selected plant species):

- *Cenchrus ciliaris Planted Veld*
- *Cymbopogon caesius - Heteropogon contortus*
- *Dichanthium annulatum - Brachiaria brizantha Pasture*
- *Panicum maximum - Urochloa mosambicensis Pasture*
- *Themeda triandra - Ziziphus mucronata*
- *Vachellia tortilis - Heteropogon contortus: A (Eragrostis lehmanniana)*
- *Ziziphus mucronata - Cymbopogon caesius: A (Grewia flava)*
- *Ziziphus mucronata - Cymbopogon caesius: B (Eragrostis lehmanniana)*

The following is brief overall summary: a total of 178 plant species were found within the proposed development site, which consisted of 158 native, 0 SCC, 3 protected, 20 alien, and 7 NEM:BA listed invasive species. Furthermore, a total of 15 species were recorded within the proposed development site that were not recorded within online databases.

Plant species turnover (i.e., the number of species unique to each plant community type) was not exceptionally high for the proposed development site, and the majority of species were shared between plant community types (see "%Unique" in Table 18, as well as Figure 22). Only the Eragrostis chloromelas - Themeda triandra and Eragrostis plana - Kyllinga erecta plant community types had a high number of unique species (41% and 44%, respectively) that were not found in the other types. As such, these are considered the most sensitive of the plant community types occurring in the proposed development site.

The following plant species were found in all the plant community types:

- *Heteropogon contortus*
- *Vachellia tortilis subsp. heteracantha*
- *Ziziphus mucronata subsp. mucronata*

Table 20: Plant species summary statistics for the plant community types of the proposed development site and broader surrounding area. "Unique" species were only observed in the specific plant community type in question, and not in others (note: this does not mean such species cannot or do not occur in other types, but only that they were not specifically observed in the other types during surveying). "Shared" species were shared between two or more types. Note that overall total values might be less than the sum of all the respective values, since species can be shared between plant community types. Also note that these are summary values, and are expanded more in-depth in Figure 23 and Figure 24. SCC = Species of Conservation Concern; THREAT = Threatened species ("CR PE", "CR", "EN", or "VU"); NWE = North West Endemic; NEM:BA = Species listed under NEM:BA Alien and Invasive Species Regulations; N/A = Not Applicable. The row in green indicates the plant community type that had the highest number of plant species, while the row in light-red indicates the plant community type that had the lowest number of plant species; Protected = Provincially protected under Schedule 11 and 12 of the Transvaal Nature Conservation Ordinance (No. 12 of 1983) or a protected tree under Section 12 of the National Forests Act 84 of 1998

	Total	Shared	Unique	%Unique	SCC	THREAT	Protected	NWE	Native	Alien	NEM:BA
Community											
Cenchrus ciliaris Planted Veld	11	11	0	0	0	0	1	0	11	0	0
Cymbopogon caesius - Heteropogon contortus	87	85	2	2	0	0	1	0	77	10	2
Dichanthium annulatum - Brachiaria brizantha Pasture	44	41	3	7	0	0	0	0	37	7	2
Panicum maximum - Urochloa mosambicensis Pasture	20	19	1	5	0	0	0	0	17	3	0
Themeda triandra - Ziziphus mucronata	33	27	6	18	0	0	0	0	28	5	0
Vachellia tortilis - Heteropogon contortus: A (Eragrostis lehmanniana)	77	73	4	5	0	0	1	0	66	11	2
Ziziphus mucronata - Cymbopogon caesius: A (Grewia flava)	126	93	33	26	0	0	2	0	113	13	4
Ziziphus mucronata - Cymbopogon caesius: B (Eragrostis lehmanniana)	101	94	7	7	0	0	1	0	90	11	2
Total											
N/A	178	N/A	N/A	N/A	0	0	3	0	158	20	7

Figure 20: Presence/absence matrix of plant species for each plant community type within the proposed development site and broader surrounds. The presence of a green block indicates the presence of the respective plant species within the respective plant community type. This figure serves as a highly useful reference to visually determine either how many (and which) species occurred in a specific plant community type, or in how many (and which) plant community types a specific species occurred. Note that the plot continues on the next page.

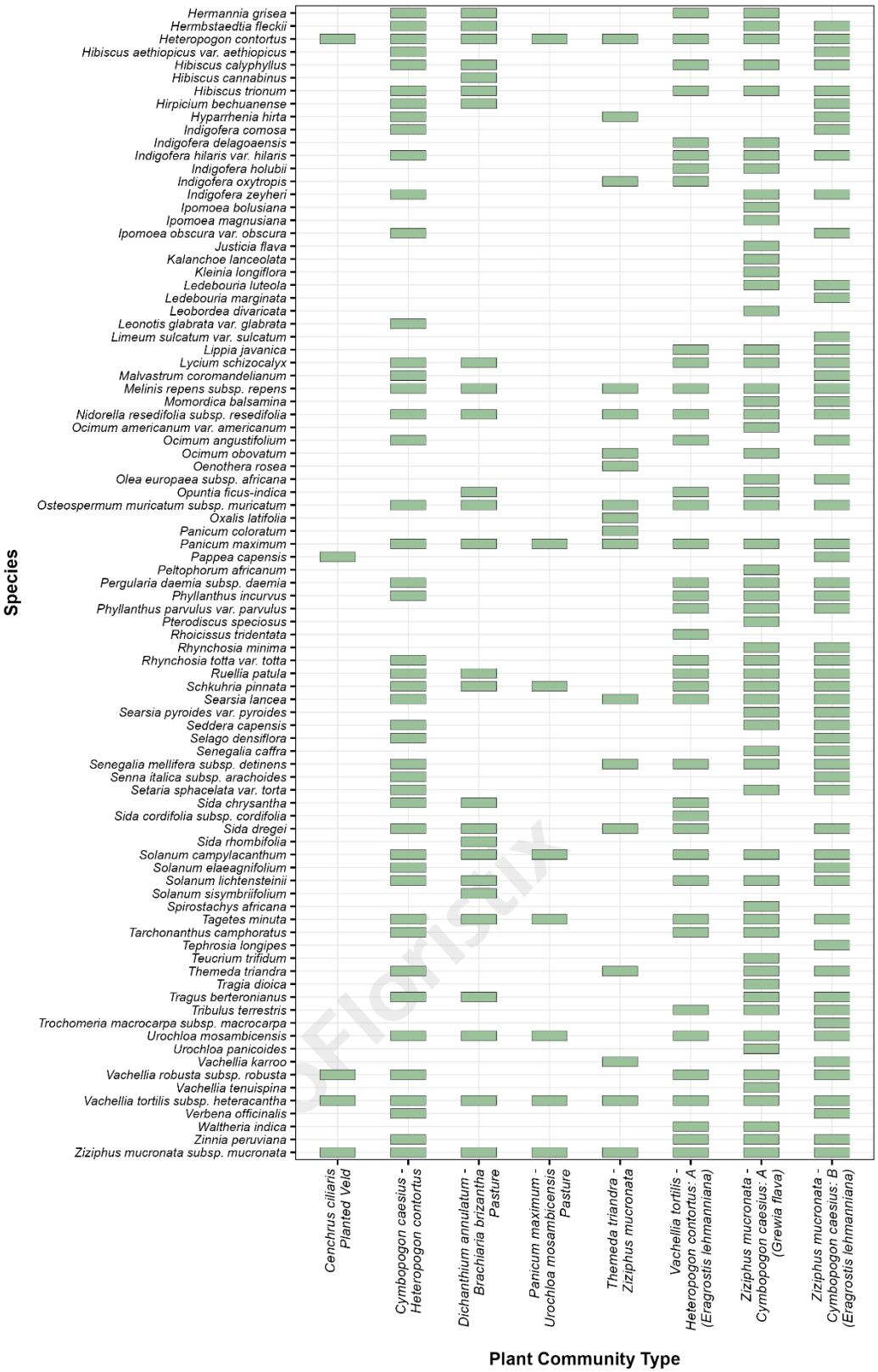

Figure 21: Presence/absence matrix of plant species for each plant community type within the proposed development site and broader surrounds. This is a continuation of Figure 20.

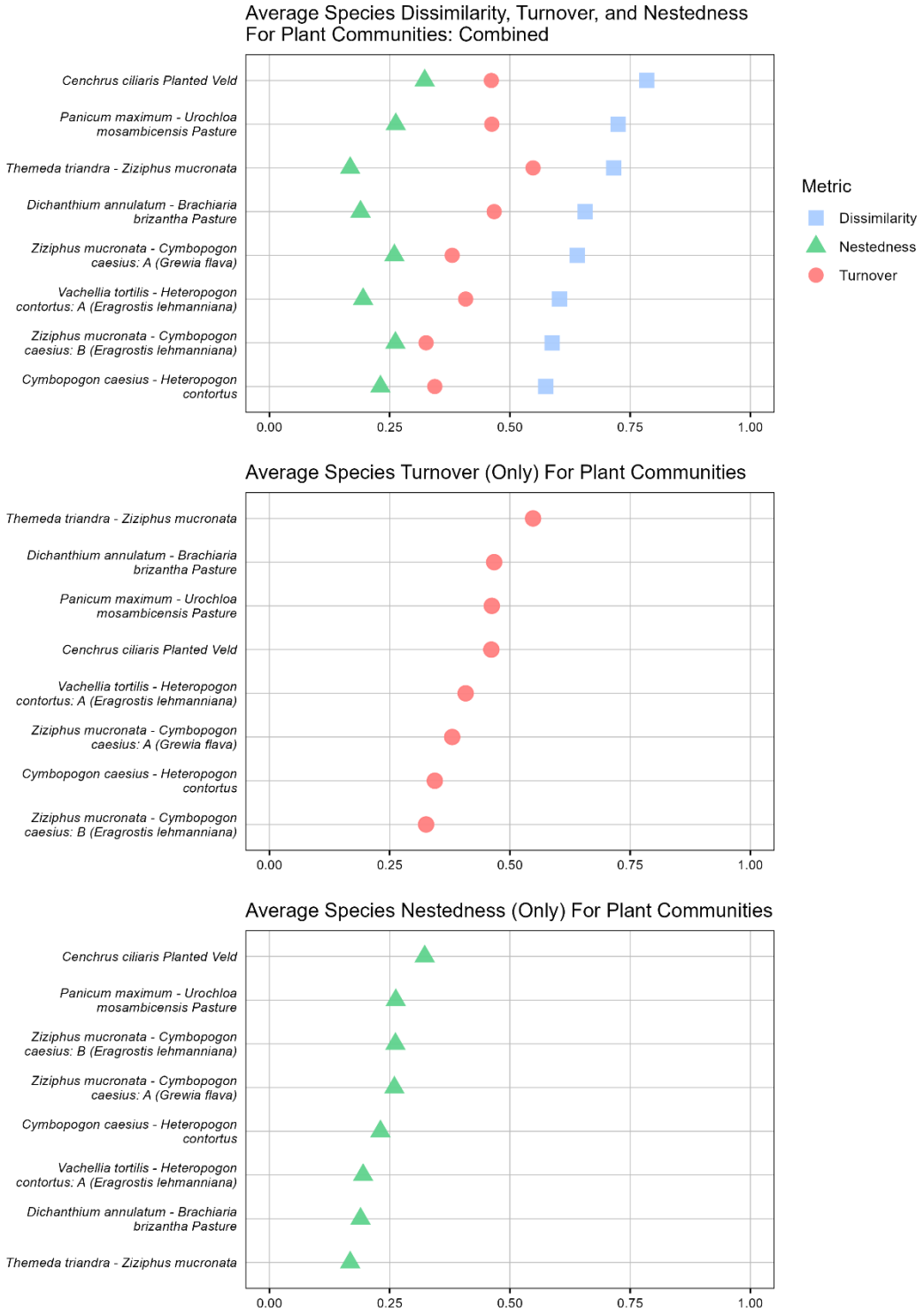

Figure 22: Average dissimilarity, turnover, and nestedness between plant community types found in the proposed development site. The **top panel** is a combined plot and is sorted descending according to full dissimilarity values. The **middle** and **bottom panels** isolate only the components of turnover and nestedness (for enable an easy visual inspection), and each of these panels is also sorted descending according to the respective component. This is a highly useful figure to not only see which communities were the most different (compared to the other communities) overall, but also how they differ. For example, although some communities might yield high dissimilarity values, these can either result due to high levels of turnover (which are more important for conservation) or nestedness (which are less important for conservation, since such communities are mostly subsets of other communities.) Note: these are overall averages; see Figure 23 and Figure 25 for individual values. Values can range from 0 (complete similarity) to 1 (complete dissimilarity).

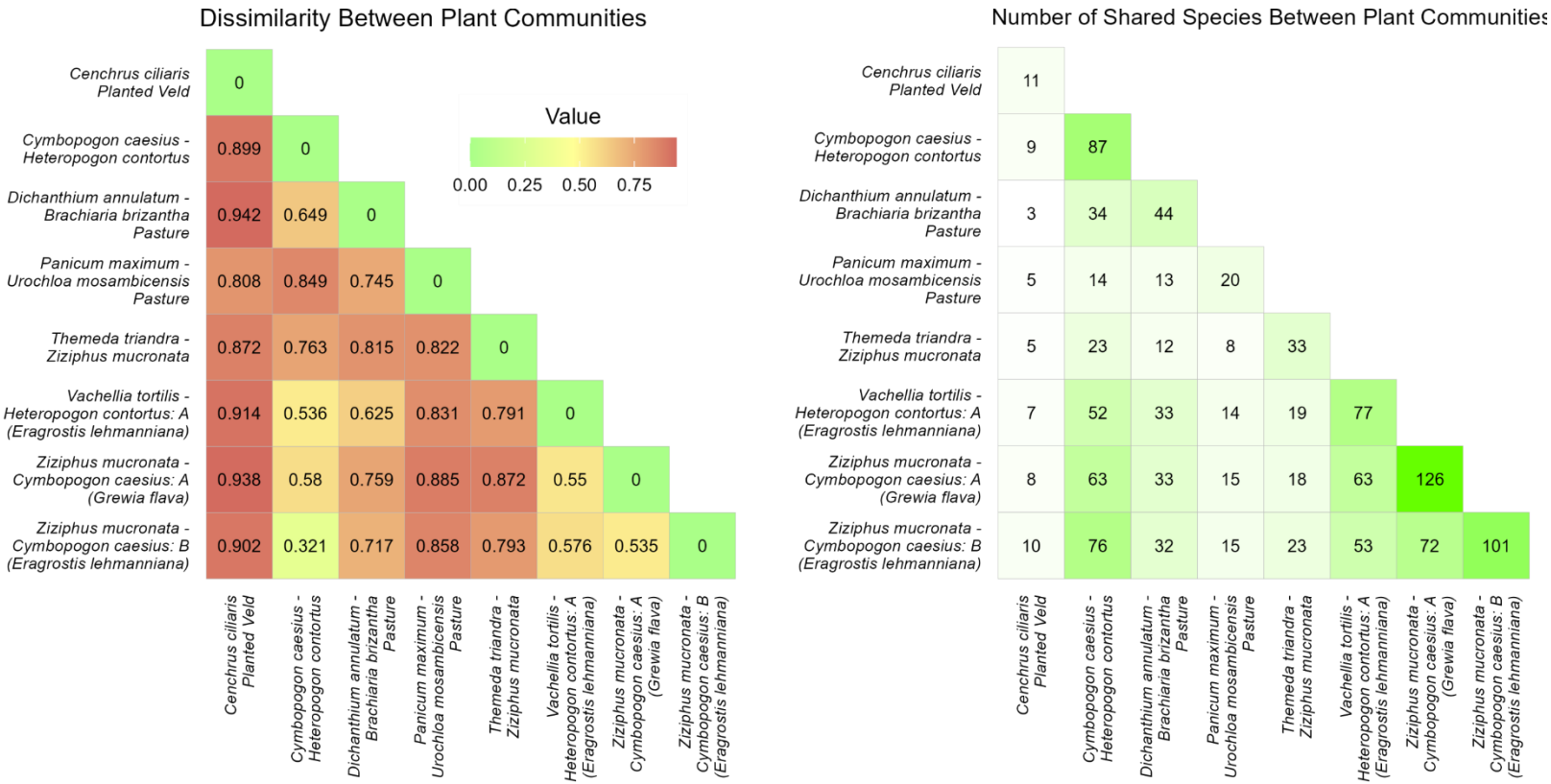

Figure 23: **LEFT PANEL:** Overall similarities between the plant community types found on site. Values can range from 0 to 1. Two plant community types that are very similar have small "dissimilarity" values (0 indicates complete similarity, or zero dissimilarity, and thus the two communities have all species in common); conversely, two plant community types that are not at all similar, but instead very dissimilar, have large "dissimilarity" values (1 indicates zero similarity, or complete dissimilarity, and thus the two communities have no species in common at all). These values are very useful to determine which communities are most similar or dissimilar. However, the notion of similarity does not indicate how the communities differ, since they can differ because they either have many different species (namely, "turnover") or are subsets of one another (namely, "nestedness"). Thus, similarity can be broken down into the two components of turnover and nestedness, which are displayed in Figure 25. The three variables of dissimilarity, turnover, and nestedness have an easy and straightforward relationship, namely: Dissimilarity = Turnover + Nestedness. The level of similarity between two plant community types is determined by the number of species that are shared between them, as well as the number of species that are unique to each (i.e., species that are not shared between the communities); these are given in the left panel, as well as the figures that follow. **RIGHT PANEL:** Number of shared species between plant community types found on site. These values simply indicate the number of species shared between plant community types for each pairwise combination; the top diagonal row of the matrix simply represents the total number of species per plant community type. Note that this is a more in-depth expansion of the totals given in **Error! Reference source not found.**. Compare with Figure 24.

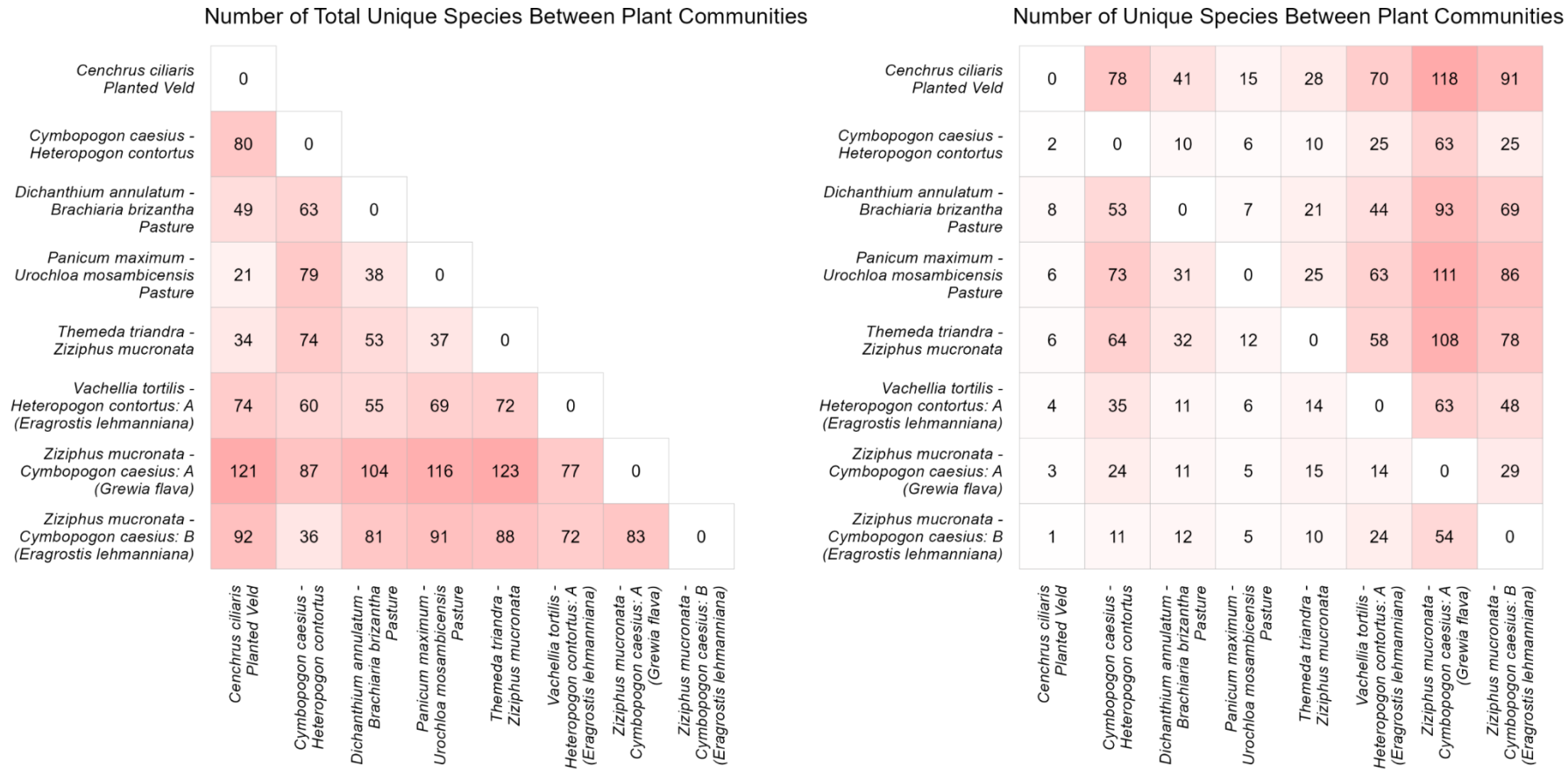

Figure 24: Unique species for the plant community types found on site. **LEFT PANEL:** This represents the total number of unique species (i.e., not shared) for each pairwise comparison between plant community types. **RIGHT PANEL:** Unique species per pairwise comparison of plant community types. Note that this is not the same as the figure in the right panel. The key difference here is that of comparison direction. That is, when a species rich and species poor plant community type is compared, then the former will have more unique species than the latter. As an example of comparing two plant community types with each other, the *Dichanthium annulatum - Verbena officinalis* type has 68 species not found in the *Cymbopogon caesius - Heteropogon contortus* type, while the *Dichanthium annulatum - Verbena officinalis* type has 23 species not found in the *Cymbopogon caesius - Heteropogon contortus* type. Together, these two types have 91 species that are not shared (and 19 species that are shared; see Figure 23).

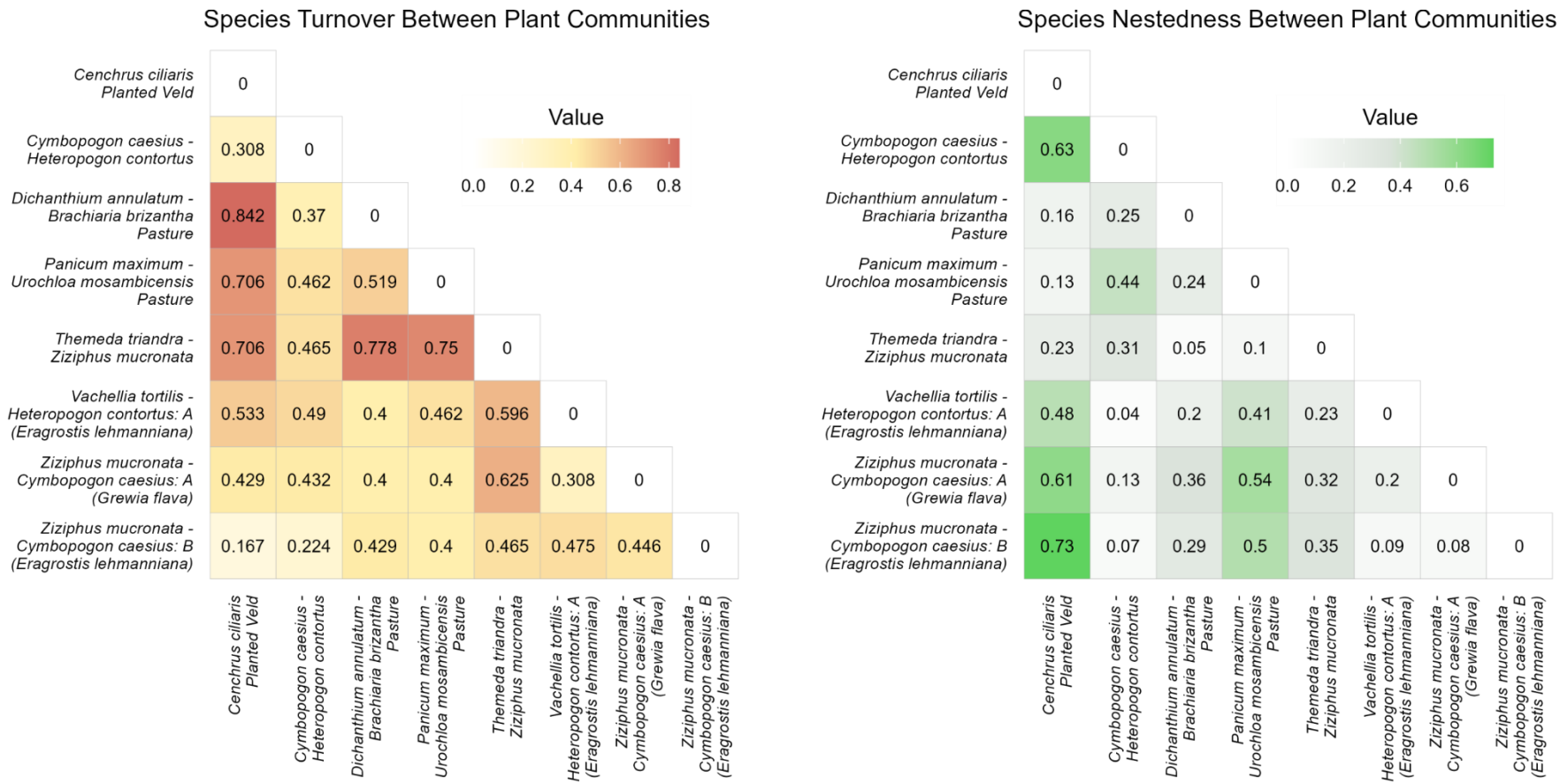

Figure 25: Turnover (left) and nestedness (right) between the plant communities found on site. Values can range from 0 to 1. Large species turnover values indicate that two plant communities do not have many species in common, and species turnover between these communities are therefore high. Conversely, low values are indicative of low levels of turnover between two respective communities. Nestedness (that is, a measure of the number of shared species) between the plant communities found on site. Large nestedness values indicate that two plant communities have many species in common, and these respective communities can therefore be regarded, to some degree, as subsets of one another. Conversely, low values are indicative that the two respective communities do not share many species. Compare with Figure 23.

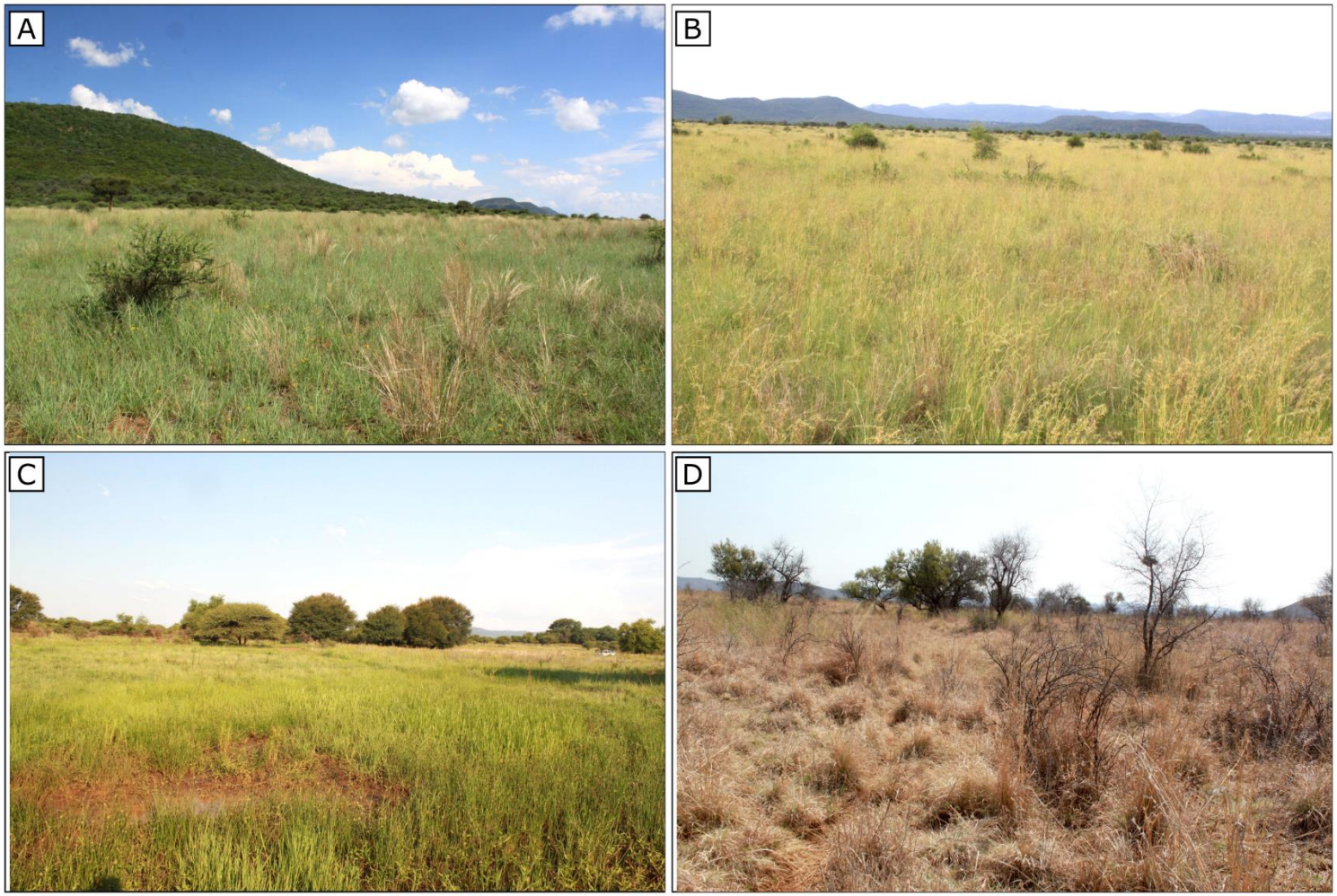

Figure 26: Representative photos of the plant community types encountered within the study area. A) Cenchrus ciliaris Planted Veld, B) C*ymbopogon caesius - Heteropogon contortus*, C) *Dichanthium annulatum - Brachiaria brizantha* Pasture, and D) *Themeda triandra - Ziziphus mucronata*.

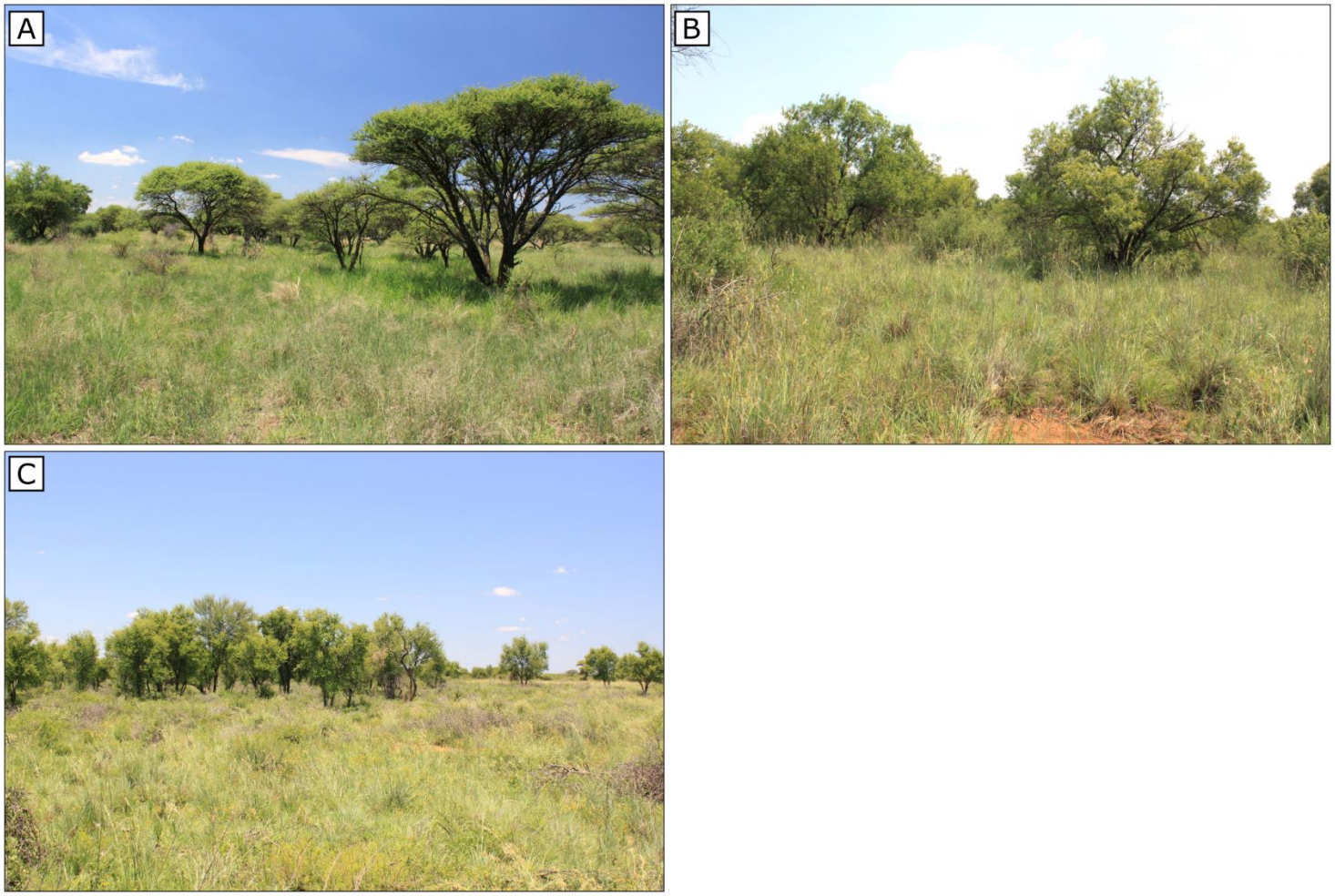

Figure 27: Representative photos of the plant community types encountered within the study area. A) *Vachellia tortilis - Heteropogon contortus*: A *(Eragrostis lehmanniana*), B) *Ziziphus mucronata - Cymbopogon caesius*: A *(Grewia flava*), C) *Ziziphus mucronata - Cymbopogon caesius*: B (*Eragrostis lehmanniana*).

Figure 28: Mapping indicating the different plant community types identified within the project site.

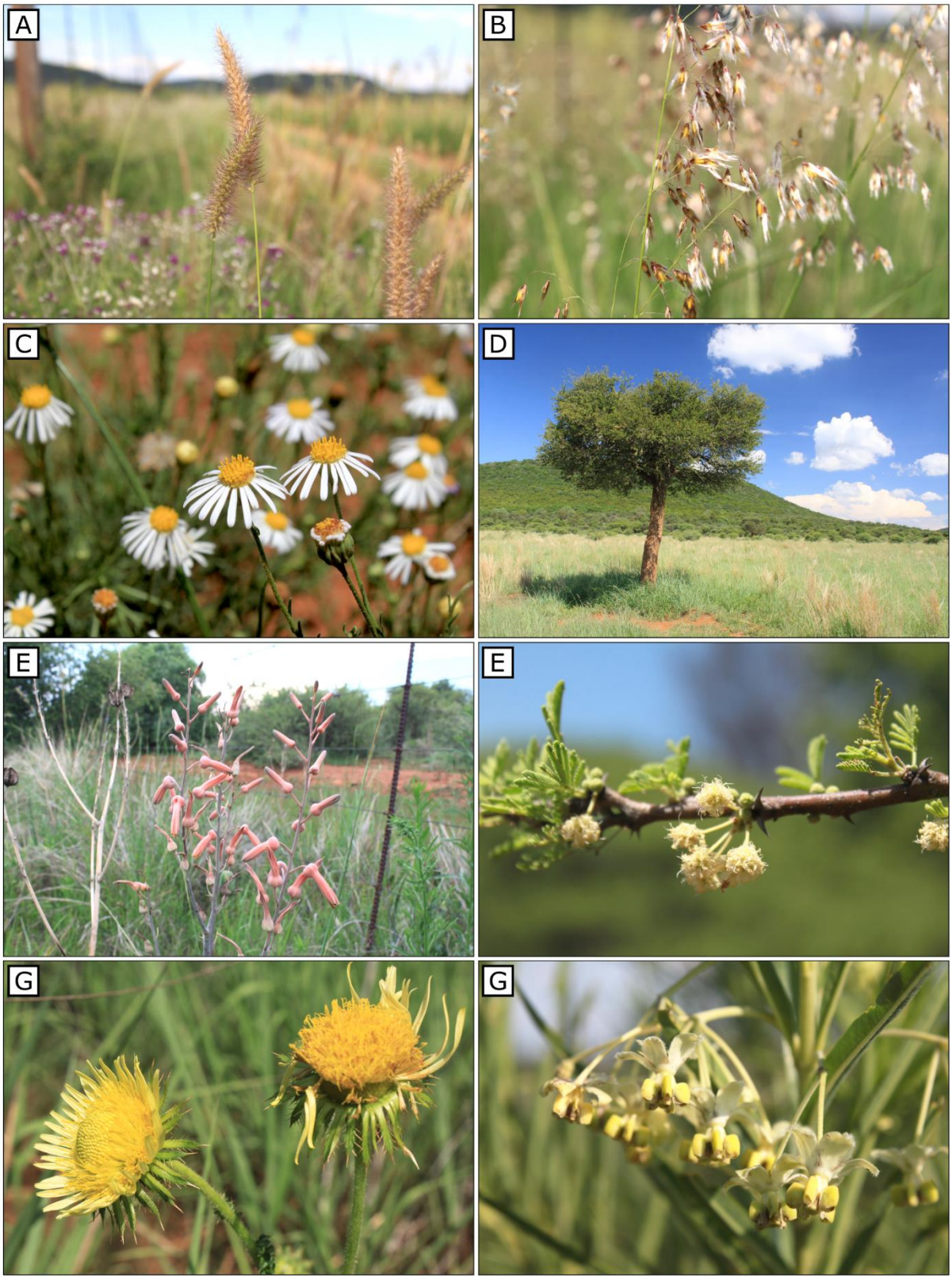

Figure 29: Photos of selected plant species occurring within the various plant community types found within the study area. A) *Cenchrus ciliaris*, B) *Melinis repens* subsp. *repens*, C) *Felicia muricata* subsp. *muricata*, D) *Boscia albitrunca*, E) *Aloe greatheadii*, F) *Senegalia mellifera* subsp. *detinens*, G) *Berkheya radula*, and H) *Gomphocarpus fruticosus* subsp. *fruticosus*.

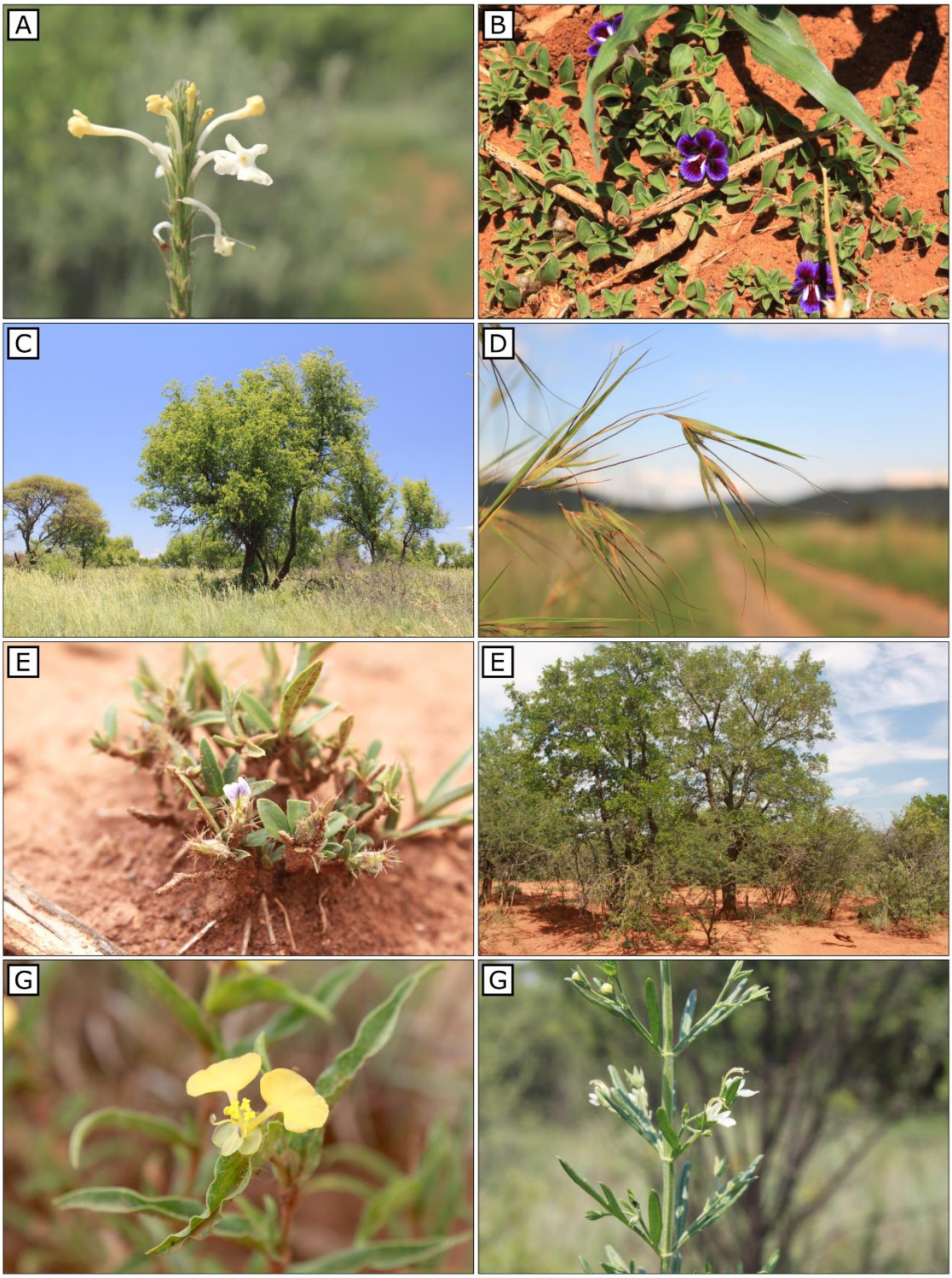

Figure 30: Photos of selected plant species occurring within the various plant community types found within the study area. A) *Chascanum hederaceum* var. *hederaceum*, B) *Aptosimum elongatum*, C) *Ziziphus mucronata* subsp. *mucronata*, D) *Themeda triandra*, E) *Blepharis maderaspatensis*, F) *Spirostachys africana*, G) *Commelina africana* var. *krebsiana*, and H) *Teucrium trifidum*.

6.1.1. *Cenchrus ciliaris* planted veld

This community comprised a total area size of about 2.6 ha (2.7% of the total mapped area) and did not conform to any of the VegMap vegetation types, although it should technically be a part of the Gold Reef Mountain Bushveld (SVcb 9) vegetation type. This is due to it having been transformed to a grassland (specifically planted pasture grasses), and is therefore also regarded as a disturbed/modified plant community type.

It is characterized by a moderate (50 – 75%) to high (>75%) density of vegetation cover, with little variation in topography. This type is mostly dominated by *Vachellia tortilis* subsp. *heteracantha* (LC) and *Ziziphus mucronata* subsp. *mucronata* (LC).

No SoCC, alien, or NEM:BA A&IS Regulations listed species were observed in this plant community type. However, the protected plant species *Boscia albitrunca* (LC; Nationally Protected Tree) was observed, with two specimens occurring within the substation area. Any damage to these specimens must be avoided, and a permit, from the relevant local authority, is required to destroy or remove them.

The following is a list of all species that were observed in this plant community type:

- *Aristida congesta subsp. congesta* (LC)
- *Boscia albitrunca* (LC; Nationally Protected Tree)
- *Cenchrus ciliaris* (LC)
- *Eragrostis rigidior* (LC)
- *Eragrostis superba* (LC)
- *Gomphocarpus tomentosus subsp. tomentosus* (LC)
- *Heteropogon contortus* (LC)
- *Pappea capensis* (LC)
- *Searsia lancea* (LC)
- *Vachellia robusta subsp. robusta* (LC)
- *Vachellia tortilis subsp. heteracantha* (LC)
- *Ziziphus mucronata subsp. mucronata* (LC)

6.1.2. Cenchrus ciliaris Planted Veld

This plant community type is located at the extreme northeastern boundary of the proposed development site and is one of the smallest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Cenchrus ciliaris* (LC). It has the lowest number of species of all plant community types in the proposed development site, and also has no unique species since all of its species are shared with other plant community types (see

"%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site).

No SCC were observed. However, one protected plant species was observed, namely *Boscia albitrunca* (LC; Nationally Protected Tree). No alien or NEM:BA A&IS Regulations listed species were observed.

This plant community type has been degraded by past disturbances, notably overgrazing, as well as ploughing for pastures and resultant removal of trees and other woody shrubs. Its functional capacity within the landscape and broader ecosystem has been somewhat comprised, and some rehabilitation will have to be implemented to restore the majority of its ecosystem functions.

This plant community type is considered as very low in sensitivity since there are no SCC present. Moreover, even though protected plant species are present, they occur in very low densities across the proposed development site and can therefore easily be avoided by the proposed activities. The limited extent of these species do not pose a significant limitation for the development. Also, the low number of unique species contributes this communities' very low sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Aristida congesta subsp. congesta (LC)*
- *Boscia albitrunca (LC; Nationally Protected Tree)*
- *Cenchrus ciliaris (LC)*
- *Eragrostis rigidior (LC)*
- *Eragrostis superba (LC)*
- *Gomphocarpus fruticosus subsp. fruticosus (LC)*
- *Heteropogon contortus (LC)*
- *Pappea capensis (LC)*
- *Vachellia robusta subsp. robusta (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.3. Cymbopogon caesius - Heteropogon contortus

This plant community type is located near the extreme northeastern boundary of the proposed development site. It is one of the smallest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Cymbopogon caesius* (LC), *Heteropogon contortus* (LC), *Aristida congesta subsp. congesta* (LC), *Cenchrus ciliaris* (LC), *Eragrostis lehmanniana var. lehmanniana* (LC), *Themeda triandra* (LC), *Aristida canescens subsp. canescens* (LC), and *Digitaria eriantha* (LC).

This plant community type did not have a very high number of unique species, and the majority of species were shared with other plant community types (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site).

No SCC were observed. However, one protected plant species was observed, namely *Euphorbia inaequilatera* (LC; Protected [Provincial Schedule 2]). Furthermore, 10 alien species were also observed, including 2 NEM:BA A&IS Regulations listed species, namely *Malvastrum coromandelianum* (Prickly malvastrum; Category 1b) and *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b).

The low number of unique species contributes this communities' low sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Aptosimum elongatum (LC)*
- *Aristida adscensionis (LC)*
- *Aristida canescens subsp. canescens (LC)*
- *Aristida congesta subsp. barbicollis (LC)*
- *Aristida congesta subsp. congesta (LC)*
- *Asparagus laricinus (LC)*
- *Barleria macrostegia (LC)*
- *Bidens pilosa (Not Evaluated)*
- *Blepharis maderaspatensis (LC)*
- *Cenchrus ciliaris (LC)*
- *Chaetacanthus costatus (LC)*
- *Chamaecrista comosa var. comosa (LC)*
- *Chascanum hederaceum var. hederaceum (LC)*
- *Chloris virgata (LC)*
- *Clematis brachiata (LC)*
- *Commelina africana var. krebsiana (LC)*
- *Corbichonia decumbens (LC)*
- *Corchorus asplenifolius (LC)*
- *Crotalaria lotoides (LC)*
- *Cymbopogon caesius (LC)*
- *Cynodon dactylon (LC)*
- *Digitaria eriantha (LC)*

- *Diospyros lycioides subsp. lycioides (LC)*
- *Eragrostis curvula (LC)*
- *Eragrostis lehmanniana var. lehmanniana (LC)*
- *Eragrostis patentipilosa (LC)*
- *Eragrostis rigidior (LC)*
- *Eragrostis superba (LC)*
- *Eragrostis trichophora (LC)*
- *Erigeron bonariensis (Not Evaluated)*
- *Euphorbia inaequilatera (LC; Protected [Provincial Schedule 2])*
- *Evolvulus alsinoides (LC)*
- *Felicia muricata subsp. muricata (LC)*
- *Geigeria burkei subsp. burkei var. burkei (Not Evaluated)*
- *Gomphocarpus fruticosus subsp. fruticosus (LC)*
- *Gomphrena celosioides (Not Evaluated)*
- *Grewia flava (LC)*
- *Helichrysum argyrosphaerum (LC)*
- *Heliotropium nelsonii (LC)*
- *Heliotropium ovalifolium (LC)*
- *Hermannia boraginiflora (LC)*
- *Hermannia grisea (LC)*
- *Hermbstaedtia fleckii (LC)*
- *Heteropogon contortus (LC)*
- *Hibiscus aethiopicus var. aethiopicus (LC)*
- *Hibiscus calyphyllus (LC)*
- *Hibiscus trionum (Not Evaluated)*
- *Hirpicium bechuanense (LC)*
- *Hyparrhenia hirta (LC)*
- *Indigofera comosa (LC)*
- *Indigofera hilaris var. hilaris (LC)*
- *Indigofera zeyheri (LC)*
- *Ipomoea obscura var. obscura (LC)*
- *Leonotis glabrata var. glabrata (LC)*
- *Lycium schizocalyx (LC)*
- *Malvastrum coromandelianum (Not Evaluated)*
- *Melinis repens subsp. repens (LC)*
- *Nidorella resedifolia subsp. resedifolia (LC)*
- *Ocimum angustifolium (LC)*
- *Osteospermum muricatum subsp. muricatum (LC)*
- *Panicum maximum (LC)*
- *Pergularia daemia subsp. daemia (LC)*
- *Phyllanthus incurvus (LC)*
- *Rhynchosia totta var. totta (LC)*
- *Ruellia patula (LC)*
- *Schkuhria pinnata (Not Evaluated)*
- *Searsia lancea (LC)*
- *Seddera capensis (LC)*
- *Selago densiflora (LC)*
- *Senegalia mellifera subsp. detinens (LC)*
- *Senna italica subsp. arachoides (LC)*
- *Setaria sphacelata var. torta (LC)*
- *Sida chrysantha (LC)*
- *Sida dregei (LC)*
- *Solanum campylacanthum (LC)*
- *Solanum elaeagnifolium (Not Evaluated)*
- *Solanum lichtensteinii (LC)*
- *Tagetes minuta (Not Evaluated)*
- *Tarchonanthus camphoratus (LC)*
- *Themeda triandra (LC)*
- *Tragus berteronianus (LC)*
- *Urochloa mosambicensis (LC)*
- *Vachellia robusta subsp. robusta (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Verbena officinalis (Not Evaluated)*
- *Zinnia peruviana (Not Evaluated)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.4. Dichanthium annulatum - Brachiaria brizantha Pasture

This plant community type is located in the western section of the proposed development site. It is one of the largest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Dichanthium annulatum var. papillosum* (LC), *Brachiaria brizantha* (LC), *Urochloa mosambicensis* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida canescens subsp. canescens* (LC), *Asparagus cooperi* (LC), and *Eragrostis lehmanniana var. lehmanniana* (LC).

