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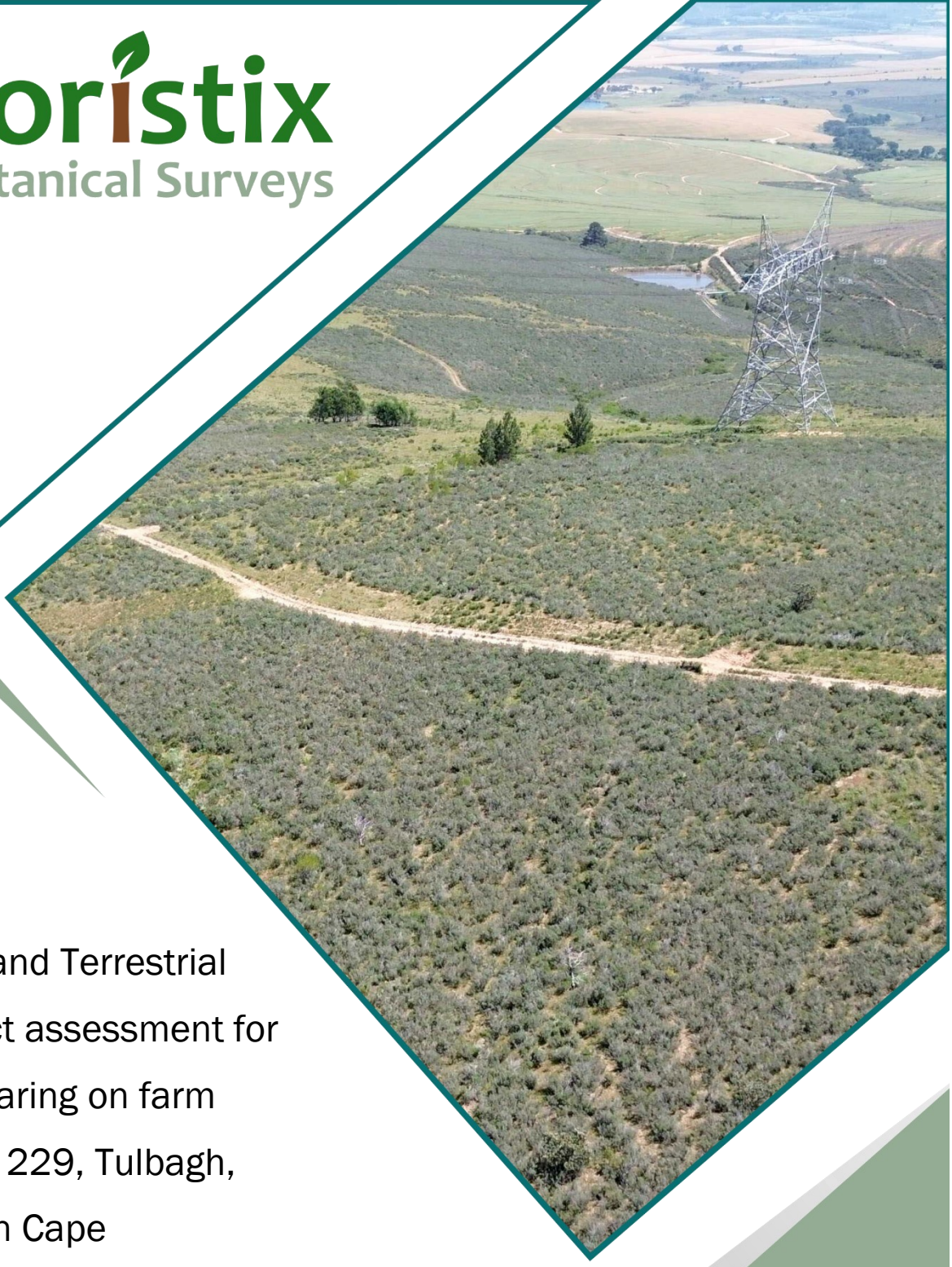

Plant Species and Terrestrial Biodiversity Impact assessment for vegetation clearing on farm Schalkenbosch 229, Tulbagh, Western Cape

REFERENCE
PR.25.038

DATE
30 November 2025

PREPARED FOR
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Executive Summary

This ecological assessment report details the findings of a botanical survey and ecological evaluation conducted on 10 October 2025 for the farm Schalkenbosch 229, Tulbagh, Western Cape province. The proposed activities specifically involve clearing indigenous vegetation that has established on previously ploughed land so the area can be returned to agricultural use. Three disjunct areas were assessed, named Driehoekkamp, Damkamp, and Agterstekamp.

The desktop data, which classified the area as having Very High Biodiversity Theme Sensitivity, was partially contradicted by on-site observations. Fieldwork confirmed that the area does not contain the mapped Breede Alluvium Fynbos and Breede Shale Fynbos, nor does the current Secondary Renosterveld (which has developed over the historic fields) fully conform to true Breede Shale Renosterveld due to past ploughing and the extremely high dominance of renosterbos. Thus, it also does not qualify as being classified as either CBA1 or CBA2 areas. However, it nonetheless holds ecological value.

The most critical finding is the presence of six Species of Conservation Concern (SCC), three of which are Endangered, predominantly in the eastern sections of Damkamp and Agterstekamp. Notably, a large and valuable population of the Near Threatened *Babiana villosa* was recorded. The presence of these species, along with the area's function as a supporting area for the adjacent Witzenberg Nature Reserve, justifies reclassifying the intact portions of Secondary Renosterveld as Ecological Support Area 1 (ESA1). Consequently, the true Site Ecological Importance (SEI) for the Secondary Renosterveld units, particularly the eastern parts of Damkamp as well as the entire Agterstekamp, is scored as Medium.

The most significant negative direct impacts of the proposed construction activities, primarily involving ploughing, are the complete loss of plant communities and ESA1 areas, and potential loss of SCC. Before mitigation, the significance of these impacts is assessed as High. To address this, the report proposes establishing No-Go areas encompassing the easternmost parts of Agterstekamp and Damkamp where SCC are concentrated, as well as the section overlapping the Witzenberg Nature Reserve. Furthermore, buffer zones around watercourses may require a Water Use Licence. Implementing the No-Go areas would effectively reduce the significance of the loss of SCC from High to Low. However, the residual impact on the loss of plant communities and ESA1 areas remains Medium, indicating that while critical species are protected, the overall ecological impact on Secondary Renosterveld is only partially mitigated. Active management, including the control of invasive alien plant species, is also a necessary mitigation for a Low residual impact. The cumulative impact on provincial and national conservation targets can also be mitigated from Medium-High to Low by preserving the proposed No-Go areas.

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i. List of Abbreviations

BODATSA: Botanical Database of Southern Africa
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 (species threat status)
DD: Data Deficient (species threat status)
DDD: Data Deficient – Insufficient Information (species threat status)
DDT: Data Deficient – Taxonomically Problematic (species threat status)
EA: Environmental Authorization
ECO: Environmental Control Officer
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
EMPr: Environmental Management Programme
EN: Endangered (species threat status)
EO: Environmental Officer
EOO: Extent of Occurrence
ESA: Ecological Support Area
EW: Extinct in the Wild (species threat status)
EX: Extinct (species threat status)
FEPA: Freshwater Ecosystem Priority Area
IAPs: Invasive Alien Plant species
IUCN: International Union for Conservation of Nature
LC: Least Concern (species threat status)
MP: Moderately Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)
NE: Not Evaluated (species threat status)
NEM:BA A&IS: NEM:BA Alien and Invasive Species Regulations, 2020
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)
NP: Not Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)
NT: Near Threatened (species threat status)
NWA: National Water Act 36 of 1998
NWM: National Wetland Map
ONA: Other Natural Area
PA: Protected Area
PAOI: Project Areas of Influence
POSA: Plants of southern Africa (online database)
PP: Poorly Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)
RE: Regionally Extinct (species threat status)
REEA: SA Renewable Energy EIA Application Database (https://egis.environment.gov.za/)
RLE: Red List of Ecosystems for South Africa
SANBI: South African National Biodiversity Institute
SCC: Species of Conservation Concern (includes species listed under the IUCN Red List Criteria as Critically Endangered [CR], Endangered [EN], Vulnerable [VU], Near Threatened [NT], or Data Deficient [DD], as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [sometimes also termed "Critically Rare"])
SSV: Site Sensitivity Verification
SWSA: Strategic Water Source Area
VegMap: National Vegetation Map of Southern Africa, Lesotho, and Swaziland (as per Mucina and Rutherford, 2006, with subsequent updates, e.g., 2018)
VU: Vulnerable (species threat status)
WP: Well Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)

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v. Report Minimum Legal Requirements

The Protocol for the Specialist Assessment and Minimum Report Content Requirements For Environmental Impacts on Terrestrial Plant Species (GN 1150, 43855, 30 October 2020) and the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN 320, 43110, 30 October 2020) are presented here, together with their fulfilments within this report.

Where protocol reference numbers differ between the two protocols, they are indicated either as PS (occurring in the Terrestrial Plant Species protocol) or TB (occurring in the Terrestrial Biodiversity protocol); otherwise they are the same between the protocols.

Protocol Reference	Plant Species and Terrestrial Biodiversity Specialist Assessment Report Content	Sections in this Report	Page
3.1.1.	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae.	12	96
3.1.2.	A signed statement of independence by the specialist	vi	ix
3.1.3.	A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	2.3.1	27
3.1.4	A description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used where relevant	9 and 10	77 and 84
3.1.5.	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations	1.5	7
3.1.6.	A description of the mean density of observations/number of samples sites per unit area of site inspection observations	10	84
3.1.7. PS	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported	2.3.2	43
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3.1.9. PS 3.1.6 TB	The location of areas not suitable for development and to be avoided during construction where relevant	2.3.5	53
3.1.9. TB	The degree to which impacts and risks can be mitigated	3	53
3.1.10 TB	The degree to which the impacts and risks can be reversed	3	53
3.1.10. PS	A discussion on the cumulative impacts	3	53
3.1.11. PS	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr)	4	61
3.1.11 TB	The degree to which the impacts and risks can cause loss of irreplaceable resources	3	53
3.1.12.	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant	5	63
3.1.13.	A motivation must be provided if there were any development footprints identified that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate	Not Applicable	Not Applicable
3.1.14. TB	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not	5.2	63
3.1.15 TB	Any conditions to which this statement is subjected	4	61

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vi. Declaration of Consultant Independence

The consultant hereby declares that he:

- Is an independent specialist in this application;
- Regards 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/or 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;
- Is 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 his disposal at the time of publication regarding the application, whether such information is favourable to the applicant or not; and
- Is aware that a false declaration is an offense in terms of regulation 48 of GN No. R. 326.

REPORT AUTHOR:

Dr. Jan-Hendrik Keet
Pr.Sci.Nat 121678 (Botanical Science)

Fields of Expertise: Botany; Biogeography; Terrestrial Biodiversity; Vegetation Surveys and Mapping; Invasive Alien Plant Species Identification, Management, and Monitoring; Biological Sciences; Biodiversity Informatics; Experimental Design and Analysis; Geographic Information Systems; and Statistical Computing and Data Analysis.

Summary of Qualifications: BSc (*cum laude*) Chemistry with Physics and Biology; BSc (Hons *cum laude*) Botany (majoring in Plant Taxonomy, Plant Ecology, and Plant Physiology); MSc Botany (Invasive Plant Species and Risk Assessment); PhD Botany (Invasive Plant Species and Impacts); GIS Intermediate (GISB1500S NQF Level 5); SAGIC Invasive Species Consultant; Professional Natural Scientist (Botanical Science: 121678).



November 2025

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PART 1: Introduction, Background, and Findings of the Assessment

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1. Introduction

1.1. General Information

This project, as well as any and all related areas/sites, will from here on interchangeably be referred to as either the "Project", "Project Area", "development site", or "study area" If the proposed activity(-ies) will impact on Species of Conservation Concern (SCC) beyond the boundary of the preferred site, the "project areas of influence" (PAOI) will be defined and used where relevant. The development footprint (or proposed development footprint) in the context of this document means the area that will be directly disturbed or impacted. The term "property" might also be used to refer to one or more cadastral property boundaries, and not just the study area.

Enviro EAP (hereafter referred to as the "client"), on behalf of Karla en Anke Trust (hereafter referred to as the "applicant"), approached EcoFloristix Specialist Botanical Surveys to conduct a Plant Species and Terrestrial Biodiversity Impact assessment for vegetation clearing on farm Schalkenbosch 229, Tulbagh, Western Cape.

1.2. Terms of Reference (ToR)

The main aim of this assessment was to provide a professional opinion on botanical and terrestrial biodiversity issues related to the proposed activities within the study area. Specifically, this assessment intends to provide the relevant information for guiding and mitigating the risk(s) associated with the proposed activities and their impacts on the local plant communities and associated ecosystems within the study area and surrounds by conducting a desktop analysis and a Site Sensitivity Verification (also referred to as a "SSV").

Briefly, the following activities were performed:

- A desktop assessment to identify relevant ecologically important geographical features (for example, unique habitats, Critical Biodiversity Areas (CBAs), and threatened ecosystems);
- A desktop assessment to compile a list of species that might occur in the study area and surrounds, with a focus on plant Species of Conservation Concern (SCC);
- A field survey to assess the general species composition of the plant communities within and around the study area, as well as the presence of any SCC;
- A delineation and mapping of the plant communities and/or habitat types that occur within the study area, and a determination of their respective Site Ecological Importance values;
- An identification of the potential impacts of the proposed activities on the SCC and plant communities of the study area, and an evaluation of the risks associated with these potential impacts; and
- A prescription of mitigation measures and recommendations for the identified risks.

1.3. Locality and Details of Proposed Activities

1.3.1. Locality and General Details

The study area is situated approximately 5 km directly southeast of Tulbagh (Map 1, Map 2). Access occurs via an existing farm gravel road, namely Van Der Stel Street. The property is located in the Cape Winelands District Municipality of the Western Cape Province and falls under the jurisdiction of the Witzenberg Local Municipality.

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The study area occurs primarily on the farm Schalkenbosch 229, with a part of the southernmost section overlapping with the parent farm Schalken Berg 228 in the east.

1.3.2. Details of Proposed Activities

The applicant proposes to clear vegetation in the study area, which comprises of historically ploughed land where the topsoil has not been legally disturbed during the past 10 years. The intention is to again use these areas for agricultural activities, specifically by ploughing.

The term "proposed activities" will from here on specifically refer to the activities as defined in this section.

1.3.3. Alternatives

Two "Alternatives" are assessed here, namely the "Baseline" (or "No Development Scenario, i.e. maintaining the present circumstances and not proceeding with the proposed activities) and Alternative 1 (A1), namely the proposed activities and associated areas as presented in section 1.3.2 and 1.3.1, respectively.

1.3.4. Project Areas of Influence (PAOI)

The study area itself is comprised of three separate sections (polygons), namely Agterstekamp, Damkamp, and Driehoekkamp. The PAOI is considered the same as the study area (Map 2).

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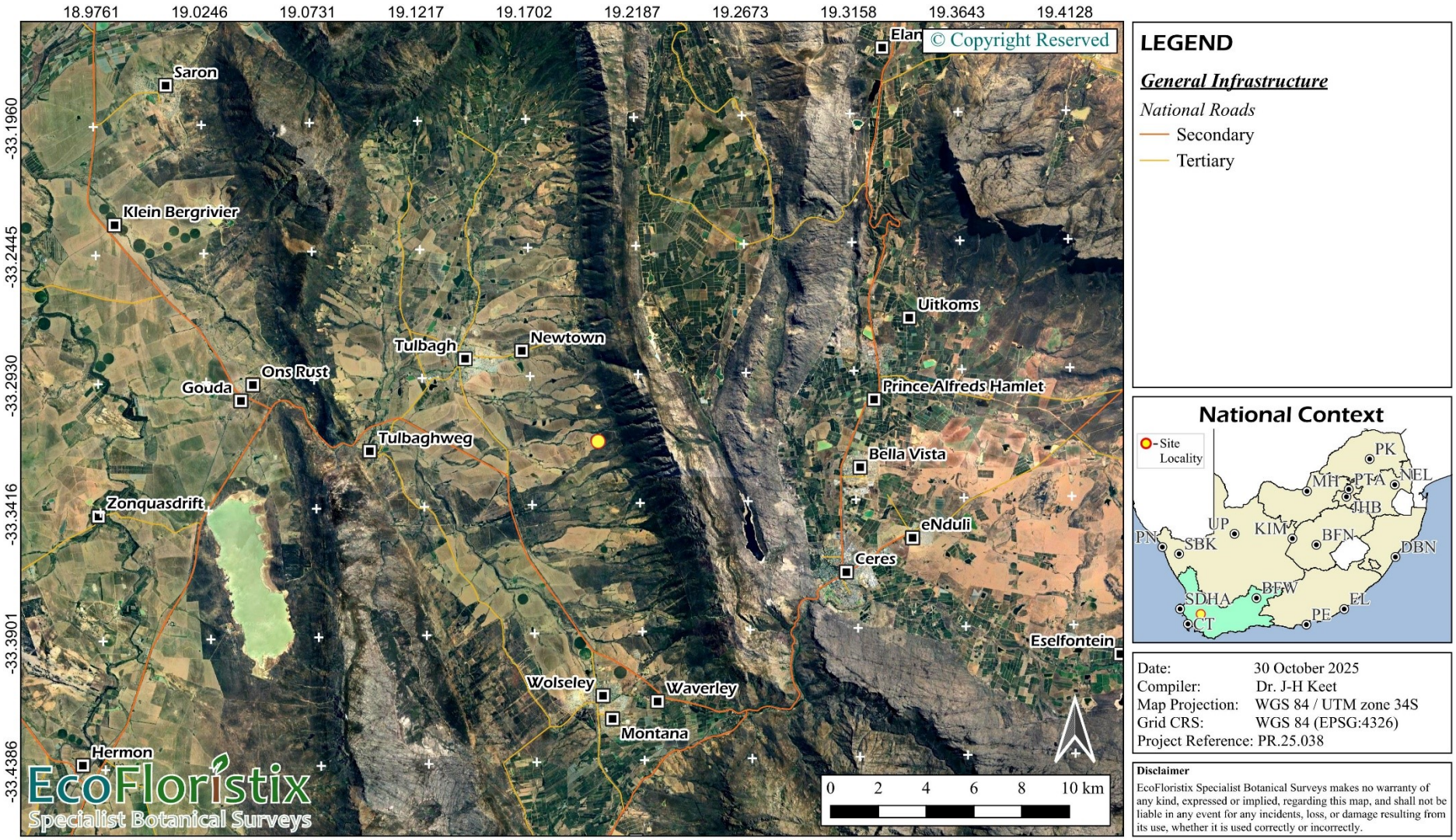

Map 1: Locality of the study area, zoomed out to give a broad context. The inset map shows the main map extent within the broader (national) context of South Africa.

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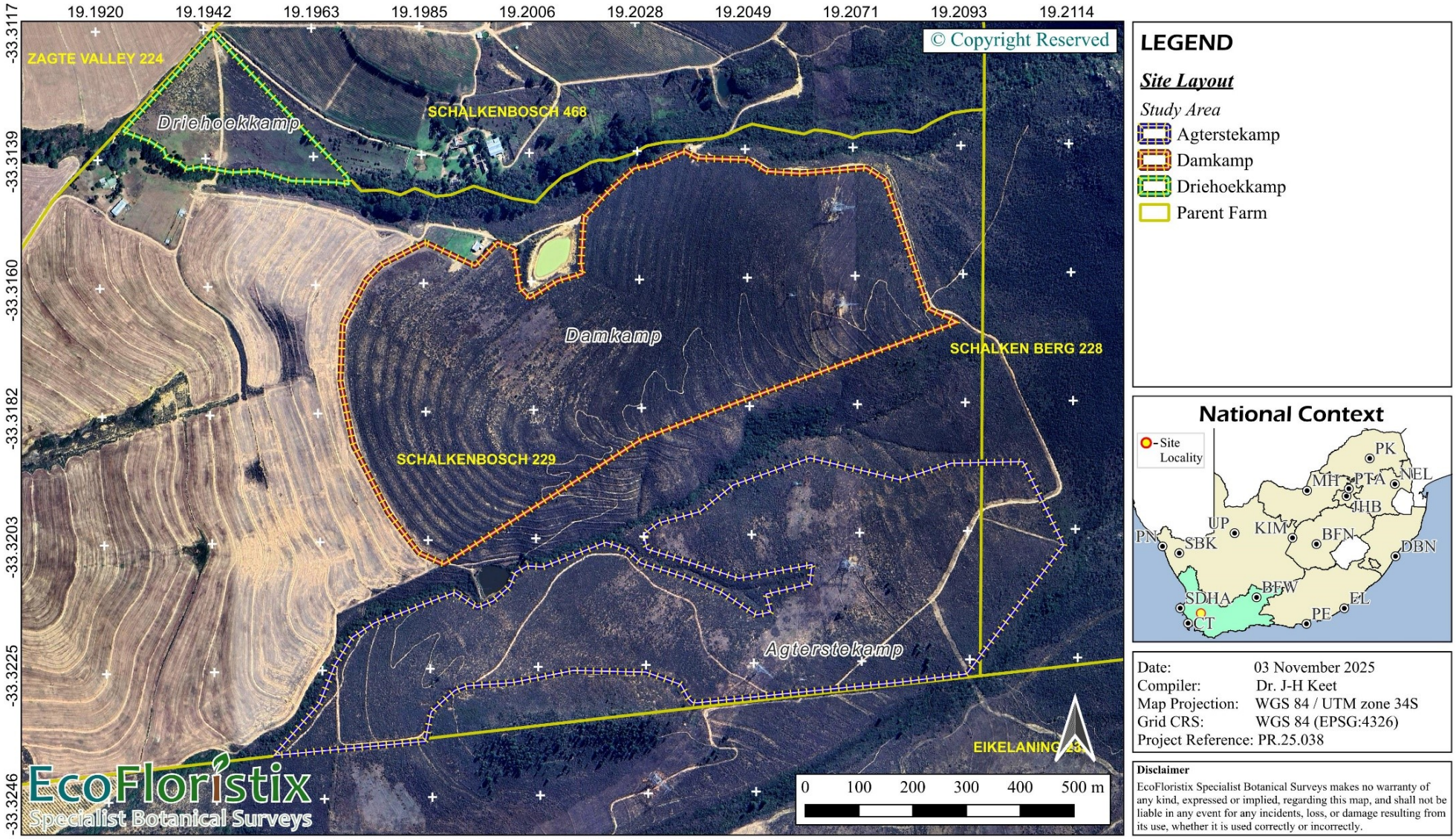