This plant community type did not have a very high number of unique species, and the majority of species were shared with other plant community types (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site).

No SCC or protected plant species were observed. However, 7 alien species was / were also observed, including 2 NEM:BA A&IS Regulations listed species, namely *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi) and *Solanum sisymbriifolium* (Wild tomato, Dense- thorned bitter apple; Category 1b).

This plant community type is considered as very low in sensitivity since there are no SCC or protected plant species present. The low number of unique species also contributes to this sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Alternanthera pungens (Not Evaluated)*
- *Aristida canescens subsp. canescens (LC)*
- *Aristida stipitata subsp. stipitata (LC)*
- *Asparagus cooperi (LC)*
- *Brachiaria brizantha (LC)*
- *Chloris virgata (LC)*
- *Clematis brachiata (LC)*
- *Corchorus asplenifolius (LC)*
- *Crotalaria lotoides (LC)*
- *Cymbopogon caesius (LC)*
- *Dichanthium annulatum var. papillosum (LC)*
- *Eragrostis curvula (LC)*
- *Eragrostis lehmanniana var. lehmanniana (LC)*
- *Erigeron bonariensis (Not Evaluated)*
- *Grewia flava (LC)*
- *Heliotropium nelsonii (LC)*
- *Hermannia boraginiflora (LC)*
- *Hermannia depressa (LC)*
- *Hermannia grisea (LC)*
- *Hermbstaedtia fleckii (LC)*
- *Heteropogon contortus (LC)*
- *Hibiscus calyphyllus (LC)*
- *Hibiscus cannabinus (LC)*
- *Hibiscus trionum (Not Evaluated)*

- *Hirpicium bechuanense (LC)*
- *Lycium schizocalyx (LC)*
- *Melinis repens subsp. repens (LC)*
- *Nidorella resedifolia subsp. resedifolia (LC)*
- *Opuntia ficus-indica (Not Evaluated)*
- *Osteospermum muricatum subsp. muricatum (LC)*
- *Panicum maximum (LC)*
- *Ruellia patula (LC)*
- *Schkuhria pinnata (Not Evaluated)*
- *Sida chrysantha (LC)*
- *Sida dregei (LC)*
- *Sida rhombifolia ()*
- *Solanum campylacanthum (LC)*
- *Solanum lichtensteinii (LC)*
- *Solanum sisymbriifolium (Not Evaluated)*
- *Tagetes minuta (Not Evaluated)*
- *Tragus berteronianus (LC)*
- *Urochloa mosambicensis (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.5. Panicum maximum - Urochloa mosambicensis Pasture

This plant community type is located near the northwestern boundary of the proposed development site and is a relatively small plant community type, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Panicum maximum* (LC), *Urochloa mosambicensis* (LC), *Digitaria eriantha* (LC), *Brachiaria brizantha* (LC), *Dichanthium annulatum var. papillosum* (LC), *Enneapogon cenchroides* (LC), and *Eragrostis curvula* (LC).

This plant community type had only one unique species (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site). It also had the second lowest number of species of all plant community types on site.

No SCC, protected plant species, NEM:BA A&IS Regulations listed species were observed in this plant community type. Only 3 alien species were observed.

This plant community type is considered as very low in sensitivity since there are no SCC or protected plant species present. The low number of unique species, as well as overall low richness, also contributes to this communities' very low sensitivity rating.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Alternanthera pungens (Not Evaluated)*
- *Aristida congesta subsp. congesta (LC)*

- *Brachiaria brizantha (LC)*
- *Cenchrus ciliaris (LC)*
- *Crotalaria sphaerocarpa subsp. sphaerocarpa (LC)*
- *Cynodon dactylon (LC)*
- *Dactyloctenium giganteum (LC)*
- *Dichanthium annulatum var. papillosum (LC)*
- *Digitaria eriantha (LC)*
- *Enneapogon cenchroides (LC)*
- *Eragrostis curvula (LC)*
- *Eragrostis lehmanniana var. lehmanniana (LC)*
- *Heteropogon contortus (LC)*
- *Panicum maximum (LC)*
- *Schkuhria pinnata (Not Evaluated)*
- *Solanum campylacanthum (LC)*
- *Tagetes minuta (Not Evaluated)*
- *Urochloa mosambicensis (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.6. Themeda triandra - Ziziphus mucronata

This plant community type is located near the north-central boundary of the proposed development site. It is dominated by *Themeda triandra* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Cymbopogon caesius* (LC), *Vachellia karroo* (LC), *Asparagus laricinus* (LC), *Cenchrus ciliaris* (LC), *Cynodon dactylon* (LC), and *Nidorella resedifolia subsp. resedifolia* (LC). This plant community type had moderate number of unique species (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site).

No SCC, protected plant species, or NEM:BA A&IS Regulations listed species were observed in this plant community type. However, 5 alien species were found.

This plant community type is considered as low in sensitivity since there are no SCC or protected plant species present. The moderate number of unique species prevents if from being "very low" in sensitivity rating, since these do not occur in other plant community types.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Aristida adscensionis (LC)*
- *Aristida transvaalensis (LC)*
- *Asparagus laricinus (LC)*
- *Berkheya radula (LC)*
- *Bidens pilosa (Not Evaluated)*
- *Cenchrus ciliaris (LC)*
- *Chenopodium album (Not Evaluated)*
- *Chloris virgata (LC)*
- *Cymbopogon caesius (LC)*
- *Cynodon dactylon (LC)*
- *Digitaria eriantha (LC)*
- *Eragrostis lehmanniana var. lehmanniana (LC)*
- *Gomphocarpus fruticosus subsp. fruticosus (LC)*
- *Gomphrena celosioides (Not Evaluated)*
- *Hermannia depressa (LC)*

- *Heteropogon contortus (LC)*
- *Hyparrhenia hirta (LC)*
- *Indigofera oxytropis (LC)*
- *Melinis repens subsp. repens (LC)*
- *Nidorella resedifolia subsp. resedifolia (LC)*
- *Ocimum obovatum (LC)*
- *Oenothera rosea (Not Evaluated)*
- *Osteospermum muricatum subsp. muricatum (LC)*
- *Oxalis latifolia (Not Evaluated)*
- *Panicum coloratum ()*
- *Panicum maximum (LC)*
- *Searsia lancea (LC)*
- *Senegalia mellifera subsp. detinens (LC)*
- *Sida dregei (LC)*
- *Themeda triandra (LC)*
- *Vachellia karroo (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.7. Vachellia tortilis - Heteropogon contortus: A (Eragrostis lehmanniana)

This plant community type is located near the extreme northeastern boundary of the proposed development site. It is one of the smallest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Eragrostis lehmanniana var. lehmanniana* (LC), *Vachellia tortilis subsp. heteracantha* (LC), *Heteropogon contortus* (LC), *Panicum maximum* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida congesta subsp. congesta* (LC), *Cenchrus ciliaris* (LC), and *Cymbopogon caesius* (LC), and had a very low number of unique species (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site).

No SCC, or NEM:BA A&IS Regulations listed species were observed in this plant community type. However, one protected plant species was found, namely *Boscia albitrunca* (LC; Nationally Protected Tree), as well as 5 alien species were found. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely. This plant community type is considered as having a medium in sensitivity rating.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Achyranthes aspera var. aspera (Not Evaluated)*
- *Acrotome inflata (LC)*
- *Albuca glauca (LC)*
- *Aloe greatheadii (LC)*
- *Alternanthera pungens (Not Evaluated)*
- *Aptosimum elongatum (LC)*
- *Aristida canescens subsp. canescens (LC)*
- *Aristida congesta subsp. barbicollis (LC)*
- *Aristida congesta subsp. congesta (LC)*

- *Aristida stipitata subsp. stipitata (LC)*
- *Barleria macrostegia (LC)*
- *Bidens pilosa (Not Evaluated)*
- *Boscia albitrunca (LC; Nationally Protected Tree)*
- *Cenchrus ciliaris (LC)*
- *Cereus jamacaru (Not Evaluated)*
- *Chamaecrista comosa var. comosa (LC)*
- *Chloris virgata (LC)*
- *Clematis brachiata (LC)*
- *Combretum hereroense subsp. hereroense (LC)*
- *Commelina africana var. krebsiana (LC)*
- *Commelina benghalensis (LC)*
- *Corbichonia decumbens (LC)*
- *Corchorus asplenifolius (LC)*
- *Corchorus kirkii (LC)*
- *Crabbea angustifolia (LC)*
- *Cymbopogon caesius (LC)*
- *Dichrostachys cinerea subsp. africana (LC)*
- *Digitaria eriantha (LC)*
- *Enneapogon cenchroides (LC)*
- *Eragrostis lehmanniana var. lehmanniana (LC)*
- *Eragrostis trichophora (LC)*
- *Erigeron bonariensis (Not Evaluated)*
- *Geigeria burkei subsp. burkei var. burkei (Not Evaluated)*
- *Gomphrena celosioides (Not Evaluated)*
- *Grewia flava (LC)*
- *Heliotropium nelsonii (LC)*
- *Hermannia boraginiflora (LC)*
- *Hermannia depressa (LC)*
- *Hermannia grisea (LC)*
- *Heteropogon contortus (LC)*
- *Hibiscus calyphyllus (LC)*
- *Hibiscus trionum (Not Evaluated)*
- *Indigofera delagoaensis (LC)*
- *Indigofera hilaris var. hilaris (LC)*
- *Indigofera holubii (LC)*
- *Indigofera oxytropis (LC)*
- *Lippia javanica (LC)*
- *Lycium schizocalyx (LC)*
- *Melinis repens subsp. repens (LC)*
- *Nidorella resedifolia subsp. resedifolia (LC)*
- *Ocimum angustifolium (LC)*
- *Opuntia ficus-indica (Not Evaluated)*
- *Osteospermum muricatum subsp. muricatum (LC)*
- *Panicum maximum (LC)*
- *Pergularia daemia subsp. daemia (LC)*
- *Phyllanthus incurvus (LC)*
- *Phyllanthus parvulus var. parvulus (LC)*
- *Rhoicissus tridentata (LC)*
- *Rhynchosia totta var. totta (LC)*
- *Ruellia patula (LC)*
- *Schkuhria pinnata (Not Evaluated)*
- *Searsia lancea (LC)*
- *Senegalia mellifera subsp. detinens (LC)*
- *Sida chrysantha (LC)*
- *Sida cordifolia subsp. cordifolia (LC)*
- *Sida dregei (LC)*
- *Solanum campylacanthum (LC)*
- *Solanum lichtensteinii (LC)*
- *Tagetes minuta (Not Evaluated)*
- *Tarchonanthus camphoratus (LC)*
- *Tribulus terrestris (LC)*
- *Urochloa mosambicensis (LC)*
- *Vachellia robusta subsp. robusta (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Waltheria indica (LC)*
- *Zinnia peruviana (Not Evaluated)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.8. Ziziphus mucronata - Cymbopogon caesius: A (Grewia flava)

This plant community type covers the lower half of the proposed development site. It is the largest plant community type, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Cymbopogon caesius* (LC), *Grewia flava* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida canescens subsp. canescens* (LC), *Aristida congesta subsp. congesta* (LC), *Searsia lancea* (LC), and *Vachellia robusta subsp. robusta* (LC).

This plant community type had a moderate number of unique species, which were not shared with other plant community types (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site). Also, it had the highest number of species (126) of all the plant community types in the proposed development site.

No SCC were observed. However, 2 protected plant species were observed, namely *Boscia albitrunca* (LC; Nationally Protected Tree) and *Spirostachys africana* (LC; Protected [Provincial Schedule 2]). Furthermore, 13 alien species was / were also observed, including 4 NEM:BA A&IS Regulations listed species, namely *Cereus jamacaru* (Queen of the night; Category 1b), *Datura ferox* (Large thorn apple; Category 1b), *Flaveria bidentis* (Smelter's-bush; Category 1b), and *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi).

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Achyranthes aspera var. aspera (Not Evaluated)*
- *Achyropsis leptostachya (LC)*
- *Acrotome inflata (LC)*
- *Albuca glauca (LC)*
- *Aloe greatheadii (LC)*
- *Alternanthera pungens (Not Evaluated)*
- *Ammocharis coranica (LC)*
- *Aptosimum elongatum (LC)*
- *Aristida bipartita (LC)*
- *Aristida canescens subsp. canescens (LC)*
- *Aristida congesta subsp. barbicollis (LC)*
- *Aristida congesta subsp. congesta (LC)*
- *Asparagus cooperi (LC)*
- *Asparagus suaveolens (LC)*
- *Barleria macrostegia (LC)*
- *Bidens pilosa (Not Evaluated)*
- *Blepharis maderaspatensis (LC)*
- *Boscia albitrunca (LC; Nationally Protected Tree)*
- *Cadaba termitaria (LC)*
- *Carissa bispinosa (LC)*
- *Celtis africana (LC)*

- *Cereus jamacaru (Not Evaluated)*
- *Chaetacanthus costatus (LC)*
- *Chamaecrista comosa var. comosa (LC)*
- *Chascanum hederaceum var. hederaceum (LC)*
- *Chloris virgata (LC)*
- *Chlorophytum cooperi (LC)*
- *Chlorophytum galpinii var. galpinii (LC)*
- *Clematis brachiata (LC)*
- *Commelina africana var. krebsiana (LC)*
- *Commelina benghalensis (LC)*
- *Corbichonia decumbens (LC)*
- *Corchorus asplenifolius (LC)*
- *Corchorus kirkii (LC)*
- *Cordylostigma longifolium (LC)*
- *Crabbea angustifolia (LC)*
- *Crabbea hirsuta (LC)*
- *Crotalaria lotoides (LC)*
- *Cymbopogon caesius (LC)*
- *Cynodon dactylon (LC)*
- *Cyphocarpa angustifolia ()*
- *Cyphostemma lanigerum (LC)*
- *Dactyloctenium giganteum (LC)*
- *Datura ferox (Not Evaluated)*
- *Dichanthium annulatum var. papillosum (LC)*
- *Dicliptera minor subsp. minor (LC)*
- *Digitaria eriantha (LC)*
- *Diospyros lycioides subsp. lycioides (LC)*
- *Dipcadi gracillimum (LC)*
- *Dyschoriste setigera (LC)*
- *Eragrostis curvula (LC)*
- *Eragrostis rigidior (LC)*
- *Eragrostis trichophora (LC)*
- *Erigeron bonariensis (Not Evaluated)*
- *Euclea crispa subsp. crispa (LC)*
- *Felicia muricata subsp. muricata (LC)*
- *Flaveria bidentis (Not Evaluated)*
- *Geigeria burkei subsp. burkei var. burkei (Not Evaluated)*
- *Gladiolus permeabilis subsp. edulis (LC)*
- *Gomphocarpus fruticosus subsp. fruticosus (LC)*
- *Gomphrena celosioides (Not Evaluated)*
- *Grewia flava (LC)*
- *Grewia retinervis (LC)*
- *Gymnosporia buxifolia (LC)*
- *Helichrysum argyrosphaerum (LC)*
- *Heliotropium nelsonii (LC)*
- *Hermannia grisea (LC)*
- *Hermbstaedtia fleckii (LC)*
- *Heteropogon contortus (LC)*
- *Hibiscus calyphyllus (LC)*
- *Hibiscus trionum (Not Evaluated)*
- *Indigofera delagoaensis (LC)*
- *Indigofera hilaris var. hilaris (LC)*
- *Indigofera holubii (LC)*
- *Indigofera zeyheri (LC)*
- *Ipomoea bolusiana (LC)*
- *Ipomoea magnusiana (LC)*
- *Justicia flava (LC)*
- *Kalanchoe lanceolata (LC)*
- *Kleinia longiflora (LC)*
- *Ledebouria luteola (LC)*
- *Leobordea divaricata (LC)*
- *Lippia javanica (LC)*
- *Lycium schizocalyx (LC)*
- *Melinis repens subsp. repens (LC)*
- *Momordica balsamina (LC)*
- *Nidorella resedifolia subsp. resedifolia (LC)*
- *Ocimum americanum var. americanum (LC)*
- *Ocimum obovatum (LC)*
- *Olea europaea subsp. africana (LC)*
- *Opuntia ficus-indica (Not Evaluated)*
- *Osteospermum muricatum subsp. muricatum (LC)*
- *Panicum maximum (LC)*
- *Peltophorum africanum (LC)*

- *Pergularia daemia subsp. daemia (LC)*
- *Phyllanthus incurvus (LC)*
- *Phyllanthus parvulus var. parvulus (LC)*
- *Pterodiscus speciosus (LC)*
- *Rhynchosia minima (LC)*
- *Rhynchosia totta var. totta (LC)*
- *Ruellia patula (LC)*
- *Schkuhria pinnata (Not Evaluated)*
- *Searsia lancea (LC)*
- *Searsia pyroides var. pyroides (LC)*
- *Seddera capensis (LC)*
- *Senegalia caffra (LC)*
- *Senegalia mellifera subsp. detinens (LC)*
- *Setaria sphacelata var. torta (LC)*
- *Solanum campylacanthum (LC)*
- *Solanum lichtensteinii (LC)*
- *Spirostachys africana (LC; Protected [Provincial Schedule 2])*
- *Tagetes minuta (Not Evaluated)*
- *Tarchonanthus camphoratus (LC)*
- *Teucrium trifidum (LC)*
- *Themeda triandra (LC)*
- *Tragia dioica (LC)*
- *Tragus berteronianus (LC)*
- *Tribulus terrestris (LC)*
- *Urochloa mosambicensis (LC)*
- *Urochloa panicoides (LC)*
- *Vachellia robusta subsp. robusta (LC)*
- *Vachellia tenuispina (LC)*
- *Vachellia tortilis subsp. heteracantha (LC)*
- *Waltheria indica (LC)*
- *Zinnia peruviana (Not Evaluated)*
- *Ziziphus mucronata subsp. mucronata (LC)*

6.1.9. Ziziphus mucronata - Cymbopogon caesius: B (Eragrostis lehmanniana)

This plant community type is located mostly near the north-central boundary section of the proposed development site, but also occurs as scattered patches throughout the site.

The plant community type is dominated by *Cymbopogon caesius* (LC), *Cenchrus ciliaris* (LC), *Eragrostis lehmanniana var. lehmanniana* (LC), *Grewia flava* (LC), *Heteropogon contortus* (LC), *Panicum maximum* (LC), *Themeda triandra* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida congesta subsp. congesta* (LC), and *Digitaria eriantha* (LC).

Despite having the second highest number of species, this community did not have a very high number of unique species, and the majority of species were shared with other plant community types (see "%Unique" in **Error! Reference source not found.** and compare with the other plant community types found in the proposed development site).

No SCC were observed. However, 1 protected plant species was observed, namely *Euphorbia inaequilatera* (LC; Protected [Provincial Schedule 2]). Furthermore, 11 alien species was / were also observed, including 2 NEM:BA A&IS Regulations listed species, namely *Malvastrum coromandelianum* (Prickly malvastrum; Category 1b) *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b).

The low number of unique species contributes to this communities' low sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Acrotome hispida (LC)*
- *Acrotome inflata (LC)*
- *Albuca glauca (LC)*
- *Aloe greatheadii (LC)*
- *Alternanthera pungens (Not Evaluated)*
- *Ammocharis coranica (LC)*
- *Aptosimum elongatum (LC)*
- *Aristida congesta subsp. congesta (LC)*
- *Asparagus laricinus (LC)*
- *Barleria macrostegia (LC)*
- *Bidens pilosa (Not Evaluated)*
- *Blepharis maderaspatensis (LC)*
- *Cenchrus ciliaris (LC)*
- *Ceratotheca triloba (LC)*
- *Chamaecrista comosa var. comosa (LC)*
- *Chloris virgata (LC)*
- *Clematis brachiata (LC)*
- *Commelina africana var. krebsiana (LC)*
- *Convolvulus sagittatus (LC)*
- *Corchorus asplenifolius (LC)*
- *Cordylostigma longifolium (LC)*
- *Crotalaria lotoides (LC)*
- *Cymbopogon caesius (LC)*
- *Cynodon dactylon (LC)*
- *Digitaria eriantha (LC)*
- *Diospyros lycioides subsp. lycioides (LC)*
- *Eragrostis curvula (LC)*
- *Eragrostis lehmanniana var. lehmanniana (LC)*
- *Eragrostis rigidior (LC)*
- *Eragrostis superba (LC)*
- *Eragrostis trichophora (LC)*
- *Erigeron bonariensis (Not Evaluated)*
- *Euphorbia inaequilatera (LC; Protected [Provincial Schedule 2])*
- *Evolvulus alsinoides (LC)*
- *Felicia muricata subsp. muricata (LC)*
- *Geigeria burkei subsp. burkei var. burkei (Not Evaluated)*
- *Gladiolus permeabilis subsp. edulis (LC)*
- *Gomphocarpus fruticosus subsp. fruticosus (LC)*
- *Gomphrena celosioides (Not Evaluated)*
- *Grewia flava (LC)*
- *Helichrysum argyrosphaerum (LC)*
- *Heliotropium nelsonii (LC)*
- *Heliotropium ovalifolium (LC)*
- *Hermannia boraginiflora (LC)*
- *Hermbstaedtia fleckii (LC)*
- *Heteropogon contortus (LC)*
- *Hibiscus aethiopicus var. aethiopicus (LC)*
- *Hibiscus calyphyllus (LC)*
- *Hibiscus trionum (Not Evaluated)*
- *Hirpicium bechuanense (LC)*
- *Hyparrhenia hirta (LC)*
- *Indigofera comosa (LC)*
- *Indigofera hilaris var. hilaris (LC)*
- *Indigofera zeyheri (LC)*
- *Ipomoea obscura var. obscura (LC)*
- *Ledebouria luteola (LC)*
- *Ledebouria marginata (LC)*
- *Limeum sulcatum var. sulcatum (LC)*
- *Lippia javanica (LC)*
- *Lycium schizocalyx (LC)*
- *Malvastrum coromandelianum (Not Evaluated)*

- *Melinis repens subsp. repens (LC)*
- *Momordica balsamina (LC)*
- *Nidorella resedifolia subsp. resedifolia (LC)*
- *Ocimum angustifolium (LC)*
- *Olea europaea subsp. africana (LC)*
- *Osteospermum muricatum subsp. muricatum (LC)*
- *Panicum maximum (LC)*
- *Pappea capensis (LC)*
- *Pergularia daemia subsp. daemia (LC)*
- *Phyllanthus incurvus (LC)*
- *Phyllanthus parvulus var. parvulus (LC)*
- *Rhynchosia minima (LC)*
- *Rhynchosia totta var. totta (LC)*
- *Ruellia patula (LC)*
- *Schkuhria pinnata (Not Evaluated)*
- *Searsia lancea (LC)*
- *Searsia pyroides var. pyroides (LC)*
- *Seddera capensis (LC)*
- *Selago densiflora (LC)*
- *Senegalia caffra* (LC)
- *Senegalia mellifera subsp. detinens* (LC)
- *Senna italica subsp. arachoides* (LC)
- *Setaria sphacelata var. torta* (LC)
- *Sida dregei* (LC)
- *Solanum campylacanthum (LC)*
- *Solanum elaeagnifolium* (Not Evaluated)
- *Solanum lichtensteinii* (LC)
- *Tagetes minuta* (Not Evaluated)
- *Tephrosia longipes* ()
- *Themeda triandra* (LC)
- *Tragus berteronianus* (LC)
- *Tribulus terrestris* (LC)
- *Trochomeria macrocarpa subsp. macrocarpa* (LC)
- *Urochloa mosambicensis* (LC)
- *Vachellia karroo* (LC)
- *Vachellia robusta subsp. robusta* (LC)
- *Vachellia tortilis subsp. heteracantha* (LC)
- *Verbena officinalis* (Not Evaluated)
- *Zinnia peruviana* (Not Evaluated)
- *Ziziphus mucronata subsp. mucronata* (LC)

6.2. Plant Species of Conservation Concern

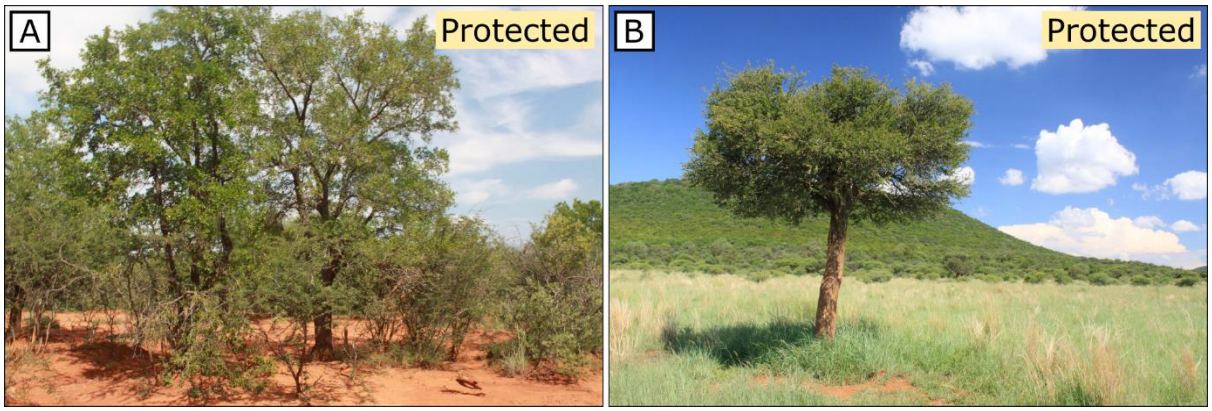

Figure 31: Selected examples of protected plant species found in the plant community types. A) *Spirostachys africana* and B) *Boscia albitrunca*. No plant SoCC were found in the proposed development site.

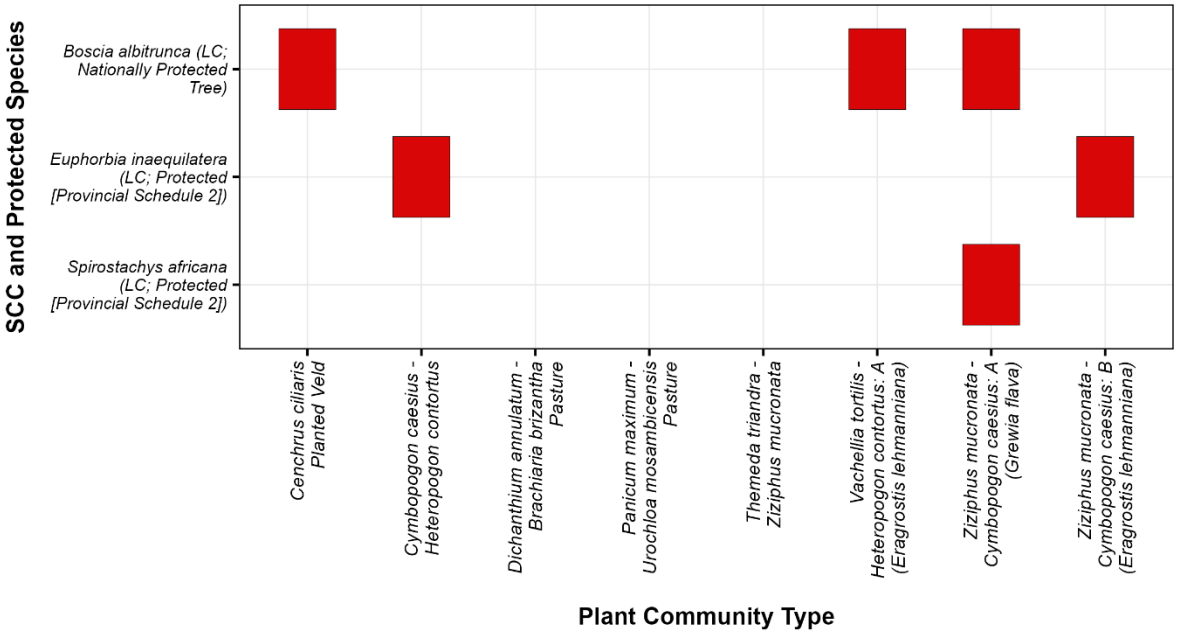

Figure 32: Presence/absence matrix of plant SCC for each plant community type within the proposed development site and broader surrounds. The presence of a red block indicates the presence of the respective plant SCC within the respective plant community type. This figure serves as a highly useful reference to visually determine either how many (and which) species occurred in a specific plant community type, or in how many (and which) plant community types a specific species occurred.

Ground truthing confirmed that no SCC occur within the proposed development site and surrounds. However, this does not mean that no SoCC can occur within the proposed development site and surrounds, and thus care must still be taken to keep an eye out for any such SoCC.

Furthermore, a total of 3 protected plant species were observed, namely:

- *Boscia albitrunca (Nationally Protected Tree)*
- *Euphorbia inaequilatera (Provincial Schedule 2)*
- *Spirostachys africana (Provincial Schedule 2)*

Care must be taken to avoid any of these species, should they be found. It is recommended that a pre-construction walkthrough be undertaken by a qualified botanist prior to commencement of construction. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely.

6.3. Alien Plant Species

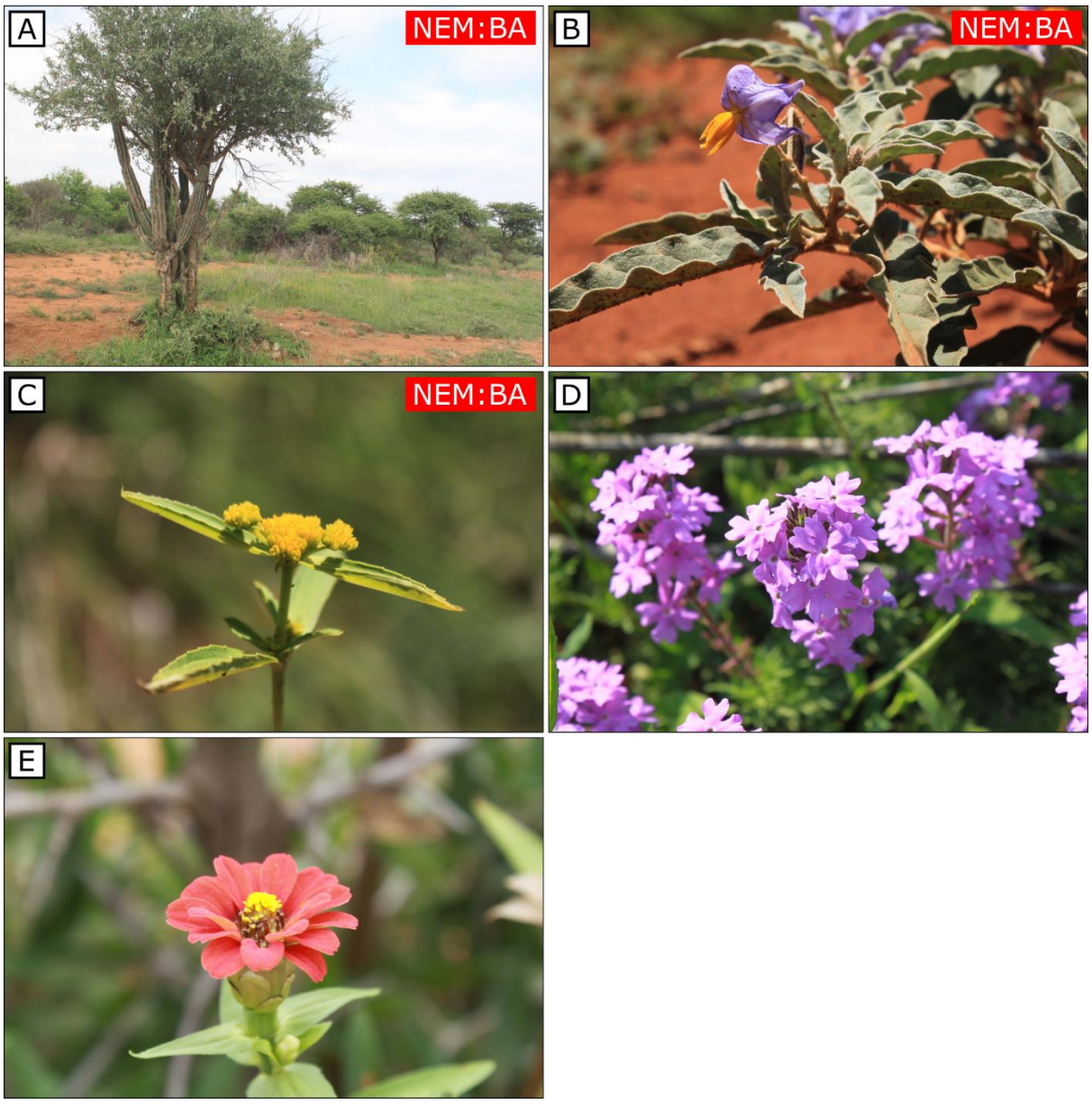

Figure 33: Selected weed and alien plant species that were observed in proposed development site. A) *Cereus jamacaru* (Queen of the night; Category 1b), B) *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b), C) *Flaveria bidentis* (Smelter's-bush; Category 1b), D) *Verbena aristigera*, and E) *Zinnia peruviana*.

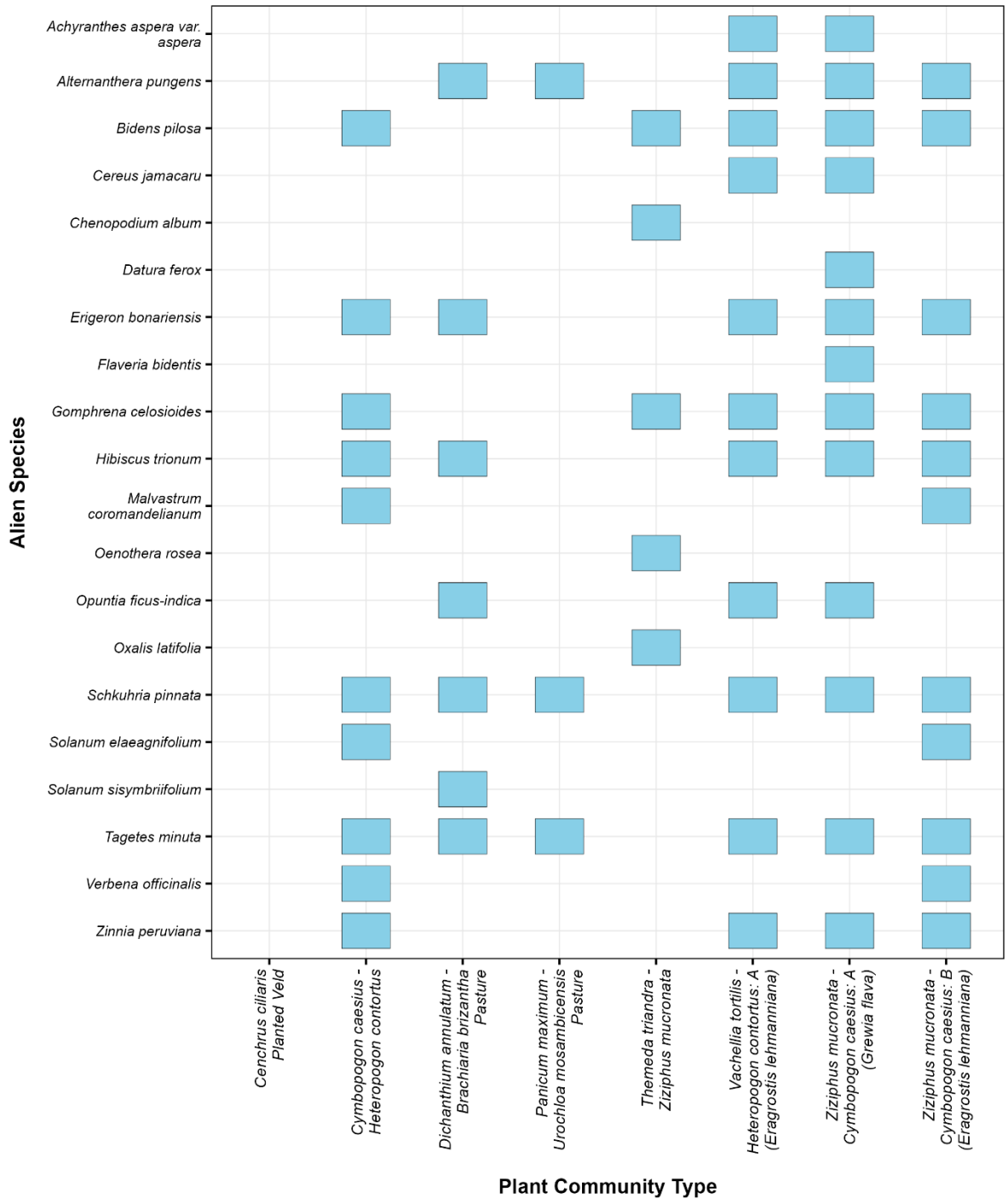

Figure 34: Presence/absence matrix of alien plant species for each plant community type within the proposed development site and broader surrounds. The presence of a blue block indicates the presence of the respective alien plant species within the respective plant community type. This figure serves as a highly useful reference to visually determine either how many (and which) species occurred in a specific plant community type, or in how many (and which) plant community types a specific species occurred.

A total of 20 alien plant species were found within the proposed development site, of which 7 are NEM:BA A&IS Regulations listed invasive species, namely:

- *Cereus jamacaru (Queen of the night; Category 1b)*
- *Datura ferox (Large thorn apple; Category 1b)*
- *Flaveria bidentis (Smelter's-bush; Category 1b)*
- *Malvastrum coromandelianum (Prickly malvastrum; Category 1b)*
- *Opuntia ficus-indica (Mission prickly pear, Sweet prickly pear; Category Multi)*
- *Solanum elaeagnifolium (Silver-leaf bitter apple; Category 1b)*
- *Solanum sisymbriifolium (Wild tomato, Dense- thorned bitter apple; Category 1b)*

Cereus jamacaru: A serious invader in many parts of South Africa, especially in the savanna biome, but it also invades grasslands, karoo, and rocky ridges. It can be difficult to distinguish from other cacti in the *Cereus hexagonus* complex; for example, it is possible that some specimens might be *C. hildmannianus* subsp. *uruguayanus* and that it might even be interbreeding with *C. jamacaru*. This species has large, attractive white flowers that open at night during springtime, and its seeds are spread by birds and monkeys that consume the fruit. Subsequently, excreted seeds fall and germinate under trees where the monkeys and birds sit. It mainly invades open veld where it grows under and among trees. It can replace indigenous vegetation and also prevents animals from accessing food and shade. Branches that are removed possess the capacity to root and form new plants. Any fragments of this species should therefore be burned, and not translocated to be discarded elsewhere, since these fragments will inevitably form new plants and might potentially form new invasive populations. Small pants can be sprayed with appropriate weed killers, while larger plants can be injected with MSMA. Plants can be chopped down, but as mentioned all fragments must be thoroughly destroyed, and stem bases must be dug out and also appropriately destroyed. The biocontrol stem borer *Alcidion cereicola* has proved to be somewhat successful. Nevertheless, every effort must be made to eradicate this species wherever it is found.

Datura ferox: A serious annual weed of many crops in South Africa, as well as an invader of wastelands and disturbed areas, roadsides, and riverbanks. Seeds and seedlings are poisonous to humans, with deaths having been recorded as resulting from deliberate or accidental ingestions (from there the colloquial name "malpitte", translated directly as "crazy seeds" or "crazy kernels", and alluding to the hallucinogenic effects that manifest after ingestion). These highly poisonous seeds can have a major negative impact on agricultural produce. A single seed per 10 kg of maize is enough to cause a grain buyer to reject a crop. This is roughly equivalent to one plant per hectare, which serves to demonstrate the impact that this noxious weed can have. Furthermore, the leaves, flowers, and fruits can cause skin irritations. The plants very aggressive growers and can quickly outgrow and outcompete other plants. They are very difficult to manage in maize fields, especially when using pre-emergence herbicides, since the plants are deep germinators, thus allowing them to elude the effects of the herbicides.

Flaveria bidentis: A native of tropical America, it is a semi-herbaceous annual up to 1 m high with sparsely hairy, yellowish, or orange stems, and bluish green, opposite, stalkless to shortly stalked leaves with finely toothed margins and that are prominently

3-veined from the base. Flowerheads are dark yellow, and dense, and are axillary or terminal, stalkless or stalked. It flowers mostly in summer, but also all year round. The species was probably introduced in imported fodder during the Anglo-Boer War. It has spread rapidly in South Africa and is most common in northern and eastern Mpumalanga, the Northern Cape, and Namibia, but is found throughout the country with the exception of the southern and Eastern Cape. It invades roadsides, rail sides, cultivated lands, waste ground, overgrazed land, riverbanks, floodplains, and wetlands, and is widespread in South Africa. It is a common annual weed of crops, gardens, and waste places, occasionally becoming dense and competitive. This species is fortunately very easy to control with shallow cultivation and conventional herbicides.

Malvastrum coromandelianum: This is a variable perennial or annual weed, native to North America. It is an erect herb up to 1 m high with tough stems that are often purplish and with long, silvery, appressed hairs. It has green, ovate to lanceolate leaves with venation conspicuously sunken on the upper surface, and with a coarsely toothed margin. Flowers are yellow and solitary or a few clustered in leaf axils. It does not have any thorns or prickles but is rather tough and leathery. It should not be confused with *Sida cordifolia*, which it resembles strongly. *Malvastrum coromandelianum* is a common and sometimes serious weed of roadsides, orchards, waste places, disturbed sites, cultivated lands, savanna, wetlands, riverbanks, and perennial crops in the summer-rainfall region, with the exception of the Free State. It is very drought resistant, and can be found growing on dry road shoulders where other weeds may perish. Very few herbicides are registered for its control, although it is probably susceptible to conventional herbicides, but only if sprayed when young. Seedlings can be removed by shallow cultivation, but mature plants are very difficult to pull up.

Opuntia ficus-indica: One of several species introduced from Central America. It is mainly used for hedging and its fruit. The species propagates easily from leaf pads (technically called "cladodes") and fragments; even small pieces can take root. The species can become an aggressive invader, and land that is heavily infested can be rendered virtually useless. Although some cultivars and varieties are supposedly non-invasive, certain spineless cultivars can potentially revert back to spiny forms and become invasive. The small spines on the fruit of these plants are highly irritating. Stock and game readily browse the leaf pads. This species can be controlled with herbicides such as MSMA and glyphosate. Biological control with cactoblastis and cochineal has been highly successful, and dense infestations have fortunately become very rare and sporadic. Nevertheless, every effort should be made to remove and eradicate this species wherever it occurs naturally.

Solanum elaeagnifolium: A herbaceous shrublet, from North, Central, and South America, 30 – 60 cm high with annual stems and perennial, deep, spreading roots. It has characteristic reddish prickles on the stems and undersides of leaves, but these can be absent. Leaves are greyish green above, often wavy, and folded upwards along the margins to expose silvery or whitish undersurfaces. Flowers are mauve, blue, or white, and eventually yield small yellow berries. It was recorded in South Africa in 1952, although some authorities believe it was identified at Wolmaransstad as early as 1919. It

was probably introduced from the Americas with hay and has now spread to large parts of the Free State, Mpumalanga, and the Eastern and southwestern Cape. This species is an important perennial weed and invasive species that occurs mainly on disturbed and ploughed soil, neglected lands, in grazing camps, along roads, and in water furrows. Firebreaks that have been ploughed or disked along fence lines provide an ideal environment for the seeds dropped by birds perching on fences. In cultivated land it can completely swamp the crop. Young fruits and leaves are poisonous and has been suspected as being a source of potato viruses. In recent years the government has spent large sums of money on the control of *S. elaeagnifolium* but without much success. Its very extensive root system, which penetrates to depths of up to 3 m or more, and its ability to propagate from its roots, make this an extremely difficult weed to control. Fluroxypyr is registered as a foliar application. Biological control is showing promise and several defoliating beetles are being studied by the Department of Agriculture. The plants, with as much of the root as possible, should be removed before seeds are formed. Continuous removal will debilitate the plant and prevent the roots from forming shoots.

Solanum sisymbriifolium: A much-branched, very spiny, low shrub 0.5 – 1.5 m high, with an extensive root system; all parts are covered with sticky, glandular hair and bright orange-red to brown-yellow spines up to 2 cm long. Leaves are dull green, spiny, glandular-hairy, deeply pinnately lobed and toothed, and up to 20 cm long, with spines mainly on midrib and veins. Flowers are white, cream, or bluish; the species flowers all year. Fruits are shiny berries, green turning bright red and about 1.5 cm across. This species was introduced from South America during the Anglo-Boer War. It is a spiny, woody shrub, with a very extensive root system that is highly resistant to nematodes. As such, it is used as a trap crop for potato cyst nematode in the United Kingdom. If often grows along fences in open veld, as this is where birds that have eaten the fruit will sit and deposit the seeds. Many other species of *Solanum* are often referred to as "bitter apple" or "wild tomato". Many of them have thorns on the stems and the leaves. Some of them are toxic, with unripe fruit being more toxic than ripe fruit. The ripe fruit does not fall off easily and often remains on the plant in winter when they are then spread around in hay or by birds and other animals that consume them. This species occurs in roadsides, orchards, and tramped-out veld, and also invades wastelands, disturbed grassland, agricultural lands, and forestry plantations. It is a very resilient and aggressive invader. Once established, it is very difficult to remove and can replace large areas of indigenous vegetation. *Solanum sisymbriifolium* can be controlled with a foliar application of triclopyr. Unfortunately, this is an expensive operation. Biocontrol investigations are under way, but so far with minimal success.

6.4. Terrestrial Site Ecological Importance

Refer to Section **Error! Reference source not found.** for a description of the Relative Plant Species Theme Sensitivity and Relative Biodiversity Theme Sensitivity as described and classified within the DFFE Environmental Screening Tool as well as Section 40 for remarks based on on-site findings (verification/disproving) regarding the components and features underlying the various Environmental Planning Frameworks that underpin the

findings and mapping of the Relative Biodiversity Theme Sensitivity within the screening tool.

Field observations, together with the SEI assessment presented here, indicated that the bulk of the PAOI is regarded as of "Low" sensitivity (64%) (Figure 35 and Table 21). The bulk of the "Low" sensitive area have been moderately to largely modified through anthropogenic intervention in the form of brush/tree management/control (thinning out) in order to improve the grazing potential of these rangelands. Severe historical livestock overgrazing has resulted in some small patches becoming bare/devoid of vegetation, exposing these areas to soil capping/compaction. Fairly recent underutilization of these areas has resulted in *Cymbopogon caesius* becoming the dominant species. No plant Species of Conservation Concern (SCC) or highly range restricted species/populations that are dependent on these habitats for survival, have been recorded within these areas and due to limited habitat suitability, there are some potential habitat for plant SCC.

Natural to near-natural savannas have also been classified as "Low" sensitive. These areas contain vegetation consistent with the Zeerust Thornveld. Livestock (cattle) grazing is the most significant impact within these areas, with these areas being subjected to livestock grazing for a very long period. These habitats have been subjected to fairly frequent periods of overgrazing and have resulted in some transformation of the vegetation composition, including the encroachment of woody shrubs and trees. Land use practices within the area (intensive game breeding and cultivation) as well as road infrastructure, have resulted in natural areas being highly fragmented. Only a small area of natural/near-natural habitat (< 11.6 ha) will be impacted by the proposed grid infrastructure. No plant Species of Conservation Concern (SCC) or highly range restricted species/populations that are dependent on these habitats for survival, have been recorded within these natural/near-natural areas. These areas do however provide potential habitat for plant SCC.

More than 36% of the project site have been significantly impacted through agricultural activities, with these areas being ploughed and cultivated with pasture grasses (cattle grazing). These areas contain very little natural vegetation and furthermore no plant Species of Conservation Concern (SCC) or highly range restricted species/populations that are dependent on these habitats for survival. These pastures also contribute to the highly fragmented nature of the area, significantly impacting habitat connectivity. Due to the highly degraded nature of the area, including the removal of natural, indigenous vegetation, significant disturbance of topsoil including tilling and ploughing, the loss of the indigenous seedbank, habitat recovery will be limited and very slow, requiring intensive human intervention.

The proposed grid corridor will cross a small/narrow drainage line which is regarded as "medium" sensitive. This drainage line has been significantly modified in terms of hydrology, geomorphology and vegetation coverage. The bulk of this drainage line is located within pasture paddocks and are subjected to significant grazing pressure (small paddocks used for intensive game breeding, mainly grazers). Furthermore, this drainage line has been dammed upstream (small gravel dams) and such dams have a profound

impact on the hydrology of such smaller systems. No plant Species of Conservation Concern (SCC) or highly range restricted species/populations, that are dependent on such habitats for survival, have been recorded within the drainage line that crosses the grid corridor. This drainage line is however regarded as "Medium" sensitive as this drainage line feeds into a short intermittent watercourse, which is a minor tributary of the Elands River. Impacts on this drainage line can be successfully avoided through the implementation of buffer areas (appropriate buffer size will be provided within the Aquatic Biodiversity Report) and the mere spanning of the drainage line and the use of existing farm roads for access.

The SEI score interpretations according to the *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, 2020) are as follows:

- "High": requires avoidance mitigation wherever possible, or minimization mitigation, and subsequent changes to limit the amount of habitat impacted.
- "Low": minimization and restoration mitigation.
- "Very Low": minimization mitigation.

Table 21: Evaluation of Site Ecological Importance (SEI) for the plant community type(s) (Plant Species and Terrestrial Biodiversity Theme combined) within the proposed development site and surrounds. BI = Biodiversity Importance.