Map 2: Overview of the study area. Note: to optimize space, true north faces to the right and slightly to the bottom (this will be the case for many of the subsequent maps).

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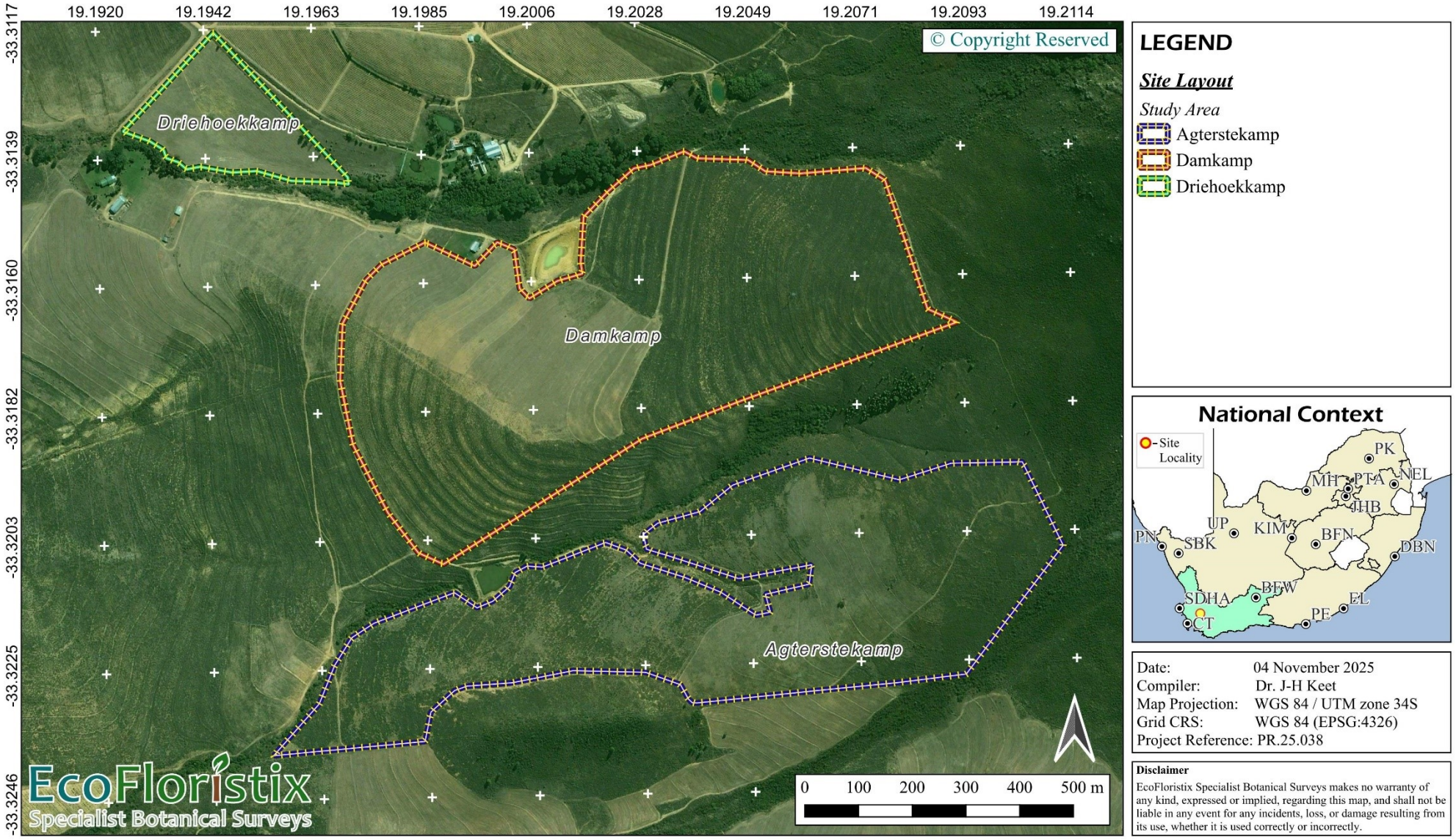

Map 3: Overview of the current study area as per historic satellite imagery of April 2006.

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1.4. Conditions of This Report

This report deals exclusively with the study area as defined in sections 1.1 and 1.3, and the impacts upon plant diversity and natural ecosystems in that area. Therefore, all relevant project information provided by the applicant and/or the client, as well as any other relevant Environmental Impact Assessment practitioner(s), to the biodiversity specialist was assumed to be correct and valid at the time of its provision and at the time of compilation. This report is not liable to include and assess any alterations to the study area, as provided by the client, if such alterations occurred after the survey date(s).

All findings, recommendations, and conclusions provided in this report are based on the author's best scientific and professional knowledge at the time of compilation, as well as information available at the time of compilation. This report, whether in full or in part, may not be amended or extended in any way whatsoever without the prior explicit written consent of the author. Any recommendations, statements, or conclusions drawn from, or based on, this report must clearly cite or make reference to this report, making sure to include the following reference: PR.25.038. This report must be included in its entirety whenever any recommendations, statements, or conclusions relating to this report form any part of another report.

1.5. General Assumptions and Potential Limitations

Temporal variation plays an important role in the structure and patterns of plant biodiversity, communities, and species occurrences. One site visit (or even multiple visits), or a single season's survey, might not fully catalogue plant species diversity in an area (for example, due to seasonal variation in vegetation and plant growth patterns).

Specifically, some annual, short-lived, ephemeral (plants surviving unfavourable conditions as seeds), geophytic (species with underground storage organs), or other cryptic species might not be observable/detectable. That is, many plant species 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 (for geophytes), or seeds (for ephemeral species) below the soil surface. Together with this, rare and threatened plant species are generally uncommon and/or localized, and can easily be overlooked. Even multiple site visits might 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 practice it is almost always impossible to survey any area to its full extent, both spatially (i.e., over land surface area) and temporally (i.e., over time). 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 possibility always exists that certain plant species might not be observable/detectable on site during the time of surveying, as a result of their potential annual, short-lived, dormant, cryptic, or ephemeral nature, or their rare and/or localized distributions on site, or the incomplete and inaccurate identification of plant species which lacked flowers and/or fruits and/or other characteristic features during surveying. This presents a gap

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in knowledge, but can be mitigated to a great extent by supplementing site species lists with records from online databases (see section 9.3 for more details).

1.6. Key Legislative Requirements

The lists below provide legislation, policies, and guidelines that are applicable to the current project in terms of biodiversity and ecological support systems. Although these lists are extensive, they are not exhaustive, and other legislation, policies, and guidelines may also apply.

International Legislation:

- Convention on Biological Diversity (CBD, 1993)
- The Convention on Wetlands (RAMSAR Convention, 1971)
- The United Nations Framework Convention on Climate Change (UNFCC,1994)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
- The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)

National Legislation:

- Constitution of the Republic of South Africa (Act No. 108 of 1996)
- The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
- The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
- The National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), Threatened or Protected Species Regulations
- 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, GNR 320 of Government Gazette 43310 (March 2020)
- Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 1150 of Government Gazette 43855 (October 2020)
- The National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
- The Environment Conservation Act (Act No. 73 of 1989)
- National Protected Areas Expansion Strategy (NPAES)
- Natural Scientific Professions Act (Act No. 27 of 2003)
- National Biodiversity Framework (NBF, 2009)
- National Forest Act (Act No. 84 of 1998)
- National Veld and Forest Fire Act (101 of 1998)
- National Water Act (NWA) (Act No. 36 of 1998)
- National Spatial Biodiversity Assessment (NSBA)
- World Heritage Convention Act (Act No. 49 of 1999)
- Municipal Systems Act (Act No. 32 of 2000)

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- Alien and Invasive Species Regulations and, Alien and Invasive Species Lists, published under NEM:BA (NEM:BA A&IS Regulations)
- South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)

Provincial Legislation and Other:

- Western Cape Nature Conservation Ordinance, (Act No. 19 of 1974)
- Western Cape Nature Conservation Regulations, (Act No. 955 of 1975)
- Western Cape Nature Conservation Board Act, (Act No. 15 of 1998)
- Western Cape Nature Conservation Laws Amendment Act, (Act No. 3 of 2000)
- Western Cape Biodiversity Act, (Act No. 6 of 2021) 2024 Northern Cape Biodiversity Spatial Plan

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2. Results

For all relevant methodology, see sections 9 and 10 at the end of this document.

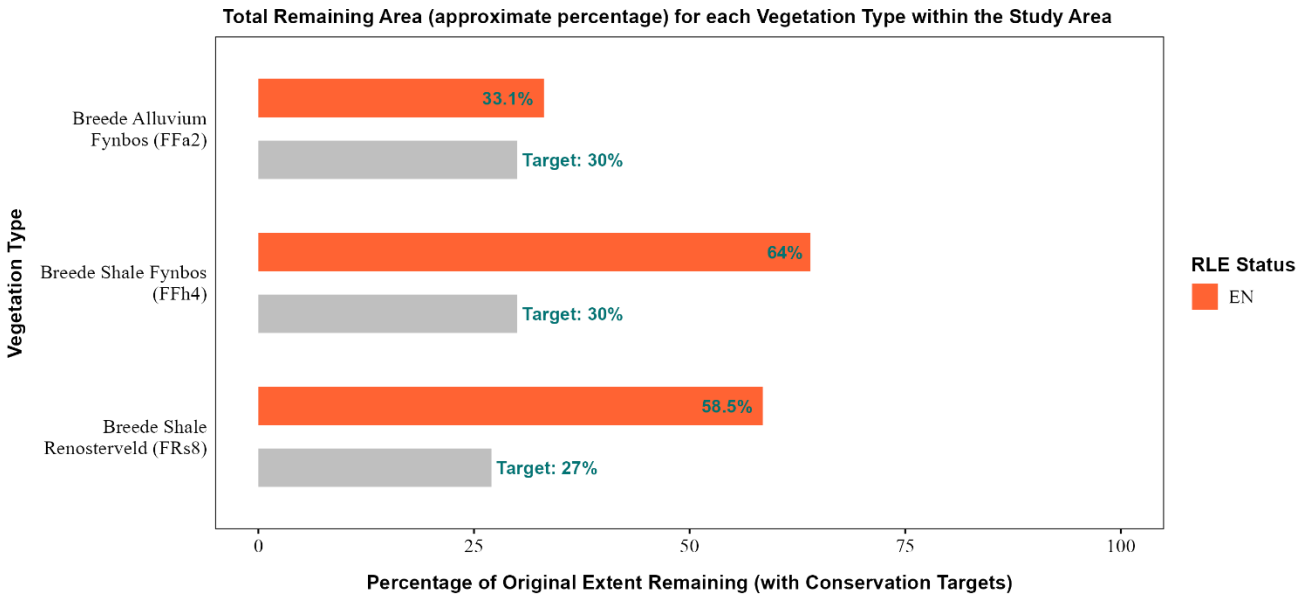
2.1. Desktop Analyses: Botanical Assessment

2.1.1. Vegetation Types of Study Area and Surrounds

According to VegMap, the study area overlaps with one vegetation type, namely Breede Alluvium Fynbos (FFa2), Breede Shale Fynbos (FFh4), and Breede Shale Renosterveld (FRs8) (Map 4 and Map 5; Table 1). The closest other vegetation type, Winterhoek Sandstone Fynbos (FFs5), occurs about 450 m to the east of the study area, but is characteristic of steeper upper mountain slopes and a different underlying geology. Thus, it is not treated here.

Table 1: Total area sizes (approximate) for vegetation types occurring within, or near, the study area, as mapped by the National Vegetation Map 2018.

Vegetation Type	Historic Distribution		Current Distribution			RLE Threat Status
	Total Area (km^2)	Total Area (ha)	Total Area (km^2)	Total Area (ha)	Percentage Remaining (%)	
Breede Alluvium Fynbos (FFa2)	502	50 166	166	16 629	33.1	Endangered
Breede Shale Fynbos (FFh4)	318	31 814	203	20 348	64	Endangered
Breede Shale Renosterveld (FRs8)	1 050	104 991	614	61 369	58.5	Endangered



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2.1.1.a) Breede Shale Fynbos (FFh 4)

This vegetation type is distributed in the Western Cape Province at the Breede River and Slanghoek Valleys discontinuously from Tulbagh (Winterhoek Kom) to Swellendam, on the lower southern slopes of the Groot Winterhoek, Witsenberg, Hex and Langeberg Mountains and at places along the base of the Slanghoekberge and western Badsberg.

It is characterized by steep upper slopes below mountains grading to slightly undulating plains, and is well dissected by rivers. Vegetation is a moderately tall and dense shrubland, being mostly restioid, proteoid and asteraceous (mesotrophic) fynbos. A remarkably tall and dense post fire component dominates early seral communities on wetter slopes.

Conservation: EN according to RLE2021. Target: 30% according to NBA 2018.

About 30% conserved in CapeNature and other statutory nature reserves such as Grootwinterhoek Wilderness Area, Dassieshoek, Marloth, Wittebrug, and Witzenberg, and in mountain catchment areas such as Langebergwes, Matroosberg, and Winterhoek. About 30% of the area is transformed, mostly for cultivation. *Pinus pinaster* and *Hakea sericea* are the most serious woody aliens in the unit. Erosion very low and moderate.

Key species associated with Breede Shale Fynbos (FFh 4).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Taxa Small Tree	*Protea nitida (d)*
Tall Shrubs	*Cliffortia serpyllifolia (d), Dodonaea viscosa var. angustifolia (d), Leucadendron eucalyptifolium (d), L. rubrum, Protea burchellii, P. laurifolia, P. neriifolia, P. repens*
Low Shrubs	*Aspalathus spinosa subsp. spinosa (d), Cliffortia ruscifolia (d), Elytropappus rhinocerotis (d), Erica hispidula (d), E. versicolor (d), Oedera squarrosa (d), Penaea cneorum subsp. ruscifolia (d), Stoebe cinerea (d), Aulax cancellata, Erica pubigera, Eriocephalus africanus var. africanus, Felicia filifolia subsp. filifolia, Leucadendron salignum, L. spissifolium subsp. spissifolium, Passerina obtusifolia, Pteronia paniculata*
Succulent Shrubs	*Ruschia caroli (d), Adromischus filicaulis subsp. filicaulis, Erepsia gracilis, Tetragonia fruticosa*
Herb	*Edmondia sesamoides*
Geophytic Herb	*Lanaria lanata (d)*
Graminoids	*Tetraria flexuosa (d), Capeobolus brevicaulis, Cymbopogon marginatus, Ehrharta ramosa subsp. ramosa, Restio capensis, R. curviramis, R. gaudichaudiana, Rhodocoma fruticosa, Tetraria ustulata*
ENDEMIC SPECIES	
Growth Form	**Key Species (d = "Dominant")**

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Low Shrubs	*Rafnia angulata subsp. thunbergii, Vexatorella latebrosa*
Succulent Shrubs	*Drosanthemum opacum, Lampranthus dregeanus, L. tulbaghensis, Oscularia vernicolor*
Geophytic Herb	*Oxalis lindaviana*

2.1.1.b) Breede Shale Renosterveld (FRs 8)

This vegetation type is distributed in the Western Cape Province with patches in the Breede River Valley from Tulbagh to Swellendam; more specifically, most of the valley floor between Tulbagh and Wolseley, isolated small patches to the vicinity of Worcester, diverse patches between Stettyn and McGregor south of the Breede River, and a near continuous but irregular band on the southern foothills of the Langeberg from Philipsdale near Worcester to Ashton. The most extensive area occurs near Ashton. It also occurs at McGregor and the confluence of the Riviersonderend and Breede Rivers west of Swellendam.

It is characterized by low hills, slightly undulating to undulating plains and lower mountain slopes. In the western regions low, cupressoid leaved shrubland (with scattered emergent small trees) is dominated by renosterbos. Elements of shale fynbos are present. In the eastern regions open, tall shrublands (possibly closely affiliated to FRs 12 Central Ruens Shale Renosterveld) are found, with microphyllous shrubs forming the dominant layer. Breede Shale Renosterveld grades into SKv 7 Robertson Karoo in the central valley, with karoo shrublands usually occurring on the northern aspects and renosterveld found on the southern aspects, with a decline in the extent of the karoo shrublands to the south. Heuweltjies are very prominent, with either bush clumps in moister areas or succulent shrubs in drier habitats. Soils are clays and loams mostly derived from Bokkeveld and some Witteberg Group shales, as well as Porterville Formation phyllite shale of the Malmesbury Group (Namibian Erathem) in the northwest.

Conservation: EN according to RLE2021. Target: 27% according to NBA 2018.

The unit is statutorily conserved in the Vrolijkheid Nature Reserve (2%) as well as in Langebergwes and Matroosberg mountain catchment areas. Some 31% transformed, mainly by cultivation. Alien *Pinus pinaster* and several species of *Acacia* occur locally, at low levels. Erosion spans high and very low. Around Noree (between Robertson and Worcester) there are small exposed dolomite lenses (partly subject to mining), supporting species such as *Aloe microstigma*, *Antimima leipoldtii* and *Gazania*. This unit extends onto FFb 4 Central Coastal Shale Band Vegetation in the Langeberg near Nuy but as the extent of this is unknown it has not been mapped.

Key species associated with Breede Shale Renosterveld (FRs 8).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Tall Shrubs	*Euclea undulata (d), Lycium ferocissimum (d), Dodonaea viscosa var. angustifolia, Euryops tenuissimus, Searsia angustifolia, S. undulata*

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Low Shrubs	*Aspalathus steudeliana (d), Elytropappus rhinocerotis (d), Galenia africana (d), G. herniariaefolia (d), G. secunda (d), Oedera sedifolia (d), O. squarrosa (d), Pentzia incana (d), Pteronia incana (d), P. paniculata (d), Anthospermum aethiopicum, Aspalathus candicans, A. pachyloba subsp. macroclada, A. submissa, A. varians, Carissa bispinosa subsp. bispinosa, Chrysocoma ciliata, C. coma-aurea, Felicia filifolia subsp. filifolia, F. flanaganii, Freylinia undulata, Hermannia vestita, Heterolepis peduncularis, Metalasia octoflora, Oedera genistifolia, Passerina obtusifolia, Pteronia fasciculata, Selago fruticosa, Senecio pinifolius, Wahlenbergia tenella*
Succulent Shrubs	*Delosperma pageanum (d), Euphorbia burmannii (d), E. mauritanica (d), Ruschia caroli (d), R. festiva (d), Tylecodon paniculatus (d), Adromischus filicaulis subsp. filicaulis, Aloe microstigma subsp. microstigma, Crassula atropurpurea var. atropurpurea, C. pubescens subsp. pubescens, C. rupestris, C. tetragona, Pelargonium alternans, Mesembryanthemum coriarium, Ruschia multiflora, Tetragonia fruticosa, T. sarcophylla, Tylecodon grandiflorus*
Herb	*Hypericum lalandii*
Geophytic Herbs	*Babiana melanops, Freesia caryophyllacea, Geissorhiza heterostyla, G. inflexa, G. ornithogaloides subsp. ornithogaloides, G. purpureolutea, G. tulbaghensis, Lachenalia polyphylla, Ornithogalum dubium, Oxalis goniorrhiza, Wurmbea monopetala*
Succulent Herbs	*Crassula aphylla, C. muscosa*
Graminoids	*Ehrharta calycina, E. villosa var. villosa, Ficinia ramosissima, Hyparrhenia hirta, Restio gaudichaudianus, Tenaxia stricta*
ENDEMIC SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Low Shrubs	*Aspalathus macrocarpa, Cliffortia varians, Lotononis rigida*
Succulent Shrubs	*Acrodon purpureostylus, Drosanthemum aureopurpureum, D. hallii, Lampranthus hurlingii*
Geophytic Herbs	*Babiana villosa, Freesia fucata, Ixia vanzijliae, I. vinacea, Moraea incurva, M. radians*

2.1.1.c) Breede Alluvium Fynbos (FFh 2)

This vegetation type is distributed in the Western Cape Province in the Upper Breede River Valley flats from Tulbagh to the Brandvlei Dam near Worcester including the Slanghoek and Brandwag Valleys, and extends to the Hex River Valley.