Plant Community Type / Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	SEI
Ziziphus mucronata - Cymbopogon caesius (Variation B)	Medium: • More than 50% of receptor contains natural habitat with potential to support SCC.	Medium: • Mostly minor current negative ecological impacts with some major impacts (e.g., established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential. • Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.	High: • Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.	**Low (BI: Medium)**
Ziziphus mucronata - Cymbopogon caesius (Variation A)	Medium: • More than 50% of receptor contains natural habitat with potential to support SCC.	High: • Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential. • Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.	High: • Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.	**Low (BI: Medium)**
Vachellia tortilis - Heteropogon contortis (Variation C)	Low: • No confirmed or highly likely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species.	Very Low: • Several major current negative ecological impacts.	Low: • Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low (BI: Very Low)**

Themeda triandra - Ziziphus mucronata	Medium: • More than 50% of receptor contains natural habitat with potential to support SCC.	Medium: • (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type.	Medium: • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium (BI: Medium)**
Cymbopogon caesius - Heteropogon contortus	Low: • Less than 50% of receptor contains natural habitat with limited potential to support SCC.	Medium: • Mostly minor current negative ecological impacts with some major impacts (e.g., established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential. • Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.	Medium: • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Low (BI: Low)**
Panicum maximum - Urochloa mosambicensis planted veld	Very Low: • No natural habitat remaining.	Very Low: • Several major current negative ecological impacts. • Very limited habitat connectivity except for with wind-dispersed seeds.	Medium: • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low (BI: Very Low)**
Dichanthium annulatum - Brachiaria brizantha planted veld	Very Low: • No natural habitat remaining.	Very Low: • Several major current negative ecological impacts. • Very limited habitat connectivity except for with wind-dispersed seeds.	Medium: • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low (BI: Very Low)**

Cenchrus ciliaris planted veld	Very Low: • No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species.	Low: • Very limited habitat connectivity except for with wind-dispersed seeds. • Several minor and major current negative ecological impacts.	Medium: • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low** **(BI = Very Low)**

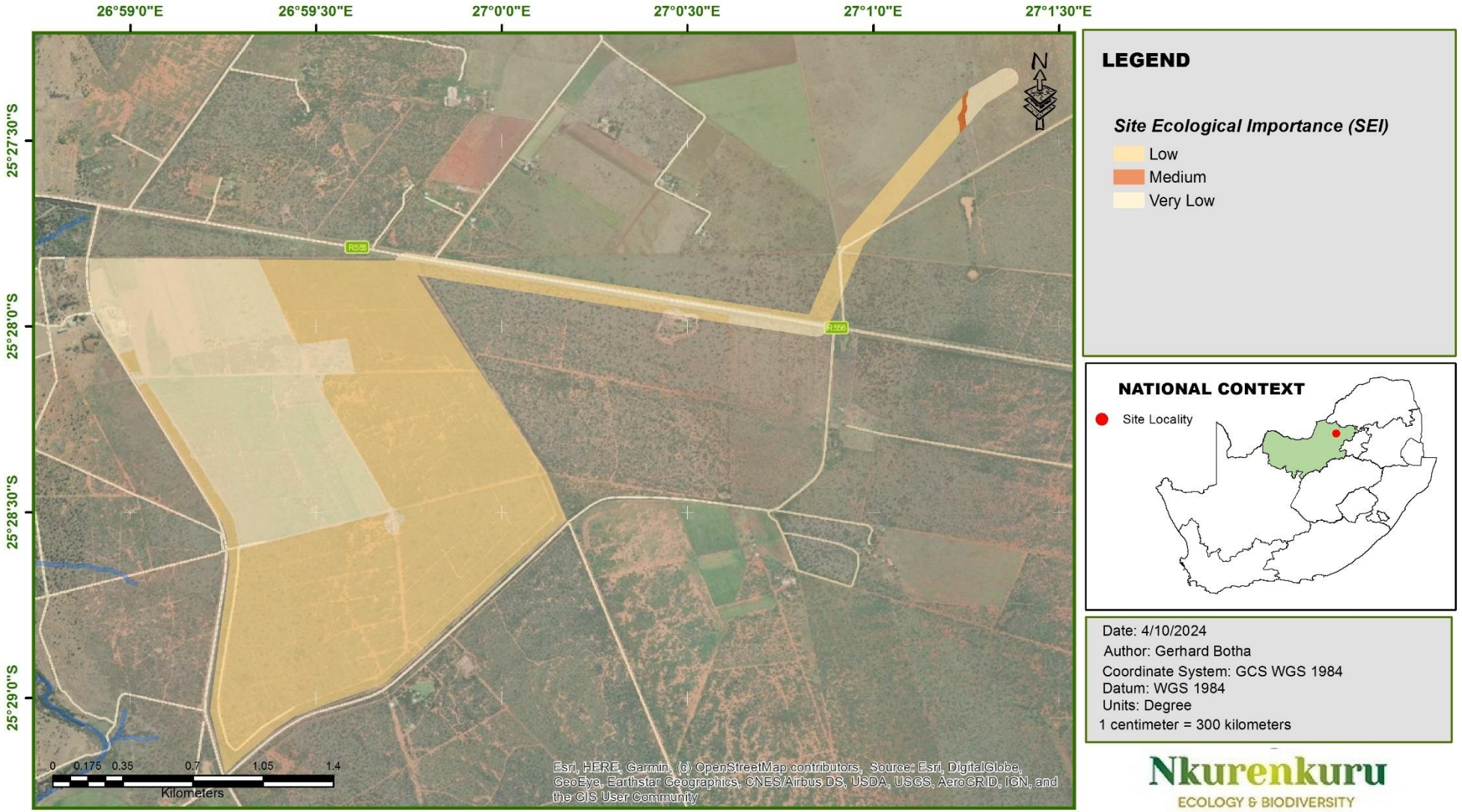

Figure 35: Site Ecological Importance (SEI) for the proposed development site and surrounds (see Table 21 for more details).

7. FINDINGS OF THE FAUNAL ASSESSMENT

This section describes the faunal ecology of the PAOI and the immediate surrounding areas as well as mapping and defining areas of increased Sensitivity and Ecological Importance (SEI). Furthermore, as mentioned the purpose of this study/report was furthermore, to:

- Define the Faunal Present Ecological State (PES) of the PAOI
- To provide inventories of faunal species as encountered within the PAOI
- To determine and describe major faunal habitat types,
- To determine and describe the faunal communities associated with the habitat types;
- To identify and consider all sensitive systems/habitats and landscape units, including outcrops, hills, rocky ridges, riparian habitats, watercourses, wetlands and/ or any other special features;
- To conduct a Species of Conservation Concern (SoCC) assessment, and the overall potential for such species to occur within the PAOI.

A total distance of ± 47.2 km (convex hull = 695.8 ha) was surveyed on foot across the proposed development site, as well as by vehicle (Figure 5). As mentioned, the timing of the survey can be regarded as acceptable as the timing of the survey aligns well with the natural behaviours and activities of the majority of the faunal species. Recent climatic events and seasonal conditions were also acceptable. Subsequently, vegetation coverage and natural fodder was fairly readily available, and was still in a fairly decent condition. Furthermore, time spend on site, can be regarded as minimal, but still acceptable in order to obtain enough relevant data.

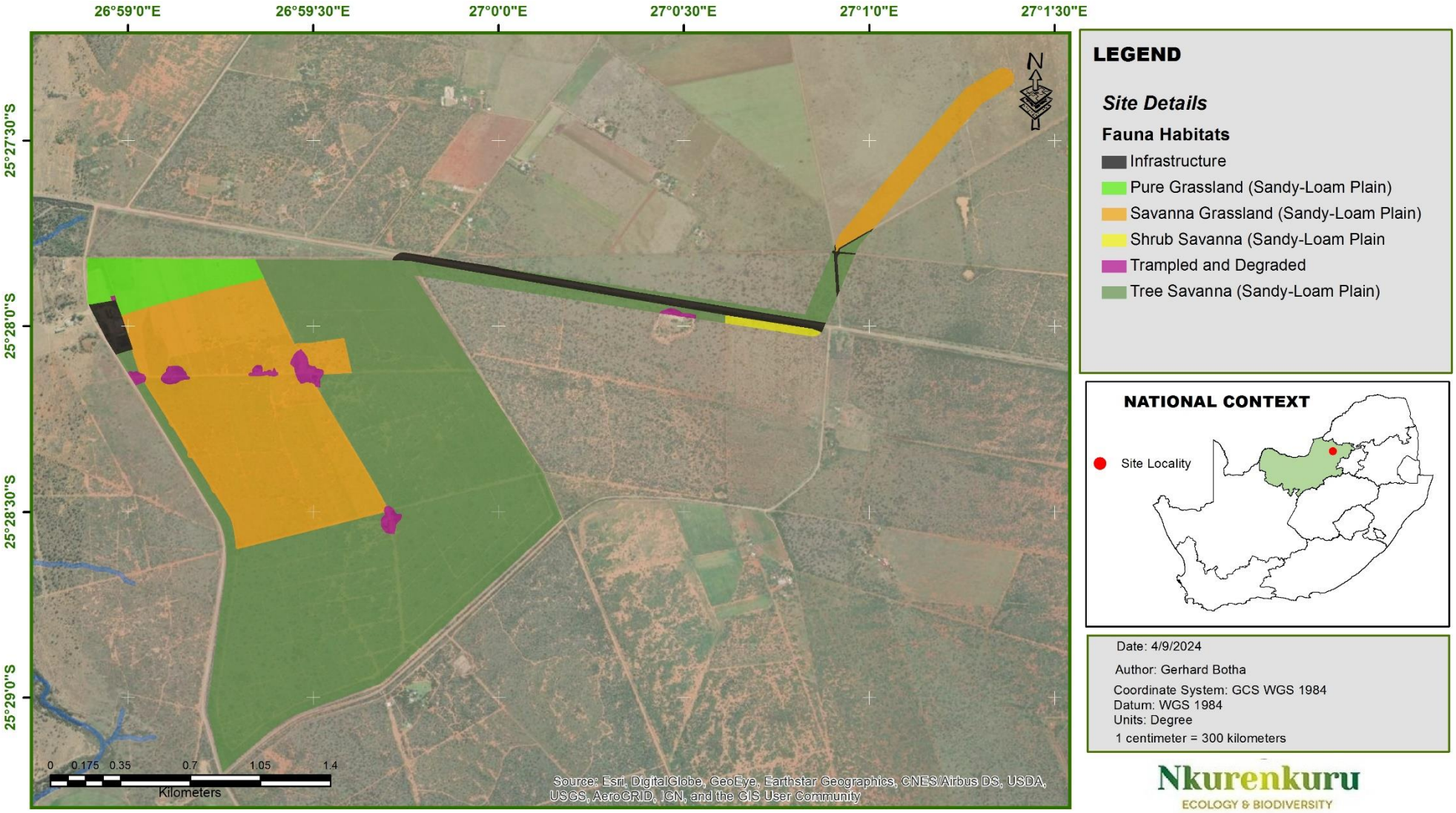

Figure 36: Mapping indicating the major faunal habitat types identified within the project site.

7.1. Faunal Habitat

Faunal species are adapted to a particular niche which often comprises a unique set of environmental conditions creating optimal habitat. The reliance of fauna on species-specific plant resources indicates the interconnected nature between faunal and floristically diversity. These "micro-habitats" do not always correspond strictly to vegetation associations, but rather to a combination of vegetation structure and species composition, topography, land use, available food source and other factors. Landscape composed of spatially heterogeneous abiotic conditions create a greater diversity of potential niches for fauna species, providing both diverse forage as well as refuge areas. Habitat availability is often used to determine databases due to the often cryptic, nocturnal and highly mobile nature displayed by many fauna species.

In the rich tapestry of South Africa's savannas, the interactions between the landscape and its inhabitants, particularly browsers and grazers, are pivotal in shaping the ecosystem's structure and biodiversity. Grazers, such as zebras, wildebeests, and various antelope species, wield a transformative influence on the savanna's form. These grazers' appetite for grasses maintains the landscape's openness, preventing the encroachment of shrubs and trees that could otherwise dominate. This control over vegetation encourages the continuous growth of grasses, ensuring a diverse mosaic of habitats within the savanna. Meanwhile, browsers like njalas, kudus, and giraffe have a profound impact on the vegetation structure by selectively consuming leaves and branches from trees and shrubs. This pruning behaviour not only affects plant growth but also fosters a complex array of plant species adapted to such grazing pressures. Consequently, the coexistence and interaction between browsers, grazers, and the vegetation create a dynamic balance that fosters biodiversity within the savanna. Fauna diversity, especially in terms of ungulates and mega herbivores in general, are extremely high and the potential of these savannas to sustain such diversity is astonishing, from the iconic African elephant to the smallest insects and birds. Each species plays a unique role in the intricate web of interactions, contributing to the resilience and richness of the savanna biome. These animals act as ecosystem engineers, influencing soil fertility, nutrient cycling, and even water retention, further emphasizing their fundamental role in maintaining the vitality and diversity of South Africa's savannas. The disturbance and/or removal of these interactions, along with the avoidance of frequent fires, have resulted in large scale bush encroachment across all types of South African savannas, a reduction in grass cover and in turn has led to a general decline in plant and animal diversity within these modified habitats.

In terms of habitat diversity/heterogeneity, the PAOI can be regarded as low and largely homogenous. Within the PAOI, four (4) major faunal habitats have been identified (Figure 36). Furthermore, no aquatic faunal habitats are present within the PAOI or within proximity to the PAOI.

Terrestrial Habitats:

- Tree Savanna Plains occupying deep to moderately deep sandy-loam soils (near natural to moderately modified);

- Shrub Savanna Plains occupying deep sandy-loam soils (seriously modified).
- Savanna Grassland Plains occupying deep sandy-loam soils (critically to seriously modified)
- Pasture or Pure Grassland Plains occupying deep sandy-loam soils (completely modified)

As stated during the description of the various vegetation types (Section 6.1), small-scale plant diversity and ecological condition of vegetation varied across the development site and was primarily driven by anthropogenic activities. Edaphic factors (soil texture and soil depth played a minor role.

Vegetation community/type diversity has a significant impact on faunal diversity in ecosystems. The variety of plant species within a community provides different niches and resources for various animal species. Herbivores, for instance, rely on specific plant species for food. The relationship between grass, tree and shrub coverage for example will determine the relationship and diversity of browsers and grazers within an area, whilst the hight of the shrubs/trees as well as grass species may influence the type of grazers and browsers that will occupy the area. Additionally, the structural complexity of diverse vegetation communities offers shelter and breeding sites for animals. Furthermore, flowering plants in diverse communities attract a variety of pollinators, contributing to the diversity of insect and bird species. As such, rich and varied vegetation communities can support a wide array of animal species, creating a web of interdependence that underscores the significance of preserving plant diversity for the conservation of animal biodiversity.

As mentioned, the various vegetation types/units/communities found within the project site have been listed and described within Section 6.1 of this report. To aligning this section (faunal habitats) with the vegetation types/communities we have indicated in Table 22 below, were the faunal habitat units, as identified in this section, overlap the vegetation types/units as mentioned in Section 6.1. It should be noted that the faunal habitats are more broad units as much of the vegetation types share similar structure and some ecological drivers, but may slightly vary in diagnostic and dominant species. Subsequently some of these "fairly" similar vegetation types will be very similar in terms of faunal assemblages, interactions, faunal functions and services as well as faunal importance and sensitivity, and subsequently have been delineated as such to allow for practical implementation of fauna and flora management practices.

Table 22: Table illustrating the overlap between the faunal habitat units and the vegetation communities/units/types as identified and described within this report.

Faunal Habitats	Size of Faunal Habitat (Ha)	Vegetation Communities	Size of Vegetation Community (Ha)	% Coverage of Vegetation Community within Faunal Habitat
Tree Savanna Plains (Sandy-Loam Soils)	210.5	*Ziziphus mucronata - Cymbopogon caesius* (Variation A)	173.4	82.4 %
		Ziziphus mucronata - Cymbopogon caesius (Variation B)	37.4	18.2 %

Savanna Grassland Plains (Sandy-Loam Soils)	99.8	*Cenchrus ciliaris* planted veld	2.8	2.8 %
		Cymbopogon caesius - Heteropogon contortus	7.9	7.9 %
		Dichanthium annulatum - Brachiaria brizantha planted veld	88.7	88.9 %
		Themeda triandra - Ziziphus mucronata	0.4	0.4 %
Savanna Shrubland Plain (Sandy-Loam Soils)	1.5	*Vachellia tortilis - Heteropogon contortus (*Variation C*)*	1.5	100 %
Pastures or Pure Grassland Plains (Sandy-Loam Soils)	15	*Panicum maximum – Urochloa mosambicensis* Planted Veld	15	100 %
Infrastructure	12.1	Agricultural Infrastructure	2.8	23.1 %
		Gravel Road	0.7	5.8 %
		Tar Road (R556)	8.5	70.2 %
Trampled and Degraded	4.23	Trampled and Degraded	4.23	100 %

7.1.1. Tree Savanna occupying Sandy-Loam Plains

The bulk of the project site comprises this faunal habitat (210.5 ha). The bulk of the area is utilized as small breeding camps for scares and exotic game species, whilst only a small portion is utilized for livestock farming (cattle). Approximately 173.4 ha (82.4 %) of this faunal habitat has been moderately to largely modified through the artificial (mechanically) and strategically removal of certain woody species (trees and shrubs), Signs of severe historical overgrazing is also present in the form of small patches of bare soil exposed to soil capping. The remaining 18.2 % (37.4 ha) is regarded as near natural vegetation utilized for cattle farming, and is currently also being intensively overgrazed.

Furthermore, this habitat is associated with reddish, sandy loam soils (mostly deep) with no to very little surface gravel/stones. However, sallow soils with surface stones and rocks are present in one fairly small location.

Floral, alpha diversity within this habitat type was low-moderate. Typically, this habitat can be characterised as a fairly open savanna with a moderately to well-developed grass layer and medium sized trees. The grass layer is highly variable within this habitat and may cover up to 80% in areas where a dense grass layer has been encouraged through brush management. Overgrazed areas may cover a grass layer of less than 55%, and as mentioned small exposed soil patches are present, and are remnants of severe historical overgrazing. The tree layer throughout this habitat occur at a density of between 20 and 35%, with an average height of between 4 and 5 m. The shrub layer, as in the case of the grass layer, is highly variable (vary in coverage from 10 % to 55%) and are also closely tied to land management practices (especially brush management and grazing regimes.

Key plant species found within this habitat type include: *Cymbopogon caesius, Aristida congesta var. congesta, Heteropogon contortus, Eragrostis rigidior, E. lehmanniana Themeda triandra, Urochloa mosambicensis, Grewia flava, Peltophorum africanum, Vachellia robusta, Vachellia tortilis Ziziphus mucronata, Searsia lancea, Panicum maximum, Lycium schizocalyx, Blepharis maderaspatensis, Nidorella resedifolia, Osteospermum muricatum, Seddera capensis, and Solanum campylacanthum*. The integrity and functions of this habitat type are overall regarded as moderately modified.

This low to low-moderately structurally variable habitat generally provides moderate refugia and forage. This habitat is also regarded as low-moderately important breeding site, especially for mammal species. However, natural movement patterns of "natural" occurring mammals, especially medium to larger sized mammals have been significantly impacted by tall game fences surrounding numerous small breeding camps within the project site, as well as within the larger surroundings. This, along with a fairly busy road network within the area have significantly fractured the landscape.

The highly fractured nature of the area, the low-moderate structural complexity (habitat and niche diversity) and moderate foraging potential allows for a low natural faunal diversity, with a noteworthy absence of carnivore species, apart from smaller, more adaptable carnivores such as mongooses.

Most of the species recorded within this habitat type can be regarded as habitat generalists. The most frequently observed mammals include; Common Duiker (*Sylvicapra grimmia)*, Steenbok (*Raphicerus campestris*), African Savanna Hare (*Lepus victoriae*), Slender Mongoose (*Herpestes sanguineus*).

In terms of herpetofauna diversity within this habitat, due to a low habitat and niche diversity and structural complexity, reptilian diversity is expected to be low. Only three reptile species recorded, namely: Savanna Lizard (*Meroles squamulosus*), Spotted Grass Snake (*Psammophylax rhombeatus rhombeatus*) and Mozambique Spitting Cobra *(Naja mossambica*).

No amphibian species have been recorded within this habitat, with very limited suitable habitat available for amphibian species.

In terms of faunal SoCC, no species were observed within this faunal habitat.

In terms of provincially protected mammals, the following protected mammals were recorded within this faunal habitat:

- Steenbok - *Raphicerus campestris*

Figure 37: Representative photos of the shrubland savanna occupying heavy clay soils. This habitat is found within the north-eastern portion of the projects site. A & C) This habitat has been significantly impacted through anthropogenic activities, including the removal of larger woody plants for firewood and frequent burning. B & D) This habitat type is now dominated by tall shrubs and small multi-stemmed tree species.

7.1.2. Savanna Grassland and Pure Grassland occupying Sandy-Loam Plains (Pastures)

This faunal habitat represents seriously to critically modified form of the tree savanna (on sandy-loam plains), where significant bush (trees and shrubs) clearance has occurred, along with irregular ripping and ploughing and re-seeding of the areas with more palatable gras species (pastures). These activities have occurred over, at least, the last 30 to 50 years, with the aim of improving the grazing potential of these areas, in the past for intensive cattle farming, but for the last 10 to 15 years, for intensive game breeding. This has led to significant changes in the vegetation cover and structure with this habitat now being regarded as an open grassland savanna, with the tree and shrub cover being reduced by at least 70 to 80%, however the percentage of trees and shrubs do differ between the various pastures.

This habitat is located on weak red to reddish yellow, sandy-loam soils of varying depth (mostly moderately deep). Furthermore, this habitat is characterized by flat plains (slope>1%). Currently, these areas are all utilized for intensive game breeding (scarce and exotic game) and comprise of small game camps cordoned off by tall, mostly impenetrable game fences, which has had a significant impact on the natural movement patterns of larger, "natural" wildlife, especially carnivores.

These pastures are characterised by mostly dense, medium grassland, with grasses and forbs covering between 65 – 85% of this habitat. However, localised overgrazing has resulted in a few, mostly small patches, of sparser areas (soil capping and compaction are frequent observed within these overgrazed patches). Key or dominant grass and forb species observed within these patches include; *Cenchrus ciliaris, Brachiaria deflexa, Dichanthium annulatum, Cymbopogon caesius, Aristida congesta, Eragrostis rigidior, Aristida adscensionis, Heteropogon contortus, Nidorella resedifolia, Panicum maximum Solanum campylacanthum, Eragrostis lehmanniana, Urochloa mosambicensis, Vachellia tortilis, Ziziphus mucronata* and *Tagetes minuta*. As mentioned, the tree and shrub layer have been significantly reduced and comprise of shrub/small tree layer (*Vachellia tortilis, and Ziziphus mucronata)* with a density varying between 10% and 30%, and a medium sized tree layer covering a combined area of between 4% and 7% (most areas<5%).

Floral diversity within this habitat type was low, and as mentioned the integrity and functionality of this habitat type have been significantly modified, however this habitat is still capable of providing some functions and services, albeit in a modified manner.

Structurally, this habitat is the most homogenous, of the faunal habitats. The most significant function of this habitat is the provision of fairly good grazing, however, as mentioned the mostly impenetrable game fences have prevented the use of these pastures for medium sized "natural" occurring mammals. Furthermore, due to low structural complexity, and frequent past disturbances, "natural" faunal diversity within this habitat is low. The softer substrate is, however, more optimal for smaller fossorial or burrowing species such as mole rats, mongooses, and porcupines and subsequently, these smaller mammals are the most frequently observed species within the area. Warthog, frequently dig underneath the fences providing occasional passage to and from this habitat for smaller antelopes such as steenbok and common duiker as well as smaller carnivores such as black-baked jackal. However, these fences are frequently patrolled, and any holes/passages are promptly closed up. Meso and small carnivores such as black-baked jackal and caracal are religiously persecuted within these areas, in order to protect the breeding herds of scarce and exotic game.

No Herpetofaunal species have been recorded within this area. Subsequently, the overall faunal diversity and habitat connectivity, of this habitat can be regarded as low.

No animal SoCC were recorded within the PAOI. However, there is a moderate Likelihood of Occurrence (LoO) for some animal SoCC to occur within this habitat.

In terms of provincially protected mammals, only one mammal species has been recorded namely:

- Steenbok - *Raphicerus campestris*

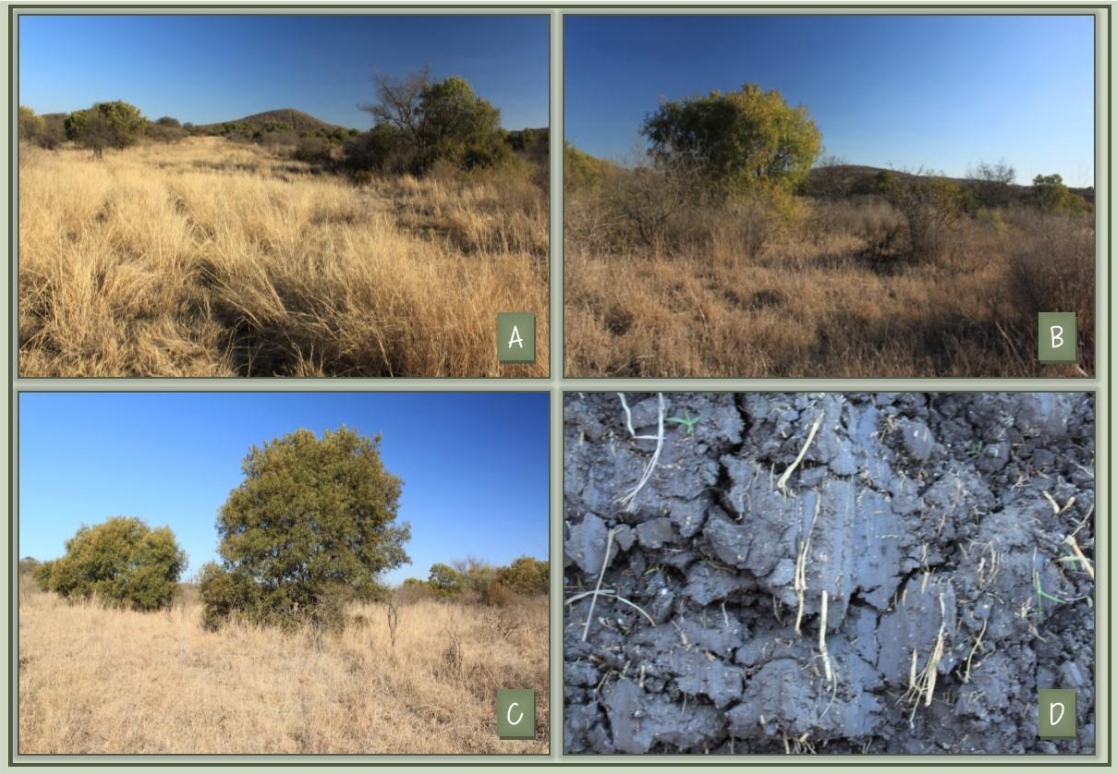

Figure 38: Representative study area photos of the tree savanna occupying heavy clay soils A - C) natural open tree savanna comprising a dense, well developed grass layer and medium sized trees, *especially Searsia lancea* and *Senegalia mellifera*. D) Dark, swelling (wet) and cracking (dry) vertic soils with slickenside (Rensburg form).

7.1.3. Savanna Shrubland occupying Sandy-Loam Plains

This faunal habitat represents seriously to critically modified form of the tree savanna (on sandy-loam plains), where historic cultivation activities have been abandoned and the area being allowed to re-establish a more natural vegetation cover. These activities have occurred over, at least, the last 30 to 50 years. Following the re-establishment of a vegetation cover, the area has been utilized as grazing (cattle). This area experience high to severe grazing pressure and has resulted in the encroachment of small thorny trees and shrubs.

This habitat type is a transitional area between the typical sandy-loam areas that characterize the majority of the region and areas with a slightly higher clay content. The clay content is still quite low within this habitat, but enough to have an influence on the species composition and structure, most notable within the tree and shrub layer (especially in terms of species composition and height).

This area is also located within a flat plain (slope<1%) with very little geomorphological variations. Floral, alpha diversity within this habitat type was very low. Typically, this habitat was characterised by a moderately sparse ground cover, with numerous bare patches, exposing the soils to soil capping, sheet erosion and trampling. The grass cover is fairly sparse and is characterized by short to moderate-tall grass species (coverage:

40%), dominated by *Cynodon dactylon, Aristida canescens, Aristida adscensionis, Aristida congesta var. congesta, Melenis repens*, and Eragrostis *rigidior.* The shrub (1.6 m) and small tree (2.5 m to 3 m) layer covered collectively between 75 % and 80 % of this habitat, with Vachellia tortilis, Senegalia mellifera and *Grewia flava* being the diagnostic species within this layer. Trees taller than 3m was scarce, throughout this habitat type (predominantly *Vachellia tortilis*).

This habitat unit generally provides poor refugia and forage for faunal species. This habitat is also not regarded as an important breeding and foraging site. The grasses in this habitat are mainly wiry pioneers and sub-climax species of low palatability and forage value. The low structural complexity (habitat and niche diversity) and low foraging potential allows for a low faunal species diversity for this area. Natural movement patterns of larger "natural" occurring mammals, especially carnivores have been impacted by tall game fences within the surroundings, however within the property itself, cattle fences surrounding this grazing camp do not provide much hindrance for small and medium sized mammals. Most of the species recorded within this habitat type can be regarded as habitat generalists. The most frequently observed mammals include; Black-backed Jackal (*Canis mesomelas*), Single-striped Grass Mouse (*Lemniscomys rosalia*) and Slender Mongoose (*Herpestes sanguineus*).

In terms of herpetofaunal diversity, this habitat type was found to be low in diversity with no reptile or amphibian species recorded within this habitat very limited, suitable habitat being available for amphibian species.

No animal SoCC were recorded within this habitat and there is a low Likelihood of Occurrence (LoO) for animal SoCC to inhabit or utilize this habitat for forage.

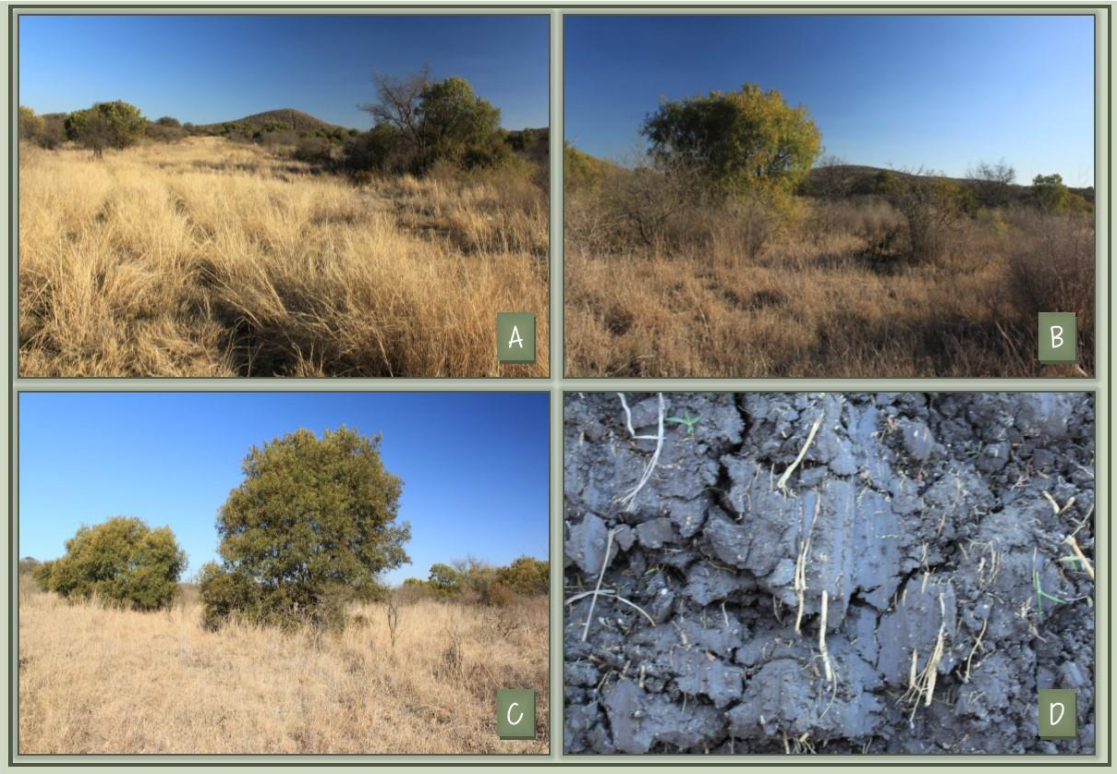

Figure 39: Representative study area photos of the tree savanna occupying heavy clay soils A - C) natural open tree savanna comprising a dense, well developed grass layer and medium sized trees, *especially Searsia lancea* and *Senegalia mellifera*. D) Dark, swelling (wet) and cracking (dry) vertic soils with slickenside (Rensburg form).

Table 23: Summary of the results of the faunal habitat sensitivity assessment. Abbreviations: SoCC = Species of Conservation Concern; LoOC = Likelihood of Occurance.

Sensitivity Summary	FAUNAL HABITATS		
	Tree Savanna (Sandy-Loam Plains)	**Savanna Grassland and Pure Grassland (Sandy-Loam Plains)**	**Savanna Shrubland (Sandy-Loam Plains)**
Observed Species Diversity	3 Reptiles; 6 Mammals 0 Amphibians	0 Reptiles; 6 Mammals 0 Amphibians	0 Reptiles; 3 Mammals 0 Amphibians
Potential Species Diversity	Moderate	Low	Low
Habitat Specialist	Mainly generalists	Mainly generalists	Mainly generalists
Observed Species of Conservation Concern *(excluding species that have been introduced for intensive game breeding)*	0	0	0
Potential SoCC = Medium to High LoOC *(refer to* ***Error! Reference source not found.****)*	0 Reptiles; 1 Mammals 0 Amphibians	0 Reptiles; 1 Mammals 0 Amphibians	0 Reptiles; 0 Mammals 0 Amphibians
Observed Protected Species *(excluding species that have been introduced for intensive game breeding)*	1 Mammal	0	0
Structural Complexity *(micro-habitat and niche space)*	Low-Moderate	Very Low	Very Low
Habitat Integrity	Moderate	Low	Low
Present Ecological Status	Mainly moderately modified	Serious Modifications	Serious Modifications

Sensitivity Summary	FAUNAL HABITATS		
	Tree Savanna (Sandy-Loam Plains)	**Savanna Grassland and Pure Grassland (Sandy-Loam Plains)**	**Savanna Shrubland (Sandy-Loam Plains)**
	A slight to moderate change in ecosystem processes is discernible and a loss of natural habitats and biota have taken place.	The change in ecosystem processes and loss of natural habitat and biota was great during the initial disturbance/ transformation, however some natural habitat features have returned and are now recognizable.	The change in ecosystem processes and loss of natural habitat and biota was great during the initial disturbance/ transformation, however some natural habitat features have returned and are now recognizable.
Food Availability	Moderate	Moderate	Low-
Connectivity	Low	Low	Low-Moderate
Important Structural and Landscape Elements	No important structural and landscape elements observed	No important structural and landscape elements observed	No important structural and landscape elements observed
Climate Resilience	Moderate	Low	Low
RATING	**Medium**	**Very Low**	**Very Low**

Mammals

7.1.4. Overall Diversity

Mammal diversity within the PAOI was considered low. A total of 16 mammal species were observed within the PAOI. However, 6 of these species are larger antelope (Family: Cetartiodactyla) species that has been introduced into the area for "agricultural purposes (intensive game breeding). These species are predominantly larger and scarcer antelope species as well as exotic variation of these antelope species. Furthermore, these species are kept in fairly small grazing camps which is surrounded by tall, impenetrable game fences, restricting any natural movement in and out of these areas (larger mammals). These larger more scarce and exotic antelope species that were observed within the PAOI include:

- *Syncerus caffer* – African Buffalo
- *Hippotragus niger* - Sable Antelope
- *Aepyceros melampus melampus* - Impala
- *Connochaetes taurinus* - Blue Wildebeest
- *Damaliscus pygargus phillipsii* - Blesbok
- *Tragelaphus angasii* - Nyala

Subsequently, a total of 10 "natural" occurring mammals were recorded namely:

- Family: Carnivora

    - *Canis mesomelas* - Black-backed Jackal (LC)
    - *Herpestes sanguineus* - Slender Mongoose (LC)
- Family: Cetartiodactyla
    - *Phacochoerus africanus* - Common Warthog (LC)
    - *Raphicerus campestris* – Steenbok (LC)
    - *Sylvicapra grimmia* - Common Duiker (LC)
- Family: Lagomorpha
    - *Lepus victoriae* - African Savanna Hare (LC)
- Family: Rodentia
    - *Aethomys ineptus* - Tete Veld Rat (LC)
    - *Lemniscomys rosalia* - Single-striped Grass Mouse (LC)
    - *Hystrix africaeaustralis* - Cape Porcupine (LC)
    - *Rhabdomys dilectus* - Mesic Four-striped Grass Rat (LC)

Based on the various sampling techniques, the following mammals were the most frequently observed within the project site:

- Steenbok (*Raphicerus campestris*): Physical observations and numerous dry pellet heaps.
- Slender Mongoose (*Herpestes sanguineus*): Physical observations.
- Duiker (*Sylvicapra grimmia*): Caught on camera traps

Natural movement patterns of "natural" occurring mammals, especially medium to larger sized mammals have been significantly impacted by tall game fences surrounding numerous small breeding camps within the project site, as well as within the larger surroundings. This, along with a fairly busy road network within the area have significantly fractured the landscape.

The highly fractured nature of the area, the low-moderate structural complexity (habitat and niche diversity) and moderate foraging potential allows for a low natural faunal diversity.

The condition of the mammals observed looked good, indicating that sufficient forage is available for mammals occupying the focus area. Forage availability for primary consumers is considered intermediate to high. Forage for small carnivorous mammals like mongooses and shrews etc. is anticipated to be intermediate. Mesopredators will occur occasionally occur within the area but large predators were completely absent from the PAOI.

7.1.5. Protected Mammal Species

Apart from the introduced mammals that are protected within the relevant Provincial Conservation Act (South African Giraffe and Sable Antelope), one (1) "natural" occurring mammal have been observed, which is protected within the relevant legislation namely:

- Steenbok (*Raphicerus campestris*);

This species is fairly common within the region and have a fairly wide range within South Africa.

It is highly unlikely that the proposed development will have a significant impact on these species and its population within the area as this species is also well represented outside of the development footprint.

7.1.6. Mammal Species of Conservation Concern (SCC)

During the site visit no mammal SoCC were recorded within the PAOI.

The initial screening report revealed that three mammal SCC have a distribution range that include the project site and may potentially inhabit the project site namely; Sensitive Species 5 (for their protection, the identities of these species will not made public); *Crocidura maquassiensis* (Makwassie musk shrew), and *Lycaon pictus* (African wild dog). Subsequently, the project site has been classified as Medium Sensitive within the screening tool.

During the site survey it was determined that there is a very low likelihood of occurrence (LoOC) for all three mammal species to occur within the project site. Due to livestock and intensive game breeding activities within the area, *Lycaon pictus* (African wild dog) and Species 5 these species will likely also not be tolerated within the area, there movement within the area would also be highly restricted due to numerous impenetrable, and frequently electrified game fences. Furthermore, *Crocidura maquassiensis* (Maquassie Musk Shrew) prefers densely vegetated, moist grassland/wetland habitats, and no such habitats are present within the project site.

It is highly unlikely that the proposed development will have a significant impact on potential SoCC species and their regional populations, as large tracts of natural habitat will still persist outside of the development site.

7.2. Reptile and Amphibian

7.2.1. Overall Diversity

A very low reptile diversity was observed during the field assessment, with only five (3) reptile species observed within PAOI namely:

The following reptiles were observed within the project site:

- *Meroles squamulosus* - Savanna Lizard (LC)
- *Psammophylax rhombeatus rhombeatus* - Spotted Grass Snake (LC)
- *Naja mossambica* - Mozambique Spitting Cobra (LC)

Diversity and abundance are anticipated to fairly low to a low habitat and niche diversity and general structural complexity within the project site. Reptiles are inherently secretive and shy, making their detection and identification in the field challenging (specifically during site visits of a short duration).

No limitations of reptile movement are anticipated within the area and they will readily utilise even transformed areas to move through. The higher density of taller trees and shrubs within the tree savanna habitat provide favourable habitat for more arboreal species. Rodent burrows and those of larger species, which are often utilised by snakes, were observed in low densities, providing fairly limited shelter for burrowing snake species or food resources (rodents). There are likely sufficient levels of food resources for predatory snakes preying on small mammals, as well as for herbivorous and insectivorous reptile species.

No amphibian species have been recorded within the project area. The fairly arid nature of the locality and the absence of freshwater resources, reduces the suitability of the site for amphibians. Artificially impoundments and watering points (for game and livestock) may be suitable habitat but only to amphibians able to withstand poor water quality. Subsequently, the general arid landscape does not lend itself to habitation by amphibians as a result of the fairly arid nature of the landscape. Some species can be anticipated but will occur at low densities. The diversity anticipated within the focus area is very low (based on the habitat suitability). Forage is not anticipated to be a limiting factor for amphibians. Impacts on amphibians will be low given the absence of suitable habitat within the project site.

7.2.2. Reptile and Amphibian Species of Conservation Concern (SCC)

During the site visit no Reptile or Amphibian SoCC were recorded through active searching (diurnal and nocturnal surveys), and through random observations.

It is highly unlikely that the proposed development will have a significant impact on potential SoCC species and their regional populations.

Figure 40: Photos of some of the faunal species that were recorded within the PAOI. Species names: A) South African Giraffe (*Giraffa camelopardalis giraffa*), B) *Aepyceros melampus melampus* (Impala); C & D) *Damaliscus pygargus phillipsii (*Blesbok); E) *Tragelaphus angasii* (Nyala); F) *Tragelaphus oryx* (Eland); G) Spoor of *Canis mesomelas* (Black-backed Jackal); H) Spoor of *Tragelaphus strepsiceros* (Greater Kudu); I) Dung of *Hystrix africaeaustralis* (Cape Porcupine), J) Dry dung pellets of *Raphicerus campestris* (Steenbok); K) Rodent burrow; L) Dry dung pellets of *Lepus victoriae* (African Savanna Hare); M) *Procavia capensis* (Rock Dassie) latrine; N) Spoor of *Parahyaena brunnea* (Brown Hyaena); O) Shell of *Kinixys lobatsiana* (Lobatse Hinge-back Tortoise).

7.3. Faunal Habitat Sensitivity

Faunal species are adapted to a particular niche which often comprises a unique set of environmental conditions creating optimal habitat. The reliance of fauna on species-specific plant resources indicates the interconnected nature between faunal and floristically diversity. These "micro-habitats" do not always correspond strictly to vegetation associations, but rather to a combination of vegetation structure and species composition, topography, land use, available food source and other factors. Landscape composed of spatially heterogeneous abiotic conditions create a greater diversity of potential niches for fauna species, providing both diverse forage as well as refuge areas. Habitat availability is often used to determine databases due to the often cryptic, nocturnal and highly mobile nature displayed by many fauna species.

Field observations, together with the SEI assessment presented here, indicated that the majority of the site can be regarded as of "Low" sensitivity (210.5 ha or 61% of project site) whist the remaining 39% (132.6 ha) are regarded as "Very Low" sensitive (Table 24). None of the areas were scored as "High" or "Very High".

The SEI score interpretations according to the *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, 2020) are as follows:

- "High": requires avoidance mitigation wherever possible, or minimization mitigation, and subsequent changes to limit the amount of habitat impacted.
- "Medium": minimization and restoration mitigation.
- "Low": minimization and restoration mitigation.
- "Very Low": minimization mitigation.

Table 24: Evaluation of Site Ecological Importance (SEI) for the faunal habitats within the proposed development site and surrounds. BI = Biodiversity Importance.

Faunal Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	SEI
Infrastructure	**Very Low**: • No natural habitat remaining • No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species.	**Very Low**: • No habitat connectivity except for flying species. • Several major current negative ecological impacts.	**Low**: • Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low** (BI = Very Low)
Trampled and Degraded	**Very Low:** • No natural habitat remaining • No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species.	**Very Low**: • Several major current negative ecological impacts. • Very small (< 1 ha) area.	**Low**: • Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low** (BI = Very Low)
Savanna Grassland and Pure Grassland on sandy-loam plains	**Very Low**: • No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species.	**Low**: • Several minor and major current negative ecological impacts. • Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential.	**Medium:** • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low** (BI = Very Low)
Savanna Shrubland on sandy-loam plains	**Very Low**: • No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species.	**Low**: • Several minor and major current negative ecological impacts.	**Medium:** • Will recover slowly (more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low** (BI = Very Low)
Tree Savanna on sandy-loam plains	**Medium:**	**Medium:**	**High**:	**Low**

	• More than 50% of receptor contains natural habitat with potential to support SCC.	• Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential. • Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.	• Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.	(BI = Medium)

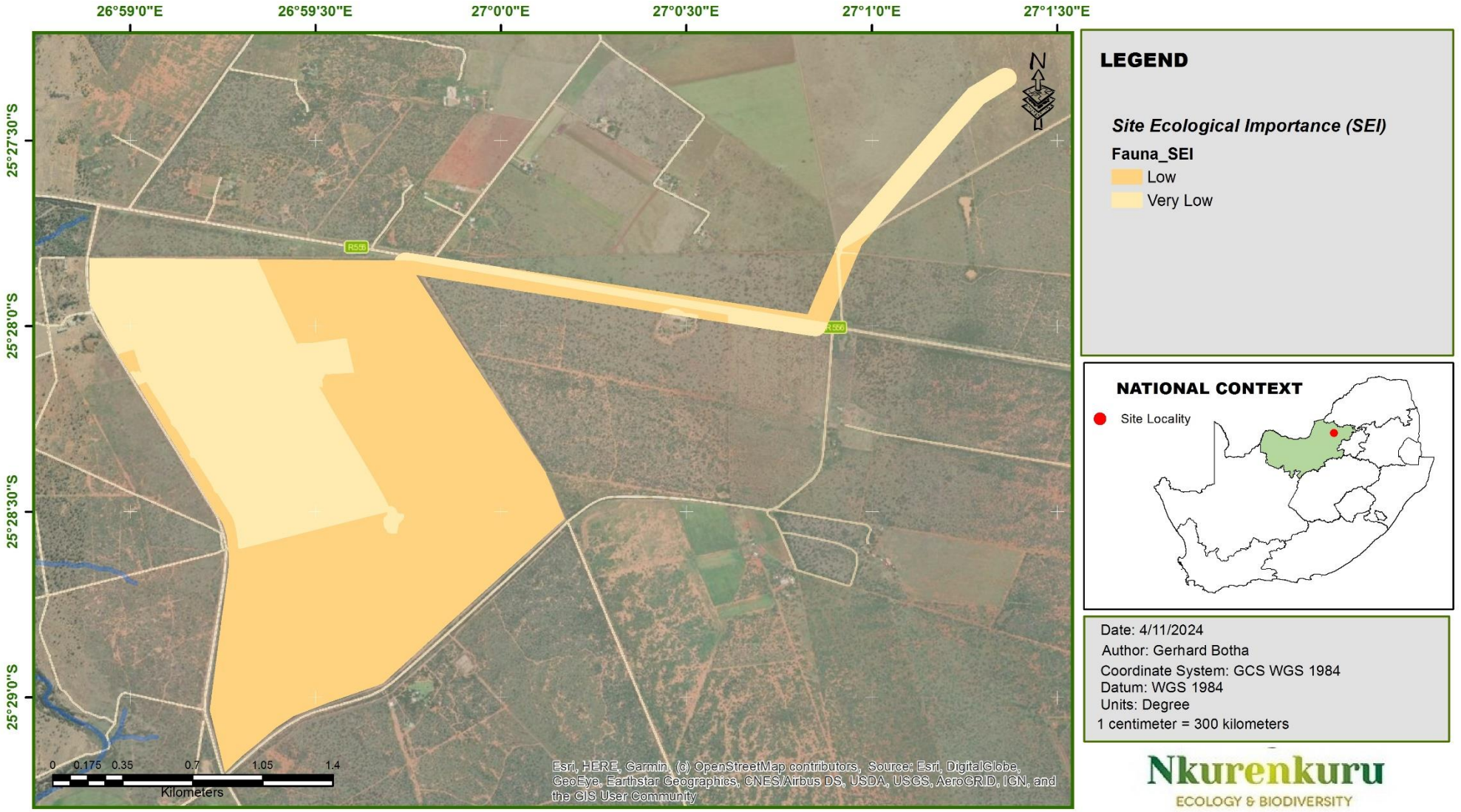

Figure 41: Faunal Site (Habitat) Ecological Importance (SEI) for the proposed development site and surrounds (see Table 24 for more details).

8. COMBINED SITE ECOLOGICAL IMPORTANCE AND SENSITIVITY (FLORA, FAUNA AND TERRESTRIAL BIODIVERSITY THEMES)

The map below (Figure 42) illustrate the sensitivities identified within the faunal, floral, and terrestrial biodiversity assessments.

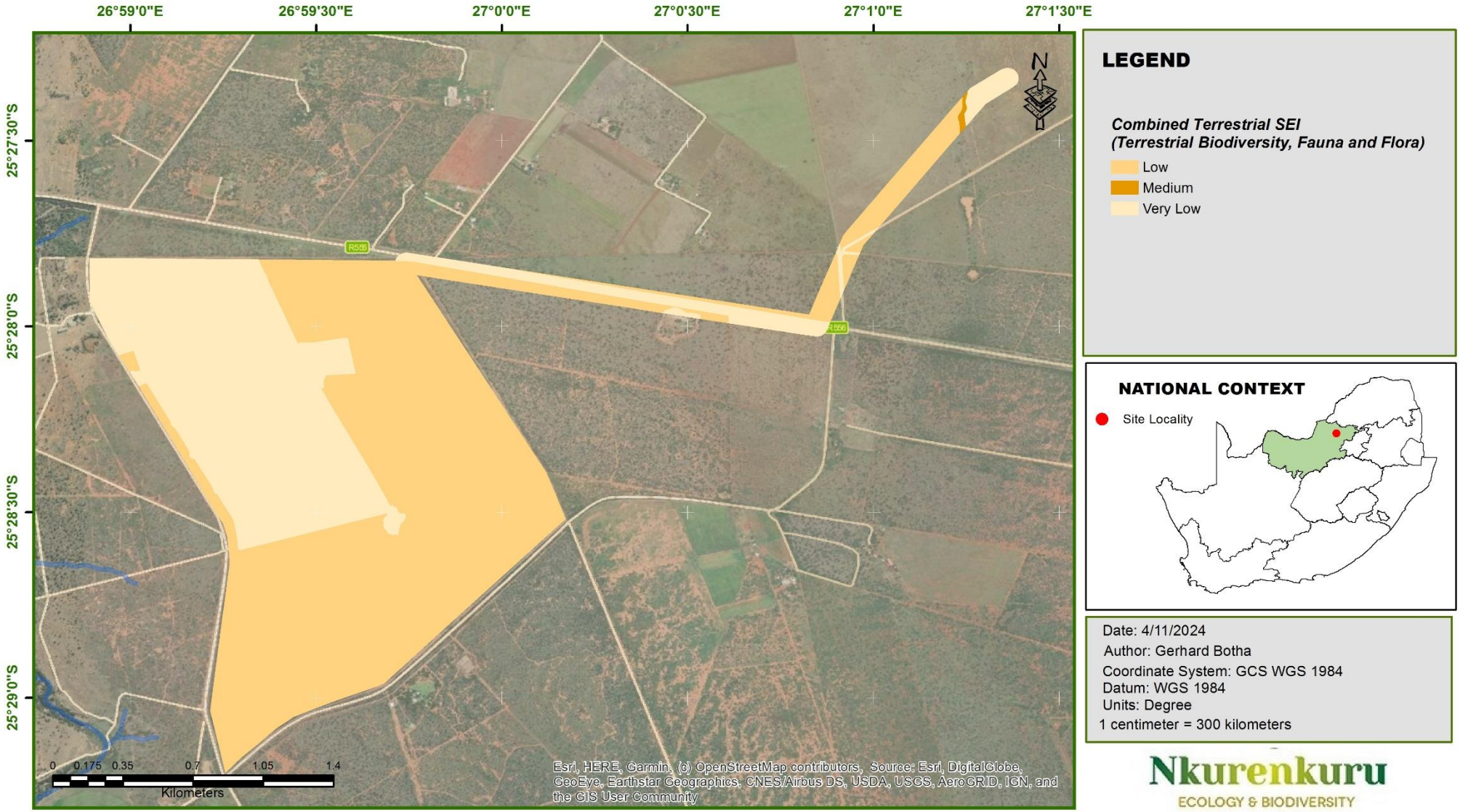

Figure 42: Mapping indicating the combined (Terrestrial Biodiversity, Fauna and Flora) ecological importance and sensitivity for the study area.