It is characterized by slightly undulating plains and adjacent high mountains, with numerous alluvial fans and streams. Open emergent tall proteoids occur in a moderately tall shrub matrix with a graminoid understorey. Asteraceous and proteoid fynbos are dominant, with localised restioid and ericaceous fynbos. Quaternary alluvial deposits occur, consisting of round cobbles embedded in fine loamy sand over metasediments of the Malmesbury Group and Bokkeveld Group shales.

Conservation: EN according to RLE2021. Target: 30% according to NBA 2018.

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Small patches conserved in the statutory Fonteintjiesberg and Limietberg Nature Reserves, Matroosberg and Hawequas (both mountain catchment areas), as well as in the private Quaggas Berg. Much of it is already transformed for cultivation (vineyards, pastures, pine plantations), road building, and urban sprawl. This area is susceptible to transformation through long-term continuous grazing and repeated short interval burning. This disturbance eliminates palatable grasses and increases the unpalatable shrubs that sprout after fire or have a short life cycle. Aliens do not play a major role except for *Acacia saligna*, *Hakea sericea* and a number of alien annual grasses. Erosion very low and low. This unit shares ecological and floristic features with FRa 1 Breede Alluvium Renosterveld, with which it grades to the east in the lower valleys. It also contains elements of the FFd 4 Atlantis Sand Fynbos, suggesting an ancient link, possibly as dune corridors over the Hawequas Mountains north of the Nuwekloof Pass.

Key species associated with Breede Alluvium Fynbos (FFh 2).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Small Tree	*Protea nitida*
Tall Shrubs	*Diospyros glabra, Leucadendron chamelaea, L. rubrum, Leucospermum vestitum, Protea burchellii, P. laurifolia, P. repens, Searsia angustifolia*
Low Shrubs	*Acmadenia matroosbergensis, Aspalathus spinosa subsp. flavispina, Athanasia trifurcata, Cliffortia ruscifolia, Leucadendron brunioides var. brunioides, L. corymbosum, L. salignum, Protea acaulos, Serruria fasciflora, Stoebe plumosa*
Herbs	*Adenogramma glomerata, Felicia tenella*
Geophytic Herbs	*Geissorhiza geminata, G. ornithogaloides subsp. ornithogaloides*
Graminoids	*Cynodon dactylon, C. incompletus, Ficinia indica, Hyparrhenia hirta, Restio sieberi, Juncus cephalotes, Tenaxia stricta, Pentameris airoides, Schoenus compar, Themeda triandra, Tribolium echinatum*
ENDEMIC SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Tall Shrub	*Leucadendron flexuosum*
Low Shrubs	*Aspalathus acanthoclada, A. amoena, A. singuliflora, A. tulbaghensis, Diastella parilis, Erica hansfordii, Leucadendron lanigerum var. laevigatum, L. spirale, Leucospermum calligerum (prostrate form), Rafnia crispa*
Succulent Shrub	*Lampranthus reptans*
Herb	*Manulea minor*
Geophytic Herbs	*Ixia mostertii, I. rouxii, Lachenalia moniliformis, Moraea worcesterensis*

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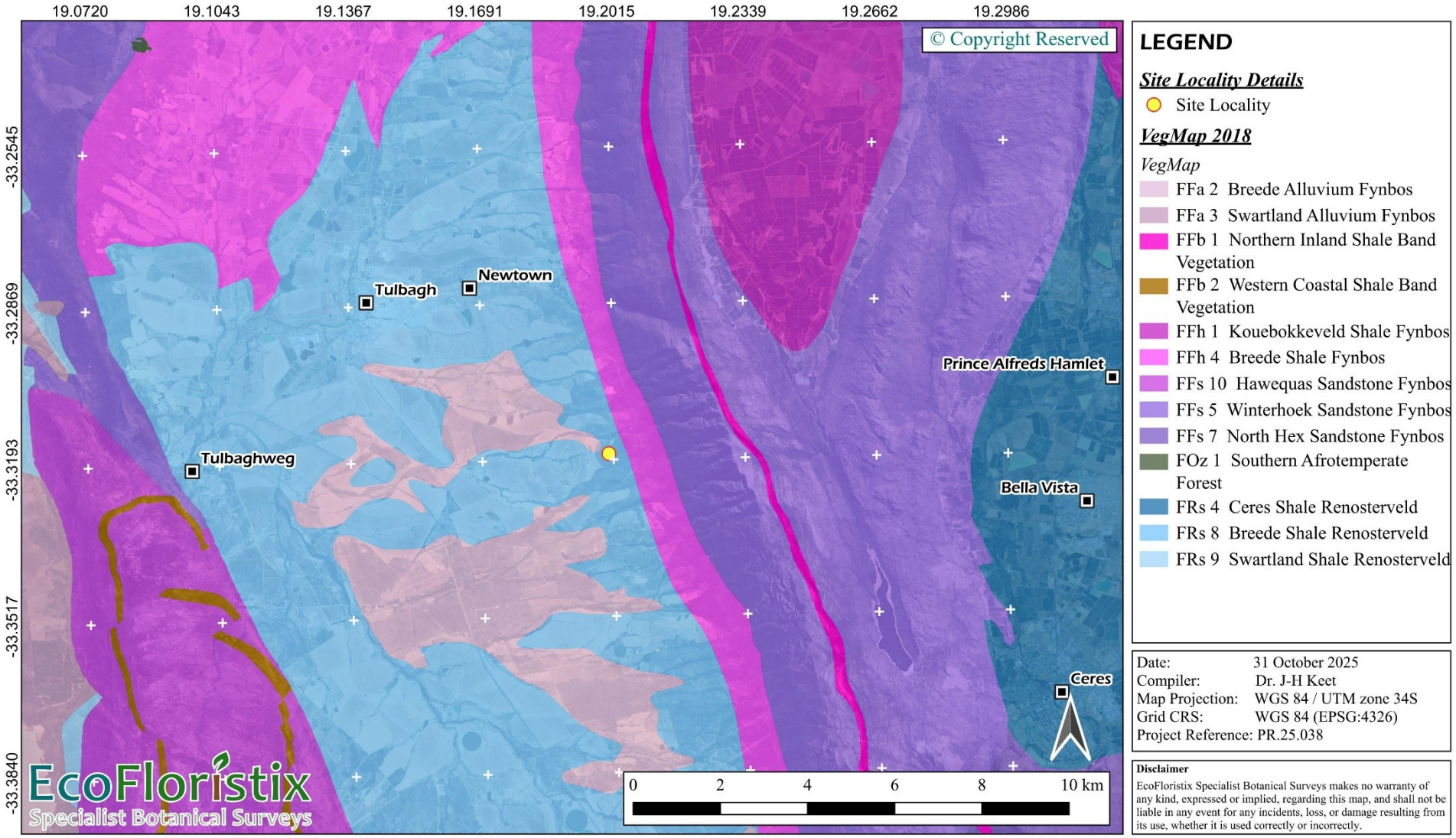

Map 4: Vegetation types (according to VegMap 2018 and subsequent updates) for the study area and surrounds. This map is specifically zoomed out to also show the broader extent of each vegetation type surrounding the study area (see Map 5 for site specific vegetation).

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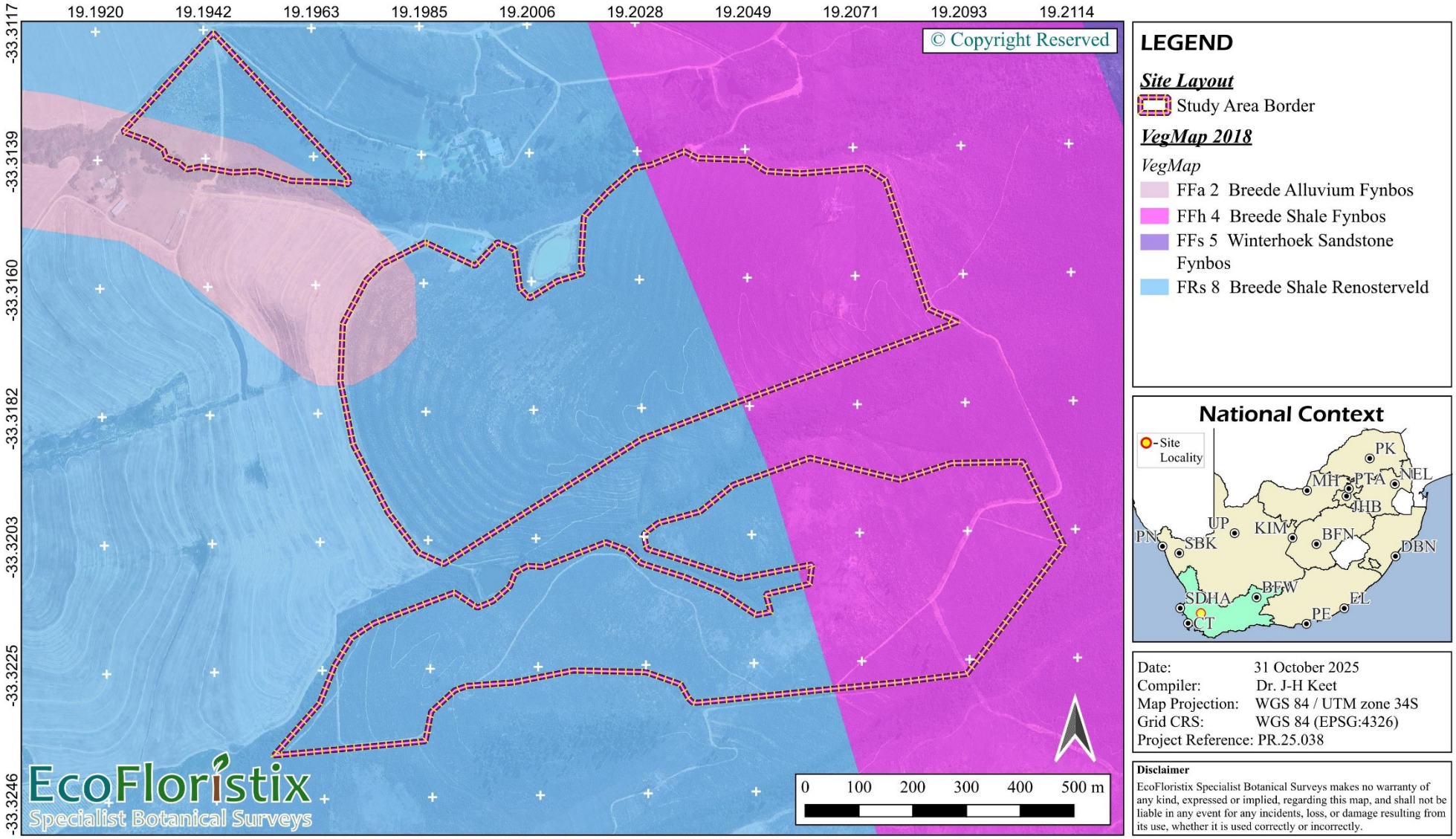

Map 5: Specific vegetation types (according to VegMap 2018) of the study area and surrounds.