9. ASSESSMENT OF PROPOSED IMPACTS

9.1. Assumptions

The following is assumed and/or known:

- A thorough ecological walkthrough of all footprint areas will be conducted to detect and map all protected species. These results should then be used during the permit application process for the removal/relocation, destruction, and disturbance of these protected species.
    - Such an investigation should be carried out by a suitably qualified botanist prior to commencement of construction, and
    - must be carried out at a time when the maximum number of species is actively growing and thus visible (preferably between November and February)
- Prior to development, and after construction, the development footprint will be routinely cleared of all alien invasive plants if detected.
- The construction phase itself will be associated with clearing of vegetation within the development footprint only.
- Where practically possible, the need for grading is expected to be minimal, limited mostly to contour buffer strips and/or small-scale levelling where necessary.
- All removal of vegetation for construction purposes will be done mechanically, without the use of herbicides for indigenous species and in the case of Invasive Alien Species only where deemed absolutely necessary and with the authorisation of the EO.
- A continuous vegetation layer is the most important aspect of ecosystem functionality within and beyond the project site.
    - A weakened or absent vegetation layer not only exposes the soil surface, but also lacks the binding and absorption capacity that creates the buffering functionality of vegetation to prevent or lessen erosion as a result of floods.
- All existing access and service roads will be used as far as possible.

9.2. Fixed and Tracking PV Panels

Impacts on the environment will be influenced by the types of PV panel arrays to be used. The most important differences that are envisaged to influence the impact on the ecological environment (Tsoutsos et al. 2005, Turney and Fthenakis 2011) can be summarised as follows:

Types of PV panel array	Fixed panel	Tracking panel
Size of land needed	smaller	larger
Shading and associated change of vegetation	More continuous and intense shading. Less stable and dense vegetation expected, reduced buffering capacity of extreme weather events by vegetation expected.	More variable and less intense overall shading. More stable and denser vegetation cover expected, smaller reduction of buffering capacity of extreme weather events expected.
Effect on runoff and accelerated erosion	Larger continuous panel area, more concentrated runoff, constant runoff edges potentially create more erosion, especially where vegetation is weakened.	Smaller continuous panel areas, runoff more dissipated, moderate variation of runoff edges that are expected to create less erosion where vegetation is weakened.
Mounting height	PV panels may be as low as 50 cm above ground to allow for higher panels, increasing the limits of permissible vegetation due to maintenance and fire risks.	Expected to be more than 1 m off the ground, increasing the possibility of low vegetation establishment and small fauna movement without compromising safety.

9.3. Localised vs. cumulative impacts: some explanatory notes.

Ecosystems consist of a mosaic of many different patches. The size of natural patches affects the number, type, and abundance of species they contain. At the periphery of patches, influences of neighbouring patches become apparent, known as the 'edge effect'. Patch edges may be subjected to increased levels of heat, dust, desiccation, disturbance, invasion of exotic species, and other factors. Edges seldom contain rare species, habitat specialists, or species that require larger tracts of undisturbed core habitat. Fragmentation due to development reduces core habitat and greatly extends edge habitat, which causes a shift in the species composition, which in turn puts great pressure on the dynamics and functionality of ecosystems (Perlman & Milder, 2005).

Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of a development be kept as close together as possible. Thus, new power lines should follow routes of existing servitudes if such exist. Renewable energy facilities should be constructed as close as possible to existing infrastructure or substations, and if several developments are planned within proximity, these developments should be situated as close together as possible, not scattered throughout the landscape.

According to the REEA database (May 2023), only one REF apart from the proposed Boshoek Solar 2 and 3 REFs is located within the 30 km cumulative radius. In terms of a 50 km cumulative radius, three additional REFS, apart from the aforementioned REFS will be considered. Existing renewable energy projects that were considered in terms of their potential cumulative terrestrial ecological impacts, that are in an approximate 50 km radius of the Boshoek Solar 1 Energy Facility, are illustrated below in Figure 43.

Subsequently, as mentioned, apart from the other two Boshoek SEF projects (Boshoek Solar PV 2 and 3), only four other REFs are currently included within the REEA database (May 2023), and which are located within the 50 km radius.

The construction and operation of the Boshoek Solar 1 is expected to have a **limited to very limited contribution** to the cumulative impacts of the area and will **not:**

- » compromise the ecological functioning of the larger "natural" environment; and
- » disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

The combined, cumulative footprint of all renewable energy projects (located within the 50 km radius) is estimated at around 4407.6 ha, covering only 0.5 % of the area within the 50 km radius (Figure 43). Of the 4407.6 ha, Boshoek Solar 1 SEF will contribute approximately 7.8 % (343.1 ha). The contribution of the Boshoek Solar 1 SEF, to the loss of natural/near-natural to moderately modified vegetation within the 50 km radius is even smaller as most of the project site is located within already transformed and degraded areas.

In terms of the cumulative impact on the Zeerust Thornveld Vegetation Type, all three Boshoek PV Facilities as well as three other REFs (according to the REEA database) are located within the Zeerust Thornveld Vegetation Type. For an impact on vegetation types and ecosystems one will have to look beyond the 50 km radius, at all of the REFs located completely or partially within this ecosystem/vegetation type. The combined footprint of all the REFs located within the Zeerust Thornveld Vegetation Type will be approximately 4961.2 ha and will impact only 1.2 % of the total extent of the mentioned vegetation type. The contribution of the Boshoek Solar 1 SEF itself will be very small to insignificant and thus the cumulative impact of the REFs on the affected vegetation type will be insignificant and will not impact or threaten the conservation targets as well as Red List status of this vegetation type.

The cumulative loss and transformation of intact habitats pose a significant threat to the status and ecological functioning of provincially identified Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), thereby affecting the biodiversity conservation targets outlined by the North West Province. Within a 50 km radius, five out of seven Renewable Energy Facilities (REFs) are situated within ESA 1 (natural) and/or ESA 2 (unnatural), which aids crucial corridors and nodes for wildlife movement. Among these REFs, only one (Boshoek PV 2 SEF) is located entirely within a CBA2 Corridor Node, while another is partially situated within such a node.

Regarding ecosystem functions and services, particularly landscape connectivity, the three Boshoek PV SEFs are expected to exert a cumulative impact due to their close proximity to one another and their adjacency to identified corridor nodes and linkages (CBAs). Although Boshoek Solar 1 and 3 are positioned within an ecological support area that connects three Corridor Nodes and a Critical Corridor Linkage, their current contribution

to landscape connectivity is minimal. This is primarily due to extensive habitat transformation and degradation on these properties, both of which are extensively used for intensive game breeding activities. These properties are divided into small game breeding camps enclosed by highly secure, electrified game fences, which are rigorously monitored, severely constraining natural movement across the area.

Furthermore, the surrounding areas of these properties are characterised by a prominent trafficked road network, further impeding connectivity within the region.

Table 25: Renewable energy projects listed within the REEA database, and which are within a 50 km radius of Kingston Solar PV Energy Facility.

Project Name	Distance from study area	Proposed generating capacity	DFFE reference	EIA process	Project status
Renewable energy projects listed within the REEA database					
GI Renewable IPP: Matau PV	~ 35 km	150 MW	14/12/16/3/3/1/498	BAR	In Process
50 MW Photovoltaic Solar Farm on Portion 44 Of Farm Kortfontein No.461	~ 38 km	50 MW	2012/09/12	Scoping & EIA	Approved
RUSTMO3 PV plant, North West Province	~ 50 km	5 MW	2012/07/04	BAR	Approved
Rustmo2 PV Plant, North West Province	~ 50 km	10 MW	2012/01/31	BAR	Approved
Renewable energy projects not listed within the REEA database					
Boshoek PV 2 Solar Energy Facility	~ 1 km	150 MW	To be confirmed	Scoping & EIA	In Process
Boshoek PV 3 Solar Energy Facility	~ 0.6 km	150 MW	To be confirmed	Scoping & EIA	In Process

Conclusion on cumulative impacts within the 50 km radius due to this and the surrounding renewable energy developments:

- These renewable energy facilities (REFs) will impact a very small area within the 50 km radius and will subsequently result in minimal transformation of intact habitats. Subsequently, the cumulative threat posed by these developments on the ecological functioning of these habitats are very small to insignificant, and it is unlikely that these REFS will result in significant habitat fragmentation, disruption of landscape connectivity, and impair the ability of these habitat types to respond to environmental fluctuations.
- The proposed REFs will not threaten the conservation status and targets of set out for national or provincially identified conservation features.

Excessive clearing of vegetation can, and will, influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains, and this could also have detrimental effects on downslope areas.

» Rehabilitation and revegetation of all surfaces disturbed or altered during construction is desirable.
» Runoff from sealed surfaces, or surfaces that need to be kept clear of vegetation to facilitate operation of a development, must be monitored regularly to ensure that erosion control and stormwater management measures are adequate to prevent the degradation of the surrounding environment.

Large-scale disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent agricultural land and rangelands.

» A regular monitoring and eradication protocol must be part of all the developments' long-term management plans.

Excessive clearing of vegetation can and will influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains and intermittent drainage lines, and this could also have detrimental effects on the lower-lying areas.

- Rehabilitation and revegetation of all surfaces disturbed or altered during the operational phase are desirable.

Disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent rangelands.

» A regular monitoring and eradication protocol must be part of all the developments' long-term management plans.

After decommissioning, a continuous vegetation layer will be the most important aspect of ecosystem functionality within and beyond the project site.

- A weakened or absent vegetation layer not only exposes the soil surface; but, lacks the binding and absorption capacity that creates the buffering functionality of vegetation to prevent or lessen erosion as a result of floods.

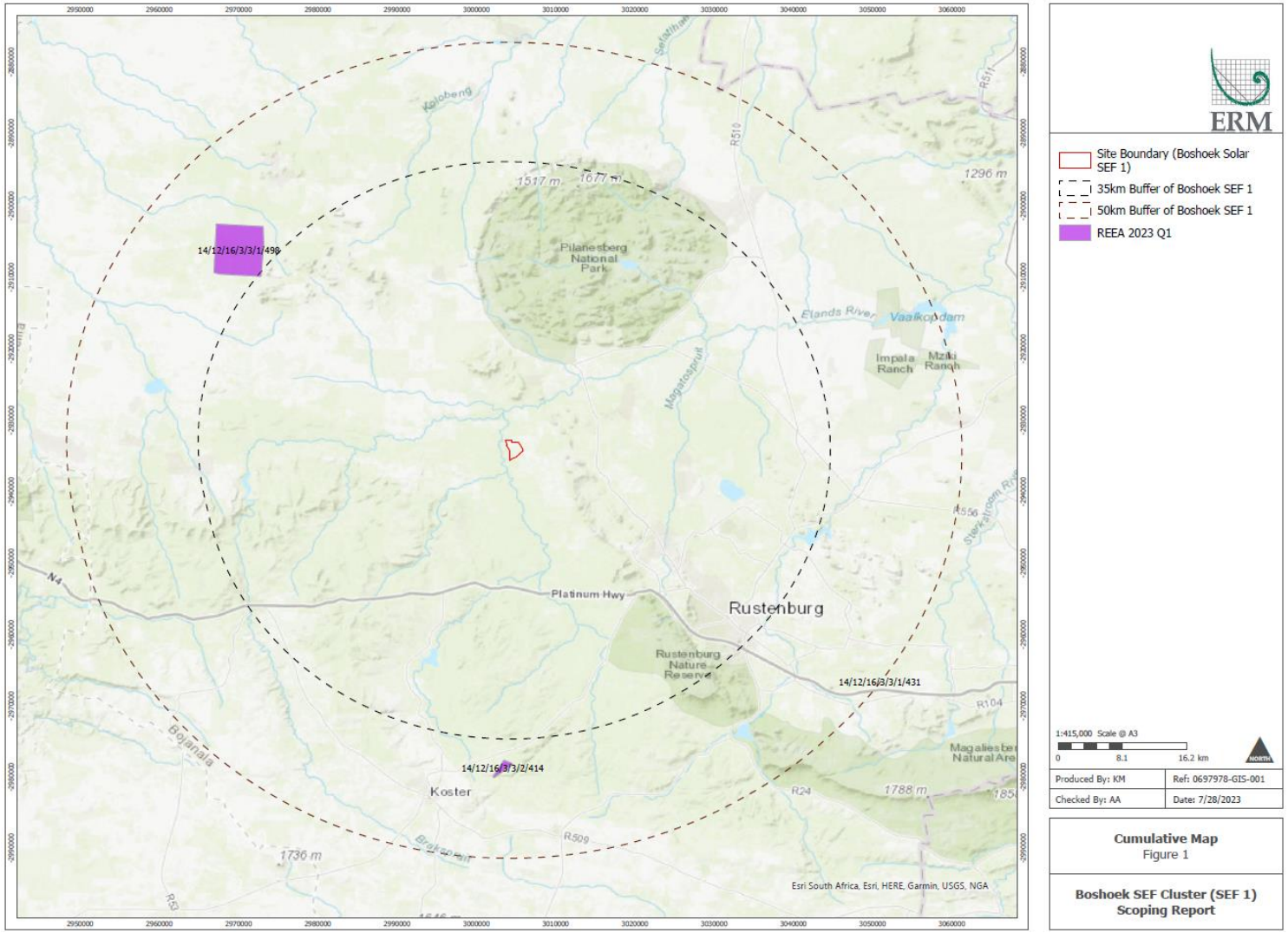

Figure 43: Location Map of the proposed Boshoek Solar 1 Solar Facility relative to the other renewable facilities planned within a 30 km radius (Map provided by ERM).

9.4. Identification of Potential Terrestrial Ecological Impacts and Associated Activities.

Potential ecological impacts resulting from the proposed development would stem from a variety of different activities and risk factors associated with the construction and operation phases of the project, and include the following:

Construction Phase

SEFs require an initial high intensity disturbance of a large surface area including the clearance of the vegetation cover and the levelling of earth on different terraces where necessary and the compaction of local soil within the development footprint. Concrete foundations for the framework on which the PV panels will be mounted. Soil disturbance, vegetation clearance and hardened surfaces will also be associated with the construction of access and internal roads within the PV solar facility. The internal substation would also need to be constructed within the site. Temporary laydown and storage areas would need to be placed within the site for the construction works.

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purpose.
- Site clearing and exploration activities for site establishment.
- Vegetation clearing could impact listed plant species and the potential habitat. Vegetation clearing would also lead to the loss of vegetation communities and habitats for fauna and avifauna and potentially the loss of faunal as well as avifaunal species, habitats, and ecosystems. On a larger and cumulative scale (if numerous and uncontrolled developments are allowed to occur in the future) the loss of these vegetation communities and habitats may potentially lead to a change in the conservation status of the affected vegetation type, as well as the ability of this vegetation type and associated features to fulfil its ecological responsibilities (functions). The above impact is most likely to be low due to the fact that most of the development area is situated within an area which has been somewhat degraded due to long term overgrazing.
- Soil compaction and increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may potentially impact the downstream watercourses, wetlands, and aquatic habitats, mainly due to an increase of surface water and silt inflow from the surrounding disturbed areas (these potential impacts on downslope wetland features have been assessed within the freshwater resource study and assessment). These potential impacts may result in a reduction in the buffering capacities of the landscape during extreme weather events.

- » Movement of construction vehicles and placement of infrastructure within the boundary of the drainage line may lead to the disturbance of these habitats, removal of vegetation cover and a potential increase in erosion, which may eventually spread into downstream areas.
- » Invasion by alien plants may be attributed to excessive disturbance to vegetation, creating a window of opportunity for the establishment of these alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the study area by machinery traversing through areas with such plants or materials that may contain regenerative materials of such species.
- » Presence and operation of construction machinery in the study area. This will create a physical impact as well as generate noise, potential pollution, and other forms of disturbance in the study area.
- » Increased human presence can lead to poaching, illegal plant harvesting, and other forms of disturbance such as fire.

Operation Phase

During the operation phase the facilities will operate continuously, mostly unattended and with low maintenance required for the duration of the SEFs lives (±20 years). The SEFs is likely to be monitored and controlled remotely, with maintenance only taking place when required.

The PV panels as well as the hard surfaces created by the development may lead to increased runoff (reduction in infiltration) and the potential interception and channelling of surface runoff, particular on surfaces with a steeper gradient. This may potentially lead to:

- » A modification to the surface runoff and infiltration patterns;
- » Increased erosion; and
- » Sedimentation of the downslope areas.

Subsequently, a localised long-term impact (more than 20 years) of moderate to low intensity could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified freshwater resource features in the area.

Decommission Phase

- » During decommissioning, the potential impacts will be very similar to that of the Construction Phase, although with slightly lower significance.

Cumulative Impacts

- The loss of vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets.
- Transformation of intact, sensitive habitats could compromise the ecological functioning of these habitats and may contribute to the fragmentation of the landscape, and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.
- The loss of biodiversity may be exacerbated.
- Invasion of exotics and invasive species into the broader area may also potentially be exacerbated.
- The loss of and transformation of the CBAs and ESAs could impact the Province's ability to meet its conservation targets (Not applicable to this SEF, as it is located outside any CBAs and ESAs).

The impacts identified above are assessed below during the construction, operation, and decommissioning phases of the facility, as well as before and after mitigation.

The majority of impacts associated with the development would occur during the construction phase as a result of the disturbance associated with the operation of heavy machinery in the study area and the presence of construction personnel. The major risk factors and contributing activities associated with the development are identified and briefly outlined and summarised below before the impacts are assessed. These are not necessarily a reflection of the impacts that would occur, but rather a discussion on overall potential impacts and/or extent of these potential impacts that would occur if mitigation measures were not considered and/ or sensitive areas not avoided. The assessment of these impacts is outlined in the following section.

Impact 1. Potential impacts on vegetation and listed or protected plant species

As already mentioned, the most likely and significant impact will be on the vegetation located within the development area and development footprint. The proposed development will lead to a direct loss of vegetation. Some loss of vegetation is an inevitable consequence of the development.

At Vegetation Level:

Consequences of the impact occurring may include:

- general loss of habitat for sensitive species;
- loss in variation within sensitive habitats due to loss of portions of it;
- general reduction in biodiversity;
- increased fragmentation (depending on location of impact);
- disturbance to processes maintaining biodiversity and ecosystem goods and services; and
- loss of ecosystem goods and services.

Although the development will impact the described least concern vegetation type, at a relative local scale, it is highly unlikely that this development will impact on the status of this vegetation type (impact on a regional scale) due to the fact that only 4% of the project site resembles near natural Zeerust Thornveld whilst 60% of the project site have been subjected to moderate levels of modifications, most notable bush clearance and overgrazing. A total of 31% of the project site have been subjected to significant levels of modifications and include extensive bush clearance and the planting of palatable grazing grass species (pastures). As for the grid line, due to its linear and small impact nature, the grid line, with applicable mitigation measures in place, will not have a significant impact on the conservation status of this vegetation type.

At species level:

No plant SCC were observed within the study area; however, the following two protected species were observed within the area;

- *Boscia albitrunca* (Nationally Protected Tree)
- *Spirostachys africana* (Provincial Schedule 2)

SoCC are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities, but are also affected by overall loss of habitat.

Due to the fact that no such plant SoCC were recorded within the study area, any impacts on such species/populations will be avoided.

The protected species recorded within the study area are fairly abundant within the region, and some loss of these species are regarded as acceptable, and will not threaten important populations of these species. Furthermore, the nature and extent of impacts on these species can be evaluated, and the impacts can be mitigated to an extent through avoidance of identified sensitive areas, and the search-and-rescue of some of these protected species, that have the potential to establish successfully after relocation.

Impact 2. Direct Faunal impacts

Faunal species will primarily be affected by the overall loss of habitat. Increased levels of noise, disturbance, potential pollution, and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species and species confined and dependent on specified habitats would not be able to avoid the construction activities and might be at risk. 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. This impact is highly likely to occur during the construction phase and could also potentially occur with resident fauna within the facility after construction.

Threatened species (red data species) include those listed as Critically Endangered, Endangered, or Vulnerable. For any other species a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened animal species, loss of a population or individuals could lead to a direct change in the conservation status of the species and possible extinction. This may arise if the proposed infrastructure is located where it will impact on such individual or populations. Consequences may include:

» fragmentation of populations of affected species;
» reduction in the area of occupancy of affected species; and
» loss of genetic variation within the affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species' overall survival.

As already mentioned, faunal diversity within the study area, and also within the surrounding environment, are very low to low. Larger mammals are livestock (cattle) and/or game species (hunting and intensive breeding programmes). "Natural" fauna that have historically occurred in area have been significantly affected by the anthropogenic impacts and most species now found within the area are highly adaptable, tolerant species with some being capable and small enough to move between the fenced grazing camps. Within the affected farm property very low faunal activity was observed. Species frequently observed within the affected farm properties include:

- Small and medium sized mammals such as: Steenbok (*Raphicerus campestris*), and Slender Mongoose (*Cynictis penicillata*).

No SoCC or highly range restricted animal species were observed within the project site.

There are however some suitable, albeit limited and highly fractured habitat (near natural habitat) for the following Animal SoCC (High to Very High Likelihood of Occurrence (LoO):

» South African Hedgehog - *Atelerix frontalis* (Near Threatened);

Ground truthing furthermore did, however, confirm the occurrence of one (1) natural occurring provincially protected animal species, namely;

- Schedule 4 of the Transvaal Nature Conservation Ordinance (No. 12 of 1983)
  - Steenbok *(Raphicerus campestris)*

During the construction phase noise generated may cause some temporary disturbances although it is expected that this will not deter these species.

Disturbance of faunal species can be maintained to a minimum and low significance by implementing effective mitigation measures. Livestock will most likely be relocated to other camps with some smaller species such as for example, sheep, goat and smaller antelope species (Steenbok and Duiker) can potentially be allowed to roam and graze the development footprint. Most of the natural occurring species are mobile and will most likely move away from the development area during construction phase with some species likely to return during the operation phase. Less mobile species such as tortoises, snakes and potential amphibian species should be looked out for and where encountered should either be relocated as recommended by the ECO or be left undisturbed if the development will not affect the species (e.g. toads and frogs of nearby wetland habitats).

As already mentioned, the most likely and significant impact will be on the vegetation and as a result a local loss of habitat, within the development area and development footprint of the proposed facility for most of the faunal species.

Impact 3. Soil erosion and associated degradation of ecosystems

This impact, along with the loss of vegetation, is probably the most significant impact that may occur due to the proposed development. Soil erosion is a frequent risk associated with SEFs on account of the vegetation clearing and disturbance associated with the construction phase of the development and will continue occurring throughout the operation phase. Service roads and installed infrastructure will generate increased direct runoff during intense rainfall events and may exacerbate the loss of topsoil and the effects of erosion. These eroded materials may enter nearby watercourses and may potentially impact these systems through siltation and changes in water chemistry and turbidity. Current erosion patterns observed within the affected farm properties were moderate.

With effective mitigation measures in place, including regular monitoring of the occurrence, spread and potential cumulative effects of erosion, may be limited to an absolute minimum.

Impact 4. Alien Plant Invasions

Major factors contributing to invasion by alien invader plants include habitat disturbance and associated destruction of indigenous vegetation. Consequences of this may include:

- change in the vegetation structure leading to change in various habitat characteristics and loss of indigenous vegetation;
- replacement of palatable species with unpalatable species therefore reducing the grazing capacity of the area;
- change in the plant species composition;
- change in soil chemistry properties;
- loss of sensitive habitats (e.g. downstream watercourses and wetlands);

- » loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
- » fragmentation of sensitive habitats;
- » change in vegetation flammability, depending on alien species; and
- » impairment of wetland function.

The affected farm properties mostly contain moderate levels of IAPs. These IAPs may be a threat during the construction phase and throughout the operation phase, and will require regular and careful monitoring. With effective and meticulous mitigation measures in place this can be achieved.

During the survey a total of 20 alien plant species were found within the proposed development site, of which 7 are NEM:BA A&IS Regulations listed invasive species, namely:

- » *Cereus jamacaru* (Queen of the night; Category 1b)
- » *Datura ferox* (Large thorn apple; Category 1b)
- » *Flaveria bidentis* (Smelter's-bush; Category 1b)
- » *Malvastrum coromandelianum* (Prickly malvastrum; Category 1b)
- » *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi)
- » *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b)
- » *Solanum sisymbriifolium* (Wild tomato, Dense- thorned bitter apple; Category 1b)

Impact 5. Impacts on broad-scale ecological processes

Ecological processes generally occupy larger areas than biodiversity pattern features. They are also more difficult to measure and map. For current purposes, inferred ecological processes are associated with whole habitats, specific habitat patches, or any other part of the landscape that can be spatially defined and mapped.

Important ecological processes operating at the site include:

- » Climate-change refuge habitats: These are areas or habitats that have moderated microclimates relative to the broader landscape and allow species to persist in a landscape that has an otherwise incompatible climate. At the site no such important habitats have been identified.

- » Climate resilience and the provision of ecological infrastructure and services: Natural grasslands and savannas are regarded as remarkable and irreplaceable biodiversity assets of global significance. In South Africa, grassland and savanna ecosystems provide the natural resources and ecological infrastructure that supports most of South Africa's important economic activities, and millions of rural livelihoods. Ecological infrastructure is the stock of functioning ecosystems that provides a flow of essential

system services to human communities — services such as the provision of fresh water, climate regulation, and soil formation. Ecological infrastructure includes features such as healthy mountain catchments, rivers, wetlands, and nodes and corridors of natural habitat which together form a network of interconnected structural elements within the landscape. If this ecological infrastructure is degraded or lost, the flow of ecosystem services will diminish and ecosystems will become vulnerable to shocks and disturbances, such as the impacts of climate change, unsustainable land use change, and natural disasters like floods and droughts. It is important to note that when ecological infrastructure is degraded or fails, the direct monetary cost to society and government is often very high. Ecological infrastructure is, therefore, the nature-based equivalent of hard infrastructure, and is just as important for providing the vital services that underpin social development and economic activity.

Grassland and savanna ecosystems provide many essential ecosystem services, underpinned by rich biodiversity and diverse ecosystem processes. Important local and large-scale ecosystem services provided by grasslands and savannas include:

- Water production, water purification, and flood attenuation.
- Good quality forage for animal production.
- Nutrient-cycling and carbon sequestration and storage.
- Pollination services.
- Support for livelihoods such as thatching and weaving.
- Medicinal and food plants.
- Cultural, heritage, and recreational amenities, often with significant tourism value.
- Deep, nutrient-rich soils.

» Island biogeography. In nature, size matters and larger patches of habitat support more species and are more resilient to ecological perturbation. Within the regions large tracts of natural vegetation have been transformed through cultivation, plantation forestry, mining, and urban settlement and have contributed to landscape fracturing. Within the study area and surrounding area, especially cultivation practices, and to some extent habitat degradation due to overgrazing, have resulted in the cumulative transformation of large tracts of natural habitat. Natural habitats currently have a somewhat patchy distribution within the landscape. Landscape connectivity within the larger area is, however, still regarded as fairly good with fairly large continuous savanna tracts still present. The project site itself is, however, isolated, fractured from these natural, connected areas and as such provide minimal contribution to habitat connectivity.

» Species movement. As previously mentioned, large tracts of land have been transformed, with minimal intact natural vegetation still present, existing as isolated patches and subsequently landscape connectivity are regarded as low, severely

impacting species movement. Thus, it appears that this area does not form part of an important biodiversity corridor or habitat linkage. The proposed development will not impact or reduce the ability of important biodiversity corridors, linkages and nodes to provide sufficient landscape connectivity within the region, and in turn facilitate species movement.

The contribution of this development to the impacts on the above described broad-scale ecological processes is regarded as very small, due to:

» the relatively small development footprint, most of the project site located within already transformed and degraded areas, the proximity to agricultural areas, subsequently clustering/restricting developments to already impacted areas and in doing so avoiding development within large natural areas.

9.5. Assessment of Impacts

CONSTRUCTION PHASE

Impact 1: Potential impacts on plant biodiversity and habitats

Vegetation clearing for site preparation will impact local vegetation habitats

Impacts on vegetation and protected plant species would occur due to the construction of the facility and associated infrastructure. This impact is regarded as the most likely and significant impact and will lead to direct loss of vegetation, including protected species.

The most likely consequences include:

» local loss of habitat (to an extent as a natural ground covering will be maintained where possible);
» very small and local disturbance to processes maintaining local biodiversity and ecosystem goods and services; and
» a potential loss of a few local protected species.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Low	High	Negative	High	Medium	High
With Mitigation	Medium	Low	Medium	Negative	Medium	Medium	High
Can the impact be reversed?	Partially Reversible. Through a rehabilitation and revegetation program which will be implemented during the decommissioning phase.						
Will impact cause irreplaceable loss or resources?	Only marginal loss of resources.						
Can impact be avoided, managed or mitigated?	The impact cannot be avoided, however the impact can be managed and mitigated (see mitigation measures below).						

Mitigation measures to reduce residual risk or enhance opportunities:

» Preconstruction walk-through of the final development footprint for protected species and species of conservation concern that would be affected.
» Before construction commences individuals of listed species within the development footprint that would be affected, should be counted and marked by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant provincial authorities, will be required to relocate and/or disturb listed plant species.

» Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.
» Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.
» ECO and/or Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.
» Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low sensitivity and are properly fenced or demarcated as appropriate and practically possible.
» All vehicles to remain on demarcated roads and no unnecessary driving in the veld outside these areas should be allowed.
» Regular dust suppression during construction, if deemed necessary, especially along access roads.
» No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purpose without express permission from the ECO and or Contractor's EO in consultation with the Botanical Specialist.
» No fires should be allowed on-site.

Residual impact	Vegetation loss within areas where hard engineering surfaces will be constructed will take a very long time, post-decommissioning to restore and as such is regarded as a residual impact.

CONSTRUCTION PHASE

Impact 2: Impact on Faunal Diversity.

Increased levels of noise, pollution, disturbance, and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would 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. Some impact on fauna is highly likely to occur during construction.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Low	Medium	Negative	High	Medium	High
With Mitigation	Low	Low	Medium	Negative	Medium	Medium	High

Can the impact be reversed?	Partially Reversible. Only a few highly adaptable and opportunistic faunal species may return following the construction phase. It is however unlikely that these animals will permanently reside within the project site, but may potentially move through the area to forage areas. However, the rehabilitation of a stable vegetation cover after the decommissioning of the facility may allow some animals to return to the area, with the area providing suitable habitat for some species.
Will impact cause irreplaceable loss or resources?	Only marginal loss of resources. Faunal diversity was very low and most species will merely move away during the construction phase.
Can impact be avoided, managed or mitigated?	The impact cannot be avoided, however the impact can be managed and mitigated (see mitigation measures below).

Mitigation measures to reduce residual risk or enhance opportunities:

» Site access should be controlled and no unauthorised persons should be allowed onto the site.
» Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
» The 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 demarcated site.
» Fires should not be allowed on site.

» 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.
» All construction vehicles should adhere to a low speed limit (30 km/h) to avoid collisions with susceptible species such as snakes and tortoises.
» Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual impact	The altered development area will contain a lower diversity of habitat types and niches for faunal species, however faunal diversity was in any way confirmed to be limited and as such this potential residual impact can be **regarded as low**.

CONSTRUCTION PHASE

Impact 3: Potential impacts on Animal Species of Conservation Concern (SoCC)

The foremost concern revolves around habitat destruction, as this development will likely lead to the loss of habitats utilized these potential animal SoCC for foraging and movement. These species may traverse this area in search of food, making the disruption of their migratory paths and foraging grounds a potential pressing issue.

Moreover, the displacement of these species due to the solar development can disrupt their natural behaviours, potentially leading to increased stress, reduced breeding success, and a heightened risk of predation or competition. This displacement also threatens their food sources, which may result in population declines and a loss of biodiversity in the region.

Another distressing implication is the heightened risk of illegal poaching that could accompany such a development. The disturbance caused by construction and human presence in these areas may attract poachers, targeting these vulnerable and valuable species for trade, further endangering their populations.

During the survey no animal SoCC was recorded within the project site and even though there are some suitable habitat within the Project Site the potential for such animal SoCC to inhabit the area is regarded as low

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Low	High	Negative	Low	Medium	High
With Mitigation	High	Low	Medium	Negative	Low	Low	High

Can the impact be reversed?	Partially Reversible. Most species including SoCC will move away during the construction phase. It is unlikely that these animals will return to the project site during the operational phase, but may potentially move through the area to forage areas. The rehabilitation of a stable vegetation cover after the decommissioning of the facility may some suitable habitat for animal SoCC
Will impact cause irreplaceable loss or resources?	Only marginal loss of resources. No Faunal SoCC was observed within the project site and the project site provide minimal suitable habitat for Faunal SoCC.
Can impact be avoided, managed or mitigated?	The impact can be avoided.

Mitigation measures to reduce residual risk or enhance opportunities:

» Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding potential animal SoCC, and the appropriate procedures to be followed if such a species has been observed during the construction phase.
» Should any faunal SoCC be encountered, construction should be halted, the EO must be notified, and authorisation to relocate such species
» must be obtained from DFFE and/or LEDET.

» No staff member may attempt to handle these species.
» Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.
» Contractors and working staff should stay within the development area and movement outside these areas must be restricted.
» No development should occur beyond the proposed footprint.
» No hunting/trapping or collecting of faunal species is allowed.
» No informal fires by construction personnel are allowed.
» Faunal habitat beyond the demarcated area should not be altered.
» Driving must take place on existing and new access roads and a speed limit of 30km/h must be implemented on all roads traversing the project site during the construction phase.
» Passage ways, of the appropriate size, should be created along the boundary fence of the PV facility, to allow the potential "target" animals to safely move through the PV facility.
» The use of electrical fencing is strongly discouraged.
» If electrical fencing is going to be used, no electrical wires may be placed within a minimum of 1 m from the ground level.

Residual impact	Due to the nature of this development, there will be a permanent loss of habitat and forage for potential fauna SoCC. However, due to the fact that only a small area of potential suitable habitat was found within the footprint and no fauna SoCC was observed during the surveys, this potential residual impact can be **regarded as very low**.

CONSTRUCTION AND OPERATIONAL PHASE

Impact 4: Soil erosion and associated degradation of ecosystems.

During and following construction, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

Severe cases of erosion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as grazing and clean water.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Medium	Medium	High

Can the impact be reversed?	Yes. By implementing robust erosion monitoring and management measures, along with diligent execution of the plan, swift identification of erosion features can occur, enabling effective remediation of affected areas and reversal of associated impacts.
Will impact cause irreplaceable loss or resources?	Effective implementation of erosion control, monitoring, and management measures can successfully prevent the irreparable loss of resources caused by erosion.
Can impact be avoided, managed or mitigated?	Impact can be largely avoided and where they occur can be successfully managed/mitigated.

Mitigation measures to reduce residual risk or enhance opportunities:

» Any erosion problems observed along access roads or any hardened/engineered surface should be rectified immediately and monitored thereafter to ensure that they do not re-occur.
» All bare areas (excluding agricultural land and the development footprint), affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
» Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.
» Site rehabilitation should aim to restore surface drainage patterns as far as is feasible.

» An erosion control management plan should be utilised to prevent erosion
» Roads and other disturbed areas should be regularly monitored for erosion problems, and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation.
» Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.
» Erosion control measures such as silt fences (for areas of works) and gravel strips may be considered at the impact zone where water falls from the solar panels onto the soil surface (due to deterioration in natural grassland because of poor maintenance or lack of solar radiation).
» Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities
» Stormwater from hardstand areas, buildings and the substation must be managed using appropriate channels and swales when located within steep areas.
» Storm water run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the Solar PV site.

Residual impact	The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be **very low**.

OPERATIONAL PHASE

Impact 5: Alien Plant Invasion

Increased alien plant invasion is one of the greatest risk factors associated with this development following the construction phase. The disturbed and bare ground that is likely to be present at the site during and after construction would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

Severe cases of Alien Plant Invasion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as forage.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Medium	Medium	High

Can the impact be reversed?	Yes. By implementing robust Alien Invasive Plant (AIP) monitoring and management measures, along with diligent execution of the plan, swift identification of areas that contain signs of alien plant invasion, enabling effective remediation of affected areas and reversal of associated impacts.
Will impact cause irreplaceable loss or resources?	Effective implementation of AIP control, monitoring, and management measures can successfully prevent the irreparable loss of resources caused by Alien Plant Invasion.
Can impact be avoided, managed or mitigated?	Impact can be largely avoided and where they occur can be successfully managed/mitigated.

Mitigation measures to reduce residual risk or enhance opportunities:

» The successful reduction in the threat (significance) posed by Alien Invasive Plants relies on a detailed;
  - Site-specific eradication and management programme for alien invasive plants;
  - Site-specific Vegetation Rehabilitation Management Plan; and
  - The meticulous implementation of this Management Plan.
» Such an Alien Invasive and Vegetation Rehabilitation Management Plan must subsequently be included in the Environmental Management Programme (EMPr).
» Regular monitoring by the operation and maintenance team for alien plants must occur and could be conducted simultaneously with erosion monitoring.

» When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.
» Clearing methods must aim to keep disturbance to a minimum.
» No planting or importing any listed invasive alien plant species (all Category 1a, 1b, 2, and 3 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.

Residual impact	If the above recommended mitigation measures are strictly implemented, and some re-establishment and rehabilitation of natural vegetation is allowed, the residual impact will be **very low**.

OPERATIONAL PHASE

Impact 6: Direct Faunal Impacts.

Increased levels of noise, pollution, disturbance, and human presence during decommissioning will be detrimental to fauna. Sensitive and shy fauna would move away from the area during this 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. Some impact on fauna is highly likely to occur during construction.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Low	Medium	Negative	Medium	Medium	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High

Can the impact be reversed?	Yes. Only a few highly adaptable and opportunistic faunal species may inhabit the project site during the operational phase. These species will move away during the decommissioning phase with some species returning post-decommissioning phase. However, the rehabilitation of a stable vegetation cover after the decommissioning of the facility may not only allow some of these species that have inhabited the project site during the operational phase to return but may allow faunal species that have inhabited the area post construction phase to return.
Will impact cause irreplaceable loss or resources?	Implementing an effective rehabilitation and re-vegetation plan can prevent any irretrievable loss of resources.
Can impact be avoided, managed or mitigated?	Disturbance of residing faunal species during the decommissioning phase cannot be avoided, however the impact can be managed and mitigated (see mitigation measures below).

Mitigation measures to reduce residual risk or enhance opportunities:

» Site access should be controlled and no unauthorised persons should be allowed onto the site.
» Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
» The 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 demarcated site.
» Fires should not be allowed on site.
» 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.
» All vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.
» Vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual impact	The development site will be rehabilitated and re-vegetated establishing faunal habitat and forage. Thus, there will be **no residual impact**.

OPERATIONAL PHASE

Impact 7: Soil erosion and associated degradation of ecosystems.

During and following decommission, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

Severe cases of erosion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as grazing and clean water.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High

Can the impact be reversed?	Yes. By implementing a rehabilitation and re-vegetation plan, as well as a robust erosion monitoring and management plan.
Will impact cause irreplaceable loss or resources?	Effective implementation of a rehabilitation and re-seeding plan as well as an erosion control, monitoring, and management plan, irreparable loss of resources caused by erosion can successfully be avoided.
Can impact be avoided, managed or mitigated?	Impact can be largely avoided and where they occur can be successfully managed/mitigated.

Mitigation measures to reduce residual risk or enhance opportunities:

- Any erosion problems observed should be rectified immediately and monitored thereafter to ensure that they do not re-occur.
- There should be regular monitoring for erosion for at least 2 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.
- All bare areas, affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.

Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impact will be **very low**.

OPERATIONAL PHASE

Impact 8: Alien Plant Invasion

Increased alien plant invasion is one of the greatest risk factors associated with this development following the decommission phase. The disturbed and bare ground that is likely to be present at the site during and after decommission would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

Severe cases of Alien Plant Invasion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as forage.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High

Can the impact be reversed?	Yes. By implementing an effective rehabilitation and re-vegetation plan, as well as a robust erosion monitoring and management plan.
Will impact cause irreplaceable loss or resources?	Effective implementation of a rehabilitation and re-seeding plan as well as a robust Alien Invasive Plant (AIP) monitoring and

	management plan, irreparable loss of resources caused by Alien Plant Invasion can successfully be avoided.
Can impact be avoided, managed or mitigated?	Impact can be largely avoided and where they occur can be successfully managed/mitigated.

Mitigation measures to reduce residual risk or enhance opportunities:

» The successful reduction in the threat (significance) posed by Alien Invasive Plants relies on a detailed;
  - Site-specific eradication and management programme for alien invasive plants;
  - Site-specific Vegetation Rehabilitation Management Plan; and
  - The meticulous implementation of this Management Plan.

» Such an Alien Invasive and Vegetation Rehabilitation Management Plans must subsequently be included in the Environmental Management Programme (EMPr).

» 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 must be implemented until a cover of indigenous species (ideally climax species) has returned.

» When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.

» Clearing methods must aim to keep disturbance to a minimum.

» No planting or importing of any listed invasive alien plant species (all Category 1a, 1b, 2, and 3 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.

Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impacts will be **avoided**.

CUMULATIVE IMPACT PHASE

Impact 9: Impact on Critical Biodiversity Areas and broad-scale ecological processes

Transformation of intact habitats could potentially compromise ecological processes, as well as ecological functioning of important habitats, and would contribute to the fragmentation of the landscape and potentially disrupt the connectivity of the landscape for fauna and flora, and impair their ability to respond to environmental fluctuations.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	High	Medium	Negative	Low	Low	High
With Mitigation	Low	High	Medium	Negative	Low	Low	High

Can the impact be reversed?	Moderate reversibility. By implementing an effective rehabilitation and re-vegetation plan during the decommission phase some areas may regain their functions and ecological processes may re-establish within the area, albeit to a sufficient extent
Will impact cause irreplaceable loss or resources?	No irreplaceably loss of resources as this area currently do not significantly contribute to landscape connectivity.
Can impact be avoided, managed or mitigated?	Impact can be largely avoided.

Mitigation measures to reduce residual risk or enhance opportunities:

» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.

» An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.

» Reduce the footprint of the facility within sensitive habitat types as much as possible.

» All disturbed areas that are not used, such as excess road widths, should be rehabilitated with locally occurring plant species after construction to reduce the overall footprint of the development.

Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impacts will be **will be very low,** with most of the areas regaining their functions and ecological processes.

CUMULATIVE IMPACT PHASE							
Impact 10: Impact on Critical Biodiversity Areas and broad-scale ecological processes Transformation of intact habitats could potentially compromise ecological processes, as well as ecological functioning of important habitats, and would contribute to the fragmentation of the landscape and potentially disrupt the connectivity of the landscape for fauna and flora, and impair their ability to respond to environmental fluctuations.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	High	Medium	Negative	Low	Low	High
With Mitigation	Low	High	Medium	Negative	Low	Low	High
Can the impact be reversed?			Moderate reversibility. By implementing an effective rehabilitation and re-vegetation plan during the decommission phase some areas may regain their functions and ecological processes may re-establish within the area, albeit to a sufficient extent				
Will impact cause irreplaceable loss or resources?			No irreplaceably loss of resources as this area currently do not significantly contribute to landscape connectivity.				
Can impact be avoided, managed or mitigated?			Impact can be largely avoided.				
Mitigation measures to reduce residual risk or enhance opportunities: » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland. » Reduce the footprint of the facility within sensitive habitat types as much as possible. » All disturbed areas that are not used, such as excess road widths, should be rehabilitated with locally occurring plant species after construction to reduce the overall footprint of the development.							
Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impacts will be **will be very low,** with most of the areas regaining their functions and ecological processes.						

10. CONCLUSION

This study aimed to conduct a screening assessment of the projects site to:

- Identify and describe ecological sensitive areas;
- Confirm or dispute the current use of the land and environment sensitivity as identified by the national web-based environmental screening tool;
- Provide motivation and evidence of either the verified or different use of the land and environmental sensitivity;
- Identify sensitive areas to be avoided (including corresponding spatial data);
- Provide recommendations regarding the areas available for the development of the collector substation and powerline;
- Determine and assess impacts associated within the collector substation and powerline development;
- Provide mitigation measures in order to avoid or reduce the impacts to acceptable and manageable levels;
- Compile a detailed terrestrial ecological impact assessment report which adheres to the following:

- The report will be compiled to fulfil the requirement for a Terrestrial Biodiversity Assessment as per the 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 NEMA (GNR 320), as gazetted on 20 March 2020.
- In terms of the 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 NEMA, gazetted on 30 October 2020, relating to requirements relating specifically to the Terrestrial Plant and Animal (species) themes, this report includes these requirements.

As part of this Assessment detailed field surveys were undertaken over the course of 27th to the 29th of March 2023 (early autumn) and 23rd to 24th of January (summer). During the site visits the vegetation was in optimal survey conditions; and the majority of plants were easily identifiable. The outcome of this report is a terrestrial ecological importance and sensitivity map visually illustrating the findings and results which will then aid in the final planning and design phase of the Boshoek Solar 1 Solar Facility, with the purpose of avoiding any sensitive areas and/or detrimental impacts on the environment.

Habitat sensitivity classification was based on available GIS coverages including various terrestrial ecosystems and biodiversity data, a recent screening survey, and the expert's mapping from Google Earth satellite imagery (altitude 1 to 2 km).

The affected properties are almost entirely used for game ranching with very limited infrastructure, mainly restricted to access roads, bomas, kraals, water and feeding points for game and livestock, and the occasional homestead. Land-use within the surrounding properties are also similarly and predominantly utilized for game ranching.

Livestock farming was historically the main land use practise within the area, with varying stocking rates and grazing regimes implemented. It however appears that the farms were historically fairly small and utilized as grazing for predominantly cattle and occasionally a mixture between cattle and sheep. Stocking rates appears to have varied between moderate to high rates with continuous grazing to rotational grazing systems utilized, with the exclusion of fire (natural or as a management tool). This has likely resulted in the current overgrazed and transformed situation observed on certain properties, with bare, exposed soils locally present and subjected to soil capping and sheet erosion. These historical management practices have also resulted in the encroachment of small to shrubby, thorny bushes, which have been occasionally cleared and thinned out over the last 30 – 50 years (these management practices are present within almost all of the properties). However, since the transition to game breeding, large areas have been subjected to significant modifications, with the areas being cordoned off in small game breeding camps, with large scale bush clearing and in some areas the ripping, tilling and planting of palatable grasses such as Cenchrus ciliaris, *Urochloa mosambicensis, Digitaria argyrograpta* and *Dichanthium annulatum.* These areas should rather be regarded as pastures than natural grazing lands.

Based on the results obtained from the site visit, only 4% of the project site resembles near natural Zeerust Thornveld (vegetation type within which the project site is located) whilst 60% of the project site have been subjected to moderate levels of modifications, most notable bush clearance and overgrazing. A total of 31% of the project site have been subjected to significant levels of modifications and include extensive bush clearance and the planting of palatable grazing grass species (pastures).

According to the National Vegetation Map 2018, Gold Reef Mountain Bushveld (SVcb9) and Zeerust Thornveld (SVcb3) are mapped for the study area (see Figure 13 and section 5.1). Both of these vegetation types are regarded as Least Concern. During the survey it was determined that both of these vegetation types were present on site, as well as smaller scale variations within them, (plant community types). Mapping for this section was therefore carried out on such plant community type level.

According the various national and provincial environmental planning frameworks the following environmental/conservation planning units will be impacted:

» At national level:
  - *NPAES Focus Area:*
    - Small portion of PAOI included as part of a NPAES Focus Area (0.086 ha).

The proposed development won't have any impact on any protected- and/or conservation areas. Subsequently, the development is regarded, in terms of this systematic planning framework, as acceptable.

» At Provincial level:
  - *NWBSP 2015: Critical Biodiversity Areas:*
    - CBA 2: T9 (Biodiversity Node)
      - 4.6 ha (1%) of PAOI
  - *NWBSP 2015: Ecological Support Areas:*
    - ESA 1: T7 (Natural Corridor: Selected Planning Units)
      - 267.3 ha (78%) of PAOI.
    - ESA 2: T7 (Non-Natural Corridor: Selected Planning Units)
      - 70.6 ha of PAOI)
    - ESA 2: T11 (Corridor – Cultivated areas)
      - 7.2 ha of PAOI)

Biological Corridors (Selected planning units and cultivated areas): A very small portion (0.08 ha) of the project site (along the eastern boundary of the project site) falls within this CBA2 Corridor. In terms of this small area being classified as a CBA 2, this is rather due to an error that occurred during the processing of the spatial data used to generate the CBA map. This CBA 2 area is rather associated with the adjacent property to the east but has slightly extended to areas outside of this property and into the effected property. As mentioned above (ESA Corridors), the "naturalness" and connectivity of the affected property, as well as surrounding properties, have been

severely impacted through current and historical land use activities, and current land use activities have resulted in the fragmentation of the landscape, with natural areas being isolated from each other.

A very small portion of the proposed grid connection corridor (4.52 ha) will traverse this biodiversity corridor node.

Taking into account the small extent of this component of the proposed development and the typical nature of such a linear development, as well as the extent of remaining natural and intact biodiversity surrounding the proposed development footprint, the construction and operation of the grid connection infrastructure should not affect the functions and services associated with this biodiversity corridor node (CBA 2), as well as the conservation targets set out for this area..

Important habitats (hills and ridges): The potential of this area to functions as a biological corridor has been severely impacted through agricultural practices. Due to extensive exotic game farming/breeding within the region, natural movement have been significantly impacted, within this corridor, as most of farms in the area (including the affected property) comprise of small game breeding camps cordoned off with high, impenetrable game fences, which also is regularly electrified. These wildlife breeding activities have resulted in significant fracturing of the landscape. Furthermore, historically, large areas have been subjected to extensive tree and shrub removal, ploughing, and subsequent reseeding with pasture grasses, all aimed at enhancing the grazing potential of the area. Follow-up, ripping and reseeding of localised areas within these pastures, occur at irregular intervals.
Subsequently it can be concluded that the proposed development within the affected area will not significantly impact the integrity, functions and services associated with the natural biodiversity corridors within the area..

Overall, no significant terrestrial ecological flaws that could pose a problem to the proposed EGI development were identified during this assessment.

From a botanical and ecological perspective, a total of eight (8) plant community types were identified, namely:

- *Cenchrus ciliaris* Planted Veld: Very Low Sensitivity/Site Ecological Importance
- *Cymbopogon caesius - Heteropogon contortus*: Low Sensitivity/Site Ecological Importance
- *Dichanthium annulatum - Brachiaria brizantha Pasture*: Very Low Sensitivity/Site Ecological Importance
- *Panicum maximum - Urochloa mosambicensis Pasture*: Very Low Sensitivity/Site Ecological Importance
- *Themeda triandra - Ziziphus mucronata*: Medium Sensitivity/Site Ecological Importance

- » *Vachellia tortilis - Heteropogon contortus: A (Eragrostis lehmanniana)*: Low Sensitivity/Site Ecological Importance
- » *Ziziphus mucronata - Cymbopogon caesius: A (Grewia flava)*: Low Sensitivity/Site Ecological Importance
- » *Ziziphus mucronata - Cymbopogon caesius: B (Eragrostis lehmanniana)*: Low Sensitivity/Site Ecological Importance

Development within Very Low and Low sensitivity plant communities is regarded as acceptable. Development in these areas will not threaten their integrity, as well as the services and functions provided by them. Furthermore, impacts on the areas listed as Medium Site Ecological Importance can be mitigated to acceptable levels, or these areas can be avoided since they occupy only a very small area of the proposed development site. No plant SoCC were recorded within the proposed development site.

A total of 178 plant species were found within the proposed development site, which consisted of 158 native, 0 SCC, 3 protected, 20 alien, and 7 NEM:BA listed invasive species. Protected plant species were found in 5 of the plant community types. Care must be taken to avoid any protected plant species, should they be found. It is recommended that a pre-construction walkthrough be undertaken by a qualified botanist prior to commencement of construction. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely.

From a fauna species and habitat perspective, a total of four (4) major faunal habitat types were identified namely:

- Savanna Shrubland occupying deep sandy-loam soils plains (seriously modified): Very Low Sensitivity
- Savanna Grassland occupying sandy-loam plains (critically to seriously modified): Very Low Sensitivity
- Tree Savanna occupying deep to moderately deep sandy-loam plains (mainly moderately modified with some areas being largely modified and small patches still in a near-natural condition): Low Sensitivity
- Pasture or Pure Grassland occupying deep sandy-loam plains soils (completely modified): Very Low Sensitivity

It was found that that the majority of the site can be regarded as of "Low" sensitivity (210.5 ha or 61% of project site) whist the remaining 39% (132.6 ha) are regarded as "Very Low" sensitive (Table 24). None of the areas were scored as "High" or "Very High".

Mammal diversity within the PAOI was considered low. A total of 16 mammal species were observed within the PAOI. However, 6 of these species are larger antelope (Family: Cetartiodactyla) species that has been introduced into the area for "agricultural purposes (intensive game breeding). These species are predominantly larger and scarcer antelope species as well as exotic variation of these antelope species. Furthermore, these species

are kept in fairly small grazing camps which is surrounded by tall, impenetrable game fences, restricting any natural movement in and out of these areas (larger mammals). .

During the site visit no mammal SoCC were recorded within the PAOI.

The initial screening report revealed that three mammal SCC have a distribution range that include the project site and may potentially inhabit the project site namely; Sensitive Species 5 (for their protection, the identities of these species will not made public); *Crocidura maquassiensis* (Makwassie musk shrew), and *Lycaon pictus* (African wild dog). Subsequently, the project site has been classified as Medium Sensitive within the screening tool.

During the site survey it was determined that there is a very low likelihood of occurrence (LoOC) for all three mammal species to occur within the project site. Due to livestock and intensive game breeding activities within the area, *Lycaon pictus* (African wild dog) and Species 5 these species will likely also not be tolerated within the area, there movement within the area would also be highly restricted due to numerous impenetrable, and frequently electrified game fences. Furthermore, *Crocidura maquassiensis* (Maquassie Musk Shrew) prefers densely vegetated, moist grassland/wetland habitats, and no such habitats are present within the project site.

It is highly unlikely that the proposed development will have a significant impact on potential SoCC species and their regional populations, as large tracts of natural habitat will still persist outside of the development site.

A very low herpetofaunal diversity was observed during the field assessment, with only five (3) reptile species observed and no amphibian species. Reptile diversity and abundance are anticipated to fairly low to a low habitat and niche diversity and general structural complexity within the project site. The general arid landscape does not lend itself to habitation by amphibians.

During the site visit no Reptile or Amphibian SoCC were recorded through active searching (diurnal and nocturnal surveys), and through random observations.

It is highly unlikely that the proposed development will have a significant impact on potential SoCC species and their regional populations.

There are no impacts associated with the proposed Boshoek Solar PV 1 development that cannot be mitigated to a low level. Its local environmental impact can be reduced to an acceptable magnitude. Likewise, the contribution of the proposed Solar PV facility to the cumulative impact in the area would be low and is acceptable. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding. Therefore, it is the opinion of the specialists that the

development may be authorised within the specified area, subject to the implementation of the recommended mitigation measures.

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12. APPENDICES

Appendix 1 Plant Species List (Site and POSA Generated List)

The plant species list presented here is a combination of online databases (e.g., POSA and iNaturalist) and site survey data. Descriptions of colours and symbols are given below:

Species marked with "*":	Protected plant species.
Species marked with "~":	Plant Species of Conservation Concern.
Species highlighted in orange:	Threatened (CR, EN, VU) plant species.
Species highlighted in blue:	Alien plant species.
Species marked with NEM:BA:	Invasive Alien Plant species listed in the NEM:BA A&IS Regulations.
Species marked with NWE:	Limpopo Endemic.
Small letters in []:	Vegetation/plant community type in which the species was found:

- a*: Cenchrus ciliaris Planted Veld*
- *b: Cymbopogon caesius - Heteropogon contortus*
- *c: Dichanthium annulatum - Brachiaria brizantha Pasture*
- *d: Panicum maximum - Urochloa mosambicensis Pasture*
- *e: Themeda triandra - Ziziphus mucronata*
- *f: Vachellia tortilis - Heteropogon contortus: A (Eragrostis lehmanniana)*
- *g: Ziziphus mucronata - Cymbopogon caesius: A (Grewia flava)*
- *h: Ziziphus mucronata - Cymbopogon caesius: B (Eragrostis lehmanniana)*

Family	Species	IUCN	Family	Species	IUCN	Family	Species	IUCN
Cyperaceae	*Abildgaardia ovata*	LC	Zamiaceae	*~Encephalartos eugene-maraisii*	EN	Lamiaceae	*Orthosiphon suffrutescens*	LC
Fabaceae	*Abrus laevigatus*	LC	Sapotaceae	*Englerophytum magalismontanum*	LC	Osmundaceae	*Osmunda hilsenbergii*	
Malvaceae	*Abutilon angulatum* var. *angulatum*	NE	**Poaceae**	***Enneapogon cenchroides*** [df]	**LC**	Osmundaceae	*Osmunda regalis*	LC
Malvaceae	*Abutilon angulatum* var. *macrophyllum*	NE	Poaceae	*Enneapogon pretoriensis*	LC	Asteraceae	*Osteospermum muricatum*	
Malvaceae	*Abutilon austro-africanum*	LC	Poaceae	*Enneapogon scoparius*	LC	**Asteraceae**	***Osteospermum muricatum*** subsp. ***muricatum*** [bcefgh]	**LC**
Malvaceae	*Abutilon galpinii*	LC	Fabaceae	*Entada elephantina*		Santalaceae	*Osyris compressa*	
Malvaceae	*Abutilon piloso-cinereum*	LC	Poaceae	*Enteropogon macrostachyus*	LC	Santalaceae	*Osyris lanceolata*	LC
Malvaceae	*Abutilon pycnodon*	LC	Entodontaceae	*Entodon cymbifolius*		Fabaceae	*Otholobium nigricans*	LC
Malvaceae	*Abutilon ramosum*	LC	Entodontaceae	*Entodon macropodus*		Asteraceae	*Othonna natalensis*	LC
Malvaceae	*Abutilon sonneratianum*	LC	Onagraceae	*Epilobium capense*	LC	Rubiaceae	*Otiophora calycophylla*	

Fabaceae	*Acacia baileyana* (NEM:BA)	NE	Onagraceae	*Epilobium hirsutum*	LC	Rubiaceae	*Otiophora calycophylla* subsp. *calycophylla*	LC
Fabaceae	*Acacia caffra*		Onagraceae	*Epilobium salignum*	LC	Rubiaceae	*Otiophora cupheoides*	LC
Fabaceae	*Acacia cyclops* (NEM:BA)	NE	Equisetaceae	*Equisetum ramosissimum*		Fabaceae	*Otoptera burchellii*	LC
Fabaceae	*Acacia dealbata* (NEM:BA)	NE	Equisetaceae	*Equisetum ramosissimum* subsp. *ramosissimum*	LC	Oxalidaceae	*Oxalis corniculata*	NE
Fabaceae	*Acacia decurrens* (NEM:BA)	NE	Poaceae	*Eragrostis acraea*	LC	Oxalidaceae	*Oxalis depressa*	LC
Fabaceae	*Acacia elata* (NEM:BA)	NE	Poaceae	*Eragrostis aspera*	LC	**Oxalidaceae**	***Oxalis latifolia*** [e]	**NE**
Fabaceae	**Acacia erioloba*		Poaceae	*Eragrostis barbinodis*	LC	Oxalidaceae	*Oxalis obliquifolia*	LC
Fabaceae	*Acacia erubescens*		Poaceae	*Eragrostis barrelieri*	NE	Oxalidaceae	*Oxalis semiloba* subsp. *semiloba*	LC
Fabaceae	*Acacia hebeclada* subsp. *hebeclada*		Poaceae	*Eragrostis biflora*	LC	Oxalidaceae	*Oxalis smithiana*	LC
Fabaceae	*Acacia longifolia* (NEM:BA)	NE	Poaceae	*Eragrostis capensis*	LC	Polygonaceae	*Oxygonum alatum* var. *alatum*	LC
Fabaceae	*Acacia paradoxa* (NEM:BA)		Poaceae	*Eragrostis chloromelas*	LC	Polygonaceae	*Oxygonum delagoense*	LC
Fabaceae	*Acacia permixta*		Poaceae	*Eragrostis cilianensis*	LC	Polygonaceae	*Oxygonum dregeanum* subsp. *canescens* var. *canescens*	NE
Fabaceae	*Acacia tortilis*		**Poaceae**	***Eragrostis curvula*** [bcdgh]	**LC**	Anacardiaceae	*Ozoroa paniculosa*	
Fabaceae	*Acacia tortilis* subsp. *heteracantha*		Poaceae	*Eragrostis cylindriflora*	LC	Anacardiaceae	*Ozoroa paniculosa* var. *paniculosa*	LC
Euphorbiaceae	*Acalypha angustata*	LC	Poaceae	*Eragrostis gummiflua*	LC	Anacardiaceae	*Ozoroa paniculosa* var. *salicina*	LC
Euphorbiaceae	*Acalypha caperonioides*		Poaceae	*Eragrostis heteromera*	LC	Anacardiaceae	*Ozoroa sphaerocarpa*	LC
Euphorbiaceae	*~Acalypha caperonioides* var. *caperonioides*	DDT	Poaceae	*Eragrostis hierniana*	LC	Apocynaceae	*Pachycarpus concolor* subsp. *concolor*	LC
Euphorbiaceae	*Acalypha glabrata*		Poaceae	*Eragrostis inamoena*	LC	Apocynaceae	*Pachycarpus schinzianus*	LC
Euphorbiaceae	*Acalypha glabrata* var. *glabrata*	LC	Poaceae	*Eragrostis lappula*	LC	Apocynaceae	*Pachycymbium keithii*	
Euphorbiaceae	*Acalypha glabrata* var. *pilosa*	LC	**Poaceae**	***Eragrostis lehmanniana* var. *lehmanniana*** [bcdefh]	**LC**	Rubiaceae	*Pachystigma bowkeri*	
Euphorbiaceae	*Acalypha indica* var. *indica*	LC	Poaceae	*Eragrostis mexicana* subsp. *virescens*	NE	Rubiaceae	*Pachystigma macrocalyx*	
Euphorbiaceae	*Acalypha peduncularis*	LC	Poaceae	*Eragrostis nindensis*	LC	Rubiaceae	*Pachystigma pygmaeum*	
Euphorbiaceae	*Acalypha segetalis*	LC	Poaceae	*Eragrostis pallens*	LC	Lycopodiaceae	*Palhinhaea cernua*	
Euphorbiaceae	*Acalypha villicaulis*	LC	**Poaceae**	***Eragrostis patentipilosa*** [b]	**LC**	Pallaviciniaceae	*Pallavicinia lyellii*	
Cucurbitaceae	*Acanthosicyos naudinianus*	LC	Poaceae	*Eragrostis phyllacantha*		Amaryllidaceae	*Pancratium tenuifolium*	LC
Asteraceae	*Acanthospermum australe*	NE	Poaceae	*Eragrostis plana*	LC	**Poaceae**	***Panicum coloratum*** [e]	
Asteraceae	*Acanthospermum glabratum*	NE	Poaceae	*Eragrostis planiculmis*	LC	Poaceae	*Panicum deustum*	LC
Asteraceae	*Acanthospermum hispidum*	NE	Poaceae	*Eragrostis racemosa*	LC	**Poaceae**	***Panicum maximum*** [bcdefgh]	**LC**
Sapindaceae	*Acer negundo* (NEM:BA)		**Poaceae**	***Eragrostis rigidior*** [abgh]	**LC**	Poaceae	*Panicum natalense*	LC
Amaranthaceae	*Achyranthes aspera*		Poaceae	*Eragrostis rotifer*	LC	Poaceae	*Panicum schinzii*	LC
Amaranthaceae	***Achyranthes aspera* var. *aspera*** [fg]	**NE**	Poaceae	*Eragrostis sarmentosa*	LC	Poaceae	*Panicum stapfianum*	LC
Amaranthaceae	*Achyranthes aspera* var. *sicula*	NE	Poaceae	*Eragrostis sclerantha* subsp. *sclerantha*	LC	Poaceae	*Panicum subalbidum*	LC
Amaranthaceae	***Achyropsis leptostachya*** [g]	**LC**	Poaceae	*Eragrostis stapfii*	LC	Poaceae	*Panicum volutans*	LC
Apocynaceae	*Acokanthera oppositifolia*	LC	**Poaceae**	***Eragrostis superba*** [abh]	**LC**	Papaveraceae	*Papaver aculeatum*	LC

Lamiaceae	***Acrotome hispida*** [h]	**LC**	Poaceae	*Eragrostis tef*	NE	**Sapindaceae**	***Pappea capensis*** [ah]	**LC**
Lamiaceae	***Acrotome inflata*** [fgh]	**LC**	**Poaceae**	***Eragrostis trichophora*** [bfgh]	**LC**	Apocynaceae	*Parapodium costatum*	LC
Pteridaceae	*Actiniopteris dimorpha* subsp. *dimorpha*	LC	Ericaceae	*Erica alopecurus* var. *glabriflora*	LC	Apocynaceae	*Parapodium simile*	LC
Pteridaceae	*Actiniopteris radiata*	LC	Ericaceae	*Erica drakensbergensis*	LC	Chrysobalanaceae	*Parinari capensis*	
Passifloraceae	*Adenia digitata*	LC	Ericaceae	*Erica woodii*		Chrysobalanaceae	*Parinari capensis* subsp. *capensis*	LC
Passifloraceae	*Adenia glauca*	LC	Ericaceae	*Erica woodii* var. *woodii*	LC	Asteraceae	*Parthenium hysterophorus* (NEM:BA)	NE
Apocynaceae	*Adenium oleifolium*	LC	**Asteraceae**	***Erigeron bonariensis*** [bcfgh]		Poaceae	*Paspalum dilatatum*	NE
Asteraceae	*Adenostemma caffrum*		Rosaceae	*Eriobotrya japonica* (NEM:BA)		Poaceae	*Paspalum distichum*	LC
Pteridaceae	*Adiantum capillus-veneris*	LC	Eriocaulaceae	*Eriocaulon abyssinicum*	LC	Poaceae	*Paspalum notatum*	NE
Pteridaceae	*Adiantum poiretii*	LC	Eriocaulaceae	*Eriocaulon dregei* var. *sonderianum*		Poaceae	*Paspalum scrobiculatum*	LC
Crassulaceae	*Adromischus umbraticola*		Eriocaulaceae	*Eriocaulon sonderianum*	LC	Poaceae	*Paspalum urvillei*	NE
Crassulaceae	*~Adromischus umbraticola* subsp. *umbraticola*	NT	Poaceae	*Eriochloa fatmensis*	LC	Poaceae	*Paspalum vaginatum*	LC
Lamiaceae	*Aeollanthus buchnerianus*	LC	Fabaceae	*Eriosema burkei*		Passifloraceae	*Passiflora caerulea* (NEM:BA)	
Amaranthaceae	*Aerva lanata*	LC	Fabaceae	*Eriosema burkei* var. *burkei*	LC	Passifloraceae	*Passiflora edulis* (NEM:BA)	NE
Amaranthaceae	*Aerva leucura*	LC	Fabaceae	*Eriosema cordatum*	LC	Apiaceae	*Pastinaca sativa*	NE
Asteraceae	*Afroaster peglerae*	LC	Fabaceae	*Eriosema distinctum*	LC	Paulowniaceae	*Paulownia tomentosa* (NEM:BA)	
Asteraceae	*Afroaster serrulatus*	LC	Fabaceae	*Eriosema nutans*	LC	Rubiaceae	*Pavetta eylesii*	LC
Rubiaceae	*Afrocanthium gilfillanii*	LC	Fabaceae	*Eriosema pauciflorum* var. *pauciflorum*	LC	Rubiaceae	*Pavetta gardeniifolia*	
Rubiaceae	*Afrocanthium mundianum*	LC	Fabaceae	*Eriosema psoraleoides*	LC	Rubiaceae	*Pavetta gardeniifolia* var. *gardeniifolia*	LC
Violaceae	*Afrohybanthus serratus*		Fabaceae	*Eriosema salignum*	LC	Rubiaceae	*Pavetta gardeniifolia* var. *subtomentosa*	LC
Apiaceae	*Afrosciadium magalismontanum*	LC	Fabaceae	*Eriosema squarrosum*	LC	Rubiaceae	*Pavetta harborii*	LC
Iridaceae	*Afrosolen sandersonii* subsp. *sandersonii*		Fabaceae	*Eriosema transvaalense*	LC	Rubiaceae	*Pavetta revoluta*	LC
Rubiaceae	*Agathisanthemum bojeri* subsp. *australe* var. *australe*		Asparagaceae	*Eriospermum cooperi*		Rubiaceae	*Pavetta zeyheri*	
Rubiaceae	*Agathisanthemum bojeri* subsp. *bojeri*	LC	Asparagaceae	*Eriospermum cooperi* var. *cooperi*	LC	Rubiaceae	*Pavetta zeyheri* subsp. *zeyheri*	LC
Asparagaceae	*Agave americana*		Asparagaceae	*Eriospermum mackenii* subsp. *galpinii*	NE	Malvaceae	*Pavonia burchellii*	LC
Asparagaceae	*Agave sisalana* (NEM:BA)	NE	Asparagaceae	*Eriospermum mackenii* subsp. *mackenii*	NE	Malvaceae	*Pavonia columella*	LC
Loranthaceae	*Agelanthus natalitius*		Asparagaceae	*Eriospermum porphyrium*	LC	Malvaceae	*Pavonia leptocalyx*	LC
Loranthaceae	*Agelanthus natalitius* subsp. *zeyheri*	LC	Asparagaceae	*Eriospermum porphyrovalve*	LC	Malvaceae	*Pavonia transvaalensis*	LC
Asteraceae	*Ageratina adenophora* (NEM:BA)	NE	Geraniaceae	*Erodium cicutarium*	NE	Fabaceae	*Pearsonia aristata*	LC
Asteraceae	*Ageratum houstonianum* (NEM:BA)	NE	Erpodiaceae	*Erpodium coronatum* subsp. *transvaaliense*		Fabaceae	*~Pearsonia bracteata*	NT
Rosaceae	*Agrimonia bracteata*	LC	Brassicaceae	*Eruca sativa*	NE	Fabaceae	*Pearsonia cajanifolia*	
Rosaceae	*Agrimonia procera* (NEM:BA)	LC	Brassicaceae	*Erucastrum austroafricanum*	LC	Fabaceae	*Pearsonia cajanifolia* subsp. *cajanifolia*	LC
Poaceae	*Agrostis continuata*	LC	Brassicaceae	*Erucastrum strigosum*	LC	Fabaceae	*Pearsonia sessilifolia* subsp. *marginata*	LC

Poaceae	*Agrostis eriantha* var. *eriantha*		Fabaceae	*Erythrina lysistemon*	LC	Fabaceae	*Pearsonia sessilifolia* subsp. *sessilifolia*	LC
Poaceae	*Agrostis lachnantha* var. *lachnantha*	LC	Fabaceae	*Erythrina zeyheri*	LC	Fabaceae	*Pearsonia uniflora*	LC
Simaroubaceae	*Ailanthus altissima* (NEM:BA)		Sapindaceae	**Erythrophysa transvaalensis*	LC	Asteraceae	*Pegolettia senegalensis*	LC
Fabaceae	*Albizia anthelmintica*	LC	Fabaceae	*Erythrostemon gilliesii*		Geraniaceae	*Pelargonium dolomiticum*	LC
Fabaceae	*Albizia brevifolia*	LC	Myrtaceae	*Eucalyptus camaldulensis* (NEM:BA)	NE	Geraniaceae	*Pelargonium luridum*	LC
Fabaceae	*Albizia tanganyicensis* subsp. *tanganyicensis*	LC	Myrtaceae	*Eucalyptus cinerea*		Thuidiaceae	*Pelekium versicolor*	
Asparagaceae	***Albuca glauca*** [fgh]	**LC**	Myrtaceae	*Eucalyptus globulus* subsp. *maidenii*	NE	Pteridaceae	*Pellaea calomelanos*	
Asparagaceae	*Albuca pachychlamys*		Myrtaceae	*Eucalyptus grandis* (NEM:BA)	NE	Pteridaceae	*Pellaea calomelanos* var. *calomelanos*	LC
Asparagaceae	*Albuca seineri*	LC	Myrtaceae	*Eucalyptus robusta*		Pteridaceae	*Pellaea dura* var. *dura*	LC
Asparagaceae	*Albuca setosa*	LC	Ebenaceae	*Euclea crispa*		Pteridaceae	*Pellaea pectiniformis*	LC
Asparagaceae	*Albuca virens* subsp. *virens*	LC	**Ebenaceae**	***Euclea crispa* subsp. *crispa*** [g]	**LC**	Ranunculaceae	*Peltocalathos baurii*	LC
Orobanchaceae	*Alectra orobanchoides*	LC	Ebenaceae	*Euclea crispa* var. *crispa*		**Fabaceae**	***Peltophorum africanum*** [g]	**LC**
Orobanchaceae	*Alectra vogelii*	LC	Ebenaceae	*Euclea natalensis*		Poaceae	*Pennisetum macrourum*	LC
Apiaceae	*Alepidea setifera*	LC	Ebenaceae	*Euclea natalensis* subsp. *angustifolia*	LC	Poaceae	*Pennisetum setaceum* (NEM:BA)	NE
Alismataceae	*Alisma plantago-aquatica* (NEM:BA)	NE	Ebenaceae	*Euclea undulata*	LC	Rubiaceae	*Pentanisia angustifolia*	LC
Poaceae	*Alloteropsis semialata* subsp. *eckloniana*	LC	Asparagaceae	*Eucomis autumnalis*	LC	Apocynaceae	*Pentarrhinum insipidum*	LC
Poaceae	*Alloteropsis semialata* subsp. *semialata*	LC	Asparagaceae	*Eucomis autumnalis* subsp. *autumnalis*	NE	Asteraceae	*Pentzia calcarea*	LC
Didiereaceae	*Alluaudia procera*		Asparagaceae	*Eucomis autumnalis* subsp. *clavata*	NE	Asteraceae	*Pentzia lanata*	LC
Asphodelaceae	*Aloe arborescens*	LC	Asparagaceae	*Eucomis montana*	LC	Asteraceae	*Pentzia monocephala*	LC
Asphodelaceae	*Aloe bergeriana*	LC	Asparagaceae	*Eucomis pallidiflora* subsp. *pallidiflora*	LC	Piperaceae	*Peperomia retusa* var. *retusa*	LC
Asphodelaceae	*Aloe davyana*	LC	Orchidaceae	*Eulophia calanthoides*	LC	Piperaceae	*Peperomia tetraphylla*	LC
Asphodelaceae	*Aloe fosteri*	LC	Orchidaceae	*Eulophia clitellifera*	LC	Cucurbitaceae	*Peponium caledonicum*	LC
Asphodelaceae	***Aloe greatheadii*** [fgh]	**LC**	Orchidaceae	*Eulophia cooperi*	LC	**Apocynaceae**	***Pergularia daemia* subsp. *daemia*** [bfgh]	**LC**
Asphodelaceae	*Aloe greatheadii* var. *davyana*		Orchidaceae	*Eulophia hereroensis*	LC	Apocynaceae	*Periglossum mackenii*	LC
Asphodelaceae	*Aloe marlothii*		Orchidaceae	*Eulophia hians* var. *hians*	LC	Poaceae	*Perotis patens*	LC
Asphodelaceae	*Aloe marlothii* subsp. *marlothii*	LC	Orchidaceae	*Eulophia hians* var. *inaequalis*	LC	Polygonaceae	*Persicaria attenuata* subsp. *africana*	LC
Asphodelaceae	*Aloe mutabilis*	LC	Orchidaceae	*Eulophia hians* var. *nutans*	LC	Polygonaceae	*Persicaria capitata* (NEM:BA)	NE
Asphodelaceae	*~Aloe peglerae*	CR	Orchidaceae	*Eulophia leontoglossa*		Polygonaceae	*Persicaria decipiens*	LC
Asphodelaceae	*Aloe pienaarii*	LC	Orchidaceae	*Eulophia livingstoneana*	LC	Polygonaceae	*Persicaria hystricula*	LC
Asphodelaceae	*Aloe subspicata*	LC	Orchidaceae	*Eulophia milnei*		Polygonaceae	*Persicaria lapathifolia*	NE
Asphodelaceae	*Aloe transvaalensis*	LC	Orchidaceae	*Eulophia ovalis*		Polygonaceae	*Persicaria limbata*	NE
Asphodelaceae	*Aloe verecunda*	LC	Orchidaceae	*Eulophia ovalis* var. *bainesii*	LC	Polygonaceae	*Persicaria madagascariensis*	
Asphodelaceae	*Aloe zebrina*	LC	Orchidaceae	*Eulophia ovalis* var. *ovalis*	LC	Polygonaceae	*Persicaria meisneriana*	LC
Cyatheaceae	*Alsophila dregei*	LC	Orchidaceae	*Eulophia streptopetala*	LC	Poaceae	*Phalaris arundinacea*	NE
Amaranthaceae	***Alternanthera pungens*** [cdfgh]	**NE**	Orchidaceae	*Eulophia tuberculata*	LC	Poaceae	*Phalaris paradoxa*	NE
Amaranthaceae	*Alternanthera sessilis*	NE	Orchidaceae	*Eulophia zeyheri*		Bartramiaceae	*Philonotis africana*	

Fabaceae	*Alysicarpus rugosus* subsp. *perennirufus*	LC	Euphorbiaceae	***Euphorbia cooperi**	LC	Bartramiaceae	*Philonotis dregeana*	
Fabaceae	*Alysicarpus zeyheri*	LC	Euphorbiaceae	**Euphorbia cooperi* var. *cooperi*		Bartramiaceae	*Philonotis falcata*	
Amaranthaceae	*Amaranthus hybridus*		Euphorbiaceae	**Euphorbia davyi*	LC	Bartramiaceae	*Philonotis globosa*	
Amaranthaceae	*Amaranthus hybridus* subsp. *hybridus* var. *hybridus*	NE	Euphorbiaceae	**Euphorbia excelsa*	LC	Bartramiaceae	*Philonotis hastata*	
Amaranthaceae	*Amaranthus praetermissus*	LC	Euphorbiaceae	**Euphorbia heterophylla*	NE	Asteraceae	*Philyrophyllum schinzii*	LC
Amaranthaceae	*Amaranthus spinosus*	NE	Euphorbiaceae	**Euphorbia hirta*	NE	Arecaceae	*Phoenix reclinata*	LC
Amaranthaceae	*Amaranthus thunbergii*	LC	**Euphorbiaceae**	****Euphorbia inaequilatera*** [bh]	**LC**	Poaceae	*Phragmites australis*	LC
Asteraceae	*Ambrosia artemisiifolia*	NE	Euphorbiaceae	**Euphorbia inaequilatera* var. *inaequilatera*		Poaceae	*Phragmites mauritianus*	LC
Lythraceae	*Ammannia baccifera*		Euphorbiaceae	**Euphorbia indica*	NE	Rhamnaceae	*Phylica paniculata*	LC
Lythraceae	*Ammannia rigidula*		Euphorbiaceae	*Euphorbia ingens*	LC	Rhamnaceae	*Phylica rigida*	LC
Lythraceae	*Ammannia sagittifolia* var. *sagittifolia*		Euphorbiaceae	**Euphorbia natalensis*	LC	Phyllanthaceae	*Phyllanthus glaucophyllus*	LC
Lythraceae	*Ammannia schinzii*		Euphorbiaceae	**Euphorbia neopolycnemoides*	LC	**Phyllanthaceae**	***Phyllanthus incurvus*** [bfgh]	**LC**
Apiaceae	*Ammi majus* var. *glaucifolium*	NE	Euphorbiaceae	*~*Euphorbia perangusta*	DDT	Phyllanthaceae	*Phyllanthus maderaspatensis*	LC
Amaryllidaceae	***Ammocharis coranica*** [gh]	**LC**	Euphorbiaceae	**Euphorbia prostrata*	NE	Phyllanthaceae	*Phyllanthus parvulus* var. *garipensis*	LC
Anacampserotaceae	*~*Anacampseros decapitata*	VU	Euphorbiaceae	**Euphorbia pseudotuberosa*	LC	**Phyllanthaceae**	***Phyllanthus parvulus* var. *parvulus*** [fgh]	**LC**
Anacampserotaceae	*Anacampseros subnuda*		Euphorbiaceae	**Euphorbia pubescens*	NE	Phyllanthaceae	*Phyllanthus tenellus*	
Anacampserotaceae	*Anacampseros subnuda* subsp. *subnuda*	LC	Euphorbiaceae	**Euphorbia pulcherrima*	NE	Rhamnaceae	*Phyllogeiton zeyheri*	
Myrsinaceae	*Anagallis arvensis* subsp. *arvensis*	NE	Euphorbiaceae	**Euphorbia schinzii*	LC	Asteraceae	*Phymaspermum athanasioides*	LC
Boraginaceae	*Anchusa riparia*	LC	Euphorbiaceae	**Euphorbia schinzii* subsp. *schinzioides*		Asteraceae	*Phymaspermum bolusii*	
Apocynaceae	*Ancylobothrys capensis*		Euphorbiaceae	**Euphorbia spartaria*	LC	Solanaceae	*Physalis angulata*	NE
Poaceae	*Andropogon appendiculatus*	LC	Euphorbiaceae	**Euphorbia striata*	LC	Solanaceae	*Physalis peruviana*	NE
Poaceae	*Andropogon chinensis*	LC	Euphorbiaceae	**Euphorbia terracina*		Solanaceae	*Physalis viscosa*	NE
Poaceae	*Andropogon eucomus*	LC	Euphorbiaceae	**Euphorbia tirucalli*	LC	Phytolaccaceae	*Phytolacca dioica* (NEM:BA)	NE
Poaceae	*Andropogon huillensis*	LC	Euphorbiaceae	**Euphorbia trichadenia*		Phytolaccaceae	*Phytolacca heptandra*	LC
Poaceae	*Andropogon schirensis*	LC	Asteraceae	*Euryops chrysanthemoides*	LC	Phytolaccaceae	*Phytolacca octandra* (NEM:BA)	NE
Commelinaceae	*Aneilema hockii*	LC	Asteraceae	*Euryops laxus*	LC	Cucurbitaceae	*Pilogyne scabra*	LC
Apiaceae	*Annesorhiza flagellifolia*	LC	Asteraceae	*Euryops transvaalensis* subsp. *transvaalensis*	LC	Apiaceae	*Pimpinella transvaalensis*	LC
Bryaceae	*Anomobryum julaceum*		Poaceae	*Eustachys paspaloides*	LC	Pinaceae	*Pinus patula* var. *patula*	NE
Anomodontaceae	*Anomodon pseudotristis*		**Convolvulaceae**	***Evolvulus alsinoides*** [bh]	**LC**	Pittosporaceae	**Pittosporum viridiflorum*	LC
Basellaceae	*Anredera cordifolia* (NEM:BA)	NE	Gentianaceae	*Exochaenium grande*	LC	Pteridaceae	*Pityrogramma argentea*	LC
Orchidaceae	*Ansellia africana*	LC	Exormothecaceae	*Exormotheca holstii*		Aytoniaceae	*Plagiochasma appendiculatum*	
Poaceae	*Anthephora pubescens*	LC	Exormothecaceae	*Exormotheca pustulosa*		Aytoniaceae	*Plagiochasma microcephalum* var. *microcephalum*	
Melastomataceae	*Antherotoma debilis*	LC	Fabroniaceae	*Fabronia pilifera*		Aytoniaceae	*Plagiochasma rupestre*	
Anthocerotaceae	*Anthoceros natalensis*		Fabroniaceae	*Fabronia rehmannii*		Aytoniaceae	*Plagiochasma rupestre* var. *rupestre*	
Rubiaceae	*Anthospermum hispidulum*	LC	Rubiaceae	*Fadogia homblei*	LC	Aytoniaceae	*Plagiochasma rupestre* var. *volkii*	

Rubiaceae	*Anthospermum rigidum* subsp. *pumilum*	LC	Convolvulaceae	*Falkia oblonga*	LC	Plantaginaceae	*Plantago lanceolata*	LC
Rubiaceae	*Anthospermum rigidum* subsp. *rigidum*	LC	Polygonaceae	*Fallopia convolvulus*	NE	Plantaginaceae	*Plantago longissima*	LC
Rubiaceae	*Anthospermum welwitschii*	LC	Proteaceae	*Faurea saligna*	LC	Plantaginaceae	*Plantago major*	
Menispermaceae	*Antizoma angustifolia*	LC	Asteraceae	*Felicia clavipilosa* subsp. *clavipilosa*	LC	Lamiaceae	*Plectranthus aliciae*	LC
Metteniusaceae	*Apodytes dimidiata*		Asteraceae	*Felicia fascicularis*	LC	Lamiaceae	*Plectranthus caninus*	LC
Metteniusaceae	*Apodytes dimidiata* subsp. *dimidiata*	LC	Asteraceae	*Felicia filifolia* subsp. *filifolia*	LC	Lamiaceae	*Plectranthus cylindraceus*	LC
Aponogetonaceae	*Aponogeton junceus*	LC	Asteraceae	*Felicia fruticosa* subsp. *brevipedunculata*	LC	Lamiaceae	*Plectranthus grallatus*	LC
Aizoaceae	*Aptenia cordifolia*	LC	Asteraceae	*Felicia muricata*		Lamiaceae	*Plectranthus grandidentatus*	LC
Scrophulariaceae	***Aptosimum elongatum*** [bfgh]	**LC**	**Asteraceae**	***Felicia muricata* subsp. *muricata*** [bgh]	**LC**	Lamiaceae	*Plectranthus hereroensis*	LC
Scrophulariaceae	*Aptosimum indivisum*	LC	Poaceae	*Festuca caprina*	LC	Lamiaceae	*Plectranthus madagascariensis* var. *ramosior*	
Scrophulariaceae	*Aptosimum procumbens*	LC	Cyperaceae	*Ficinia stolonifera*	LC	Lamiaceae	*Plectranthus neochilus*	LC
Apocynaceae	*Araujia sericifera* (NEM:BA)	NE	Moraceae	*Ficus abutilifolia*	LC	Lamiaceae	*~Plectranthus oertendahlii*	Rare
Archidiaceae	*Archidium acanthophyllum*		Moraceae	*Ficus burkei*	LC	Polypodiaceae	*Pleopeltis macrocarpa*	LC
Archidiaceae	*Archidium ohioense*		Moraceae	*Ficus cordata* subsp. *cordata*	LC	Plumbaginaceae	*Plumbago auriculata*	LC
Asteraceae	*Arctotis microcephala*	LC	Moraceae	*Ficus glumosa*	LC	Plumbaginaceae	*Plumbago zeylanica*	NE
Papaveraceae	*Argemone ochroleuca* (NEM:BA)		Moraceae	*Ficus ingens*	LC	Poaceae	*Poa annua*	NE
Papaveraceae	*Argemone ochroleuca* subsp. *ochroleuca*	NE	Moraceae	*Ficus ingens* var. *ingens*		Poaceae	*Pogonarthria squarrosa*	LC
Fabaceae	*Argyrolobium speciosum*	LC	Moraceae	*Ficus ingens* var. *tristis*		Polytrichaceae	*Pogonatum capense*	
Fabaceae	*Argyrolobium tuberosum*	LC	Moraceae	*Ficus salicifolia*	LC	Mniaceae	*Pohlia baronii*	
Iridaceae	*Aristea angolensis* subsp. *angolensis*	LC	Moraceae	*Ficus sur*	LC	Mniaceae	*Pohlia elongata*	
Poaceae	***Aristida adscensionis*** [be]	**LC**	Moraceae	*Ficus thonningii*		Caryophyllaceae	*Pollichia campestris*	LC
Poaceae	*Aristida aequiglumis*	LC	Cyperaceae	*Fimbristylis complanata*	LC	Caryophyllaceae	*Polycarpaea corymbosa* var. *corymbosa*	NE
Poaceae	***Aristida bipartita*** [g]	**LC**	Cyperaceae	*Fimbristylis dichotoma* subsp. *dichotoma*	LC	Polygalaceae	*Polygala albida* subsp. *albida*	LC
Poaceae	***Aristida canescens* subsp. *canescens*** [bcfg]	**LC**	Cyperaceae	*Fimbristylis ferruginea*	LC	Polygalaceae	*Polygala amatymbica*	LC
Poaceae	***Aristida congesta* subsp. *barbicollis*** [bfg]	**LC**	Poaceae	*Fingerhuthia africana*	LC	Polygalaceae	*Polygala capillaris*	
Poaceae	***Aristida congesta* subsp. *congesta*** [abdfgh]	**LC**	Fissidentaceae	*Fissidens asplenioides*		Polygalaceae	*Polygala gerrardii*	LC
Poaceae	*Aristida diffusa* subsp. *burkei*	LC	Fissidentaceae	*Fissidens bogosicus*		Polygalaceae	*Polygala gracilenta*	LC
Poaceae	*Aristida effusa*	LC	Fissidentaceae	*Fissidens borgenii*		Polygalaceae	*Polygala hottentotta*	LC
Poaceae	*Aristida junciformis* subsp. *junciformis*	LC	Fissidentaceae	*Fissidens bryoides*		Polygalaceae	*Polygala houtboshiana*	LC
Poaceae	*Aristida meridionalis*	LC	Fissidentaceae	*Fissidens curvatus* var. *curvatus*		Polygalaceae	*Polygala krumanina*	LC
Poaceae	*Aristida pilgeri*	LC	Fissidentaceae	*Fissidens erosulus*		Polygalaceae	*Polygala leptophylla* var. *leptophylla*	LC
Poaceae	*Aristida rhiniochloa*	LC	Fissidentaceae	*Fissidens glaucescens*		Polygalaceae	*Polygala ohlendorfiana*	LC
Poaceae	*Aristida scabrivalvis* subsp. *contracta*	LC	Fissidentaceae	*Fissidens ovatus*		Polygalaceae	*Polygala producta*	LC

Poaceae	*Aristida scabrivalvis* subsp. *scabrivalvis*	LC	Fissidentaceae	*Fissidens palmifolius*		Polygalaceae	*Polygala rehmannii*	LC
Poaceae	*Aristida spectabilis*	LC	Fissidentaceae	*Fissidens plumosus*		Polygalaceae	*Polygala schinziana*	LC
Poaceae	*Aristida stipitata* subsp. *graciliflora*	LC	Fissidentaceae	*Fissidens pseudoserratus*		Polygalaceae	*Polygala serpentaria*	LC
Poaceae	***Aristida stipitata* subsp. *stipitata*** [cf]	**LC**	Fissidentaceae	*Fissidens rufescens*		Polygalaceae	*Polygala sphenoptera* var. *sphenoptera*	LC
Poaceae	***Aristida transvaalensis*** [e]	**LC**	Fissidentaceae	*Fissidens sciophyllus*		Polygalaceae	*Polygala transvaalensis* subsp. *transvaalensis*	LC
Asteraceae	*Artemisia afra*		Fissidentaceae	*Fissidens submarginatus*		Polygalaceae	*Polygala uncinata*	LC
Asteraceae	*Artemisia afra* var. *afra*	LC	Salicaceae	*Flacourtia indica*	LC	Polygalaceae	*Polygala virgata* var. *virgata*	LC
Asteraceae	*Artemisia vulgaris*	NE	**Asteraceae**	***Flaveria bidentis*** (NEM:BA)[g]	**NE**	Polygonaceae	*Polygonum aviculare*	NE
Poaceae	*Arundinella nepalensis*	LC	Commelinaceae	*Floscopa glomerata*	LC	Polygonaceae	*Polygonum plebeium*	LC
Poaceae	*Arundo donax* (NEM:BA)	NE	Phyllanthaceae	*Flueggea virosa* subsp. *virosa*	LC	Poaceae	*Polypogon monspeliensis*	NE
Apocynaceae	*Asclepias adscendens*	LC	Apiaceae	*Foeniculum vulgare*		Poaceae	*Polypogon viridis*	NE
Apocynaceae	*Asclepias albens*	LC	Apiaceae	*Foeniculum vulgare* var. *vulgare*	NE	Polytrichaceae	*Polytrichum commune*	
Apocynaceae	*Asclepias aurea*	LC	Fossombroniaceae	*Fossombronia crispa*		Polytrichaceae	*Polytrichum subpilosum*	
Apocynaceae	*Asclepias brevipes*	LC	Fossombroniaceae	*Fossombronia gemmifera*		Pontederiaceae	*Pontederia cordata* var. *ovalis*	NE
Apocynaceae	*Asclepias densiflora*	LC	Fossombroniaceae	*Fossombronia glenii*		Pontederiaceae	*Pontederia crassipes*	
Apocynaceae	*Asclepias eminens*	LC	Fossombroniaceae	*Fossombronia straussiana*		Salicaceae	*Populus deltoides*	
Apocynaceae	*Asclepias fallax*	LC	Iridaceae	*Freesia grandiflora* subsp. *grandiflora*	LC	Salicaceae	*Populus deltoides* subsp. *deltoides*	
Apocynaceae	*Asclepias fulva*	LC	Scrophulariaceae	*Freylinia tropica*	LC	Porellaceae	*Porella vallis-gratiae*	
Apocynaceae	*Asclepias gibba* var. *gibba*	LC	Aizoaceae	*~*Frithia pulchra*	Rare	Portulacaceae	*Portulaca grandiflora*	LC
Apocynaceae	*Asclepias gibba* var. *media*	LC	Aizoaceae	*Frithia pulchra* var. *minor*		Portulacaceae	*Portulaca hereroensis*	LC
Apocynaceae	*Asclepias meliodora* var. *brevicoronata*		Frullaniaceae	*Frullania ericoides*		Portulacaceae	*Portulaca kermesina*	LC
Apocynaceae	*Asclepias sabulosa*		Cyperaceae	*Fuirena pubescens* var. *pubescens*	LC	Portulacaceae	*Portulaca oleracea*	NE
Apocynaceae	*Asclepias stellifera*	LC	Cyperaceae	*Fuirena stricta* var. *stricta*	LC	Portulacaceae	*Portulaca pilosa*	NE
Cyperaceae	*Ascolepis capensis*	LC	Fumariaceae	*Fumaria muralis* subsp. *muralis*	NE	Portulacaceae	*Portulaca quadrifida*	LC
Fabaceae	*Aspalathus divaricata* subsp. *divaricata*	LC	Funariaceae	*Funaria hygrometrica*		Potamogetonaceae	*Potamogeton crispus*	LC
Asparagaceae	*Asparagus aethiopicus*	LC	Funariaceae	*Funaria limbata*		Potamogetonaceae	*Potamogeton nodosus*	LC
Asparagaceae	*Asparagus africanus*	LC	Funariaceae	*Funaria longicollis*		Potamogetonaceae	*Potamogeton octandrus*	LC
Asparagaceae	*Asparagus angusticladus*	LC	Funariaceae	*Funaria rottleri*		Potamogetonaceae	*Potamogeton pectinatus*	LC
Asparagaceae	*Asparagus asparagoides*	LC	Asteraceae	*Galinsoga parviflora*	NE	Potamogetonaceae	*Potamogeton pusillus*	LC
Asparagaceae	*Asparagus buchananii*	LC	Rubiaceae	*Galium capense* subsp. *capense*	LC	Potamogetonaceae	*Potamogeton schweinfurthii*	LC
Asparagaceae	***Asparagus cooperi*** [cg]	**LC**	Rubiaceae	*Galium capense* subsp. *garipense* var. *garipense*	NE	Urticaceae	*Pouzolzia mixta*	
Asparagaceae	*Asparagus flavicaulis*		Rubiaceae	*Galium spurium* subsp. *africanum*	LC	Urticaceae	*Pouzolzia mixta* var. *mixta*	LC
Asparagaceae	*Asparagus flavicaulis* subsp. *flavicaulis*	LC	Rubiaceae	*Galopina circaeoides*	LC	Lamiaceae	*Premna mooiensis*	LC
Asparagaceae	***Asparagus laricinus*** [beh]	**LC**	Asteraceae	*Gamochaeta pensylvanica*	NE	Verbenaceae	*Priva flabelliformis*	LC
Asparagaceae	*Asparagus plumosus*	LC	Rubiaceae	*Gardenia volkensii* subsp. *spatulifolia*	LC	Verbenaceae	*Priva meyeri* var. *meyeri*	LC
Asparagaceae	*Asparagus setaceus*	LC	Rubiaceae	*Gardenia volkensii* subsp. *volkensii* var. *volkensii*	NE	Proteaceae	*Protea caffra*	

Asparagaceae	***Asparagus suaveolens*** [g]	**LC**	Asteraceae	*Garuleum woodii*	LC	Proteaceae	*Protea caffra* subsp. *caffra*	LC
Asparagaceae	*Asparagus transvaalensis*	LC	Asteraceae	*Gazania krebsiana* subsp. *serrulata*	LC	Proteaceae	*~Protea compacta*	NT
Asparagaceae	*Asparagus virgatus*	LC	Asteraceae	*Geigeria brevifolia*	LC	Proteaceae	*Protea gaguedi*	LC
Apocynaceae	*Aspidoglossum biflorum*	LC	Asteraceae	*Geigeria burkei*		Proteaceae	*Protea mundii*	LC
Apocynaceae	*Aspidoglossum glabrescens*	LC	**Asteraceae**	***Geigeria burkei* subsp. *burkei* var. *burkei*** [bfgh]	**NE**	Proteaceae	*Protea nitida*	LC
Apocynaceae	*Aspidoglossum interruptum*	LC	Asteraceae	*Geigeria burkei* subsp. *burkei* var. *intermedia*	NE	Proteaceae	*Protea roupelliae*	
Apocynaceae	*Aspidoglossum lamellatum*	LC	Asteraceae	*Geigeria burkei* subsp. *burkei* var. *zeyheri*	NE	Proteaceae	*Protea roupelliae* subsp. *roupelliae*	LC
Apocynaceae	*Aspidoglossum ovalifolium*	LC	Asteraceae	*Geigeria elongata*	LC	Proteaceae	*Protea welwitschii*	LC
Apocynaceae	*Aspidoglossum restioides*	LC	Asteraceae	*Geigeria ornativa* subsp. *ornativa*	LC	Rosaceae	*~*Prunus africana*	VU
Asteraceae	*Aspilia mossambicensis*	LC	Lentibulariaceae	*Genlisea hispidula*	LC	Rosaceae	*Prunus persica*	
Aspleniaceae	*Asplenium aethiopicum*	LC	Asteraceae	*Gerbera ambigua*	LC	Rosaceae	*Prunus salicifolia*	
Aspleniaceae	*Asplenium capense*	LC	Asteraceae	*Gerbera piloselloides*	LC	Molluginaceae	*Psammotropha mucronata* var. *foliosa*	LC
Aspleniaceae	*Asplenium cordatum*	LC	Asteraceae	*Gerbera viridifolia*	LC	Molluginaceae	*Psammotropha mucronata* var. *mucronata*	LC
Aspleniaceae	*Asplenium friesiorum*	LC	Gisekiaceae	*Gisekia africana* var. *africana*	LC	Molluginaceae	*Psammotropha myriantha*	LC
Aspleniaceae	*Asplenium inaequilaterale*	LC	Gisekiaceae	*Gisekia africana* var. *pedunculata*	NE	Pottiaceae	*Pseudocrossidium crinitum*	
Aspleniaceae	*Asplenium phillipsianum*	LC	Gisekiaceae	*Gisekia pharnaceoides* var. *pharnaceoides*		Asteraceae	*Pseudognaphalium luteoalbum*	
Aspleniaceae	*Asplenium varians* subsp. *fimbriatum*	LC	Iridaceae	*Gladiolus antholyzoides*	LC	Asteraceae	*Pseudognaphalium oligandrum*	LC
Asteraceae	*Aster harveyanus*		Iridaceae	*Gladiolus crassifolius*	LC	Phyllanthaceae	*Pseudolachnostylis maprouneifolia* var. *glabra*	NE
Asteraceae	*Aster peglerae*		Iridaceae	*Gladiolus dalenii*		Leskeaceae	*Pseudoleskea leskeoides*	
Asteraceae	*Aster squamatus*	NE	Iridaceae	*Gladiolus dalenii* subsp. *dalenii*	LC	Leskeaceae	*Pseudoleskeopsis claviramea*	
Aytoniaceae	*Asterella bachmannii*		Iridaceae	*Gladiolus elliotii*	LC	Leskeaceae	*Pseudoleskeopsis pseudoattenuata*	
Aytoniaceae	*Asterella marginata*		Iridaceae	*Gladiolus longicollis* subsp. *platypetalus*	LC	Asteraceae	*Psiadia punctulata*	LC
Aytoniaceae	*Asterella muscicola*		Iridaceae	*Gladiolus oatesii*	LC	Myrtaceae	*Psidium guajava* (NEM:BA)	NE
Aytoniaceae	*Asterella wilmsii*		Iridaceae	*Gladiolus papilio*	LC	Iridaceae	*Psilosiphon sandersonii* subsp. *sandersonii*	
Fabaceae	*Astragalus atropilosulus* subsp. *burkeanus* var. *burkeanus*	NE	Iridaceae	*Gladiolus permeabilis*		Rubiaceae	*Psychotria capensis*	
Acanthaceae	*Asystasia intrusa*		**Iridaceae**	***Gladiolus permeabilis* subsp. *edulis*** [gh]	**LC**	Rubiaceae	*Psydrax livida*	LC
Acanthaceae	*Asystasia schimperi*	LC	Iridaceae	*Gladiolus pretoriensis*	LC	Dennstaedtiaceae	*Pteridium aquilinum* subsp. *capense*	
Asteraceae	*Athrixia elata*	LC	Iridaceae	*Gladiolus rehmannii*	LC	Pteridaceae	*Pteris buchananii*	LC
Polytrichaceae	*Atrichum androgynum*		Iridaceae	*Gladiolus sericeovillosus*		Pteridaceae	*Pteris cretica*	LC
Amaranthaceae	*Atriplex nummularia* subsp. *nummularia* (NEM:BA)	NE	Iridaceae	*Gladiolus sericeovillosus* subsp. *calvatus*	LC	Pteridaceae	*Pteris dentata*	LC
Erpodiaceae	*Aulacopilum trichophyllum*		Iridaceae	*Gladiolus vinosomaculatus*	LC	Pteridaceae	*Pteris friesii*	LC
Poaceae	*Avena fatua*	NE	Iridaceae	*Gladiolus woodii*	LC	Pteridaceae	*Pteris vittata*	LC
Salviniaceae	*Azolla filiculoides* (NEM:BA)	NE	Verbenaceae	*Glandularia aristigera*		Fabaceae	*Pterocarpus rotundifolius*	