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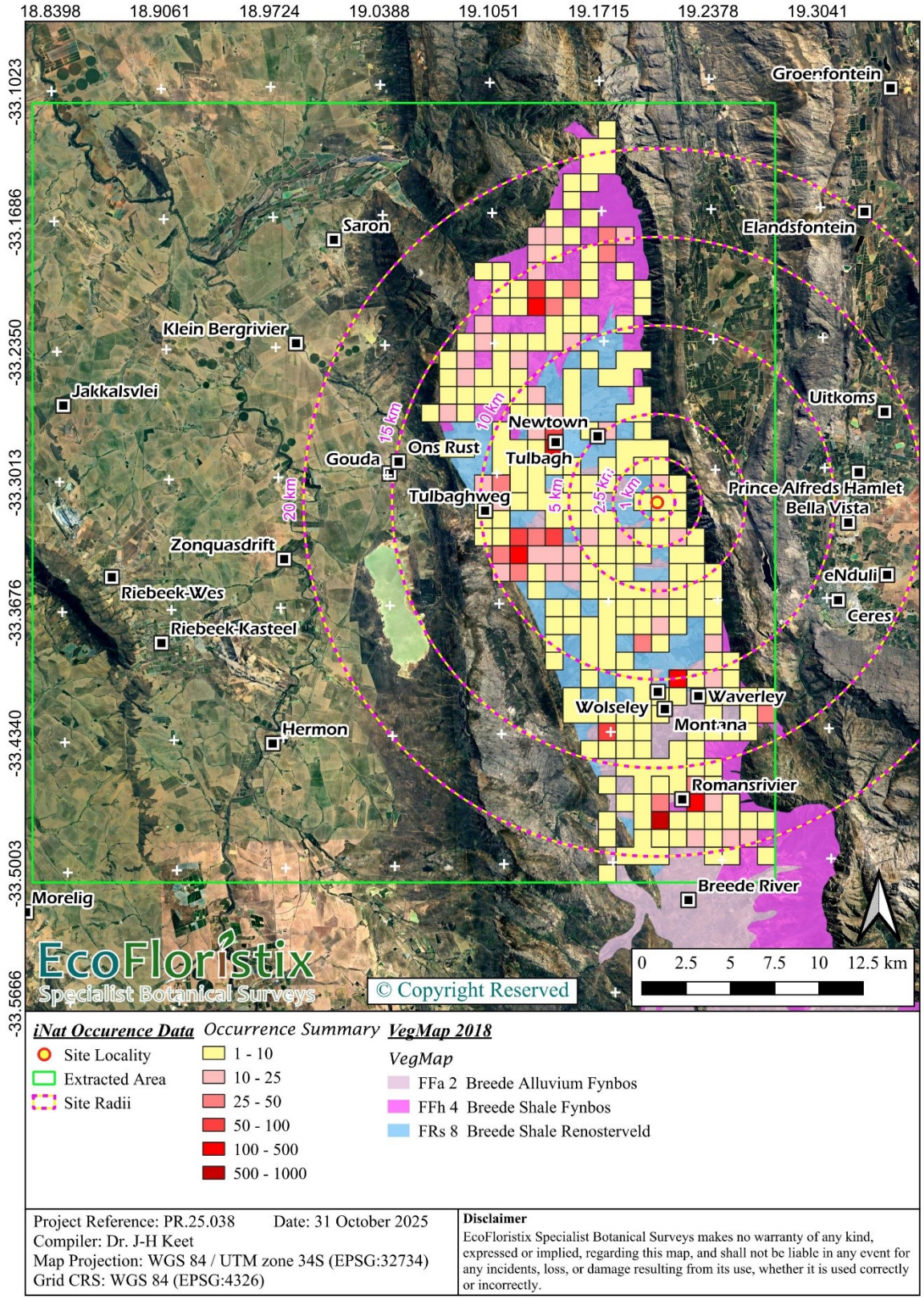
2.1.2. Species of Conservation Concern and General Species Occurrences



Map 6: Plant species occurrence data from iNaturalist, displayed as the number of records per grid square. Also shown are the mapped vegetation types (from VegMap) underlying the study area. See section 9.3.1 for more details on methodology.

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Only SCC that might potentially occur in the study area and surrounds, as predicted by online databases (see section 9.3.1; Map 6), are listed in this section. The field survey(s) aimed to validate which of these species occur within the study area, and whether any additional species were present that may not yet have been recorded in official databases (see section 2.3). Also see section 1.6 for key legislation used to assess SCC and protected plant species. Note that many records that are in the POSA database do not have an IUCN listing, or might have a "Not Evaluated" listing, even though they are indigenous. This is because such records represent older taxonomic groupings that have subsequently been assigned criteria at higher, or lower, taxonomic levels (for example, a subspecies name that is no longer valid and which has been assigned an IUCN value at species level, or a record of a species that has subsequently been divided into subspecies, and therefore assigned IUCN values at subspecies level instead of species level). These records have been included in the analysis for the sake of comprehensiveness since they still represent valuable data.

A combined total of 17 596 records were extracted from the online POSA (3 688 records) and iNaturalist (13 908 records) databases. The total area used to extract the records covered 178 220 hectares (1 782 km^2), with the records covering a minimum convex hull area of 176 434 hectares (1 764 km^2). The records were aggregated to cells measuring 1 x 1 km to visually estimate how many records occur near the study area.

Together, these records consisted of a combined total of 3 940 plant species that have been recorded within the extracted area (representing a total of 3 612 species at an inclusive level, i.e., without considering subspecies, varieties, etc.), with the top three representative families being Asteraceae (413 spp.), Fabaceae (329 spp.), and Iridaceae (316 spp.).

This list included a total of 594 SCC, including 306 threatened species (full summary: 3 CR PE, 45 CR, 124 EN, 134 VU, 121 NT, 11 Critically Rare, 46 DDT, 20 DDD, 2182 LC, and 191 Not Evaluated). It should be noted that the high number of SCC is likely due to the use of an excessively large area for species record collection. Consequently, it is highly improbable that many of these species would be present within the study area or its immediate vicinity.

A total of 307 of these SCC are protected. Apart from these, a further 885 species are also protected (thus yielding a total of 1192 protected plant species, consisting of 1188 provincially protected species and 5 nationally protected trees).

Finally, the online screening report also revealed the potential presence of 28 Sensitive Species (some of these might have been included in the other online databases). Note that, for their protection, some of the identities of these species will not be made public, and they have therefore been assigned random names.

The following is a summary of the threatened species (CR PE, CR, EN, VU) as recorded in the online databases, according to descending threat status (this list might include sensitive species; if this is the case, note that, for their protection, their identities will not be made public, and they have therefore been assigned random names):

- *Aspalathus ferox* (CR PE)
- *Oxalis involuta* (CR PE)
- *Oxalis variifolia* (CR PE)
- *Agathosma corymbosa* (CR; Protected [Provincial Schedule 4])
- *Aspalathus amoena* (CR)
- *Aspalathus compacta* (CR)
- *Aspalathus horizontalis* (CR)
- *Aspalathus lenticula* (CR)
- *Aspalathus sulphurea* (CR)
- *Aspalathus tulbaghensis* (CR)
- *Cephalophyllum parviflorum* (CR; Protected [Provincial Schedule 4])
- *Cliffortia acockii* (CR)
- *Diastella parilis* (CR; Protected [Provincial Schedule 4])
- *Disa brachyceras* (CR; Protected [Provincial Schedule 4])
- *Erica hansfordii* (CR; Protected [Provincial Schedule 4])
- *Haemanthus pumilio* (CR; Protected [Provincial Schedule 4])
- *Isoetes stephanseniae* (CR)
- *Ixia campanulata* (CR; Protected [Provincial Schedule 4])
- *Ixia longistylis* (CR; Protected [Provincial Schedule 4])