Iridaceae	*Babiana bainesii*	LC	Fabaceae	*Gleditsia triacanthos* (NEM:BA)	NE	Fabaceae	*Pterocarpus rotundifolius* subsp. *rotundifolius*	LC
Iridaceae	*Babiana hypogaea*	LC	Gleicheniaceae	*Gleichenia polypodioides*	LC	Celastraceae	*Pterocelastrus echinatus*	LC
Pottiaceae	*Barbula bolleana*		Colchicaceae	*Gloriosa modesta*	LC	Pedaliaceae	*Pterodiscus luridus*	LC
Pottiaceae	*Barbula eubryum*		Colchicaceae	*Gloriosa superba*	LC	**Pedaliaceae**	***Pterodiscus speciosus*** [g]	**LC**
Acanthaceae	*Barleria affinis*	LC	Asteraceae	*Gnaphalium filagopsis*	LC	Marattiaceae	*Ptisana fraxinea* var. *salicifolia*	NE
Acanthaceae	*Barleria bolusii*	LC	Thymelaeaceae	*Gnidia caffra*		Fabaceae	*Ptycholobium plicatum* subsp. *plicatum*	LC
Acanthaceae	*Barleria bremekampii*	LC	Thymelaeaceae	*Gnidia capitata*		Asteraceae	*Pulicaria scabra*	LC
Acanthaceae	*Barleria crossandriformis*	LC	Thymelaeaceae	*Gnidia gymnostachya*	LC	Amaranthaceae	*Pupalia lappacea*	
Acanthaceae	*Barleria heterotricha* subsp. *heterotricha*		Thymelaeaceae	*Gnidia microcephala*	LC	Amaranthaceae	*Pupalia lappacea* var. *lappacea*	LC
Acanthaceae	***Barleria macrostegia*** [bfgh]	**LC**	Thymelaeaceae	*Gnidia nodiflora*	LC	Lamiaceae	*Pycnostachys reticulata*	LC
Acanthaceae	*Barleria obtusa*	LC	Thymelaeaceae	*Gnidia sericocephala*		Cyperaceae	*Pycreus flavescens*	LC
Acanthaceae	*Barleria pretoriensis*	LC	Apocynaceae	*Gomphocarpus fruticosus*		Cyperaceae	*Pycreus macranthus*	LC
Lecythidaceae	**Barringtonia racemosa*	LC	Apocynaceae	*Gomphocarpus fruticosus* subsp. *decipiens*	LC	Cyperaceae	*Pycreus mundii*	LC
Fabaceae	*Bauhinia galpinii*	LC	**Apocynaceae**	***Gomphocarpus fruticosus* subsp. *fruticosus*** [abegh]	**LC**	Cyperaceae	*Pycreus nitidus*	LC
Fabaceae	*Bauhinia petersiana* subsp. *macrantha*	LC	Apocynaceae	*Gomphocarpus glaucophyllus*	LC	Cyperaceae	*Pycreus pumilus*	LC
Fabaceae	*Bauhinia tomentosa*	LC	Apocynaceae	*Gomphocarpus physocarpus*	LC	Cyperaceae	*Pycreus unioloides*	LC
Fabaceae	*Bauhinia variegata* var. *candida*		Apocynaceae	*Gomphocarpus tomentosus* subsp. *tomentosus*	LC	Rubiaceae	*Pygmaeothamnus chamaedendrum* var. *setulosus*	LC
Begoniaceae	*Begonia cucullata*	NE	Scrophulariaceae	*Gomphostigma virgatum*	LC	Rubiaceae	*Pygmaeothamnus zeyheri*	
Rhamnaceae	**Berchemia zeyheri*	LC	**Amaranthaceae**	***Gomphrena celosioides*** [befgh]	**NE**	Rubiaceae	*Pygmaeothamnus zeyheri* var. *zeyheri*	LC
Elatinaceae	*Bergia capensis*	LC	Orobanchaceae	*Graderia subintegra*	LC	Rosaceae	*Pyracantha angustifolia* (NEM:BA)	NE
Elatinaceae	*Bergia decumbens*	LC	Malvaceae	*Grewia bicolor* var. *bicolor*	LC	Rosaceae	*Pyracantha crenulata* (NEM:BA)	NE
Asteraceae	*Berkheya carlinopsis*		**Malvaceae**	***Grewia flava*** [bcfgh]	**LC**	Fagaceae	*Quercus robur*	NE
Asteraceae	*Berkheya carlinopsis* subsp. *magalismontana*	LC	Malvaceae	*Grewia flavescens*	LC	Racopilaceae	*Racopilum capense*	
Asteraceae	*Berkheya insignis*	LC	Malvaceae	*Grewia hexamita*	LC	Ranunculaceae	*Ranunculus dregei*	LC
Asteraceae	*Berkheya latifolia*	LC	Malvaceae	*Grewia monticola*	LC	Ranunculaceae	*Ranunculus multifidus*	LC
Asteraceae	*Berkheya pinnatifida* subsp. *ingrata*	LC	Malvaceae	*Grewia occidentalis*		Myrsinaceae	*Rapanea melanophloeos*	LC
Asteraceae	*Berkheya pinnatifida* subsp. *stobaeoides*	LC	Malvaceae	*Grewia occidentalis* var. *occidentalis*	LC	Brassicaceae	*Raphanus raphanistrum*	NE
Asteraceae	***Berkheya radula*** [e]	**LC**	**Malvaceae**	***Grewia retinervis*** [g]	**LC**	Apocynaceae	*Raphionacme galpinii*	LC
Asteraceae	*Berkheya seminivea*	LC	Malvaceae	*Grewia subspathulata*	LC	Apocynaceae	*Raphionacme hirsuta*	LC
Asteraceae	*Berkheya setifera*	LC	Malvaceae	*Grewia villosa* var. *villosa*	LC	Apocynaceae	*Raphionacme velutina*	LC
Asteraceae	*Berkheya speciosa* subsp. *lanceolata*	LC	Amaranthaceae	*Guilleminea densa*	NE	Brassicaceae	*Rapistrum rugosum*	NE
Asteraceae	*Berkheya zeyheri* subsp. *zeyheri*	LC	Gunneraceae	*Gunnera perpensa*	LC	Apocynaceae	*Rauvolfia caffra*	LC
Apiaceae	*Berula repanda*	LC	Asteraceae	*Gymnanthemum myrianthum*	LC	Poaceae	*Rendlia altera*	LC
Apiaceae	*Berula thunbergii*	LC	**Celastraceae**	***Gymnosporia buxifolia*** [g]	**LC**	Rhamnaceae	*Rhamnus prinoides*	LC
Poaceae	*Bewsia biflora*	LC	Celastraceae	*Gymnosporia glaucophylla*	LC	Bignoniaceae	*Rhigozum brevispinosum*	LC

Asteraceae	*Bidens bipinnata*	NE	Celastraceae	*Gymnosporia maranguensis*	LC	Bryaceae	*Rhodobryum commersonii*	
Asteraceae	*Bidens biternata*	NE	Celastraceae	*Gymnosporia polyacantha* subsp. *vaccinifolia*	LC	Vitaceae	*Rhoicissus revoilii*	LC
Asteraceae	*Bidens formosa*		Celastraceae	*Gymnosporia tenuispina*	LC	**Vitaceae**	***Rhoicissus tridentata*** [f]	**LC**
Asteraceae	***Bidens pilosa*** [befgh]	**NE**	Orchidaceae	*~Habenaria barbertoni*	NT	Vitaceae	*Rhoicissus tridentata* subsp. *cuneifolia*	NE
Blechnaceae	*Blechnum attenuatum*	LC	Orchidaceae	*Habenaria epipactidea*	LC	Vitaceae	*Rhoicissus tridentata* subsp. *tridentata*	NE
Blechnaceae	*Blechnum australe* subsp. *australe*	LC	Orchidaceae	*Habenaria falcicornis* subsp. *caffra*	LC	Anacardiaceae	*Rhus dentata*	
Blechnaceae	*Blechnum punctulatum* var. *punctulatum*	LC	Orchidaceae	*~Habenaria kraenzliniana*	NT	Anacardiaceae	*Rhus leptodictya*	
Acanthaceae	**Blepharis angusta*	LC	Orchidaceae	*~Habenaria mossii*	EN	Fabaceae	*Rhynchosia adenodes*	LC
Acanthaceae	*Blepharis innocua*	LC	Orchidaceae	*Habenaria nyikana* subsp. *nyikana*	LC	Fabaceae	*Rhynchosia albissima*	LC
Acanthaceae	*Blepharis integrifolia* var. *integrifolia*	LC	Orchidaceae	*Habenaria schimperiana*	LC	Fabaceae	*Rhynchosia atropurpurea*	LC
Acanthaceae	*Blepharis leendertziae*	LC	Orchidaceae	*Habenaria tridens*	LC	Fabaceae	*Rhynchosia caribaea*	LC
Acanthaceae	***Blepharis maderaspatensis*** [bgh]	**LC**	Amaryllidaceae	*Haemanthus carneus*	LC	Fabaceae	*Rhynchosia confusa*	
Acanthaceae	*Blepharis serrulata*	LC	Amaryllidaceae	*Haemanthus humilis* subsp. *hirsutus*	LC	Fabaceae	*Rhynchosia crassifolia*	LC
Acanthaceae	*Blepharis squarrosa*	LC	Amaryllidaceae	*Haemanthus humilis* subsp. *humilis*	LC	Fabaceae	*Rhynchosia densiflora* subsp. *chrysadenia*	LC
Acanthaceae	*Blepharis stainbankiae*	LC	Stilbaceae	*Halleria lucida*	LC	Fabaceae	*Rhynchosia hirsuta*	LC
Acanthaceae	*Blepharis subvolubilis*	LC	Asteraceae	*Haplocarpha scaposa*	LC	Fabaceae	*Rhynchosia holosericea*	LC
Asteraceae	*Blumea dregeanoides*	LC	Pedaliaceae	*Harpagophytum zeyheri* subsp. *zeyheri*	LC	**Fabaceae**	***Rhynchosia minima*** [gh]	**LC**
Orchidaceae	*Bonatea antennifera*	LC	Anacardiaceae	*Harpephyllum caffrum*	LC	Fabaceae	*Rhynchosia minima* var. *minima*	NE
Orchidaceae	*Bonatea polypodantha*	LC	Poaceae	*Harpochloa falx*	LC	Fabaceae	*Rhynchosia minima* var. *prostrata*	NE
Orchidaceae	*Bonatea saundersioides*	LC	Cactaceae	*Harrisia balansae* (NEM:BA)		Fabaceae	*Rhynchosia monophylla*	LC
Amaryllidaceae	*Boophone disticha*	LC	Orobanchaceae	*Harveya pumila*	LC	Fabaceae	*Rhynchosia nervosa*	LC
Capparaceae	****Boscia albitrunca*** [afg]	**LC**	Scrophulariaceae	*Hebenstretia comosa*	LC	Fabaceae	*Rhynchosia nitens*	LC
Capparaceae	*Boscia albitrunca* var. *albitrunca*		Scrophulariaceae	*Hebenstretia dentata*	LC	Fabaceae	*Rhynchosia pedunculata*	
Capparaceae	*Boscia foetida*		Lythraceae	*Heimia myrtifolia*	NE	Fabaceae	*Rhynchosia pentheri* var. *pentheri*	LC
Capparaceae	*Boscia foetida* subsp. *rehmanniana*	LC	Asteraceae	*Helianthus annuus*	NE	Fabaceae	*Rhynchosia reptabunda*	LC
Poaceae	*Bothriochloa bladhii*	LC	Asteraceae	*Helichrysum acutatum*	LC	Fabaceae	*Rhynchosia sordida*	LC
Poaceae	*Bothriochloa insculpta*	LC	**Asteraceae**	***Helichrysum argyrosphaerum*** [bgh]	**LC**	Fabaceae	*Rhynchosia totta*	
Poaceae	*Bothriochloa radicans*	LC	Asteraceae	*Helichrysum athrixiifolium*	LC	Fabaceae	*Rhynchosia totta* var. *rigidula*	
Hyacinthaceae	*Bowiea volubilis*		Asteraceae	*Helichrysum aureum* var. *monocephalum*	NE	**Fabaceae**	***Rhynchosia totta* var. *totta*** [bfgh]	**LC**
Hyacinthaceae	*~Bowiea volubilis* subsp. *volubilis*	VU	Asteraceae	*Helichrysum auronitens*		Fabaceae	*Rhynchosia totta* var. *venulosa*	
Poaceae	*Brachiaria advena*	NE	Asteraceae	*Helichrysum caespititium*	LC	Fabaceae	*Rhynchosia venulosa*	
Poaceae	***Brachiaria brizantha*** [cd]	**LC**	Asteraceae	*Helichrysum callicomum*	LC	Cyperaceae	*Rhynchospora brownii*	LC
Poaceae	*Brachiaria deflexa*	LC	Asteraceae	*Helichrysum candolleanum*	LC	Brachytheciaceae	*Rhynchostegiella zeyheri*	
Poaceae	*Brachiaria eruciformis*	LC	Asteraceae	*Helichrysum cephaloideum*	LC	Brachytheciaceae	*Rhynchostegium brachypterum*	

Poaceae	*Brachiaria nigropedata*	LC	Asteraceae	*Helichrysum cerastioides*		Aneuraceae	*Riccardia fastigiata*		
Poaceae	*Brachiaria serrata*	LC	Asteraceae	*Helichrysum cerastioides* var. *cerastioides*	LC	Ricciaceae	*Riccia albolimbata*		
Poaceae	*Brachiaria xantholeuca*	LC	Asteraceae	*Helichrysum chionosphaerum*	LC	Ricciaceae	*Riccia atropurpurea*		
Malvaceae	*Brachychiton populneus*		Asteraceae	*Helichrysum coriaceum*		Ricciaceae	*Riccia cavernosa*		
Orchidaceae	*~Brachycorythis conica* subsp. *transvaalensis*	CR	Asteraceae	*Helichrysum dasymallum*	LC	Ricciaceae	*Riccia congoana*		
Orchidaceae	*Brachycorythis tenuior*	LC	Asteraceae	*Helichrysum difficile*	LC	Ricciaceae	*Riccia crystallina*		
Asteraceae	*Brachylaena rotundata*	LC	Asteraceae	*Helichrysum epapposum*	LC	Ricciaceae	*Riccia macrocarpa*		
Asteraceae	*Brachylaena transvaalensis*	LC	Asteraceae	*Helichrysum harveyanum*	LC	Ricciaceae	*Riccia microciliata*		
Bryaceae	*Brachymenium acuminatum*		Asteraceae	*Helichrysum kraussii*	LC	Ricciaceae	*Riccia nigrella*		
Poaceae	*Brachypodium flexum*	LC	Asteraceae	*Helichrysum lepidissimum*	LC	Ricciaceae	*Riccia okahandjana*		
Apocynaceae	**Brachystelma barberae*	LC	Asteraceae	*Helichrysum mixtum* var. *mixtum*	NE	Ricciaceae	*Riccia rosea*		
Apocynaceae	**Brachystelma circinatum*	LC	Asteraceae	*Helichrysum mundtii*	LC	Ricciaceae	*Riccia runssorensis*		
Apocynaceae	**Brachystelma foetidum*	LC	Asteraceae	*Helichrysum nudifolium* var. *leiopodium*		Ricciaceae	*Riccia simii*		
Apocynaceae	**Brachystelma gracile*	LC	Asteraceae	*Helichrysum nudifolium* var. *nudifolium*	LC	Ricciaceae	*Riccia volkii*		
Apocynaceae	**Brachystelma oianthum*	LC	Asteraceae	*Helichrysum nudifolium* var. *oxyphyllum*	LC	Rubiaceae	*Richardia brasiliensis*	NE	
Brachytheciaceae	*Brachythecium implicatum*		Asteraceae	*Helichrysum oreophilum*	LC	Rubiaceae	*Richardia scabra*	NE	
Brassicaceae	*Brassica rapa*	NE	Asteraceae	*Helichrysum paronychioides*	LC	Apocynaceae	*Riocreuxia polyantha*	LC	
Bartramiaceae	*Breutelia microdonta*		Asteraceae	*Helichrysum polycladum*	LC	Apocynaceae	*Riocreuxia torulosa* var. *torulosa*	LC	
Phyllanthaceae	*Bridelia mollis*	LC	Asteraceae	*Helichrysum rugulosum*	LC	Fabaceae	*Robinia pseudoacacia* (NEM:BA)	NE	
Rubiaceae	*Bridsonia chamaedendrum*		Asteraceae	*Helichrysum setosum*	LC	Brassicaceae	*Rorippa fluviatilis* var. *fluviatilis*	LC	
Poaceae	*Briza minor*	NE	Asteraceae	*Helichrysum stenopterum*	LC	Brassicaceae	*Rorippa nudiuscula*	LC	
Poaceae	*Bromus catharticus*	NE	Asteraceae	*Helichrysum uninervium*	LC	Rosaceae	*Rosa rubiginosa* (NEM:BA)	NE	
Poaceae	*Bromus leptoclados*	LC	Asteraceae	*Helichrysum zeyheri*	LC	Lythraceae	*Rotala tenella*	LC	
Amaryllidaceae	*Brunsvigia natalensis*	LC	Rhamnaceae	*Helinus integrifolius*	LC	Lamiaceae	*Rotheca hirsuta*	LC	
Amaryllidaceae	*Brunsvigia radulosa*	LC	Brassicaceae	*Heliophila magaliesbergensis*		Lamiaceae	*Rotheca louwalbertsii*	LC	
Bryaceae	*Bryum alpinum*		Brassicaceae	*Heliophila rigidiuscula*	LC	Lamiaceae	*Rotheca myricoides*	LC	
Bryaceae	*Bryum apiculatum*		Boraginaceae	*Heliotropium amplexicaule*	NE	Rubiaceae	*Rothmannia capensis*	LC	
Bryaceae	*Bryum argenteum*		Boraginaceae	*Heliotropium ciliatum*	LC	Rubiaceae	*Rubia horrida*	LC	
Bryaceae	*Bryum aubertii*		Boraginaceae	*Heliotropium lineare*	LC	Rubiaceae	*Rubia petiolaris*	LC	
Bryaceae	*Bryum capillare*		**Boraginaceae**	***Heliotropium nelsonii*** [bcfgh]	**LC**	Rosaceae	*Rubus ï¿½ proteus*		
Bryaceae	*Bryum dichotomum*		**Boraginaceae**	***Heliotropium ovalifolium*** [bh]	**LC**	Rosaceae	*Rubus cuneifolius* (NEM:BA)	NE	
Bryaceae	*Bryum pseudotriquetrum*		Boraginaceae	*Heliotropium strigosum*	LC	Rosaceae	*Rubus ludwigii* subsp. *ludwigii*	LC	
Bryaceae	*Bryum pycnophyllum*		Poaceae	*Hemarthria altissima*	LC	Rosaceae	*Rubus rigidus*	LC	
Bryaceae	*Bryum torquescens*		Araliaceae	*Heptapleurum arboricola*		Acanthaceae	*Ruellia cordata*	LC	
Orobanchaceae	*Buchnera reducta*	LC	Malvaceae	*Hermannia adenotricha*		**Acanthaceae**	***Ruellia patula*** [bcfgh]	**LC**	
Orobanchaceae	*Buchnera simplex*	LC	Malvaceae	*Hermannia bicolor*	LC	Acanthaceae	*Ruelliopsis setosa*	LC	
Scrophulariaceae	*Buddleja saligna*	LC	**Malvaceae**	***Hermannia boraginiflora*** [bcfh]	**LC**	Polygonaceae	*Rumex acetosella* subsp. *angiocarpus*		

Scrophulariaceae	*Buddleja salviifolia*	LC	Malvaceae	*Hermannia burkei*	LC	Polygonaceae	*Rumex conglomeratus*	LC
Boraginaceae	*Buglossoides arvensis*	NE	Malvaceae	*Hermannia cernua*	LC	Polygonaceae	*Rumex crispus*	NE
Asphodelaceae	*Bulbine abyssinica*	LC	Malvaceae	*Hermannia coccocarpa*	LC	Polygonaceae	*Rumex dregeanus* subsp. *montanus*	LC
Asphodelaceae	*Bulbine angustifolia*	LC	Malvaceae	*Hermannia cordata*	LC	Polygonaceae	*Rumex lanceolatus*	LC
Asphodelaceae	*Bulbine capitata*	LC	**Malvaceae**	***Hermannia depressa*** [cef]	**LC**	Polygonaceae	*Rumex sagittatus*	LC
Asphodelaceae	*Bulbine favosa*	LC	Malvaceae	*Hermannia eenii*	LC	Polygonaceae	*Rumex woodii*	LC
Asphodelaceae	*Bulbine lagopus*	LC	Malvaceae	*Hermannia floribunda*	LC	Acanthaceae	*Ruttya ovata*	LC
Asphodelaceae	*Bulbine narcissifolia*	LC	Malvaceae	*Hermannia grandifolia*	LC	Poaceae	*Sacciolepis chevalieri*	LC
Cyperaceae	*Bulbostylis burchellii*	LC	Malvaceae	*Hermannia grandistipula*	LC	Celastraceae	*Salacia rehmannii*	LC
Cyperaceae	*Bulbostylis contexta*	LC	**Malvaceae**	***Hermannia grisea*** [bcfg]	**LC**	Salicaceae	*Salix babylonica* var. *babylonica*	NE
Cyperaceae	*Bulbostylis hispidula* subsp. *pyriformis*	LC	Malvaceae	*Hermannia lancifolia*	LC	Salicaceae	*Salix mucronata* subsp. *capensis*	
Cyperaceae	*Bulbostylis humilis*	LC	Malvaceae	*Hermannia linnaeoides*	LC	Salicaceae	*Salix mucronata* subsp. *woodii*	LC
Cyperaceae	*Bulbostylis oritrephes*	LC	Malvaceae	*Hermannia marginata*	LC	Amaranthaceae	*Salsola glabrescens*	LC
Cyperaceae	*Bulbostylis scabricaulis*	LC	Malvaceae	*Hermannia modesta*	LC	Amaranthaceae	*Salsola kali* (NEM:BA)	NE
Cyperaceae	*Bulbostylis schoenoides*	LC	Malvaceae	*Hermannia parvula*	LC	Lamiaceae	*Salvia coccinea*	NE
Fabaceae	*Burkea africana*	LC	Malvaceae	*Hermannia quartiniana*	LC	Lamiaceae	*Salvia radula*	LC
Burmanniaceae	*Burmannia madagascariensis*	LC	Malvaceae	*Hermannia stellulata*	LC	Lamiaceae	*Salvia reflexa*	NE
Capparaceae	*Cadaba aphylla*	LC	Malvaceae	*Hermannia tomentosa*	LC	Lamiaceae	*Salvia repens* var. *repens*	LC
Capparaceae	***Cadaba termitaria*** [g]	**LC**	Malvaceae	*Hermannia umbratica*	LC	Lamiaceae	*Salvia runcinata*	LC
Pilotrichaceae	*Callicostella tristis*		**Amaranthaceae**	***Hermbstaedtia fleckii*** [bcgh]	**LC**	Lamiaceae	*Salvia stenophylla*	
Asteraceae	*Callilepis lancifolia*	LC	Amaranthaceae	*Hermbstaedtia odorata* var. *albi-rosea*		Lamiaceae	*Salvia tiliifolia* (NEM:BA)	NE
Asteraceae	*Callilepis leptophylla*	LC	Amaranthaceae	*Hermbstaedtia odorata* var. *aurantiaca*	NE	Salviniaceae	*Salvinia molesta* (NEM:BA)	NE
Asteraceae	*Callilepis salicifolia*	LC	Amaranthaceae	*Hermbstaedtia odorata* var. *odorata*	NE	Adoxaceae	*Sambucus canadensis* (NEM:BA)	
Rutaceae	*Calodendrum capense*	LC	Asteraceae	*Hertia pallens*	LC	Asparagaceae	*Sansevieria aethiopica*	LC
Calypogeiaceae	*Calypogeia arguta*		Iridaceae	*Hesperantha coccinea*	LC	Apocynaceae	*Sarcostemma viminale* subsp. *viminale*	
Asteraceae	*Campuloclinium macrocephalum* (NEM:BA)	NE	Iridaceae	*Hesperantha leucantha*	LC	Lamiaceae	*Satureja biflora*	LC
Leucobryaceae	*Campylopus atroluteus*		Iridaceae	*Hesperantha longicollis*	LC	Orchidaceae	*Satyrium cristatum* var. *cristatum*	LC
Leucobryaceae	*Campylopus flaccidus*		Pontederiaceae	*Heteranthera callifolia*	LC	Orchidaceae	*Satyrium hallackii* subsp. *ocellatum*	LC
Leucobryaceae	*Campylopus introflexus*		Apiaceae	*Heteromorpha arborescens*		Caprifoliaceae	*Scabiosa columbaria*	LC
Leucobryaceae	*Campylopus pilifer* var. *pilifer*		Apiaceae	*Heteromorpha arborescens* var. *abyssinica*	LC	Amaryllidaceae	*Scadoxus puniceus*	LC
Leucobryaceae	*Campylopus pyriformis*		Apiaceae	*Heteromorpha arborescens* var. *arborescens*	LC	Anacardiaceae	*Schinus molle*	NE
Leucobryaceae	*Campylopus robillardei*		**Poaceae**	***Heteropogon contortus*** [abcdefgh]	**LC**	Asteraceae	*Schistostephium crataegifolium*	LC
Leucobryaceae	*Campylopus savannarum*		Heteropyxidaceae	*Heteropyxis natalensis*	LC	Poaceae	*Schizachyrium jeffreysii*	LC
Leucobryaceae	*Campylopus thwaitesii*		Malvaceae	*Hibiscus aethiopicus*		Poaceae	*Schizachyrium sanguineum*	LC
Cannaceae	*Canna indica* (NEM:BA)	NE	**Malvaceae**	***Hibiscus aethiopicus* var. *aethiopicus*** [bh]	**LC**	Poaceae	*Schizachyrium ursulus*	LC
Cannabaceae	*Cannabis sativa* var. *sativa*	NE	Malvaceae	*Hibiscus aethiopicus* var. *ovatus*	LC	Asparagaceae	*Schizocarphus nervosus*	LC

Rubiaceae	*Canthium suberosum*	LC	Malvaceae	*Hibiscus caesius* var. *caesius*	NE	Apocynaceae	*Schizoglossum nitidum*	LC
Cyperaceae	*Carex acutiformis*	NE	**Malvaceae**	***Hibiscus calyphyllus*** [bcfgh]	**LC**	**Asteraceae**	***Schkuhria pinnata*** [bcdfgh]	**NE**
Cyperaceae	*Carex cognata*	LC	**Malvaceae**	***Hibiscus cannabinus*** [c]	**LC**	Poaceae	*Schmidtia pappophoroides*	LC
Cyperaceae	*Carex glomerabilis*	LC	Malvaceae	*Hibiscus engleri*	LC	Cyperaceae	*Schoenoplectus brachyceras*	LC
Cyperaceae	*Carex rhodesiaca*	LC	Malvaceae	*Hibiscus lunariifolius*		Cyperaceae	*Schoenoplectus corymbosus*	LC
Cyperaceae	*Carex spartea*		Malvaceae	*Hibiscus marlothianus*	LC	Cyperaceae	*Schoenoplectus muricinux*	LC
Cyperaceae	*Carex spicatopaniculata*		Malvaceae	*Hibiscus meyeri* subsp. *transvaalensis*	LC	Cyperaceae	*Schoenoplectus muriculatus*	LC
Cyperaceae	*Carex uhligii*		Malvaceae	*Hibiscus micranthus* var. *micranthus*	LC	Cyperaceae	*Schoenoxiphium madagascariense*	LC
Apocynaceae	***Carissa bispinosa*** [g]	**LC**	Malvaceae	*Hibiscus microcarpus*	LC	Cyperaceae	*Schoenoxiphium sparteum*	LC
Celastraceae	*Cassine burkeana*		Malvaceae	*Hibiscus mutatus*	LC	Fabaceae	*Schotia brachypetala*	LC
Icacinaceae	*Cassinopsis ilicifolia*	LC	Malvaceae	*Hibiscus nigricaulis*	LC	Cyperaceae	*Scirpoides burkei*	LC
Casuarinaceae	*Casuarina cunninghamiana* (NEM:BA)	NE	Malvaceae	*Hibiscus pusillus*	LC	Cyperaceae	*Scleria bulbifera*	LC
Apocynaceae	*Catharanthus roseus* (NEM:BA)	NE	Malvaceae	*Hibiscus rosa-sinensis*		Cyperaceae	*Scleria distans*	LC
Cannabaceae	***Celtis africana*** [g]	**LC**	Malvaceae	*Hibiscus sabdariffa*	NE	Cyperaceae	*Scleria dregeana*	LC
Poaceae	*Cenchrus caudatus*		Malvaceae	*Hibiscus sidiformis*	LC	Anacardiaceae	*Sclerocarya birrea*	
Poaceae	***Cenchrus ciliaris*** [abdefh]	**LC**	Malvaceae	*Hibiscus subreniformis*	LC	Anacardiaceae	**Sclerocarya birrea* subsp. *caffra*	LC
Poaceae	*Cenchrus setaceus*		**Malvaceae**	***Hibiscus trionum*** [bcfgh]		Salicaceae	*Scolopia mundii*	LC
Asteraceae	*Centaurea melitensis*	NE	Malvaceae	*Hibiscus vitifolius* subsp. *vitifolius*	LC	Salicaceae	*Scolopia zeyheri*	LC
Apiaceae	*Centella asiatica*	LC	Malvaceae	*Hibiscus vitifolius* subsp. *vulgaris*	LC	Lamiaceae	*Scutellaria racemosa*	NE
Caprifoliaceae	*Cephalaria zeyheriana*	LC	Asteraceae	*Hilliardiella aristata*	LC	Anacardiaceae	*Searsia chirindensis*	LC
Caryophyllaceae	*Cerastium arabidis*	LC	Asteraceae	*Hilliardiella elaeagnoides*	LC	Anacardiaceae	*Searsia dentata*	LC
Caryophyllaceae	*Cerastium capense*	LC	Asteraceae	*Hilliardiella hirsuta*	LC	Anacardiaceae	*Searsia discolor*	LC
Ditrichaceae	*Ceratodon purpureus* subsp. *stenocarpus*		Asteraceae	*Hilliardiella oligocephala*		Anacardiaceae	*Searsia dregeana*	LC
Pedaliaceae	***Ceratotheca triloba*** [h]	**LC**	Asteraceae	*Hilliardiella sutherlandii*	LC	Anacardiaceae	*Searsia gracillima*	
Cactaceae	*Cereus hildmannianus* (NEM:BA)		**Asteraceae**	***Hirpicium bechuanense*** [bch]	**LC**	**Anacardiaceae**	***Searsia lancea*** [befgh]	**LC**
Cactaceae	***Cereus jamacaru*** (NEM:BA)[fg]	**NE**	Orchidaceae	*~Holothrix randii*	NT	Anacardiaceae	*Searsia leptodictya*	LC
Apocynaceae	*Ceropegia conrathii*	LC	Pedaliaceae	*Holubia saccata*	LC	Anacardiaceae	*Searsia leptodictya* forma. *leptodictya*	
Apocynaceae	*Ceropegia crassifolia* var. *crassifolia*	LC	Apocynaceae	*Huernia insigniflora*		Anacardiaceae	*Searsia lucida* forma. *lucida*	
Apocynaceae	*Ceropegia haygarthii*	LC	Apocynaceae	*Huernia longituba*	LC	Anacardiaceae	*Searsia magalismontana*	
Apocynaceae	*~*Ceropegia insignis*	EN	Apocynaceae	*Huernia stapelioides*	LC	Anacardiaceae	*Searsia magalismontana* subsp. *magalismontana*	LC
Apocynaceae	*Ceropegia multiflora* subsp. *multiflora*	LC	Apocynaceae	*Huernia transvaalensis*	LC	Anacardiaceae	*Searsia pallens*	LC
Apocynaceae	*Ceropegia rendallii*	LC	Araliaceae	*Hydrocotyle verticillata*	LC	Anacardiaceae	*Searsia pyroides*	
Solanaceae	*Cestrum aurantiacum* (NEM:BA)	NE	Pottiaceae	*Hyophila involuta*		Anacardiaceae	*Searsia pyroides* var. *gracilis*	LC
Solanaceae	*Cestrum parqui* (NEM:BA)		Poaceae	*Hyparrhenia anamesa*	LC	Anacardiaceae	*Searsia pyroides* var. *integrifolia*	LC
Scrophulariaceae	*Chaenostoma floribundum*	LC	Poaceae	*Hyparrhenia dregeana*	LC	**Anacardiaceae**	***Searsia pyroides* var. *pyroides*** [gh]	**LC**

Scrophulariaceae	*Chaenostoma leve*	LC	Poaceae	*Hyparrhenia filipendula* var. *filipendula*	LC	Anacardiaceae	*Searsia rigida*	
Scrophulariaceae	*Chaenostoma patrioticum*	LC	Poaceae	*Hyparrhenia filipendula* var. *pilosa*	LC	Anacardiaceae	*Searsia rigida* var. *dentata*	LC
Acanthaceae	*Chaetacanthus burchellii*		**Poaceae**	***Hyparrhenia hirta*** [beh]	**LC**	Anacardiaceae	*Searsia rigida* var. *margaretae*	LC
Acanthaceae	***Chaetacanthus costatus*** [bg]		Poaceae	*Hyparrhenia newtonii* var. *newtonii*	LC	Anacardiaceae	*Searsia rigida* var. *rigida*	LC
Acanthaceae	*Chaetacanthus setiger*		Poaceae	*Hyparrhenia poecilotricha*	LC	Anacardiaceae	*Searsia undulata*	LC
Cannabaceae	*Chaetachme aristata*		Poaceae	*Hyparrhenia quarrei*	LC	Anacardiaceae	*Searsia zeyheri*	LC
Fabaceae	*Chamaecrista absus*	LC	Poaceae	*Hyparrhenia schimperi*	LC	Gentianaceae	*Sebaea bojeri*	LC
Fabaceae	*Chamaecrista biensis*	LC	Poaceae	*Hyparrhenia tamba*	LC	Gentianaceae	*Sebaea exigua*	LC
Fabaceae	*Chamaecrista capensis* var. *flavescens*	LC	Rubiaceae	*Hyperacanthus amoenus*	LC	Gentianaceae	*Sebaea junodii*	LC
Fabaceae	*Chamaecrista comosa* var. *capricornia*	LC	Hypericaceae	*Hypericum aethiopicum* subsp. *aethiopicum*	LC	Gentianaceae	*Sebaea leiostyla*	LC
Fabaceae	***Chamaecrista comosa* var. *comosa*** [bfgh]	**LC**	Hypericaceae	*Hypericum aethiopicum* subsp. *sonderi*	LC	Gentianaceae	*Sebaea sedoides* var. *confertiflora*	LC
Fabaceae	*Chamaecrista mimosoides*	LC	Hypericaceae	*Hypericum lalandii*	LC	Gentianaceae	*Sebaea sedoides* var. *schoenlandii*	LC
Fabaceae	*Chamaecrista stricta*	LC	Hypericaceae	*Hypericum revolutum* subsp. *revolutum*	LC	Apocynaceae	*Secamone alpini*	LC
Arecaceae	*Chamaerops humilis*		Poaceae	*Hyperthelia dissoluta*	LC	Apocynaceae	*Secamone filiformis*	LC
Arecaceae	*Chamaerops humilis* var. *argentea*		Asteraceae	*Hypochaeris brasiliensis*	NE	Apocynaceae	*Secamone parvifolia*	LC
Verbenaceae	*Chascanum adenostachyum*	LC	Asteraceae	*Hypochaeris microcephala* var. *albiflora*	NE	Polygalaceae	**Securidaca longepedunculata*	
Verbenaceae	***Chascanum hederaceum* var. *hederaceum*** [bg]	**LC**	Asteraceae	*Hypochaeris radicata*	NE	Polygalaceae	*Securidaca longepedunculata* var. *longepedunculata*	LC
Verbenaceae	*Chascanum pinnatifidum* var. *pinnatifidum*	LC	Hypodontiaceae	*Hypodontium dregei*		**Convolvulaceae**	***Seddera capensis*** [bgh]	**LC**
Pteridaceae	*Cheilanthes contracta*	LC	Acanthaceae	*Hypoestes forskaolii*	LC	Convolvulaceae	*Seddera suffruticosa*	LC
Pteridaceae	*Cheilanthes dolomiticola*	LC	Acanthaceae	*Hypoestes phyllostachya*		Poaceae	*Sehima galpinii*	LC
Pteridaceae	*Cheilanthes eckloniana*	LC	Acanthaceae	*Hypoestes triflora*	LC	Selaginellaceae	*Selaginella caffrorum* var. *caffrorum*	LC
Pteridaceae	*Cheilanthes hirta* var. *brevipilosa*	LC	Hypoxidaceae	*Hypoxis acuminata*	LC	Selaginellaceae	*Selaginella dregei*	LC
Pteridaceae	*Cheilanthes hirta* var. *brevipilosa* forma. *brevipilosa*		Hypoxidaceae	*Hypoxis angustifolia* var. *angustifolia*	LC	Selaginellaceae	*Selaginella mittenii*	LC
Pteridaceae	*Cheilanthes hirta* var. *brevipilosa* forma. *laxa*		Hypoxidaceae	*Hypoxis argentea*		Scrophulariaceae	*Selago capitellata*	LC
Pteridaceae	*Cheilanthes hirta* var. *hirta*	LC	Hypoxidaceae	*Hypoxis argentea* var. *argentea*	LC	**Scrophulariaceae**	***Selago densiflora*** [bh]	**LC**
Pteridaceae	*Cheilanthes inaequalis*		Hypoxidaceae	*Hypoxis argentea* var. *sericea*	LC	Scrophulariaceae	*Selago lacunosa*	LC
Pteridaceae	*Cheilanthes involuta* var. *involuta*	LC	Hypoxidaceae	*Hypoxis filiformis*	LC	Scrophulariaceae	*Selago mixta*	LC
Pteridaceae	*Cheilanthes involuta* var. *obscura*	LC	Hypoxidaceae	*Hypoxis galpinii*	LC	Sematophyllaceae	*Sematophyllum brachycarpum*	
Pteridaceae	*Cheilanthes marlothii*	LC	Hypoxidaceae	*Hypoxis hemerocallidea*	LC	Sematophyllaceae	*Sematophyllum sphaeropyxis*	
Pteridaceae	*Cheilanthes multifida* subsp. *lacerata*	LC	Hypoxidaceae	*Hypoxis interjecta*	LC	Sematophyllaceae	*Sematophyllum subpinnatum*	
Pteridaceae	*Cheilanthes multifida* var. *multifida*		Hypoxidaceae	*Hypoxis iridifolia*		Sematophyllaceae	*Sematophyllum wageri*	
Pteridaceae	*Cheilanthes nielsii*	LC	Hypoxidaceae	*Hypoxis oblonga*		Sematophyllaceae	*Sematophyllum zuluense*	
Pteridaceae	*Cheilanthes pentagona*	LC	Hypoxidaceae	*Hypoxis rigidula*	LC	Asteraceae	*Senecio achilleifolius*	LC
Pteridaceae	*Cheilanthes viridis*		Hypoxidaceae	*Hypoxis rigidula* var. *pilosissima*	NE	Asteraceae	*Senecio affinis*	LC

Pteridaceae	*Cheilanthes viridis* var. *glauca*	LC	Hypoxidaceae	*Hypoxis rigidula* var. *rigidula*	NE	Asteraceae	*Senecio albanensis* var. *doroniciflorus*	LC
Pteridaceae	*Cheilanthes viridis* var. *macrophylla*	LC	Aquifoliaceae	*Ilex mitis*		Asteraceae	*Senecio apiifolius*	
Pteridaceae	*Cheilanthes viridis* var. *viridis*	LC	Aquifoliaceae	*Ilex mitis* var. *mitis*	LC	Asteraceae	*Senecio barbertonicus*	LC
Amaranthaceae	*Chenopodiastrum murale*		Poaceae	*Imperata cylindrica*	LC	Asteraceae	*Senecio burchellii*	LC
Amaranthaceae	***Chenopodium album*** [e]	**NE**	Fabaceae	*Indigastrum burkeanum*	LC	Asteraceae	*Senecio consanguineus*	LC
Amaranthaceae	*Chenopodium mucronatum*	LC	Fabaceae	*Indigastrum costatum* subsp. *macrum*	LC	Asteraceae	*Senecio coronatus*	LC
Lophocoleaceae	*Chiloscyphus dubius*		Fabaceae	*Indigastrum fastigiatum*	LC	Asteraceae	*Senecio erubescens* var. *crepidifolius*	NE
Oleaceae	*Chionanthus foveolatus* subsp. *foveolatus*	LC	Fabaceae	*Indigastrum parviflorum* subsp. *parviflorum* var. *parviflorum*	NE	Asteraceae	*Senecio erubescens* var. *erubescens*	NE
Gentianaceae	*Chironia palustris* subsp. *palustris*	LC	Fabaceae	*Indigofera adenoides*	LC	Asteraceae	*Senecio gerrardii*	LC
Gentianaceae	*Chironia palustris* subsp. *transvaalensis*	LC	Fabaceae	*Indigofera alternans* var. *alternans*	LC	Asteraceae	*Senecio glanduloso-pilosus*	LC
Gentianaceae	*Chironia purpurascens* subsp. *humilis*	LC	Fabaceae	*Indigofera arrecta*	LC	Asteraceae	*Senecio gregatus*	LC
Poaceae	*Chloris gayana*	LC	Fabaceae	*Indigofera atrata*	LC	Asteraceae	*Senecio harveianus*	LC
Poaceae	*Chloris pycnothrix*	LC	Fabaceae	*Indigofera circinnata*	LC	Asteraceae	*Senecio hieracioides*	LC
Poaceae	***Chloris virgata*** [bcefgh]	**LC**	**Fabaceae**	***Indigofera comosa*** [bh]	**LC**	Asteraceae	*Senecio inaequidens*	LC
Agavaceae	*Chlorophytum bowkeri*	LC	Fabaceae	*Indigofera confusa*	LC	Asteraceae	*Senecio inornatus*	LC
Agavaceae	***Chlorophytum cooperi*** [g]	**LC**	Fabaceae	*Indigofera cryptantha* var. *cryptantha*	LC	Asteraceae	*Senecio isatideus*	LC
Agavaceae	*Chlorophytum fasciculatum*	LC	Fabaceae	*Indigofera daleoides*	LC	Asteraceae	*Senecio laevigatus* var. *integrifolius*	LC
Agavaceae	***Chlorophytum galpinii* var. *galpinii*** [g]	**LC**	Fabaceae	*Indigofera daleoides* var. *daleoides*	NE	Asteraceae	*Senecio laevigatus* var. *laevigatus*	LC
Agavaceae	*Chlorophytum krookianum*	LC	**Fabaceae**	***Indigofera delagoaensis*** [fg]	**LC**	Asteraceae	*Senecio latifolius*	LC
Agavaceae	*Chlorophytum recurvifolium*	LC	Fabaceae	*Indigofera dimidiata*	LC	Asteraceae	*Senecio lydenburgensis*	LC
Agavaceae	*Chlorophytum transvaalense*	LC	Fabaceae	*Indigofera egens*	LC	Asteraceae	*Senecio lygodes*	
Agavaceae	*Chlorophytum trichophlebium*	LC	Fabaceae	*Indigofera filipes*	LC	Asteraceae	*Senecio matricariifolius*	LC
Apiaceae	*Choritaenia capensis*	LC	Fabaceae	*Indigofera frondosa*	LC	Asteraceae	*Senecio orbicularis*	
Thelypteridaceae	*Christella dentata*	LC	Fabaceae	*Indigofera glaucescens*	LC	Asteraceae	*Senecio othonniflorus*	LC
Thelypteridaceae	*Christella gueintziana*		Fabaceae	*Indigofera hedyantha*	LC	Asteraceae	*Senecio oxyriifolius*	LC
Asteraceae	*Chrysanthellum indicum*	NE	Fabaceae	*Indigofera heterotricha*	LC	Asteraceae	*Senecio oxyriifolius* subsp. *oxyriifolius*	
Asteraceae	*Chrysocoma ciliata*	LC	Fabaceae	*Indigofera hilaris*		Asteraceae	*Senecio pentactinus*	LC
Poaceae	*Chrysopogon serrulatus*	LC	**Fabaceae**	***Indigofera hilaris* var. *hilaris*** [bfgh]	**LC**	Asteraceae	*Senecio pleistocephalus*	LC
Asteraceae	*Cichorium intybus* subsp. *intybus*	NE	Fabaceae	*Indigofera hochstetteri* subsp. *streyana*	LC	Asteraceae	*Senecio pterophorus*	LC
Asteraceae	*Cineraria albicans*	LC	**Fabaceae**	***Indigofera holubii*** [fg]	**LC**	Asteraceae	*Senecio purpureus*	LC
Asteraceae	*Cineraria alchemilloides*		Fabaceae	*~Indigofera hybrida*	VU	Asteraceae	*Senecio retrorsus*	LC
Asteraceae	*~Cineraria alchemilloides* subsp. *alchemilloides*	Rare	Fabaceae	*~Indigofera leendertziae*	DDT	Asteraceae	*Senecio rhomboideus*	LC
Asteraceae	*Cineraria aspera*	LC	Fabaceae	*Indigofera melanadenia*	LC	Asteraceae	*Senecio ruwenzoriensis*	LC
Asteraceae	*~*Cineraria austrotransvaalensis*	NT	Fabaceae	*Indigofera mollicoma*	LC	Asteraceae	*Senecio scitus*	LC
Asteraceae	*Cineraria burkei*		Fabaceae	*Indigofera nebrowniana*	LC	Asteraceae	*Senecio serratuloides*	LC

Asteraceae	*Cineraria lobata* subsp. *lobata*	LC	Fabaceae	*Indigofera ormocarpoides*	LC	Asteraceae	*Senecio striatifolius*	LC
Asteraceae	*Cineraria parvifolia*	LC	Fabaceae	*Indigofera oxalidea*	LC	Asteraceae	*Senecio subcoriaceus*	LC
Asteraceae	*Cirsium vulgare* (NEM:BA)	NE	**Fabaceae**	***Indigofera oxytropis*** [ef]	**LC**	Asteraceae	*Senecio urophyllus*	LC
Vitaceae	*Cissus cactiformis*	LC	Fabaceae	*Indigofera praticola*	LC	Asteraceae	*Senecio venosus*	LC
Vitaceae	*Cissus quadrangularis*		Fabaceae	*Indigofera rostrata*	LC	Fabaceae	*Senegalia ataxacantha*	LC
Cucurbitaceae	*Citrullus lanatus*	LC	Fabaceae	*Indigofera sanguinea*	LC	Fabaceae	*Senegalia burkei*	LC
Cyperaceae	*Cladium mariscus* subsp. *jamaicense*	LC	Fabaceae	*Indigofera setiflora*	LC	**Fabaceae**	***Senegalia caffra*** [gh]	**LC**
Ranunculaceae	***Clematis brachiata*** [bcfgh]	**LC**	Fabaceae	*Indigofera sordida*	LC	Fabaceae	*Senegalia erubescens*	LC
Ranunculaceae	*Clematis oweniae*		Fabaceae	*Indigofera spicata* var. *spicata*		Fabaceae	*Senegalia galpinii*	LC
Ranunculaceae	*Clematis villosa* subsp. *stanleyi*	LC	Fabaceae	*Indigofera subulata*		Fabaceae	*Senegalia hereroensis*	LC
Cleomaceae	*Cleome angustifolia* subsp. *petersiana*	LC	Fabaceae	*Indigofera torulosa* var. *torulosa*	LC	Fabaceae	*Senegalia mellifera*	
Cleomaceae	*~*Cleome conrathii*	NT	Fabaceae	*Indigofera vicioides* subsp. *vicioides*		**Fabaceae**	***Senegalia mellifera* subsp. *detinens*** [befgh]	**LC**
Cleomaceae	*Cleome gynandra*	LC	Fabaceae	*Indigofera vicioides* var. *rogersii*	LC	Fabaceae	*Senegalia senegal* var. *leiorhachis*	LC
Cleomaceae	*Cleome hassleriana*	NE	**Fabaceae**	***Indigofera zeyheri*** [bgh]	**LC**	Fabaceae	*Senegalia senegal* var. *rostrata*	LC
Cleomaceae	*Cleome macrophylla*	LC	Convolvulaceae	*Ipomoea albivenia*	LC	Fabaceae	*Senna corymbosa*	NE
Cleomaceae	*Cleome maculata*	LC	Convolvulaceae	*Ipomoea bathycolpos*	LC	Fabaceae	*Senna italica*	
Cleomaceae	*Cleome monophylla*	LC	**Convolvulaceae**	***Ipomoea bolusiana*** [g]	**LC**	**Fabaceae**	***Senna italica* subsp. *arachoides*** [bh]	**LC**
Cleomaceae	*Cleome oxyphylla* var. *oxyphylla*	LC	Convolvulaceae	*Ipomoea cairica* var. *cairica*	LC	Fabaceae	*Senna occidentalis* (NEM:BA)	NE
Cleomaceae	*Cleome rubella*	LC	Convolvulaceae	*Ipomoea carnea* subsp. *fistulosa* (NEM:BA)	NE	Fabaceae	*Senna septemtrionalis* (NEM:BA)	NE
Lamiaceae	*Clerodendrum glabrum*		Convolvulaceae	*Ipomoea coscinosperma*	LC	Amaranthaceae	*Sericorema remotiflora*	LC
Lamiaceae	*Clerodendrum ternatum*	LC	Convolvulaceae	*Ipomoea crassipes*		Asteraceae	*Seriphium plumosum*	
Rosaceae	*Cliffortia linearifolia*	LC	Convolvulaceae	*Ipomoea crassipes* var. *crassipes*	LC	Pedaliaceae	*Sesamum alatum*	LC
Rosaceae	*Cliffortia nitidula* subsp. *pilosa*	NE	Convolvulaceae	*Ipomoea dichroa*	LC	Pedaliaceae	*Sesamum triphyllum*	
Amaryllidaceae	*Clivia miniata*		Convolvulaceae	*Ipomoea gracilisepala*	LC	Pedaliaceae	*Sesamum triphyllum* var. *triphyllum*	LC
Peraceae	*Clutia abyssinica* var. *abyssinica*	LC	Convolvulaceae	*Ipomoea holubii*	LC	Fabaceae	*Sesbania bispinosa* var. *bispinosa*	NE
Peraceae	*Clutia cordata*	LC	Convolvulaceae	*Ipomoea indica* (NEM:BA)	NE	Fabaceae	*Sesbania punicea* (NEM:BA)	NE
Peraceae	*Clutia natalensis*	LC	**Convolvulaceae**	***Ipomoea magnusiana*** [g]	**LC**	Fabaceae	*Sesbania transvaalensis*	LC
Peraceae	*Clutia pulchella*		Convolvulaceae	*Ipomoea oblongata*	LC	Poaceae	*Setaria incrassata*	LC
Peraceae	*Clutia pulchella* var. *franksiae*	LC	Convolvulaceae	*Ipomoea obscura*		Poaceae	*Setaria lindenbergiana*	LC
Peraceae	*Clutia pulchella* var. *pulchella*	LC	**Convolvulaceae**	***Ipomoea obscura* var. *obscura*** [bh]	**LC**	Poaceae	*Setaria megaphylla*	LC
Cucurbitaceae	*Coccinia adoensis*	LC	Convolvulaceae	*Ipomoea oenotherae* var. *oenotherae*	LC	Poaceae	*Setaria nigrirostris*	LC
Cucurbitaceae	*Coccinia hirtella*	LC	Convolvulaceae	*Ipomoea ommanneyi*	LC	Poaceae	*Setaria plicatilis*	LC
Cucurbitaceae	*Coccinia rehmannii*	LC	Convolvulaceae	*Ipomoea papilio*	LC	Poaceae	*Setaria pumila*	LC
Cucurbitaceae	*Coccinia sessilifolia*	LC	Convolvulaceae	*Ipomoea purpurea* (NEM:BA)	NE	Poaceae	*Setaria sphacelata*	
Cucurbitaceae	*Coccinia sessilifolia* var. *sessilifolia*		Convolvulaceae	*Ipomoea simplex*	LC	Poaceae	*Setaria sphacelata* var. *sericea*	LC

Colchicaceae	*Colchicum melanthioides* subsp. *melanthioides*		Convolvulaceae	*Ipomoea transvaalensis*	LC	Poaceae	*Setaria sphacelata* var. *sphacelata*	LC
Cyperaceae	*Coleochloa setifera*	LC	Convolvulaceae	*Ipomoea wightii* var. *wightii*	LC	**Poaceae**	***Setaria sphacelata* var. *torta*** [bgh]	**LC**
Lamiaceae	*Coleus hadiensis*		Iridaceae	*Iris pseudacorus* (NEM:BA)		Poaceae	*Setaria verticillata*	LC
Lamiaceae	*Coleus neochilus*		Poaceae	*Ischaemum afrum*	LC	Malvaceae	*Sida alba*	LC
Araceae	*Colocasia esculenta*		Poaceae	*Ischaemum fasciculatum*	LC	**Malvaceae**	***Sida chrysantha*** [bcf]	**LC**
Combretaceae	*Combretum apiculatum*		Acanthaceae	*Isoglossa glandulosissima*		Malvaceae	*Sida cordifolia*	
Combretaceae	*Combretum apiculatum* subsp. *apiculatum*	LC	Acanthaceae	*Isoglossa grantii*	LC	**Malvaceae**	***Sida cordifolia* subsp. *cordifolia*** [f]	**LC**
Combretaceae	*Combretum erythrophyllum*	LC	Acanthaceae	*Isoglossa origanoides*	LC	**Malvaceae**	***Sida dregei*** [bcefh]	**LC**
Combretaceae	*Combretum hereroense*		Cyperaceae	*Isolepis cernua* var. *cernua*	LC	Malvaceae	*Sida pseudocordifolia*	LC
Combretaceae	***Combretum hereroense* subsp. *hereroense*** [f]		Cyperaceae	*Isolepis costata*	LC	**Malvaceae**	***Sida rhombifolia*** [c]	
Combretaceae	**Combretum imberbe*	LC	Cyperaceae	*Isolepis fluitans* var. *fluitans*	LC	Malvaceae	*Sida rhombifolia* subsp. *rhombifolia*	LC
Combretaceae	*Combretum kraussii*	LC	Cyperaceae	*Isolepis sepulcralis*	LC	Malvaceae	*Sida spinosa* var. *spinosa*	LC
Combretaceae	*Combretum molle*	LC	Pylaisiadelphaceae	*Isopterygium leucophanes*		Malvaceae	*Sida ternata*	LC
Combretaceae	*Combretum zeyheri*	LC	Pylaisiadelphaceae	*Isopterygium leucopsis*		Caryophyllaceae	*Silene burchellii* subsp. *modesta*	LC
Commelinaceae	*Commelina africana*		Pylaisiadelphaceae	*Isopterygium punctulatum*		Caryophyllaceae	*Silene burchellii* subsp. *pilosellifolia*	LC
Commelinaceae	*Commelina africana* var. *africana*	LC	Bignoniaceae	*Jacaranda mimosifolia* (NEM:BA)	NE	Caryophyllaceae	*Silene gallica*	NE
Commelinaceae	*Commelina africana* var. *barberae*	LC	Scrophulariaceae	*Jamesbrittenia atropurpurea* subsp. *atropurpurea*	LC	Caryophyllaceae	*Silene undulata*	
Commelinaceae	***Commelina africana* var. *krebsiana*** [bfgh]	**LC**	Scrophulariaceae	*Jamesbrittenia aurantiaca*	LC	Caryophyllaceae	*Silene undulata* subsp. *undulata*	LC
Commelinaceae	*Commelina africana* var. *lancispatha*	LC	Scrophulariaceae	*Jamesbrittenia burkeana*	LC	Brassicaceae	*Sisymbrium burchellii* var. *burchellii*	LC
Commelinaceae	*~*Commelina bella*	DDT	Scrophulariaceae	*Jamesbrittenia grandiflora*	LC	Brassicaceae	*Sisymbrium officinale*	NE
Commelinaceae	***Commelina benghalensis*** [fg]	**LC**	Scrophulariaceae	*Jamesbrittenia montana*	LC	Brassicaceae	*Sisymbrium orientale*	NE
Commelinaceae	*Commelina diffusa* subsp. *scandens*	LC	Oleaceae	*Jasminum angulare*	LC	Apocynaceae	*Sisyranthus randii*	LC
Commelinaceae	*Commelina eckloniana*	LC	Oleaceae	*Jasminum breviflorum*	LC	Apiaceae	*Sium repandum*	
Commelinaceae	*Commelina erecta*	LC	Oleaceae	*Jasminum multipartitum*	LC	Solanaceae	*Solanum aculeatissimum*	NE
Commelinaceae	*Commelina imberbis*	LC	Oleaceae	*Jasminum quinatum*	LC	Solanaceae	*Solanum americanum*	NE
Commelinaceae	*Commelina livingstonii*	LC	Euphorbiaceae	*Jatropha curcas* (NEM:BA)	NE	**Solanaceae**	***Solanum campylacanthum*** [bcdfgh]	
Commelinaceae	*Commelina modesta*	LC	Euphorbiaceae	*Jatropha schlechteri* subsp. *setifera*	LC	Solanaceae	*Solanum campylacanthum* subsp. *campylacanthum*	
Commelinaceae	*Commelina subulata*	LC	Euphorbiaceae	*Jatropha zeyheri*	LC	Solanaceae	*Solanum campylacanthum* subsp. *panduriforme*	LC
Nyctaginaceae	*Commicarpus pentandrus*	LC	Juncaceae	*Juncus dregeanus* subsp. *dregeanus*	LC	Solanaceae	*Solanum capense*	LC
Nyctaginaceae	*Commicarpus plumbagineus* var. *plumbagineus*	LC	Juncaceae	*Juncus effusus*	LC	Solanaceae	*Solanum catombelense*	LC
Burseraceae	*Commiphora angolensis*	LC	Juncaceae	*Juncus exsertus*	LC	Solanaceae	*Solanum chenopodioides*	NE
Burseraceae	*Commiphora glandulosa*	LC	Juncaceae	*Juncus lomatophyllus*	LC	Solanaceae	*Solanum coccineum*	

Burseraceae	*Commiphora mollis*	LC	Juncaceae	*Juncus oxycarpus*	LC	**Solanaceae**	***Solanum elaeagnifolium*** **(NEM:BA)[bh]**	**NE**
Burseraceae	*Commiphora neglecta*	LC	Juncaceae	*Juncus punctorius*	LC	Solanaceae	*Solanum giganteum*	LC
Burseraceae	*Commiphora pyracanthoides*	LC	Juncaceae	*Juncus rigidus*	LC	**Solanaceae**	***Solanum lichtensteinii*** **[bcfgh]**	**LC**
Burseraceae	*Commiphora schimperi*	LC	Acanthaceae	*Justicia anagalloides*	LC	Solanaceae	*Solanum mauritianum* (NEM:BA)	NE
Apiaceae	*Conium chaerophylloides*	LC	Acanthaceae	*Justicia betonica*	LC	Solanaceae	*Solanum melongena*	
Convolvulaceae	*Convolvulus aschersonii*	LC	**Acanthaceae**	***Justicia flava*** **[g]**	**LC**	Solanaceae	*Solanum nigrum*	NE
Convolvulaceae	*Convolvulus farinosus*	LC	Acanthaceae	*Justicia heterocarpa* subsp. *dinteri*	LC	Solanaceae	*Solanum panduriforme*	
Convolvulaceae	*Convolvulus multifidus*	LC	Acanthaceae	*Justicia odora*	LC	Solanaceae	*Solanum pseudocapsicum* (NEM:BA)	NE
Convolvulaceae	*Convolvulus ocellatus* var. *ocellatus*	LC	Acanthaceae	*Justicia orchioides* subsp. *glabrata*	LC	Solanaceae	*Solanum retroflexum*	LC
Convolvulaceae	***Convolvulus sagittatus*** **[h]**	**LC**	Acanthaceae	*Justicia protracta* subsp. *rhodesiana*	LC	Solanaceae	*Solanum rigescens*	NE
Convolvulaceae	*Convolvulus thunbergii*	LC	Acanthaceae	*Justicia rhodesiana*		Solanaceae	*Solanum rubetorum*	LC
Asteraceae	*Conyza aegyptiaca*		Crassulaceae	*Kalanchoe delagoensis*		Solanaceae	*Solanum seaforthianum* (NEM:BA)	
Asteraceae	*Conyza bonariensis*	NE	**Crassulaceae**	***Kalanchoe lanceolata*** **[g]**	**LC**	Solanaceae	*Solanum seaforthianum* var. *disjunctum*	NE
Asteraceae	*Conyza canadensis*	NE	Crassulaceae	*Kalanchoe paniculata*	LC	**Solanaceae**	***Solanum sisymbriifolium*** **(NEM:BA)[c]**	**NE**
Asteraceae	*Conyza chilensis*	NE	Crassulaceae	*Kalanchoe rotundifolia*	LC	Solanaceae	*Solanum viarum*	NE
Asteraceae	*Conyza podocephala*		Crassulaceae	*Kalanchoe thyrsiflora*	LC	Asteraceae	*Sonchus asper* subsp. *asper*	NE
Asteraceae	*Conyza scabrida*		Cucurbitaceae	*Kedrostis africana*	LC	Asteraceae	*Sonchus dregeanus*	LC
Asteraceae	*Conyza ulmifolia*		Cucurbitaceae	*Kedrostis foetidissima*	LC	Asteraceae	*Sonchus friesii* var. *friesii*	LC
Rubiaceae	*Coptosperma supra-axillare*	LC	Cucurbitaceae	*Kedrostis hirtella*		Asteraceae	*Sonchus integrifolius* var. *integrifolius*	LC
Corbichoniaceae	***Corbichonia decumbens*** **[bfg]**	**LC**	Rubiaceae	*Keetia gueinzii*	LC	Asteraceae	*Sonchus nanus*	LC
Malvaceae	*Corchorus argillicola*		Aizoaceae	*Khadia acutipetala*	LC	Asteraceae	*Sonchus oleraceus*	NE
Malvaceae	***Corchorus asplenifolius*** **[bcfgh]**	**LC**	Bignoniaceae	*Kigelia africana*	LC	Asteraceae	*Sonchus wilmsii*	LC
Malvaceae	*Corchorus aspleniifolius*		Achariaceae	*Kiggelaria africana*	LC	Orobanchaceae	*Sopubia cana* var. *cana*	LC
Malvaceae	*Corchorus confusus*	LC	Kirkiaceae	*Kirkia wilmsii*	LC	Orobanchaceae	*Sopubia cana* var. *glabrescens*	LC
Malvaceae	***Corchorus kirkii*** **[fg]**	**LC**	**Asteraceae**	***Kleinia longiflora*** **[g]**	**LC**	Poaceae	*Sorghum bicolor*	
Malvaceae	*Corchorus schimperi*	LC	Asphodelaceae	*Kniphofia ensifolia* subsp. *ensifolia*	LC	Poaceae	*Sorghum bicolor* subsp. *arundinaceum*	LC
Malvaceae	*Corchorus tridens*	NE	Asphodelaceae	*Kniphofia porphyrantha*	LC	Poaceae	*Sorghum bicolor* subsp. *drummondii*	LC
Malvaceae	*Corchorus trilocularis*	NE	Asphodelaceae	*~*Kniphofia typhoides*	NT	Poaceae	*Sorghum halepense* (NEM:BA)	NE
Boraginaceae	*Cordia caffra*	LC	Poaceae	*Koeleria capensis*	LC	Poaceae	*Sorghum versicolor*	LC
Rubiaceae	***Cordylostigma longifolium*** **[gh]**	**LC**	Rubiaceae	*Kohautia amatymbica*	LC	Bignoniaceae	*Spathodea campanulata* (NEM:BA)	
Asteraceae	*Coreopsis lanceolata* (NEM:BA)	NE	Rubiaceae	*Kohautia caespitosa* subsp. *brachyloba*	LC	Rubiaceae	*Spermacoce natalensis*	LC
Brassicaceae	*Coronopus integrifolius*	NE	Rubiaceae	*Kohautia cynanchica*	LC	Rubiaceae	*Spermacoce senensis*	LC
Caryophyllaceae	*Corrigiola litoralis* subsp. *litoralis* var. *litoralis*	NE	Cyperaceae	*Kyllinga alata*	LC	Sphagnaceae	*Sphagnum capense*	
Poaceae	*Cortaderia selloana* (NEM:BA)	NE	Cyperaceae	*Kyllinga alba*	LC	Sphagnaceae	*Sphagnum truncatum*	

Rosaceae	*Cotoneaster pannosus* (NEM:BA)	NE	Cyperaceae	*Kyllinga erecta* var. *erecta*	LC	Malpighiaceae	*Sphedamnocarpus pruriens*	
Asteraceae	*Cotula anthemoides*	LC	Cyperaceae	*Kyllinga melanosperma*	LC	Malpighiaceae	*Sphedamnocarpus pruriens* subsp. *galphimiifolius*	LC
Asteraceae	*Cotula australis*	LC	Fabaceae	*Lablab purpureus* subsp. *uncinatus*	LC	Malpighiaceae	*Sphedamnocarpus pruriens* subsp. *pruriens*	LC
Asteraceae	*Cotula hispida*	LC	Asteraceae	*Lactuca inermis*	LC	Fabaceae	*Sphenostylis angustifolia*	LC
Asteraceae	*Cotula nigellifolia* var. *nigellifolia*	LC	Hydrocharitaceae	*Lagarosiphon major*	LC	Araceae	*Spirodela punctata*	LC
Crassulaceae	*Cotyledon orbiculata* var. *ausana*		Hydrocharitaceae	*Lagarosiphon muscoides*	LC	**Euphorbiaceae**	***Spirostachys africana*** [g]	**LC**
Crassulaceae	*Cotyledon orbiculata* var. *oblonga*	LC	Cucurbitaceae	*Lagenaria siceraria*	LC	Poaceae	*Sporobolus africanus*	LC
Acanthaceae	***Crabbea angustifolia*** [fg]	**LC**	Asteraceae	*Laggera crispata*	LC	Poaceae	*Sporobolus centrifugus*	LC
Acanthaceae	***Crabbea hirsuta*** [g]	**LC**	Asteraceae	*Laggera decurrens*	LC	Poaceae	*Sporobolus congoensis*	LC
Acanthaceae	*Crabbea ovalifolia*	LC	Anacardiaceae	*Lannea discolor*	LC	Poaceae	*Sporobolus conrathii*	LC
Asteraceae	*Crassocephalum ï¿½ picridifolium*		Anacardiaceae	*Lannea edulis*		Poaceae	*Sporobolus discosporus*	LC
Crassulaceae	*Crassula alba* var. *alba*	NE	Anacardiaceae	*Lannea edulis* var. *edulis*	LC	Poaceae	*Sporobolus festivus*	LC
Crassulaceae	*Crassula capitella*		Verbenaceae	*Lantana camara*	NE	Poaceae	*Sporobolus fimbriatus*	LC
Crassulaceae	*~Crassula cymbiformis*	Critically Rare	Verbenaceae	*Lantana rugosa*	LC	Poaceae	*Sporobolus ioclados*	LC
Crassulaceae	*Crassula expansa* subsp. *expansa*	LC	Thymelaeaceae	*Lasiosiphon caffer*	LC	Poaceae	*Sporobolus natalensis*	LC
Crassulaceae	*Crassula lanceolata* subsp. *lanceolata*	LC	Thymelaeaceae	*Lasiosiphon canoargenteus*	LC	Poaceae	*Sporobolus nitens*	LC
Crassulaceae	*Crassula lanceolata* subsp. *transvaalensis*	LC	Thymelaeaceae	*Lasiosiphon capitatus*	LC	Poaceae	*Sporobolus panicoides*	LC
Crassulaceae	*Crassula natans* var. *natans*	LC	Thymelaeaceae	*Lasiosiphon kraussianus*		Poaceae	*Sporobolus pectinatus*	LC
Crassulaceae	*Crassula nodulosa* var. *nodulosa* forma. *nodulosa*		Thymelaeaceae	*Lasiosiphon microcephalus*		Poaceae	*Sporobolus pyramidalis*	LC
Crassulaceae	*Crassula obovata* var. *obovata*	LC	Thymelaeaceae	*Lasiosiphon polycephalus*	LC	Poaceae	*Sporobolus stapfianus*	LC
Crassulaceae	*Crassula setulosa*	LC	Thymelaeaceae	*Lasiosiphon sericocephalus*	LC	Brachytheciaceae	*Squamidium brasiliense*	
Crassulaceae	*Crassula setulosa* var. *jenkinsii*	NE	Thymelaeaceae	*Lasiosiphon splendens*	LC	Lamiaceae	*Stachys hyssopoides*	LC
Crassulaceae	*Crassula setulosa* var. *setulosa* forma. *setulosa*		Asteraceae	*Lasiospermum bipinnatum*	LC	Lamiaceae	*Stachys natalensis* var. *galpinii*	LC
Crassulaceae	*Crassula swaziensis*	LC	Asteraceae	*Launaea rarifolia* var. *rarifolia*	LC	Lamiaceae	*Stachys natalensis* var. *natalensis*	LC
Crassulaceae	*Crassula swaziensis* var. *swaziensis* forma. *swaziensis*		Haloragaceae	*Laurembergia repens* subsp. *brachypoda*	LC	Lamiaceae	*Stachys spathulata*	LC
Crassulaceae	*Crassula vaginata* subsp. *vaginata*	LC	Asparagaceae	**Ledebouria atrobrunnea*	LC	Apocynaceae	*Stapelia gigantea*	LC
Linderniaceae	*Craterostigma plantagineum*	LC	Asparagaceae	*Ledebouria burkei*		Apocynaceae	*Stapelia leendertziae*	LC
Linderniaceae	*Craterostigma wilmsii*	LC	Asparagaceae	**Ledebouria confusa*	LC	Caryophyllaceae	*Stellaria pallida*	NE
Asteraceae	*Crepis hypochaeridea*	NE	Asparagaceae	*Ledebouria cooperi*	LC	Apocynaceae	*Stenostelma capense*	LC
Amaryllidaceae	*Crinum graminicola*	LC	Asparagaceae	*Ledebouria inquinata*	LC	Apocynaceae	*Stenostelma corniculatum*	LC
Amaryllidaceae	*Crinum lugardiae*	LC	Asparagaceae	*Ledebouria leptophylla*	LC	Apocynaceae	*~*Stenostelma umbelluliferum*	NT
Amaryllidaceae	*Crinum macowanii*	LC	**Asparagaceae**	***Ledebouria luteola*** [gh]	**LC**	Malvaceae	*Sterculia rogersii*	LC
Amaryllidaceae	*Crinum paludosum*	LC	**Asparagaceae**	***Ledebouria marginata*** [h]	**LC**	Stereophyllaceae	*Stereophyllum natalense*	
Acanthaceae	*Crossandra fruticulosa*	LC	Asparagaceae	*Ledebouria ovatifolia*		Poaceae	*Stiburus alopecuroides*	LC

Acanthaceae	*Crossandra greenstockii*	LC	Asparagaceae	*Ledebouria papillata*	LC	Poaceae	*Stipa dregeana* var. *elongata*	LC
Fabaceae	*Crotalaria barkae* subsp. *barkae*	LC	Asparagaceae	*Ledebouria revoluta*	LC	Poaceae	*Stipagrostis uniplumis* var. *neesii*	LC
Fabaceae	*Crotalaria distans* subsp. *distans*	LC	Poaceae	*Leersia hexandra*	LC	Poaceae	*Stipagrostis uniplumis* var. *uniplumis*	LC
Fabaceae	*Crotalaria distans* subsp. *mediocris*	LC	Araceae	*Lemna gibba*	LC	Poaceae	*Stipagrostis zeyheri* subsp. *sericans*	LC
Fabaceae	*Crotalaria eremicola* subsp. *eremicola*	LC	Fabaceae	*~Leobordea adpressa* subsp. *leptantha*	DDT	Asteraceae	*Stoebe plumosa*	LC
Fabaceae	*Crotalaria laburnifolia* subsp. *australis*	LC	Fabaceae	*Leobordea carinata*	LC	Asteraceae	*Stoebe vulgaris*	
Fabaceae	***Crotalaria lotoides*** [bcgh]	**LC**	Fabaceae	*Leobordea corymbosa*	LC	Apocynaceae	*Stomatostemma monteiroae*	LC
Fabaceae	*Crotalaria magaliesbergensis*	LC	**Fabaceae**	***Leobordea divaricata*** [g]	**LC**	Strelitziaceae	*Strelitzia nicolai*	LC
Fabaceae	*Crotalaria obscura*	LC	Fabaceae	*Leobordea eriantha*	LC	Strelitziaceae	*Strelitzia reginae*	
Fabaceae	***Crotalaria sphaerocarpa* subsp. *sphaerocarpa*** [d]	**LC**	Fabaceae	*Leobordea foliosa*	LC	Gesneriaceae	*Streptocarpus vandeleurii*	LC
Fabaceae	*Crotalaria virgulata* subsp. *grantiana*	LC	Fabaceae	*Leobordea hirsuta*	LC	Orobanchaceae	*Striga asiatica*	LC
Euphorbiaceae	*Croton gratissimus*		Fabaceae	*Leobordea mucronata*		Orobanchaceae	*Striga bilabiata*	
Euphorbiaceae	*Croton gratissimus* var. *gratissimus*	LC	Fabaceae	*Leobordea pulchra*	LC	Orobanchaceae	*Striga bilabiata* subsp. *bilabiata*	LC
Euphorbiaceae	*Croton gratissimus* var. *subgratissimus*	LC	**Lamiaceae**	***Leonotis glabrata* var. *glabrata*** [b]	**LC**	Orobanchaceae	*Striga elegans*	LC
Apocynaceae	*Cryptolepis cryptolepioides*		Lamiaceae	*Leonotis leonurus*	LC	Orobanchaceae	*Striga forbesii*	LC
Apocynaceae	*Cryptolepis oblongifolia*	LC	Lamiaceae	*Leonotis martinicensis*	LC	Orobanchaceae	*Striga gesnerioides*	LC
Asteraceae	*Crystallopollen angustifolium*		Lamiaceae	*Leonotis nepetifolia*	LC	Loganiaceae	*Strychnos madagascariensis*	LC
Cucurbitaceae	*Cucumis africanus*	LC	Lamiaceae	*Leonotis nepetifolia* var. *nepetifolia*		Loganiaceae	*Strychnos pungens*	LC
Cucurbitaceae	*Cucumis anguria* var. *longaculeatus*	LC	Lamiaceae	*Leonotis ocymifolia*	LC	Loganiaceae	*Strychnos usambarensis*	LC
Cucurbitaceae	*Cucumis heptadactylus*	LC	Lamiaceae	*Leonotis ocymifolia* var. *raineriana*		Fabaceae	*Stylosanthes fruticosa*	LC
Cucurbitaceae	*Cucumis hirsutus*	LC	Lamiaceae	*Leonotis ocymifolia* var. *schinzii*		Scrophulariaceae	*Sutera burkeana*	
Cucurbitaceae	*Cucumis melo* subsp. *melo*	LC	Lamiaceae	*Leonotis pentadentata*	LC	Scrophulariaceae	*Sutera griquensis*	LC
Cucurbitaceae	*Cucumis melo* var. *agrestis*		Lamiaceae	*Leonotis randii*	LC	Pallaviciniaceae	*Symphogyna brasiliensis*	
Cucurbitaceae	*Cucumis metuliferus*	LC	Lamiaceae	*Leonotis sexdentata*	LC	Pallaviciniaceae	*Symphogyna podophylla*	
Cucurbitaceae	*Cucumis myriocarpus* subsp. *myriocarpus*	LC	Brassicaceae	*Lepidium africanum* subsp. *africanum*	LC	Lamiaceae	*Syncolostemon canescens*	LC
Cucurbitaceae	*Cucumis prophetarum* subsp. *zeyheri*		Brassicaceae	*Lepidium africanum* subsp. *divaricatum*	LC	Lamiaceae	*Syncolostemon elliottii*	LC
Cucurbitaceae	*Cucumis zeyheri*	LC	Brassicaceae	*Lepidium bonariense*	NE	Lamiaceae	*Syncolostemon pretoriae*	LC
Fabaceae	*~Cullen holubii*	VU	Brassicaceae	*Lepidium transvaalense*	LC	Pottiaceae	*Syntrichia ammonsiana*	
Cupressaceae	*Cupressus arizonica* var. *arizonica*	NE	Polypodiaceae	*Lepisorus schraderi*	LC	Pottiaceae	*Syntrichia laevipila*	
Convolvulaceae	*Cuscuta campestris* (NEM:BA)	NE	Poaceae	*Leptochloa eleusine*	LC	Pottiaceae	*Syntrichia pagorum*	
Araliaceae	*Cussonia paniculata*		Poaceae	*Leptochloa fusca*	LC	Myrtaceae	*Syzygium guineense* subsp. *guineense*	LC
Araliaceae	*Cussonia paniculata* subsp. *paniculata*	LC	Leptodontaceae	*Leptodon smithii*		Apocynaceae	*Tabernaemontana elegans*	LC
Araliaceae	*Cussonia paniculata* subsp. *sinuata*	LC	Myrtaceae	*Leptospermum laevigatum* (NEM:BA)	NE	**Asteraceae**	***Tagetes minuta*** [bcdfgh]	**NE**
Araliaceae	*Cussonia spicata*	LC	Fabaceae	*Lespedeza cuneata*	NE	Talinaceae	*Talinum arnotii*	LC

Araliaceae	*Cussonia transvaalensis*	LC	Fabaceae	*Lessertia depressa*	LC	Talinaceae	*Talinum caffrum*	LC
Commelinaceae	*Cyanotis lapidosa*	LC	Fabaceae	*Lessertia frutescens* subsp. *frutescens*	LC	Talinaceae	*Talinum paniculatum*	LC
Commelinaceae	*Cyanotis speciosa*	LC	Fabaceae	*Lessertia frutescens* subsp. *microphylla*	LC	Tamaricaceae	*Tamarix ramosissima* (NEM:BA)	NE
Cyatheaceae	*Cyathea dregei*		Fabaceae	*Lessertia pauciflora* var. *pauciflora*	LC	Loranthaceae	*Tapinanthus natalitius* subsp. *zeyheri*	
Amaranthaceae	*Cyathula cylindrica* var. *cylindrica*	LC	Fabaceae	*Lessertia perennans* var. *perennans*	NE	Loranthaceae	*Tapinanthus oleifolius*	LC
Amaranthaceae	*Cyathula lanceolata*	LC	Fabaceae	*Lessertia perennans* var. *polystachya*	NE	Loranthaceae	*Tapinanthus quequensis*	LC
Amaranthaceae	*Cyathula uncinulata*	LC	Fabaceae	*Lessertia stricta*	LC	Loranthaceae	*Tapinanthus rubromarginatus*	LC
Pilotrichaceae	*Cyclodictyon vallis-gratiae*		Fabaceae	*Leucaena leucocephala* subsp. *leucocephala*	NE	Fabaceae	*Tara spinosa*	
Apiaceae	*Cyclospermum leptophyllum*		Lamiaceae	*Leucas capensis*		**Asteraceae**	***Tarchonanthus camphoratus*** [bfg]	**LC**
Orobanchaceae	*Cycnium adonense*	LC	Lamiaceae	*Leucas glabrata* var. *glabrata*		Asteraceae	*Tarchonanthus parvicapitulatus*	LC
Orobanchaceae	*Cycnium tubulosum* subsp. *tubulosum*	LC	Lamiaceae	*Leucas martinicensis*		Targioniaceae	*Targionia hypophylla*	
Poaceae	***Cymbopogon caesius*** [bcefgh]	**LC**	Rosaceae	*Leucosidea sericea*	LC	Poaceae	*Tarigidia aequiglumis*	LC
Poaceae	*Cymbopogon excavatus*		Proteaceae	*~Leucospermum saxosum*	EN	Bignoniaceae	*Tecoma stans* (NEM:BA)	
Poaceae	*Cymbopogon marginatus*	LC	Oleaceae	*Ligustrum japonicum* (NEM:BA)	NE	Bignoniaceae	*Tecoma stans* var. *stans*	NE
Poaceae	*Cymbopogon nardus*	LC	Oleaceae	*Ligustrum sinense* (NEM:BA)	NE	Fabaceae	*Tephrosia acaciifolia*	LC
Poaceae	*Cymbopogon pospischilii*	NE	Limeaceae	*Limeum fenestratum* var. *fenestratum*	LC	Fabaceae	*Tephrosia burchellii*	LC
Poaceae	*Cymbopogon prolixus*	LC	Limeaceae	*Limeum pauciflorum*	LC	Fabaceae	*Tephrosia capensis* var. *capensis*	LC
Poaceae	*Cymbopogon validus*		**Limeaceae**	***Limeum sulcatum* var. *sulcatum*** [h]	**LC**	Fabaceae	*Tephrosia elongata* var. *elongata*	LC
Apocynaceae	*Cynanchum ellipticum*	LC	Limeaceae	*Limeum viscosum* subsp. *transvaalense*	LC	**Fabaceae**	***Tephrosia longipes*** [h]	
Apocynaceae	*Cynanchum viminale*		Limeaceae	*Limeum viscosum* subsp. *viscosum* var. *glomeratum*	NE	Fabaceae	*Tephrosia lupinifolia*	LC
Apocynaceae	*Cynanchum viminale* subsp. *viminale*	LC	Limeaceae	*Limeum viscosum* subsp. *viscosum* var. *kraussii*	NE	Fabaceae	*Tephrosia multijuga*	LC
Apocynaceae	*Cynanchum virens*	LC	Limeaceae	*Limeum viscosum* subsp. *viscosum* var. *viscosum*	NE	Fabaceae	*Tephrosia polystachya* var. *hirta*	LC
Poaceae	***Cynodon dactylon*** [bdegh]	**LC**	Scrophulariaceae	*Limosella longiflora*	LC	Fabaceae	*Tephrosia purpurea* subsp. *leptostachya* var. *leptostachya*	NE
Poaceae	*Cynodon hirsutus*	LC	Scrophulariaceae	*Limosella maior*	LC	Fabaceae	*Tephrosia rhodesica* var. *evansii*	LC
Poaceae	*Cynodon transvaalensis*	LC	Leskeaceae	*Lindbergia haplocladioides*		Fabaceae	*Tephrosia rhodesica* var. *rhodesica*	LC
Boraginaceae	*Cynoglossum hispidum*	LC	Leskeaceae	*Lindbergia viridis*		Fabaceae	*Tephrosia semiglabra*	LC
Boraginaceae	*Cynoglossum lanceolatum*	LC	Linaceae	*Linum thunbergii*	LC	Fabaceae	*Tephrosia villosa* subsp. *ehrenbergiana* var. *ehrenbergiana*	NE
Orchidaceae	*Cynorkis kassneriana*	LC	Asteraceae	*Linzia glabra*	LC	Fabaceae	*Teramnus labialis* subsp. *labialis*	LC
Cyperaceae	*Cyperus albostriatus*	LC	Orchidaceae	*Liparis bowkeri*	LC	Combretaceae	*Terminalia sericea*	LC
Cyperaceae	*Cyperus articulatus*	LC	Cyperaceae	*Lipocarpha chinensis*	LC	Lamiaceae	*Tetradenia brevispicata*	LC
Cyperaceae	*Cyperus ascocapensis*		Cyperaceae	*Lipocarpha nana*	LC	**Lamiaceae**	***Teucrium trifidum*** [g]	**LC**
Cyperaceae	*Cyperus austro-africanus*	LC	**Verbenaceae**	***Lippia javanica*** [fgh]	**LC**	Thelypteridaceae	*Thelypteris confluens*	LC
Cyperaceae	*Cyperus capensis*	LC	Verbenaceae	*Lippia rehmannii*	LC	**Poaceae**	***Themeda triandra*** [begh]	**LC**

Cyperaceae	*Cyperus congestus*	LC	Verbenaceae	*Lippia scaberrima*	LC	Santalaceae	*Thesium burkei*	
Cyperaceae	*Cyperus cristatus*		Verbenaceae	*Lippia wilmsii*	LC	Santalaceae	*Thesium costatum* var. *costatum*	LC
Cyperaceae	*Cyperus cuspidatus*	LC	Fabaceae	*Listia bainesii*	LC	Santalaceae	*Thesium costatum* var. *juniperinum*	LC
Cyperaceae	*Cyperus cyperoides* subsp. *pseudoflavus*	LC	Fabaceae	*Listia heterophylla*	LC	Santalaceae	*Thesium cytisoides*	
Cyperaceae	*Cyperus decurvatus*	LC	Aizoaceae	*~*Lithops lesliei* subsp. *lesliei*	NT	Santalaceae	*Thesium deceptum*	LC
Cyperaceae	*Cyperus denudatus*	LC	Boraginaceae	*Lithospermum cinereum*	LC	Santalaceae	*Thesium goetzeanum*	LC
Cyperaceae	*Cyperus difformis*	LC	Asteraceae	*Litogyne gariepina*	LC	Santalaceae	*Thesium gracilarioides*	LC
Cyperaceae	*Cyperus dives*	LC	Campanulaceae	*Lobelia angolensis*		Santalaceae	*Thesium gracile*	LC
Cyperaceae	*Cyperus dubius* var. *dubius*		Campanulaceae	*Lobelia erinus*	LC	Santalaceae	*Thesium impeditum*	LC
Cyperaceae	*Cyperus eragrostis*	NE	Campanulaceae	*Lobelia flaccida* subsp. *mossiana*	LC	Santalaceae	*Thesium junceum*	
Cyperaceae	*Cyperus esculentus* var. *esculentus*	LC	Campanulaceae	*Lobelia thermalis*	LC	Santalaceae	*Thesium magalismontanum*	LC
Cyperaceae	*Cyperus fastigiatus*	LC	Poaceae	*Lolium multiflorum*	NE	Santalaceae	*Thesium megalocarpum*	
Cyperaceae	*Cyperus glaucophyllus*	LC	Poaceae	*Lolium perenne*	NE	Santalaceae	*Thesium multiramulosum*	LC
Cyperaceae	*Cyperus indecorus* var. *indecorus*	NE	Caprifoliaceae	*Lonicera japonica*		Santalaceae	*Thesium procerum*	LC
Cyperaceae	*Cyperus indecorus* var. *inflatus*	NE	Poaceae	*Lophacme digitata*	LC	Santalaceae	*Thesium racemosum*	LC
Cyperaceae	*Cyperus kyllingiella*	LC	Lophiocarpaceae	*Lophiocarpus tenuissimus*	LC	Santalaceae	*Thesium rasum*	LC
Cyperaceae	*Cyperus leptocladus*	LC	Asteraceae	*Lopholaena coriifolia*	LC	Santalaceae	*Thesium resedoides*	LC
Cyperaceae	*Cyperus longus* var. *tenuiflorus*	NE	Fabaceae	*Lotononis burchellii*	LC	Santalaceae	*Thesium translucens*	LC
Cyperaceae	*Cyperus margaritaceus* var. *margaritaceus*	LC	Fabaceae	*Lotononis laxa*	LC	Santalaceae	*Thesium transvaalense*	LC
Cyperaceae	*Cyperus marginatus*	LC	Fabaceae	*Lotononis macrosepala*	LC	Santalaceae	*Thesium utile*	LC
Cyperaceae	*Cyperus obtusiflorus* var. *flavissimus*	LC	Fabaceae	*Lotononis tenella*	LC	Acanthaceae	*Thunbergia amoena*	LC
Cyperaceae	*Cyperus obtusiflorus* var. *obtusiflorus*	LC	Fabaceae	*Lotus discolor* subsp. *discolor*	LC	Acanthaceae	*Thunbergia atriplicifolia*	LC
Cyperaceae	*Cyperus polystachyos* subsp. *polystachyos*		Poaceae	*Loudetia flavida*	LC	Acanthaceae	*Thunbergia neglecta*	LC
Cyperaceae	*Cyperus procerus*	LC	Poaceae	*Loudetia pedicellata*	LC	Timmiellaceae	*Timmiella pelindaba*	
Cyperaceae	*Cyperus rotundus* subsp. *rotundus*	LC	Poaceae	*Loudetia simplex*	LC	Fabaceae	*Tipuana tipu* (NEM:BA)	
Cyperaceae	*Cyperus rubicundus*	LC	Onagraceae	*Ludwigia adscendens*		Asteraceae	*Tithonia diversifolia* (NEM:BA)	NE
Cyperaceae	*Cyperus rupestris* var. *rupestris*	LC	Onagraceae	*Ludwigia adscendens* subsp. *diffusa*	LC	Asteraceae	*Tithonia rotundifolia* (NEM:BA)	NE
Cyperaceae	*Cyperus semitrifidus*	LC	Onagraceae	*Ludwigia octovalvis*	LC	Asteraceae	*Tolpis capensis*	LC
Cyperaceae	*Cyperus sexangularis*	LC	Lunulariaceae	*Lunularia cruciata*		Pottiaceae	*Tortella humilis*	
Cyperaceae	*Cyperus sphaerospermus*	LC	Solanaceae	*Lycium cinereum*	LC	Pottiaceae	*Tortella xanthocarpa*	
Cyperaceae	*Cyperus textilis*	LC	Solanaceae	*Lycium horridum*	LC	Asphodelaceae	*Trachyandra asperata* var. *basutoensis*	LC
Cyperaceae	*Cyperus turrillii*	LC	**Solanaceae**	***Lycium schizocalyx*** [bcfgh]	**LC**	Asphodelaceae	*Trachyandra asperata* var. *nataglencoensis*	LC
Cyperaceae	*Cyperus uitenhagensis*	LC	Lycopodiaceae	*Lycopodiella cernua*	LC	Asphodelaceae	*Trachyandra asperata* var. *swaziensis*	LC
Campanulaceae	*Cyphia rogersii* subsp. *rogersii*	LC	Lycopodiaceae	*Lycopodiella sarcocaulon*	LC	Asphodelaceae	*Trachyandra saltii* var. *saltii*	LC
Campanulaceae	*Cyphia rogersii* subsp. *winteri*	LC	Asteraceae	*Macledium zeyheri* subsp. *zeyheri*	LC	Asphodelaceae	*Trachyandra saltii* var. *secunda*	LC
Campanulaceae	*Cyphia stenopetala*	LC	Capparaceae	*Maerua angolensis*		Pterigynandraceae	*Trachyphyllum gastrodes*	
Amaranthaceae	***Cyphocarpa angustifolia*** [g]		Capparaceae	*Maerua angolensis* subsp. *angolensis*	LC	Poaceae	*Trachypogon spicatus*	LC

Vitaceae	*Cyphostemma cirrhosum* subsp. *transvaalense*	LC	Capparaceae	*Maerua cafra*	LC	Commelinaceae	*Tradescantia pallida*	
Vitaceae	*Cyphostemma juttae*		Capparaceae	*Maerua juncea* subsp. *crustata*	LC	**Euphorbiaceae**	***Tragia dioica*** [g]	**LC**
Vitaceae	***Cyphostemma lanigerum*** [g]	**LC**	Aizoaceae	*Malephora thunbergii*	LC	Euphorbiaceae	*Tragia incisifolia*	LC
Vitaceae	*Cyphostemma puberulum*	LC	Malvaceae	*Malva neglecta*	NE	Euphorbiaceae	*Tragia minor*	LC
Vitaceae	*Cyphostemma sandersonii*	LC	Malvaceae	*Malva parviflora* var. *parviflora*	NE	Euphorbiaceae	*Tragia okanyua*	LC
Vitaceae	*Cyphostemma simulans*	LC	**Malvaceae**	***Malvastrum coromandelianum*** (NEM:BA)[bh]	**NE**	Euphorbiaceae	*~Tragia physocarpa*	DDT
Vitaceae	*Cyphostemma spinosopilosum*	LC	Aytoniaceae	*Mannia capensis*		Euphorbiaceae	*Tragia prionoides*	LC
Vitaceae	*Cyphostemma sulcatum*	LC	Scrophulariaceae	*Manulea paniculata*	LC	Euphorbiaceae	*Tragia rupestris*	LC
Vitaceae	*Cyphostemma woodii*	LC	Scrophulariaceae	*Manulea parviflora* var. *parviflora*	LC	**Poaceae**	***Tragus berteronianus*** [bcgh]	**LC**
Amaryllidaceae	*Cyrtanthus breviflorus*	LC	Marchantiaceae	*Marchantia debilis*		Poaceae	*Tragus koelerioides*	LC
Poaceae	*Dactyloctenium aegyptium*	LC	Marchantiaceae	*Marchantia pappeana* subsp. *pappeana*		Poaceae	*Tragus racemosus*	LC
Poaceae	***Dactyloctenium giganteum*** [dg]	**LC**	Marchantiaceae	*Marchantia polymorpha* subsp. *ruderalis*		Cannabaceae	*Trema orientalis*	LC
Thymelaeaceae	*Dais cotinifolia*	LC	Apocynaceae	*Marsdenia sylvestris*	LC	Bruchiaceae	*Trematodon intermedius*	
Fabaceae	*Dalbergia sissoo*	NE	Marsileaceae	*Marsilea capensis*	LC	Bruchiaceae	*Trematodon longicollis*	
Euphorbiaceae	*Dalechampia capensis*	LC	Celastraceae	*Maytenus albata*	LC	Aizoaceae	*Trianthema salsoloides* var. *salsoloides*	
Euphorbiaceae	*Dalechampia galpinii*	LC	Celastraceae	*Maytenus undata*	LC	Malpighiaceae	*Triaspis glaucophylla*	LC
Solanaceae	***Datura ferox*** (NEM:BA)[g]	**NE**	Fabaceae	*Medicago sativa*	NE	**Zygophyllaceae**	***Tribulus terrestris*** [fgh]	**LC**
Solanaceae	*Datura innoxia* (NEM:BA)		Scrophulariaceae	*Melanospermum foliosum*	LC	Meliaceae	*Trichilia dregeana*	LC
Solanaceae	*Datura inoxia*	NE	Orobanchaceae	*Melasma scabrum* var. *scabrum*	LC	Cactaceae	*Trichocereus macrogonus* var. *pachanoi*	
Solanaceae	*Datura stramonium* (NEM:BA)	NE	Malvaceae	*Melhania acuminata* var. *acuminata*	LC	Boraginaceae	*Trichodesma angustifolium*	
Apiaceae	*Daucus carota*	NE	Malvaceae	*Melhania acuminata* var. *agnosta*	LC	Boraginaceae	*Trichodesma angustifolium* subsp. *angustifolium*	LC
Fabaceae	*Decorsea galpinii*	LC	Malvaceae	*Melhania prostrata*	LC	Boraginaceae	*Trichodesma physaloides*	LC
Aizoaceae	*Delosperma herbeum*	LC	Malvaceae	*Melhania transvaalensis*	LC	Poaceae	*Tricholaena monachne*	LC
Aizoaceae	*~*Delosperma leendertziae*	NT	Meliaceae	*Melia azedarach* (NEM:BA)	NE	Poaceae	*Trichoneura grandiglumis*	LC
Asteraceae	*Denekia capensis*	LC	Poaceae	*Melica racemosa*	LC	Pottiaceae	*Trichostomum brachydontium*	
Fabaceae	*Desmodium repandum*	LC	Fabaceae	*Melilotus alba*		Fabaceae	*Trifolium africanum* var. *africanum*	NE
Fabaceae	*Desmodium tortuosum*	NE	Fabaceae	*Melilotus albus*	NE	Fabaceae	*Trifolium repens*	NE
Apiaceae	*Deverra burchellii*	LC	Fabaceae	*Melilotus indicus*	NE	Poaceae	*Tripogon minimus*	LC
Poaceae	*Diandrochloa namaquensis*	LC	Poaceae	*Melinis nerviglumis*	LC	Asteraceae	*Tripteris aghillana*	
Caryophyllaceae	*Dianthus mooiensis*	LC	Poaceae	*Melinis repens*		Asteraceae	*Tripteris aghillana* var. *aghillana*	
Caryophyllaceae	*Dianthus mooiensis* subsp. *kirkii*	NE	Poaceae	*Melinis repens* subsp. *grandiflora*	LC	Poaceae	*Triraphis andropogonoides*	LC
Caryophyllaceae	*Dianthus mooiensis* subsp. *mooiensis*		**Poaceae**	***Melinis repens* subsp. *repens*** [bcefgh]	**LC**	Poaceae	*Triraphis schinzii*	LC
Caryophyllaceae	*Dianthus mooiensis* subsp. *mooiensis* var. *mooiensis*	NE	Fabaceae	*Melolobium candicans*	LC	Poaceae	*Trisetopsis imberbis*	

Caryophyllaceae	*Dianthus transvaalensis*	LC	Fabaceae	*Melolobium microphyllum*	LC	Poaceae	*Tristachya biseriata*	LC
Caryophyllaceae	*Dianthus zeyheri* subsp. *zeyheri*	NE	Fabaceae	*~Melolobium subspicatum*	VU	Poaceae	*Tristachya leucothrix*	LC
Scrophulariaceae	*Diascia barberae*	LC	Oleaceae	*Menodora africana*	LC	Poaceae	*Tristachya rehmannii*	LC
Scrophulariaceae	*Diascia integerrima*	LC	Oleaceae	*Menodora heterophylla* var. *australis*	LC	Iridaceae	*Tritonia nelsonii*	LC
Scrophulariaceae	*Diascia patens*	LC	Lamiaceae	*Mentha aquatica*	LC	Malvaceae	*Triumfetta angolensis*	LC
Pedaliaceae	*Dicerocaryum eriocarpum*	LC	Lamiaceae	*Mentha longifolia* subsp. *capensis*	LC	Malvaceae	*Triumfetta annua* forma. *annua*	
Pedaliaceae	*Dicerocaryum senecioides*	LC	Lamiaceae	*Mentha longifolia* subsp. *polyadena*	LC	Malvaceae	*Triumfetta annua* forma. *piligera*	
Poaceae	***Dichanthium annulatum*** **var. *papillosum*** [cdg]	**LC**	Convolvulaceae	*Merremia palmata*	LC	Malvaceae	*Triumfetta pilosa*	LC
Poaceae	*Dichanthium aristatum*	NE	Convolvulaceae	*Merremia verecunda*	LC	Malvaceae	*Triumfetta pilosa* var. *effusa*	NE
Dichapetalaceae	*Dichapetalum cymosum*	LC	Metzgeriaceae	*Metzgeria furcata*		Malvaceae	*Triumfetta pilosa* var. *tomentosa*	NE
Fabaceae	*Dichilus lebeckioides*	LC	Metzgeriaceae	*Metzgeria nudifrons*		Malvaceae	*Triumfetta rhomboidea* var. *rhomboidea*	LC
Fabaceae	*Dichilus pilosus*	LC	Poaceae	*Microchloa caffra*	LC	Malvaceae	*Triumfetta sonderi*	LC
Fabaceae	*Dichilus strictus*	LC	Poaceae	*Microchloa kunthii*	LC	Cucurbitaceae	*Trochomeria debilis*	LC
Convolvulaceae	*Dichondra micrantha*	NE	Dennstaedtiaceae	*Microlepia speluncae*	LC	**Cucurbitaceae**	***Trochomeria macrocarpa*** **subsp. *macrocarpa*** [h]	**LC**
Asteraceae	*Dichrocephala integrifolia* subsp. *integrifolia*	LC	Mniaceae	*Mielichhoferia bryoides*		Alliaceae	*Tulbaghia acutiloba*	LC
Fabaceae	*Dichrostachys cinerea*		Phrymaceae	*Mimulus gracilis*	LC	Alliaceae	*Tulbaghia leucantha*	LC
Fabaceae	***Dichrostachys cinerea*** **subsp. *africana*** [f]	**LC**	Sapotaceae	*Mimusops zeyheri*	LC	Alliaceae	*Tulbaghia transvaalensis*	LC
Fabaceae	*Dichrostachys cinerea* subsp. *africana* var. *africana*	NE	Nyctaginaceae	*Mirabilis jalapa* (NEM:BA)	NE	Meliaceae	*Turraea floribunda*	LC
Acanthaceae	*Dicliptera eenii*	LC	Poaceae	*Miscanthus junceus*	LC	Meliaceae	*Turraea obtusifolia*	LC
Acanthaceae	*Dicliptera minor*		Malvaceae	*Modiola caroliniana*	NE	Apocynaceae	*~Tylophora coddii*	Rare
Acanthaceae	***Dicliptera minor*** **subsp. *minor*** [g]	**LC**	Anemiaceae	*Mohria caffrorum*	LC	Fabaceae	*Tylosema esculentum*	LC
Scrophulariaceae	*Diclis petiolaris*	LC	Anemiaceae	*Mohria vestita*	LC	Typhaceae	*Typha capensis*	LC
Scrophulariaceae	*Diclis rotundifolia*	LC	Molluginaceae	*Mollugo nudicaulis*		Ulmaceae	*Ulmus parvifolia*	NE
Asteraceae	*Dicoma anomala*		**Cucurbitaceae**	***Momordica balsamina*** [gh]	**LC**	Poaceae	*Urelytrum agropyroides*	LC
Asteraceae	*Dicoma anomala* subsp. *anomala*	LC	Cucurbitaceae	*Momordica cardiospermoides*	LC	Poaceae	*Urochloa brachyura*	LC
Asteraceae	*Dicoma anomala* subsp. *anomala*	LC	Acanthaceae	*Monechma debile*		**Poaceae**	***Urochloa mosambicensis*** [bcdfgh]	**LC**
Asteraceae	*Dicoma anomala* subsp. *gerrardii*	LC	Acanthaceae	*Monechma divaricatum*		Poaceae	*Urochloa oligotricha*	LC
Asteraceae	*Dicoma galpinii*	LC	Poaceae	*Monocymbium ceresiiforme*	LC	**Poaceae**	***Urochloa panicoides*** [g]	**LC**
Asteraceae	*Dicoma macrocephala*	LC	Lobeliaceae	*Monopsis decipiens*	LC	Asteraceae	*Ursinia nana*	
Asteraceae	*Dicoma tomentosa*	LC	Geraniaceae	*Monsonia angustifolia*	LC	Asteraceae	*Ursinia nana* subsp. *leptophylla*	LC
Pottiaceae	*Didymodon tophaceus*		Geraniaceae	*Monsonia attenuata*	LC	Asteraceae	*Ursinia nana* subsp. *nana*	LC
Urticaceae	*Didymodoxa caffra*	LC	Geraniaceae	*Monsonia burkeana*	LC	Asteraceae	*Ursinia tenuiloba*	LC
Iridaceae	*Dierama mossii*	LC	Geraniaceae	*Monsonia grandifolia*	LC	Lentibulariaceae	*Utricularia livida*	LC
Iridaceae	*Dietes grandiflora*	LC	Geraniaceae	*Monsonia transvaalensis*	LC	Lentibulariaceae	*Utricularia stellaris*	LC
Poaceae	*Digitaria argyrograpta*	LC	Araceae	*Monstera deliciosa*		Lentibulariaceae	*Utricularia welwitschii*	LC