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- *Ixia rouxii* (CR; Protected [Provincial Schedule 4])
- *Ixia vinacea* (CR; Protected [Provincial Schedule 4])
- *Lampranthus coccineus* (CR; Protected [Provincial Schedule 4])
- *Lampranthus rupestris* (CR; Protected [Provincial Schedule 4])
- *Leucadendron chamelaea* (CR; Protected [Provincial Schedule 4])
- *Leucadendron lanigerum var. laevigatum* (CR; Protected [Provincial Schedule 4])
- *Marasmodes macrocephala* (CR)
- *Marasmodes oppositifolia* (CR)
- *Marasmodes undulata* (CR)
- *Metalasia schlechteri* (CR)
- *Moraea angulata* (CR; Protected [Provincial Schedule 4])
- *Moraea ogamana* (CR; Protected [Provincial Schedule 4])
- *Oxalis natans* (CR)
- *Pelargonium heterophyllum* (CR)
- *Podalyria microphylla* (CR)
- *Polhillia ignota* (CR)
- *Psoralea cataracta* (CR)
- *Rafnia crispa* (CR)
- *Senecio cadiscus* (CR)
- *Sensitive Species X12* (CR; Protected [Provincial Schedule 4])
- *Sensitive Species X27* (CR; Protected [Provincial Schedule 4])
- *Serruria aemula* (CR; Protected [Provincial Schedule 4])
- *Serruria furcellata* (CR; Protected [Provincial Schedule 4])
- *Serruria pinnata* (CR; Protected [Provincial Schedule 4])
- *Serruria scoparia* (CR; Protected [Provincial Schedule 4])
- *Serruria trilopha* (CR; Protected [Provincial Schedule 4])
- *Sorocephalus imbricatus* (CR; Protected [Provincial Schedule 4])
- *Sorocephalus scabridus* (CR; Protected [Provincial Schedule 4])
- *Stylapterus ericoides subsp. ericoides* (CR; Protected [Provincial Schedule 4])
- *Agathosma conferta* (EN; Protected [Provincial Schedule 4])
- *Agathosma glandulosa* (EN; Protected [Provincial Schedule 4])
- *Agathosma latipetala* (EN; Protected [Provincial Schedule 4])
- *Albuca albucoides* (EN)
- *Annesorhiza articulata* (EN)
- *Annesorhiza refracta* (EN)
- *Anthospermum ericifolium* (EN)
- *Antimima aristulata* (EN; Protected [Provincial Schedule 4])
- *Aristea lugens* (EN; Protected [Provincial Schedule 4])
- *Aristea nigrescens* (EN; Protected [Provincial Schedule 4])
- *Aspalathus attenuata* (EN)
- *Aspalathus fasciculata* (EN)
- *Aspalathus muraltioides* (EN)
- *Aspalathus puberula* (EN)
- *Aspalathus secunda* (EN)
- *Aspalathus stricticlada* (EN)
- *Aspalathus varians* (EN)
- *Aspalathus wurmbeana* (EN)
- *Athanasia adenantha* (EN)
- *Athanasia capitata* (EN)
- *Athanasia crenata* (EN)
- *Babiana arenicola* (EN; Protected [Provincial Schedule 4])
- *Babiana blanda* (EN; Protected [Provincial Schedule 4])
- *Babiana inclinata* (EN; Protected [Provincial Schedule 4])
- *Babiana leipoldtii* (EN; Protected [Provincial Schedule 4])
- *Babiana secunda* (EN; Protected [Provincial Schedule 4])
- *Cannomois arenicola* (EN)
- *Cliffortia marginata* (EN)
- *Codonorhiza azurea* (EN; Protected [Provincial Schedule 4])
- *Diastella myrtifolia* (EN; Protected [Provincial Schedule 4])
- *Diosma dichotoma* (EN; Protected [Provincial Schedule 4])
- *Disa spathulata subsp. tripartita* (EN; Protected [Provincial Schedule 4])
- *Disparago gongylodes* (EN)
- *Drosanthemum worcesterense* (EN; Protected [Provincial Schedule 4])
- *Echiostachys ecklonianus* (EN)
- *Elegia extensa* (EN)
- *Erica hippurus* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza brehmii* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza erosa* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza exilis* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza furva* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza geminata* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza louisabolusiae* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza purpurascens* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza setacea* (EN; Protected [Provincial Schedule 4])
- *Geissorhiza tulbaghensis* (EN; Protected [Provincial Schedule 4])
- *Gnidia humilis* (EN)
- *Gnidia insignis* (EN)
- *Hypodiscus rugosus* (EN)
- *Indigofera psoraloides* (EN)
- *Indigofera quinquefolia* (EN)
- *Isoetes capensis* (EN)
- *Ixia aurea* (EN; Protected [Provincial Schedule 4])
- *Ixia erubescens* (EN; Protected [Provincial Schedule 4])
- *Ixia monadelpha* (EN; Protected [Provincial Schedule 4])
- *Ixia mostertii* (EN; Protected [Provincial Schedule 4])
- *Ixia sarmentosa* (EN; Protected [Provincial Schedule 4])
- *Ixia viridiflora* (EN; Protected [Provincial Schedule 4])
- *Lachenalia bachmannii* (EN; Protected [Provincial Schedule 4])
- *Lachenalia polyphylla* (EN; Protected [Provincial Schedule 4])
- *Lampranthus debilis* (EN; Protected [Provincial Schedule 4])
- *Lampranthus dilutus* (EN; Protected [Provincial Schedule 4])
- *Lampranthus leptaleon* (EN; Protected [Provincial Schedule 4])
- *Lampranthus scaber* (EN; Protected [Provincial Schedule 4])
- *Lampranthus sociorum* (EN; Protected [Provincial Schedule 4])
- *Lebeckia meyeriana* (EN)
- *Lebeckia plukenetiana* (EN)
- *Leucadendron floridum* (EN; Protected [Provincial Schedule 4])
- *Leucadendron gydoense* (EN; Protected [Provincial Schedule 4])
- *Leucadendron lanigerum var. lanigerum* (EN; Protected [Provincial Schedule 4])
- *Leucadendron stellare* (EN; Protected [Provincial Schedule 4])
- *Leucospermum hypophyllocarpodendron subsp.*

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hypophyllocarpodendron (EN; Protected [Provincial Schedule 4])
- *Leucospermum innovans* (EN; Protected [Provincial Schedule 4])
- *Lotononis complanata* (EN)
- *Lotononis densa subsp. densa* (EN)
- *Marasmodes oligocephala* (EN)
- *Marasmodes spinosa* (EN)
- *Monopsis variifolia* (EN)
- *Moraea tricolor* (EN; Protected [Provincial Schedule 4])
- *Moraea variabilis* (EN; Protected [Provincial Schedule 4])
- *Muraltia decipiens* (EN)
- *Oedera longipes* (EN)
- *Othonna linearifolia* (EN)
- *Oxalis droseroides* (EN)
- *Oxalis strigosa* (EN)
- *Paranomus longicaulis* (EN; Protected [Provincial Schedule 4])
- *Pauridia pygmaea* (EN)
- *Pelargonium viciifolium* (EN)
- *Pentameris bachmannii* (EN)
- *Pentameris ecklonii* (EN)
- *Pentameris pholiuroides* (EN)
- *Pharnaceum lanuginosum* (EN)
- *Phylica thunbergiana* (EN)
- *Podalyria argentea* (EN)
- *Protea mucronifolia* (EN; Protected [Provincial Schedule 4])
- *Protea rupicola* (EN; Protected [Provincial Schedule 4])
- *Pterygodium inversum* (EN; Protected [Provincial Schedule 4])
- *Rafnia lancea* (EN)
- *Restio parthenocarpos* (EN)
- *Restio pratensis* (EN)
- *Restio rigoratus* (EN)
- *Sensitive Species X18* (EN; Protected [Provincial Schedule 4])
- *Sensitive Species X22* (EN; Protected [Provincial Schedule 4])
- *Sensitive Species X24* (EN)
- *Sensitive Species X5* (EN; Protected [Provincial Schedule 4])
- *Sensitive Species X8* (EN)
- *Serruria brownii* (EN; Protected [Provincial Schedule 4])
- *Serruria millefolia* (EN; Protected [Provincial Schedule 4])
- *Serruria roxburghii* (EN; Protected [Provincial Schedule 4])
- *Sparaxis grandiflora subsp. grandiflora* (EN; Protected [Provincial Schedule 4])
- *Spatalla caudata* (EN; Protected [Provincial Schedule 4])
- *Spatalla salsoloides* (EN; Protected [Provincial Schedule 4])
- *Spatalla tulbaghensis* (EN; Protected [Provincial Schedule 4])
- *Staavia verticillata* (EN; Protected [Provincial Schedule 4])
- *Steirodiscus gamolepis* (EN)
- *Tetragonia caesia* (EN; Protected [Provincial Schedule 4])
- *Thereianthus bulbiferus* (EN; Protected [Provincial Schedule 4])
- *Thereianthus elandsmontanus* (EN; Protected [Provincial Schedule 4])
- *Trianoptiles solitaria* (EN)
- *Tritoniopsis elongata* (EN; Protected [Provincial Schedule 4])
- *Tritoniopsis lesliei* (EN; Protected [Provincial Schedule 4])
- *Watsonia borbonica subsp. ardernei* (EN; Protected [Provincial Schedule 4])
- *Watsonia distans* (EN; Protected [Provincial Schedule 4])
- *Xiphotheca reflexa* (EN)
- *Agathosma pulchella* (VU; Protected [Provincial Schedule 4])
- *Agathosma trichocarpa* (VU; Protected [Provincial Schedule 4])
- *Anisodontea biflora* (VU)
- *Anthochortus insignis* (VU)
- *Anthochortus singularis* (VU)
- *Antimima mucronata* (VU; Protected [Provincial Schedule 4])
- *Askidiosperma insigne* (VU)
- *Aspalathus acanthoclada* (VU)
- *Aspalathus aculeata* (VU)
- *Aspalathus araneosa* (VU)
- *Aspalathus lanifera* (VU)
- *Aspalathus latifolia* (VU)
- *Aspalathus lebeckioides* (VU)
- *Aspalathus recurva* (VU)
- *Brunia myrtoides* (VU; Protected [Provincial Schedule 4])
- *Brunia sphaerocephala* (VU; Protected [Provincial Schedule 4])
- *Caesia sabulosa* (VU)
- *Cliffortia pilifera* (VU)
- *Cyphia campestris* (VU)
- *Drimia albiflora* (VU)
- *Drosanthemum hispifolium* (VU; Protected [Provincial Schedule 4])
- *Drosanthemum striatum* (VU; Protected [Provincial Schedule 4])
- *Echiostachys incanus* (VU)
- *Erepsia patula* (VU; Protected [Provincial Schedule 4])
- *Erepsia ramosa* (VU; Protected [Provincial Schedule 4])
- *Erica atrovinosa* (VU; Protected [Provincial Schedule 4])
- *Erica caprina* (VU; Protected [Provincial Schedule 4])
- *Erica cremea* (VU; Protected [Provincial Schedule 4])
- *Erica doliiformis* (VU; Protected [Provincial Schedule 4])
- *Erica junonia var. junonia* (VU; Protected [Provincial Schedule 4])
- *Erica nana* (VU; Protected [Provincial Schedule 4])
- *Erica oxysepala* (VU; Protected [Provincial Schedule 4])
- *Erica rehmii* (VU; Protected [Provincial Schedule 4])
- *Erica tarantulae* (VU; Protected [Provincial Schedule 4])
- *Eriospermum spirale* (VU)
- *Euchaetis pungens* (VU; Protected [Provincial Schedule 4])
- *Euryops serra* (VU)
- *Euthystachys abbreviata* (VU)
- *Ficinia distans* (VU)
- *Geissorhiza monanthos* (VU; Protected [Provincial Schedule 4])
- *Geissorhiza silenoides* (VU; Protected [Provincial Schedule 4])
- *Helichrysum incarnatum* (VU)
- *Hermannia rugosa* (VU)
- *Hesperantha brevifolia* (VU; Protected [Provincial Schedule 4])
- *Indigofera triquetra* (VU)
- *Isolepis leucoloma* (VU)
- *Ixia abbreviata* (VU; Protected [Provincial Schedule 4])
- *Ixia tenuis* (VU; Protected [Provincial Schedule 4])
- *Klattia flava* (VU; Protected [Provincial Schedule 4])
- *Lachenalia aloides* (VU; Protected [Provincial Schedule 4])
- *Lachenalia corymbosa* (VU; Protected [Provincial Schedule 4])
- *Lachenalia mediana subsp. mediana* (VU; Protected [Provincial Schedule 4])
- *Lachenalia stayneri* (VU; Protected [Provincial Schedule 4])
- *Lachnaea capitata* (VU)
- *Lachnaea grandiflora* (VU)
- *Lachnaea pusilla* (VU)