Poaceae	*Digitaria brazzae*	LC	Iridaceae	*Moraea pallida*	LC	Fabaceae	**Vachellia erioloba*	LC
Poaceae	*Digitaria ciliaris*	NE	Iridaceae	*Moraea stricta*	LC	Fabaceae	*Vachellia hebeclada* subsp. *hebeclada*	LC
Poaceae	*Digitaria diagonalis* var. *diagonalis*	LC	Myricaceae	*Morella pilulifera*	LC	**Fabaceae**	***Vachellia karroo*** [eh]	**LC**
Poaceae	***Digitaria eriantha*** [bdefgh]	**LC**	Myricaceae	*Morella serrata*	LC	Fabaceae	*Vachellia luederitzii* var. *retinens*	LC
Poaceae	*Digitaria eylesii*	LC	Moraceae	*Morus alba* (NEM:BA)		Fabaceae	*Vachellia nilotica*	
Poaceae	*Digitaria longiflora*	LC	Poaceae	*Mosdenia leptostachys*	LC	Fabaceae	*Vachellia nilotica* subsp. *kraussiana*	LC
Poaceae	*Digitaria monodactyla*	LC	Fabaceae	*Mundulea sericea*		Fabaceae	*Vachellia permixta*	LC
Poaceae	*Digitaria ternata*	LC	Fabaceae	*Mundulea sericea* subsp. *sericea*	LC	Fabaceae	*Vachellia robusta*	
Poaceae	*Digitaria tricholaenoides*	LC	Haloragaceae	*Myriophyllum aquaticum* (NEM:BA)	NE	Fabaceae	*Vachellia robusta* subsp. *clavigera*	LC
Poaceae	*Digitaria velutina*	LC	Myrothamnaceae	*~Myrothamnus flabellifolius*	DDT	**Fabaceae**	***Vachellia robusta* subsp. *robusta*** [abfgh]	**LC**
Poaceae	*Diheteropogon amplectens*		Primulaceae	*Myrsine africana*	LC	**Fabaceae**	***Vachellia tenuispina*** [g]	**LC**
Poaceae	*Diheteropogon amplectens* var. *amplectens*	LC	Primulaceae	*Myrsine pillansii*	LC	Fabaceae	*Vachellia tortilis*	
Asteraceae	*Dimorphotheca spectabilis*	LC	Cactaceae	*Myrtillocactus geometrizans* (NEM:BA)		**Fabaceae**	***Vachellia tortilis* subsp. *heteracantha*** [abcdefgh]	**LC**
Poaceae	*Dinebra retroflexa* var. *condensata*	LC	Celastraceae	*Mystroxylon aethiopicum* subsp. *aethiopicum*	LC	Fabaceae	*Vachellia xanthophloea*	LC
Dioscoreaceae	*Dioscorea dregeana*	LC	Celastraceae	*Mystroxylon aethiopicum* subsp. *burkeanum*	LC	Vahliaceae	*Vahlia capensis* subsp. *capensis*	LC
Dioscoreaceae	*Dioscorea quartiniana*	LC	Hydrocharitaceae	*Najas horrida*		Vahliaceae	*Vahlia capensis* subsp. *ellipticifolia*	LC
Dioscoreaceae	*Dioscorea retusa*	LC	Apiaceae	*~Nanobubon hypogaeum*	EN	Vahliaceae	*Vahlia capensis* subsp. *vulgaris* var. *linearis*	NE
Dioscoreaceae	*Dioscorea sylvatica* var. *sylvatica*	NE	Brassicaceae	*Nasturtium officinale* (NEM:BA)	NE	Valerianaceae	*Valeriana capensis* var. *capensis*	LC
Ebenaceae	*Diospyros austroafricana* var. *microphylla*		Neckeraceae	*Neckera valentiniana*		Rubiaceae	*Vangueria infausta*	
Ebenaceae	*Diospyros lycioides*		Scrophulariaceae	*Nemesia fruticans*	LC	Rubiaceae	*Vangueria infausta* subsp. *infausta*	LC
Ebenaceae	*Diospyros lycioides* subsp. *guerkei*	LC	Scrophulariaceae	*Nemesia rupicola*	LC	Rubiaceae	*Vangueria parvifolia*	LC
Ebenaceae	***Diospyros lycioides* subsp. *lycioides*** [bgh]	**LC**	Fabaceae	*Neonotonia wightii*	LC	Rutaceae	*Vepris lanceolata*	LC
Ebenaceae	*Diospyros whyteana*	LC	Fabaceae	*Neorautanenia ficifolia*	LC	Verbenaceae	*Verbena aristigera*	NE
Hyacinthaceae	***Dipcadi gracillimum*** [g]	**LC**	Amaryllidaceae	*Nerine angustifolia*	LC	Verbenaceae	*Verbena bonariensis* (NEM:BA)	NE
Hyacinthaceae	*Dipcadi marlothii*	LC	Amaryllidaceae	*Nerine frithii*	LC	Verbenaceae	*Verbena brasiliensis* (NEM:BA)	NE
Hyacinthaceae	*Dipcadi papillatum*	LC	Amaryllidaceae	*Nerine gaberonensis*	LC	Verbenaceae	*Verbena litoralis*	NE
Hyacinthaceae	*Dipcadi rigidifolium*	LC	Amaryllidaceae	*Nerine krigei*	LC	**Verbenaceae**	***Verbena officinalis*** [bh]	**NE**
Hyacinthaceae	*Dipcadi viride*	LC	Amaryllidaceae	*Nerine laticoma*	LC	Asteraceae	*Verbesina encelioides* subsp. *encelioides*	
Apocynaceae	*Diplorhynchus condylocarpon*	LC	Apocynaceae	*Nerium oleander* (NEM:BA)	NE	Asteraceae	*Vernonia fastigiata*	
Brassicaceae	*Diplotaxis muralis*	NE	Lythraceae	*Nesaea dinteri* subsp. *elata*	LC	Asteraceae	*Vernonia galpinii*	
Orchidaceae	*Disa aconitoides* subsp. *aconitoides*	LC	Solanaceae	*Nicandra physalodes* (NEM:BA)	NE	Asteraceae	*Vernonia poskeana*	

Orchidaceae	*Disa patula* var. *transvaalensis*	LC	Asteraceae	*Nicolasia stenoptera* subsp. *stenoptera*	LC	Asteraceae	*Vernonia poskeana* var. *botswanica*	
Orchidaceae	*Disa polygonoides*	LC	Solanaceae	*Nicotiana glauca* (NEM:BA)	NE	Asteraceae	*Vernonia staehelinoides*	LC
Orchidaceae	*Disperis anthoceros* var. *anthoceros*	LC	Asteraceae	*Nidorella anomala*	LC	Asteraceae	*Vernonia sutherlandii*	
Orchidaceae	*Disperis micrantha*	LC	Asteraceae	*Nidorella auriculata*	LC	Plantaginaceae	*Veronica anagallis-aquatica*	LC
Ditrichaceae	*Ditrichum brachypodum*		Asteraceae	*Nidorella hottentotica*	LC	Fabaceae	*Vigna frutescens* subsp. *frutescens* var. *frutescens*	NE
Ditrichaceae	*Ditrichum difficile*		Asteraceae	*Nidorella microcephala*	LC	Fabaceae	*Vigna oblongifolia* var. *oblongifolia*	LC
Sapindaceae	*Dodonaea angustifolia*		**Asteraceae**	***Nidorella resedifolia* subsp. *resedifolia*** [bcefgh]	**LC**	Fabaceae	*Vigna schlechteri*	LC
Sapindaceae	*Dodonaea viscosa*		Solanaceae	*Nierembergia linariifolia* var. *glabriuscula*	NE	Fabaceae	*Vigna unguiculata*	
Sapindaceae	*Dodonaea viscosa* var. *angustifolia*	LC	Asteraceae	*Nolletia ciliaris*	LC	Fabaceae	*Vigna unguiculata* subsp. *stenophylla*	LC
Asteraceae	*Doellia cafra*	LC	Asteraceae	*Nolletia jeanettae*	LC	Fabaceae	*Vigna unguiculata* subsp. *unguiculata* var. *unguiculata*	NE
Fabaceae	*Dolichos angustifolius*	LC	Asteraceae	*Nolletia rarifolia*	LC	Fabaceae	*Vigna vexillata* var. *davyi*	LC
Fabaceae	*Dolichos falciformis*	LC	Stilbaceae	*Nuxia congesta*	LC	Fabaceae	*Vigna vexillata* var. *vexillata*	LC
Fabaceae	*Dolichos linearis*	LC	Stilbaceae	**Nuxia glomerulata*	LC	Apocynaceae	*Vinca major* (NEM:BA)	NE
Malvaceae	*Dombeya pulchra*	LC	Nymphaeaceae	*Nymphaea lotus*	LC	Santalaceae	*Viscum combreticola*	LC
Malvaceae	*Dombeya rotundifolia*		Nymphaeaceae	*Nymphaea nouchali* var. *caerulea*	LC	Santalaceae	*Viscum rotundifolium*	LC
Malvaceae	*Dombeya rotundifolia* var. *rotundifolia*	LC	Nymphaeaceae	*Nymphaea nouchali* var. *zanzibariensis*	LC	Santalaceae	*Viscum spragueanum*	
Pteridaceae	*Doryopteris concolor*	LC	Menyanthaceae	*Nymphoides indica* subsp. *occidentalis*		Santalaceae	*Viscum verrucosum*	LC
Salicaceae	*Dovyalis caffra*	LC	Urticaceae	*Obetia tenax*	LC	Lamiaceae	*Vitex pooara*	LC
Salicaceae	*Dovyalis zeyheri*	LC	Ochnaceae	*Ochna holstii*	LC	Lamiaceae	*Vitex rehmannii*	LC
Asparagaceae	*Dracaena fragrans*		Ochnaceae	*Ochna inermis*	LC	Lamiaceae	*Vitex zeyheri*	LC
Cyperaceae	*Dracoscirpoides surculosa*	LC	Ochnaceae	*Ochna natalitia*	LC	Campanulaceae	*Wahlenbergia androsacea*	LC
Asparagaceae	*Drimia altissima*	LC	Ochnaceae	*Ochna pretoriensis*	LC	Campanulaceae	*Wahlenbergia banksiana*	LC
Asparagaceae	*Drimia calcarata*	LC	Ochnaceae	*Ochna pulchra*	LC	Campanulaceae	*Wahlenbergia caledonica*	
Asparagaceae	*Drimia depressa*	LC	Lamiaceae	*Ocimum americanum*		Campanulaceae	*Wahlenbergia denticulata* var. *denticulata*	LC
Asparagaceae	*~Drimia elata*	DDT	**Lamiaceae**	***Ocimum americanum* var. *americanum*** [g]	**LC**	Campanulaceae	*Wahlenbergia denticulata* var. *transvaalensis*	LC
Asparagaceae	*Drimia intricata*	LC	**Lamiaceae**	***Ocimum angustifolium*** [bfh]	**LC**	Campanulaceae	*Wahlenbergia lycopodioides*	LC
Asparagaceae	*Drimia multisetosa*	LC	Lamiaceae	*Ocimum filamentosum*	LC	Campanulaceae	*Wahlenbergia magaliesbergensis*	LC
Asparagaceae	*Drimia physodes*	LC	Lamiaceae	*Ocimum gratissimum* subsp. *gratissimum*	LC	Campanulaceae	*Wahlenbergia undulata*	LC
Asparagaceae	*~*Drimia sanguinea*	NT	Lamiaceae	*Ocimum gratissimum* subsp. *gratissimum* var. *gratissimum*	NE	Campanulaceae	*Wahlenbergia virgata*	LC
Asparagaceae	*Drimia uniflora*	LC	Lamiaceae	*Ocimum labiatum*	LC	Tecophilaeaceae	*Walleria nutans*	LC
Asparagaceae	*Drimiopsis burkei* subsp. *burkei*		**Lamiaceae**	***Ocimum obovatum*** [eg]		**Malvaceae**	***Waltheria indica*** [fg]	**LC**
Droseraceae	*Drosera burkeana*	LC	Lamiaceae	*Ocimum obovatum* subsp. *obovatum* var. *obovatum*	NE	Asteraceae	*Wedelia glauca*	NE
Droseraceae	*Drosera collinsiae*	LC	Calymperaceae	*Octoblepharum albidum*		Pottiaceae	*Weissia latiuscula*	
Droseraceae	*Drosera curvipes*		Onagraceae	*Oenothera affinis*	NE	Fabaceae	*Wiborgia fusca* subsp. *fusca*	LC

Droseraceae	*Drosera madagascariensis*	LC	Onagraceae	*Oenothera indecora*	NE	Boraginaceae	*Wigandia urens* var. *caracasana* (NEM:BA)	
Dryopteridaceae	*Dryopteris athamantica*	LC	Onagraceae	*Oenothera jamesii*	NE	Solanaceae	*Withania somnifera*	LC
Dryopteridaceae	*Dryopteris inaequalis*	LC	Onagraceae	*Oenothera laciniata*	NE	Asteraceae	*Xanthium spinosum* (NEM:BA)	NE
Dryopteridaceae	*Dryopteris pentheri*	LC	Onagraceae	*Oenothera lindheimeri*		Asteraceae	*Xanthium strumarium* (NEM:BA)	NE
Rosaceae	*Duchesnea indica* (NEM:BA)	NE	**Onagraceae**	***Oenothera rosea*** [e]	**NE**	Convolvulaceae	*Xenostegia tridentata*	
Fabaceae	*Dumasia villosa* var. *villosa*	LC	Onagraceae	*Oenothera stricta* subsp. *stricta*	NE	Convolvulaceae	*Xenostegia tridentata* subsp. *angustifolia*	LC
Dumortieraceae	*Dumortiera hirsuta*		Onagraceae	*Oenothera tetraptera*	NE	Fabaceae	*Xerocladia viridiramis*	LC
Verbenaceae	*Duranta erecta* (NEM:BA)	NE	Rubiaceae	*Oldenlandia herbacea*		Velloziaceae	*Xerophyta humilis*	LC
Apocynaceae	*Duvalia polita*	LC	Rubiaceae	*Oldenlandia herbacea* var. *herbacea*	LC	Velloziaceae	*Xerophyta retinervis*	LC
Acanthaceae	***Dyschoriste setigera*** [g]	**LC**	Rubiaceae	*Oldenlandia rupicola* var. *rupicola*	LC	Velloziaceae	*Xerophyta viscosa*	LC
Acanthaceae	*Dyschoriste transvaalensis*	LC	Rubiaceae	*Oldenlandia tenella*	LC	Olacaceae	*Ximenia americana* var. *microphylla*	LC
Amaranthaceae	*Dysphania carinata*		Oleaceae	*Olea capensis* subsp. *enervis*	LC	Olacaceae	*Ximenia caffra*	
Amaranthaceae	*Dysphania pumilio*		Oleaceae	*Olea europaea*		Olacaceae	*Ximenia caffra* var. *caffra*	LC
Amaranthaceae	*Dysphania schraderiana*		**Oleaceae**	***Olea europaea* subsp. *africana*** [gh]	**LC**	Xyridaceae	*Xyris capensis*	LC
Poaceae	*Echinochloa colona*	LC	Oleaceae	*Olea europaea* subsp. *cuspidata*		Xyridaceae	*Xyris congensis*	LC
Poaceae	*Echinochloa crus-galli*	LC	Oleandraceae	*Oleandra distenta*	LC	Xyridaceae	*Xyris gerrardii*	LC
Poaceae	*Echinochloa haploclada*	LC	Resedaceae	*Oligomeris dregeana*	LC	Apocynaceae	*Xysmalobium acerateoides*	LC
Poaceae	*Echinochloa holubii*	LC	Penaeaceae	*Olinia emarginata*	LC	Apocynaceae	*Xysmalobium brownianum*	LC
Poaceae	*Echinochloa jubata*	LC	Salicaceae	*Oncoba spinosa*		Apocynaceae	*Xysmalobium undulatum* var. *ensifolium*	LC
Poaceae	*Echinochloa stagnina*	LC	Ophioglossaceae	*Ophioglossum polyphyllum* var. *polyphyllum*		Apocynaceae	*Xysmalobium undulatum* var. *undulatum*	LC
Poaceae	*Echinochloa ugandensis*	LC	Ophioglossaceae	*Ophioglossum reticulatum*	LC	Aizoaceae	*Zaleya pentandra*	LC
Boraginaceae	*Ehretia alba*	LC	Fabaceae	*Ophrestia oblongifolia* var. *oblongifolia*	LC	Scrophulariaceae	*Zaluzianskya elongata*	LC
Boraginaceae	*Ehretia rigida*		Poaceae	*Oplismenus hirtellus*	LC	Scrophulariaceae	*Zaluzianskya katharinae*	LC
Boraginaceae	*Ehretia rigida* subsp. *nervifolia*	LC	Cactaceae	*Opuntia engelmannii* (NEM:BA)		Potamogetonaceae	*Zannichellia palustris*	LC
Boraginaceae	*Ehretia rigida* subsp. *rigida*	LC	**Cactaceae**	***Opuntia ficus-indica*** (NEM:BA)[cfg]	**NE**	Rutaceae	*Zanthoxylum capense*	LC
Poaceae	*Ehrharta erecta* var. *erecta*	LC	Cactaceae	*Opuntia robusta* (NEM:BA)	NE	Cucurbitaceae	*Zehneria marlothii*	
Poaceae	*Ehrharta erecta* var. *natalensis*	LC	Cactaceae	*Opuntia salmiana* (NEM:BA)	NE	Cucurbitaceae	*Zehneria scabra* subsp. *scabra*	
Pontederiaceae	*Eichhornia crassipes* (NEM:BA)	NE	Apocynaceae	*Orbea carnosa* subsp. *carnosa*	LC	Amaryllidaceae	*Zephyranthes carinata*	
Celastraceae	*~*Elaeodendron transvaalense*	NT	Apocynaceae	*Orbea lutea*		Amaryllidaceae	*Zephyranthes robusta*	
Elatinaceae	*Elatine ambigua*	LC	Apocynaceae	*Orbea lutea* subsp. *lutea*	LC	**Asteraceae**	***Zinnia peruviana*** [bfgh]	**NE**
Cyperaceae	*Eleocharis dregeana*	LC	Apocynaceae	*Orbeopsis lutea* subsp. *lutea*		Rhamnaceae	*Ziziphus mucronata*	
Cyperaceae	*Eleocharis limosa*	LC	Hyacinthaceae	*Ornithogalum juncifolium* var. *juncifolium*	NE	**Rhamnaceae**	***Ziziphus mucronata* subsp. *mucronata*** [abcdefgh]	**LC**
Fabaceae	*Elephantorrhiza burkei*	LC	Colchicaceae	*Ornithoglossum viride*	LC	Rhamnaceae	*Ziziphus zeyheriana*	LC
Fabaceae	*Elephantorrhiza elephantina*	LC	Colchicaceae	*Ornithoglossum vulgare*	LC	Fabaceae	*Zornia capensis* subsp. *capensis*	LC

Fabaceae	*Elephantorrhiza obliqua* var. *glabra*	LC	Poaceae	*Oropetium capense*	LC	Fabaceae	*Zornia glochidiata*	LC
Poaceae	*Eleusine coracana* subsp. *africana*	LC	Apocynaceae	*Orthanthera jasminiflora*	LC	Fabaceae	*Zornia linearis*	LC
Poaceae	*Elionurus muticus*	LC	Orchidaceae	*Orthochilus leontoglossus*	LC	Fabaceae	*Zornia milneana*	LC
Polygonaceae	*Emex australis*	LC	Orchidaceae	*Orthochilus milnei*	LC			
Rubiaceae	*Empogona lanceolata*	LC	Orchidaceae	*Orthochilus welwitschii*	LC			

Appendix 2 Specialist Curriculum Vitae

CURRICULUM VITAE:

Gerhard Botha

Name:	:	Gerhardus Alfred Botha
Date of Birth	:	11 April 1986
Identity Number	:	860411 5136 088
Postal Address	:	PO Box 12500 Brandhof 9324
Residential Address	:	3 Jock Meiring Street Park West Bloemfontein 9301
Cell Phone Number	:	084 207 3454
Email Address	:	gabotha11@gmail.com
Profession/Specialisation	:	Ecological and Biodiversity Consultant
Nationality:	:	South African
Years Experience:	:	8
Bilingualism	:	Very good – English and Afrikaans

Professional Profile:

Gerhard is a Managing Director of Nkurenkuru Ecology and Biodiversity (Pty) Ltd. He has a BSc Honours degree in Botany from the University of the Free State Province and is currently completing a MSc Degree in Botany. He began working as an environmental specialist in 2010 and has since gained extensive experience in conducting ecological and biodiversity assessments in various development field, especially in the fields of conventional as well as renewable energy generation, mining and infrastructure development. Gerhard is a registered Professional Natural Scientist (Pr. Sci. Nat.)

Key Responsibilities:

Specific responsibilities as an Ecological and Biodiversity Specialist include, inter alia, professional execution of specialist consulting services (including flora, wetland and fauna studies, where required), impact assessment reporting, walk through surveys/ground-truthing to inform final design, compilation of management plans, compliance monitoring and audit reporting, in-house ecological awareness training to on-site personnel, and the development of project proposals for procuring new work/projects.

Skills Base and Core Competencies

- Research Project Management
- Botanical researcher in projects involving the description of terrestrial and coastal ecosystems.

- Broad expertise in the ecology and conservation of grasslands, savannahs, karroid wetland, and aquatic ecosystems.
- Ecological and Biodiversity assessments for developmental purposes (BAR, EIA), with extensive knowledge and experience in the renewable energy field (Refer to Work Experiences and References)
- Over 3 years of avifaunal monitoring and assessment experience.
- Mapping and Infield delineation of wetlands, riparian zones and aquatic habitats (according to methods stipulated by DWA, 2008) within various South African provinces of KwaZulu-Natal, Mpumalanga, Free State, Gauteng and Northern Cape Province for inventory and management purposes.
- Wetland and aquatic buffer allocations according to industry best practice guidelines.
- Working knowledge of environmental planning policies, regulatory frameworks, and legislation
- Identification and assessment of potential environmental impacts and benefits.
- Assessment of various wetland ecosystems to highlight potential impacts, within current and proposed landscape settings, and recommend appropriate mitigation and offsets based on assessing wetland ecosystem service delivery (functions) and ecological health/integrity.
- Development of practical and achievable mitigation measures and management plans and evaluation of risk to execution
- Qualitative and Quantitative Research
- Experienced in field research and monitoring
- Working knowledge of GIS applications and analysis of satellite imagery data
- Completed projects in several Provinces of South Africa and include a number of projects located in sensitive and ecological unique regions.

Education and Professional Status

Degrees:

- *2015:* Currently completing a M.Sc. degree in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- *2009:* B.Sc. Hons in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- *2008:* B.Sc. in Zoology and Botany, University of the Free State, University of the Free State, Bloemfontein, RSA.

Courses:

- *2013*: Wetland Management (ecology, hydrology, biodiversity, and delineation) – University of the Free State accredited course.
- *2014*: Introduction to GIS and GPS (Code: GISA 1500S) – University of the Free State accredited course.

Professional Society Affiliations:

- The South African Council of Natural Scientific Professions: Pr. Sci. Nat. Reg. No. 400502/14 (Botany and Ecology).

Employment History

- December 2017 – Current: Nkurenkuru Ecology and Biodiversity (Pty) Ltd
- 2016 – November 2017: ECO-CARE Consultancy
- *2015 - 2016*: Ecologist, Savannah Environmental (Pty) Ltd
- *2013 – 2014*: Working as ecologist on a freelance basis, involved in part-time and contractual positions for the

following companies

- Enviroworks (Pty) Ltd
- GreenMined (Pty) Ltd
- Eco-Care Consultancy (Pty) Ltd
- Enviro-Niche Consulting (Pty) Ltd
- Savannah Environmental (Pty) Ltd
- Esicongweni Environmental Services (EES) cc

- *2010 - 2012*: Enviroworks (Pty) Ltd

Publications

Publications:

- Botha, G.A. & Du Preez, P.J. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. S. *Afr. J. Bot*., **98**: 172-173.

Congress papers/posters/presentations:

- Botha, G.A. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. 41st Annual Congress of South African Association of Botanists (SAAB). Tshipise, 11-15 Jan. 2015.
- Botha, G.A. 2014. A description of the vegetation of the Nxamasere floodplain, Okavango Delta, Botswana. 10st Annual University of Johannesburg (UJ) Postgraduate Botany Symposium. Johannesburg, 28 Oct. 2014.

Other

- Guest speaker at IAIAsa Free State Branch Event (29 March 2017)
- Guest speaker at the University of the Free State Province: Department of Plant Sciences (3 March 2017):

References:

- Christine Fouché
  Manager: GreenMined (Pty) LTD
  Cell: 084 663 2399
- Professor J du Preez
  Senior lecturer: Department of Plant Sciences
  University of the Free State
  Cell: 082 376 4404

Appendix 3 Specialist Curriculum Vitae

WORK EXPERIENCES

&

References

Gerhard Botha

ECOLOGICAL RELATED STUDIES AND SURVEYS

Date Completed	Project Description	Type of Assessment/Study	Client
2019	Sirius Three Solar PV Facility near Upington, Northern Cape	Ecological Assessment (Basic Assessment)	Aurora Power Solutions
2019	Sirius Four Solar PV Facility near Upington, Northern Cape	Ecological Assessment (Basic Assessment)	Aurora Power Solutions
2019	Lichtenburg 1 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Lichtenburg 2 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Lichtenburg 3 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Ecological Assessment (Basic Assessment)	Moeding Solar
2019	Expansion of the Raumix Aliwal North Quarry, Eastern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	GreenMined
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Faunal and Flora Rescue and Protection Plan	Zevobuzz
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Zevobuzz
2018	Proposed Kruisvallei Hydroelectric Power Generation Scheme in the Ash River, Free State Province	Ecological Assessment (Basic Assessment)	Zevobuzz
2018	Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province	Ecological Assessment (Basic Assessment)	Eskom

2018	Clayville Thermal Plant within the Clayville Industrial Area, Gauteng Province	Ecological Comments Letter	Savannah Environmental
2018	Iziduli Emoyeni Wind Farm near Bedford, Eastern Cape Province	Ecological Assessment (Re-assessment)	Emoyeni Wid Farm Renewable Energy
2018	Msenge Wind Farm near Bedford, Eastern Cape Province	Ecological Assessment (Re-assessment)	Amakhala Emoyeni Renewable Energy
2017	H2 Energy Power Station near Kwamhlanga, Mpumalanga Province	Ecological Assessment (Scoping and EIA phase assessments)	Eskom
2017	Karusa Wind Farm (Phase 1 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province)	Ecological Assessment (Re-assessment)	ACED Renewables Hidden Valley
2017	Soetwater Wind Farm (Phase 2 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province)	Ecological Assessment (Re-assessment)	ACED Renewables Hidden Valley
2017	S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province	Ecological Assessment	Savannah Environmental
2016 - 2017	Noupoort CSP Facility near Noupoort, Northern Cape Province	Ecological Assessment (Scoping and EIA phase assessments)	Cresco
2016	Buffels Solar 2 PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Kabi Solar
2016	Buffels Solar 1 PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Kabi Solar
2016	132kV Power Line and On-Site Substation for the Authorised Golden Valley II Wind Energy Facility near Bedford, Eastern Cape Province	Ecological Assessment (Basic Assessment)	Terra Wind Energy
2016	Kalahari CSP Facility: 132kV Ferrum–Kalahari–UNTU & 132kV Kathu IPP–Kathu 1 Overhead Power Lines, Kathu, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Kathu Solar Park
2016	Kalahari CSP Facility: Access Roads, Kathu, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Kathu Solar Park
2016	Karoshoek Solar Valley Development – Additional CSP Facility including tower infrastructure associated with authorised CSP Site 2 near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Karoshoek Solar Valley Development –Ilanga CSP 7 and 8 Facilities near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Karoshoek Solar Valley Development –Ilanga CSP 9 Facility near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Lehae Training Academy and Fire Station, Gauteng Province	Ecological Assessment	Savannah Environmental
2016	Metal Industrial Cluster and Associated Infrastructure near Kuruman, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Northern Cape Department of Economic Development and Tourism
2016	Semonkong Wind Energy Facility near Semonkong, Maseru District, Lesotho	Ecological Pre-Feasibility Study	Savannah Environmental
2015 - 2016	Orkney Solar PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Genesis Eco-Energy
2015 - 2016	Woodhouse 1 and Woodhouse 2 PV Facilities near Vryburg, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Genesis Eco-Energy

2015	CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province	Ecological Assessment (Basic Assessment)	CAMCO Clean Energy
2015	CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province	Ecological Assessment (Basic Assessment)	CAMCO Clean Energy
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Aurora Power Solutions
2015	Sirius 2 Solar PV Project near Upington, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Invasive Plant Management Plan	Aurora Power Solutions
2015	Sirius 2 Solar PV Project near Upington, Northern Cape Province	Invasive Plant Management Plan	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Plant Rehabilitation Management Plan	Aurora Power Solutions
2015	Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province	Plant Rehabilitation Management Plan	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Plant Rescue and Protection Plan	Aurora Power Solutions
2015	Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province	Plant Rescue and Protection Plan	Aurora Power Solutions
2015	Expansion of the existing Komsberg Main Transmission Substation near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ESKOM
2015	Karusa Wind Farm near Sutherland, Northern Cape Province)	Invasive Plant Management Plan	ACED Renewables Hidden Valley
2015	Proposed Karusa Facility Substation and Ancillaries near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ACED Renewables Hidden Valley
2015	Eskom Karusa Switching Station and 132kV Double Circuit Overhead Power Line near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ESKOM
2015	Karusa Wind Farm near Sutherland, Northern Cape Province)	Plant Search and Rescue and Rehabilitation Management Plan	ACED Renewables Hidden Valley
2015	Karusa Wind Energy Facility near Sutherland, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	ACED Renewables Hidden Valley
2015	Soetwater Facility Substation, 132kV Overhead Power Line and Ancillaries, near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ACED Renewables Hidden Valley
2015	Soetwater Wind Farm near Sutherland, Northern Cape Province)	Invasive Plant Management Plan	ACED Renewables Hidden Valley
2015	Soetwater Wind Energy Facility near Sutherland, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	ACED Renewables Hidden Valley
2015	Soetwater Wind Farm near Sutherland, Northern Cape Province	Plant Search and Rescue and Rehabilitation Management Plan	ACED Renewables Hidden Valley
2015	Expansion of the existing Scottburgh quarry near Amandawe, KwaZulu-Natal	Botanical Assessment (for EIA)	GreenMined Environmental
2015	Expansion of the existing AFRIMAT quarry near Hluhluwe, KwaZulu-Natal	Botanical Assessment (for EIA)	GreenMined Environmental
2014	Tshepong 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Nyala 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Eland 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy

2014	Transalloys circulating fluidised bed power station near Emalahleni, Mpumalanga Province	Ecological Assessment (for EIA)	Trans-Alloys
2014	Umbani circulating fluidised bed power station near Kriel, Mpumalanga Province	Ecological Assessment (Scoping and EIA)	Eskom
2014	Gihon 75MW Solar Farm: Bela-Bela, Limpopo Province	Ecological Assessment (for EIA)	NETWORX Renewables
2014	Steelpoort Integration Project & Steelpoort to Wolwekraal 400kV Power Line	Fauna and Flora Pre-Construction Walk-Through Assessment	Eskom
2014	Audit of protected *Acacia erioloba* trees within the Assmang Wrenchville housing development footprint area	Botanical Audit	Eco-Care Consultancy
2014	Rehabilitation of the N1 National Road between Sydenham and Glen Lyon	Peer review of the ecological report	EKO Environmental
2014	Rehabilitation of the N6 National Road between Onze Rust and Bloemfontein	Peer review of the ecological report	EKO Environmental
2011	Illegally ploughed land on the Farm Wolwekop 2353, Bloemfontein	Vegetation Rehabilitation Plan	EnviroWorks
2011	Rocks Farm chicken broiler houses	Botanical Assessment (for EIA)	EnviroWorks
2011	Botshabelo 132 kV line	Ecological Assessment (for EIA)	CENTLEC
2011	De Aar Freight Transport Hub	Ecological Scoping and Feasibility Study	EnviroWorks
2011	The proposed establishment of the Tugela Ridge Eco Estate on the farm Kruisfontein, Bergville	Ecological Assessment (for EIA)	EnviroWorks
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Vegetation Rehabilitation Plan for illegally cleared areas	NEOTEL
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Invasive Plant Management Plan	NEOTEL
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Protected and Endangered Species Walk-Through Survey	NEOTEL
2011	Optic Fibre Infrastructure Network, Swartland Municipality	Botanical Assessment (for EIA) - Assisted Dr. Dave McDonald	Dark Fibre Africa
2011	Optic Fibre Infrastructure Network, City of Cape Town Municipality	Botanical Assessment (for EIA) - Assisted Dr. Dave McDonald	Dark Fibre Africa
2010	Construction of an icon at the southernmost tip of Africa, Agulhas National Park	Botanical Assessment (for EIA)	SANPARKS
2010	New boardwalk from Suiderstrand Gravel Road to Rasperpunt, Agulhas National Park	Botanical Assessment (for EIA)	SANPARKS
2010	Farm development for academic purposes (Maluti FET College) on the Farm Rosedale 107, Harrismith	Ecological Assessment (Screening and Feasibility Study)	Agri Development Solutions
2010	Basic Assessment: Barcelona 88/11kV substation and 88kV loop-in lines	Botanical Assessment (for EIA)	Eskom Distribution
2011	Illegally ploughed land on the Farm Wolwekop 2353, Bloemfontein	Vegetation Rehabilitation Plan	EnviroWorks

WETLAND DELINEATION AND HYDROLOGICAL ASSESSMENTS

Date Completed	Project Description	Type of Assessment/Study	Client
In progress	Steynsrus PV 1 & 2 Solar Energy Facilities near Steynsrus, Free State Province	Wetland Assessment	Cronimet Mining Power Solutions
2019	Lichtenburg 1 100MW Solar PV Facility, Lichtenburg, North-West Province	Surface Hydrological Assessment (Scoping and EIA Phase)	Atlantic Renewable Energy Partners
2019	Lichtenburg 2 100MW Solar PV Facility, Lichtenburg, North-West Province	Surface Hydrological Assessment (Scoping and EIA Phase)	Atlantic Renewable Energy Partners
2019	Lichtenburg 3 100MW Solar PV Facility, Lichtenburg, North-West Province	Surface Hydrological Assessment (Scoping and EIA Phase)	Atlantic Renewable Energy Partners
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Wetland Assessment (Basic Assessment)	Moeding Solar

2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Wetland Assessment (Basic Assessment	Zevobuzz
2017	Nyala 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Wetland Assessment	BBEnergy
2017	Eland 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Wetland Assessment	BBEnergy
2017	Olifantshoek 10MVA 132/11kV Substation and 31km Power Line	Surface Hydrological Assessment (Basic Assessment)	Eskom
2017	Expansion of the Elandspruit Quarry near Ladysmith, KwaZulu-Natal Province	Wetland Assessment	Raumix
2017	S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province	Aquatic Assessment & Flood Plain Delineation	Savannah Environmental
2017	Noupoort CSP Facility near Noupoort, Northern Cape Province	Surface Hydrological Assessment (EIA phase)	Cresco
2016	Wolmaransstad Municipality 75MW PV Solar Energy Facility in the North West Province	Wetland Assessment (Basic Assessment)	BlueWave Capital
2016	BlueWave 75MW PV Plant near Welkom Free State Province	Wetland Delineation	BlueWave Capital
2016	Harmony Solar Energy Facilities: Amendment of Pipeline and Overhead Power Line Route	Wetland Assessment (Basic Assessment)	BBEnergy

AVIFAUNAL ASSESSMENTS

Date Completed	Project Description	Type of Assessment/Study	Client
2019	Sirius Three Solar PV Facility near Upington, Northern Cape	Avifauna Assessment (Basic Assessment)	Aurora Power Solutions
2019	Sirius Four Solar PV Facility near Upington, Northern Cape	Avifauna Assessment (Basic Assessment)	Aurora Power Solutions
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Avifauna Assessment (Basic Assessment)	Moeding Solar
2018	Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province	Avifauna Assessment (Basic Assessment)	Eskom
2017	Olifantshoek 10MVA 132/11kV Substation and 31km Power Line	Avifauna Assessment (Basic Assessment)	Eskom
2016	TEWA Solar 1 Facility, east of Upington, Northern Cape Province	Wetland Assessment (Basic Assessment	Tewa Isitha Solar 1
2016	TEWA Solar 2 Facility, east of Upington, Northern Cape Province	Wetland Assessment	Tewa Isitha Solar 2

Appendix 4 Specialist Curriculum Vitae: JH Keet

Personal Details:

- Name: Dr. Jan-Hendrik Keet
- Address: Somerset West, Western Cape, 7130
- Cell: 071 451 4853
- Email: ecofloristix@gmail.com / keetjanhendrik@gmail.com
- Date of Birth: 07 November 1988
- Website: https://ecofloristix.co.za/

Expertise and Experience:

- Current: Botanical & Terrestrial Biodiversity Specialist Consultant; Founder and Principal Consultant at EcoFloristix Specialist Environmental Consulting
- Current: Freelance Academic/Technical Editor, Proof-reader, Dissertation Specialist, and Data Scientist
- Previous: Post-Doctoral Researcher — Mathematical Biosciences Hub (Department of Mathematics), Stellenbosch University
- Previous: Post-Doctoral Researcher — DST NRF Centre of Excellence for Invasion Biology (Department of Botany and Zoology), Stellenbosch University
- Specialization: Botany, Ecology, Biogeography, Invasive Plant Species, and Invasion Biology
- Years of experience: > 10 years
- Published in various, high-impact, national and international scientific journals

Skills and Competencies:

- Invasive Species Biology (PhD in Botany [Stellenbosch University] with a focus on Invasive Alien Plant Species and their environmental impacts)
- Plant Biogeography and Ecology
- Plant Identification and Taxonomy
- Vegetation Surveys and Mapping
- Biological Sciences
- Soil Microbiome Composition, Function, and Chemistry
- Geographic Information Systems (*GISB1500S, NQF level 5*)
- Research Data Management and Data Visualization
- Statistical Computing Methods (*R Statistical Computing Expert*)
- Experimental Design and Analysis

Global Scientific Influence:

- Research Interest Score >380
- Citations >460
- Scopus h-index 9
- Google Scholar h-index 10
- Google Scholar i10-index 12

Tertiary Education:

- 2015 – 2019: Stellenbosch University, Stellenbosch, South Africa. Doctor of Philosophy (Botany)

- 2013 – 2014: University of the Free State, Bloemfontein, South Africa. Magister Scientiae (Botany)
- 2012: University of the Free State, Bloemfontein, South Africa. Bachelor of Science Honours (Botany) - *cum laude*
- 2009 – 2011: University of the Free State, Bloemfontein, South Africa. Bachelor of Science (Chemistry with Physics and Biology) - *cum laude*

Employment History:

- 2015 – present: Botanical Specialist and Principal Consultant at EcoFloristix Specialist Environmental Consulting (https://www.ecofloristix.co.za/).
- 2021 – present: Freelance Academic/Technical Editor, Proof-reader, and Dissertation Specialist
- 2019 – 2021: Post-Doctoral Researcher – Centre for Invasion Biology (Department of Botany and Zoology), Stellenbosch University
- 2011: Part-time demonstrator. Department of Plant Sciences, University of the Free State, Bloemfontein, South Africa
- 2010: Part-time lab assistant. Department of Chemistry, University of the Free State, Bloemfontein, South Africa
- 2007 – 2009: Shop Manager. Christian Tees, Brandwag Centre, Bloemfontein

Memberships, Certifications, and Short Courses:

- SACNASP: Professional Natural Scientist (No.: 121678)
- SAGIC Invasive Species Consultant (Cape Town, South Africa), March 2016
- GIS Intermediate (NQF level 5): Hydrological modelling and terrain analysis using digital elevation models (University of the Free State, South Africa), 2014
- Project Management (Stellenbosch University), 2023
- Good Laboratory Practice seminar presented by Merck Millipore South Africa, 2012
- Laboratory Safety seminar presented by Merck Millipore South Africa, 2012
- Golden Key International Honour Society (Membership No.: 7564025)

Selected Peer-reviewed Scientific Publications and Book Chapters:

- **Keet J-H**, Ellis AG, Hui C, Le Roux (2023) Responses of soil bacterial communities to invasive Australian *Acacia* species over large spatial scales. In: Richardson DM, Le Roux JJ, & Marchante E (Eds.) *Wattles: Australian Acacia Species Around the World*, CAB International, https://www.cabidigitallibrary.org/doi/10.1079/9781800622197.0000.
- **Keet J-H**, Datta A, Foxcroft LC, Kumschick S, Wilson JRU, Nichols GR, Richardson DM (2022) Assessing the level of compliance with alien plant regulations in a large African protected area. *Biological Invasions* 24: 3831 – 3844, https://doi.org/10.1007/s10530-022-02883-7.
- Warrington S, Ellis AG, **Keet J-H**, Le Roux JJ (2022) How does familiarity in rhizobial interactions impact the performance of invasive and native legumes? *Neobiota* 72: 129 – 156, https://neobiota.pensoft.net/article/79620/.
- **Keet J-H** & Richardson, DM (2022) A rapid survey of naturalized and invasive eucalypt species in southwestern Limpopo, South Africa. *South African Journal of Botany* 144: 339 – 346, https://doi.org/10.1016/j.sajb.2021.09.008.
- Novoa A, Foxcroft LC, **Keet J-H**, Pyšek P, Le Roux JJ (2021) The invasive cactus *Opuntia stricta* creates fertility islands in African savannas and benefits from

those created by native trees. Scientific Reports 11: 20748, https://www.nature.com/articles/s41598-021-99857-x.

- **Keet J-H**, Ellis AG, Hui C, Novoa A, Le Roux JJ (2021) Impacts of invasive Australian acacias on soil bacterial community composition, microbial enzymatic activities, and nutrient availability in fynbos soils. *Microbial Ecology* 82: 704 – 721, http://dx.doi.org/10.1007/s00248-021-01683-1.
- **Keet J-H**, Robertson MP, Richardson DM (2020) *Alnus glutinosa* (Betulaceae) in South Africa: invasive potential and management options. *South African Journal of Botany* 135: 280 – 293, https://doi.org/10.1016/j.sajb.2020.09.009.
- Wilson JRU, Datta A, Hirsch H, **Keet J-H**, Mbobo T, Nkuna KV, Nsikani MM, Pyšek P, Richardson DM, Zengeya TA, Kumschick S (2020) Is invasion science moving towards agreed standards? The influence of selected frameworks. *NeoBiota*, 62: 569 – 590, https://doi.org/10.3897/neobiota.62.53243.
- Novoa A, **Keet J-H**, Lechuga-Lago Y, Pyšek P, Le Roux JJ (2020) Urbanization and *Carpobrotus edulis* invasion alter the diversity and composition of soil bacterial communities in coastal areas. FEMS Microbiology Ecology 96(7): fiaa106, https://doi.org/10.1093/femsec/fiaa106.
- Le Roux JJ, Leishman MR, Cinantya AP, Gufu GD, Hirsch H, **Keet J-H**, Manea A, Saul W-C, Tabassum S, Warrington S, Yannelli FA, Ossola A (2020) Plant biodiversity in the face of global change. *Current Biology* 30: R371 – R392, https://doi.org/10.1016/j.cub.2020.02.066.
- Hirsch H, Allsopp MH, Canavan S, Cheek M, Geerts S, Geldenhuys CJ, Harding G, Hurley BP, Jones W, **Keet J-H**, Klein H, Ruwanza S, van Wilgen BW, Wingfield MJ, Richardson DM (2019) *Eucalyptus camaldulensis* in South Africa – past, present, future. *Transactions of the Royal Society of South Africa* 75(1): 1 – 22, https://doi.org/10.1080/0035919X.2019.1669732.
- Le Roux JJ, Hui C, Castillo ML, Iriondo, JM, **Keet J-H**, Khapugin, AA, Médail F, Rejmánek M, Theron G, Yannelli FA, Hirsch H (2019) Recent anthropogenic plant extinctions differ in biodiversity hotspots and coldspots. *Current Biology* 29(17): 2912 – 2918, https://doi.org/10.1016/j.cub.2019.07.063.
- **Keet J-H**, Ellis AG, Hui C, Le Roux JJ (2019) Strong spatial and temporal turnover of soil bacterial communities in South Africa's hyperdiverse fynbos biome. *Soil Biology and Biochemistry* 136: 107541, https://doi.org/10.1016/j.soilbio.2019.107541.
- Le Roux JJ, Ellis AG, Van Zyl L-M, Hosking ND, **Keet J-H**, Yannelli F (2018) Importance of soil legacy effects and successful mutualistic interactions during Australian acacia invasions in nutrient-poor environments. *Journal of Ecology* 106(5): 2071 – 2081, https://doi.org/10.1111/1365-2745.1296.
- **Keet J-H**, Ellis AG, Hui C, Le Roux JJ (2017) Legume–rhizobium symbiotic promiscuity and effectiveness do not affect plant invasiveness. *Annals of Botany* 119(8): 1319 – 1331, https://doi.org/10.1093/aob/mcx028.
- Le Roux JJ, **Keet J-H**, Mutiti B, Ellis AG (2017) Cultivation may not dramatically alter rhizobial community diversity or structure associated with rooibos tea (*Aspalathus linearis* Burm.f.) in South Africa. *South African Journal of Botany* 110: 87-96, https://doi.org/10.1016/j.sajb.2017.01.014.
- Le Roux JJ, Hui C, **Keet J-H**, Ellis AG (2017) Co-introduction vs ecological fitting as pathways to the establishment of effective mutualisms during biological invasions. *New Phytologist* 215(4): 1354 – 1360, https://doi.org/10.1111/nph.14593.
- Nsikani M, Novoa A, Van Wilgen B, **Keet J-H**, Gaertner M (2017) *Acacia saligna*'s soil legacy effects persist up to ten years after clearing: Implications for

ecological restoration. *Austral Ecology* 42(8): 880 – 889, https://doi.org/10.1111/aec.12515.
- **Keet J-H**, Cindi D, Du Preez PJ (2016) Assessing the invasiveness of *Berberis aristata* and *B. julianae* (Berberidaceae) in South Africa: management options and legal recommendations. *South African Journal of Botany* 105: 288 – 298, https://doi.org/10.1016/j.sajb.2016.04.012.

Selected Conferences:

- 46th South African Association of Botanists conference (Qwa-Qwa, South Africa), January 2020, ***Alnus glutinosa* (L.) Gaertn. [Black Alder]: *an emerging invader in South Africa***
- International Association for Food Protection (IAFP; Louisville, Kentucky, USA), July 2019.
- Ecological Society of America Conference, (New Orleans, Louisiana, USA), August 2018 **Invasive legumes dramatically impact soil bacterial community structures but not function**
- Legumes for Life Workshop (Stellenbosch, South Africa), May 2018 **Legume-rhizobium symbiotic promiscuity and effectiveness do not affect plant invasiveness**
- Fynbos Forum Conference (Swellendam, South Africa), July 2017 **Assessing the impacts of invasive legumes on soil conditions and microbial community composition in a biodiversity hotspot**
- 43rd South African Association of Botanists Conference (Cape Town, South Africa), January 2017, **Legume-rhizobium symbiotic promiscuity and effectiveness do not affect plant invasiveness** *Best PhD presentation*
- 43rd Annual Research Symposium on the Management of Biological Invasions Conference (Worcester, South Africa), May 2016, **Legume-rhizobium symbiotic promiscuity does not determine plant invasiveness**
- Evolutionary dynamics of tree invasions: drivers, dimensions, and implications for management (Stellenbosch, South Africa), November 2015
- Neobiota: 8th International Conference on Biological Invasions (Antalya, Turkey), November 2014, **Assessing the threat and potential for management of Berberis spp. (Berberidaceae) in South Africa**
- 42nd Annual Symposium on the Management of Invasive Alien Plants (Karridene Beach Hotel, Durban, South Africa)
- XXth Association for the Taxonomic Study of the Flora of Tropical Africa International Conference (Stellenbosch, South Africa), January 2014
- 41st Annual Symposium on the Management of Invasive Alien Plants (Cape St. Francis, South Africa), May 2013

Brief Summary of EIAs and other surveys:

- Botanical Study and Assessment for a Housing Development, 2023. Proposed development of the development of Erf 397, Suiderstrand, Western Cape. Report prepared for RMS Environmental.
- Botanical Study and Assessment for a Mining Permit Application, 2023. Proposed development of a dolerite mine near Beaufort West, Western Cape. Report prepared for Greenmined Environmental (Pty) Ltd.

- In collaboration with Nkurenkuru Ecology and Biodiversity, 2022. Full Botanical Assessment for the proposed development of wind energy facilities south of Bethal, Mpumalanga Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Application (Expansion of mining footprint), and Final Basic Assessment and Environmental Management Plan for the proposed sand mine expansion on Portion 4 of the Farm Zandberg Fontein 97, Western Cape Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Proposed development of wind energy facilities on the farms Brussels, Driepoort (664-1 and 664-2), Kameelfontein, Lisbon, Nazareth, and Zwartkrans, near Vryburg, Northwest Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Botanical Study and Assessment: Proposed development of wind energy facilities on the farm Kluitjieskraal, Loeriesfontein, Northern Cape Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Botanical Study and Assessment: Proposed development of an access road to the authorised Sutherland 1 and Rietrug wind energy facilities near Sutherland.
- Specialist Botanical Assessment Report: Assessment of Damage and Rehabilitation Costs for Unauthorised Driving of a 4x4 Vehicle in the Big Bay Open Space System, Cape Town. Prepared for Hannes, Pretorius, Bock & Bryant Attorneys.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2019. Mining Permit, Final Basic Assessment & Environmental Management Plan for the proposed mining of Sillimanite, Aggregate and Stone Gravel on the Farm Koenabib 43, Northern Cape Province. Botanical Study and Assessment Report. Unpublished report prepared by Nkurenkuru Ecology and Biodiversity for GreenMined Environmental. Version 1.0, 30 January 2020
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2019. Mining Permit, Final Basic Assessment & Environmental Management Plan for the proposed mining of Sillimanite on the Farm Wortel 42, Northern Cape Province. Botanical Study and Assessment Report. Unpublished report prepared by Nkurenkuru Ecology and Biodiversity for GreenMined Environmental. Version 1.0, 30 January 2020
- Specialist Invasive Alien Plant Species Report: Prepared for: Mpact Corrugated, Kuils River (Western Cape), July 2019
- Proposed Township development, Country view, Gauteng: Biodiversity Impact Assessment (Flora) – Specialist Report prepared for Zone Land Solutions (PTY) Ltd, July 2015
- Colenso Anthracite Coal Mining and Power Station Project: Biodiversity Impact Assessment (Flora) – Specialist Report prepared for Zone Land Solutions (PTY) Ltd, July 2015