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- *Lachnaea uniflora* (VU)
- *Lampranthus aureus* (VU; Protected [Provincial Schedule 4])
- *Lampranthus filicaulis* (VU; Protected [Provincial Schedule 4])
- *Lampranthus peacockiae* (VU; Protected [Provincial Schedule 4])
- *Lampranthus spiniformis* (VU; Protected [Provincial Schedule 4])
- *Lampranthus stenopetalus* (VU; Protected [Provincial Schedule 4])
- *Lepidium pinnatum* (VU)
- *Leucadendron argenteum* (VU; Nationally Protected Tree)
- *Leucadendron procerum* (VU; Protected [Provincial Schedule 4])
- *Leucospermum catherinae* (VU; Protected [Provincial Schedule 4])
- *Leucospermum grandiflorum* (VU; Protected [Provincial Schedule 4])
- *Leucospermum vestitum* (VU; Protected [Provincial Schedule 4])
- *Lobostemon capitatus* (VU)
- *Lotononis rigida* (VU)
- *Metalasia capitata* (VU)
- *Metalasia octoflora* (VU)
- *Metalasia rhoderoides* (VU)
- *Metalasia serrulata* (VU)
- *Micranthus thereianthoides* (VU; Protected [Provincial Schedule 4])
- *Moraea incurva* (VU; Protected [Provincial Schedule 4])
- *Moraea villosa subsp. elandsmontana* (VU; Protected [Provincial Schedule 4])
- *Moraea villosa subsp. villosa* (VU; Protected [Provincial Schedule 4])
- *Muraltia macropetala* (VU)
- *Muraltia spicata* (VU)
- *Muraltia tenuifolia* (VU)
- *Nenax hirta subsp. hirta* (VU)
- *Othonna ciliata* (VU)
- *Oxalis meisneri* (VU)
- *Pauridia alba* (VU)
- *Pelargonium leptum* (VU)
- *Phylica ampliata* (VU)
- *Phylica cylindrica* (VU)
- *Phylica plumosa var. horizontalis* (VU)
- *Phylica stenopetala var. stenopetala* (VU)
- *Phylica strigulosa* (VU)
- *Protea angustata* (VU; Protected [Provincial Schedule 4])
- *Protea aspera* (VU; Protected [Provincial Schedule 4])
- *Protea burchellii* (VU; Protected [Provincial Schedule 4])
- *Protea cryophila* (VU; Protected [Provincial Schedule 4])
- *Protea lacticolor* (VU; Protected [Provincial Schedule 4])
- *Protea scabra* (VU; Protected [Provincial Schedule 4])
- *Protea scolymocephala* (VU; Protected [Provincial Schedule 4])
- *Protea scorzonerifolia* (VU; Protected [Provincial Schedule 4])
- *Psoralea alata* (VU)
- *Pterygodium cleistogamum* (VU; Protected [Provincial Schedule 4])
- *Restio coactilis* (VU)
- *Restio duthieae* (VU)
- *Restio paludosus* (VU)
- *Restio papillosus* (VU)
- *Romulea albomarginata* (VU; Protected [Provincial Schedule 4])
- *Ruschia diversifolia* (VU; Protected [Provincial Schedule 4])
- *Ruschia geminiflora* (VU; Protected [Provincial Schedule 4])
- *Ruschia rubricaulis* (VU; Protected [Provincial Schedule 4])
- *Salvia thermarum* (VU)
- *Sensitive Species X14* (VU)
- *Sensitive Species X16* (VU; Protected [Provincial Schedule 4])
- *Sensitive Species X17* (VU; Protected [Provincial Schedule 4])
- *Sensitive Species X19* (VU; Protected [Provincial Schedule 4])
- *Sensitive Species X28* (VU; Protected [Provincial Schedule 4])
- *Sensitive Species X4* (VU; Protected [Provincial Schedule 4])
- *Sensitive Species X7* (VU; Protected [Provincial Schedule 4])
- *Sensitive Species X9* (VU; Protected [Provincial Schedule 4])
- *Serruria candicans* (VU; Protected [Provincial Schedule 4])
- *Serruria cyanoides* (VU; Protected [Provincial Schedule 4])
- *Serruria rubricaulis* (VU; Protected [Provincial Schedule 4])
- *Serruria triternata* (VU; Protected [Provincial Schedule 4])
- *Sorocephalus capitatus* (VU; Protected [Provincial Schedule 4])
- *Sparaxis tricolor* (VU; Protected [Provincial Schedule 4])
- *Spatalla mollis* (VU; Protected [Provincial Schedule 4])
- *Spatalla propinqua* (VU; Protected [Provincial Schedule 4])
- *Spatalla thyrsiflora* (VU; Protected [Provincial Schedule 4])
- *Spetaea lachenaliiflora* (VU)
- *Thamnochortus dumosus* (VU)
- *Thesmophora scopulosa* (VU)
- *Trachyandra chlamydophylla* (VU)
- *Wachendorfia brachyandra* (VU)
- *Wurmbea inusta* (VU)
- *Xiphotheca lanceolata* (VU)

2.1.3. Alien and Invasive Plant Species

A total of 257 alien plant species have been recorded within the extracted area, with 75 of them being listed invasive species within the NEM:BA A&IS Regulations (note that if "Category Multi" exists in this list, then it is intended to indicate that the listing of the species in question is context dependent; should such a species be found on site, then the category applicable to its context will be made clear in the sections on site-specific results). The NEM:BA A&IS Regulations species are:

- *Acacia baileyana* (Bailey's wattle; Category 3)
- *Acacia cyclops* (Red eye; Category 1b)
- *Acacia decurrens* (Green wattle; Category 2)
- *Acacia elata* (Pepper tree wattle; Category 1b)

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- *Acacia implexa* (Screw pod wattle; Category 1a)
- *Acacia longifolia* (Long-leaved wattle; Category 1b)
- *Acacia mearnsii* (Black wattle; Category 2)
- *Acacia melanoxylon* (Australian blackwood; Category 2)
- *Acacia podalyriifolia* (Pearl acacia; Category 1b)
- *Acacia pycnantha* (Golden wattle; Category 1b)
- *Acacia saligna* (Port Jackson, Port Jackson willow; Category 1b)
- *Acer negundo* (Ash-leaved maple, Box elder; Category Multi)
- *Anredera cordifolia* (Madeira vine, Bridal wreath; Category 1b)
- *Araujia sericifera* (Moth catcher; Category 1b)
- *Arundo donax* (Giant reed, Spanish reed; Category 1b)
- *Casuarina cunninghamiana* (Beefwood; Category Multi)
- *Catharanthus roseus* (Madagascar periwinkle; Category Multi)
- *Cirsium vulgare* (Spear thistle, Scotch thistle; Category 1b)
- *Coreopsis lanceolata* (Tickseed; Category 1b)
- *Cuscuta campestris* (Common dodder; Category 1b)
- *Datura ferox* (Large thorn apple; Category 1b)
- *Datura stramonium* (Common thorn apple; Category 1b)
- *Echium plantagineum* (Patterson's curse; Category 1b)
- *Echium vulgare* (Blue echium; Category 1b)
- *Eriobotrya japonica* (Loquat; Category Multi)
- *Eucalyptus camaldulensis* (River red gum; Category Multi)
- *Eucalyptus cladocalyx* (Sugar gum; Category Multi)
- *Hakea drupacea* (Sweet hakea; Category 1b)
- *Hakea salicifolia* (Willow hakea; Category Multi)
- *Hakea sericea* (Silky hakea; Category 1b)
- *Ipomoea indica* (Blue morning glory; Category 1b)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)
- *Leucaena leucocephala* (Leucaena; Category 2)
- *Limonium sinuatum* (Statice, Sea lavender; Category Multi)
- *Lythrum hyssopifolia* (Hyssop loosestrife; Category 1b)
- *Melia azedarach* (Syringa; Category Multi)
- *Myriophyllum aquaticum* (Parrot's feather; Category 1b)
- *Myriophyllum spicatum* (Spiked water-milfoil; Category 1b)
- *Nerium oleander* (Oleander; Category 1b)
- *Nicotiana glauca* (Wild tobacco; Category 1b)
- *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi)
- *Orobanche ramosa* (Blue broomrape, Branched broomrape; Category 1b)
- *Paraserianthes lophantha* (Australian albizia, Stink bean; Category 1b)
- *Passiflora caerulea* (Blue passion flower; Category 1b)
- *Persicaria capitata* (Knotweed; Category 1b)
- *Phytolacca americana* (American pokeweed; Category 1b)
- *Phytolacca octandra* (Forest inkberry; Category 1b)
- *Pinus canariensis* (Canary pine; Category 3)
- *Pinus halepensis* (Aleppo pine; Category Multi)
- *Pinus pinaster* (Cluster pine; Category Multi)
- *Pinus radiata* (Radiata pine, Monterey pine; Category Multi)
- *Pittosporum undulatum* (Australian cheesewood, Sweet pittosporum; Category 1b)
- *Poa pratensis* (Kentucky bluegrass; Category Multi)
- *Populus alba* (White poplar; Category 2)
- *Psidium guajava* (Guava; Category Multi)
- *Ricinus communis* (Castor-oil plant; Category 2)
- *Robinia pseudoacacia* (Black locust; Category 1b)
- *Rumex acetosella* (Sheep sorrel, Red sorrel; Category Multi)
- *Sagittaria platyphylla* (Delta arrowhead, Slender arrowhead; Category 1a)
- *Salsola kali* (Tumbleweed; Category 1b)
- *Salsola tragus* (Russian tumbleweed; Category 1b)
- *Senna didymobotrya* (Peanut butter cassia; Category Multi)
- *Sesbania punicea* (Red sesbania; Category 1b)
- *Solanum betaceum* (Tree tomato; Category Multi)
- *Solanum mauritianum* (Bugweed; Category 1b)
- *Solanum pseudocapsicum* (Jerusalem cherry; Category 1b)
- *Solanum sisymbriifolium* (Wild tomato, Dense- thorned bitter apple; Category 1b)
- *Spartium junceum* (Spanish broom; Category Multi)
- *Stellaria media* (Common chickweed; Category Multi)
- *Tecoma stans* (Yellow bells; Category 1b)
- *Tradescantia fluminensis* (Wandering Jew; Category 1b)
- *Verbena bonariensis* (Wild verbena, Tall verbena, Purple top; Category 1b)
- *Vinca major* (Greater periwinkle; Category 1b)
- *Xanthium spinosum* (Spiny cocklebur; Category 1b)
- *Xanthium strumarium* (Large cocklebur; Category 1b)

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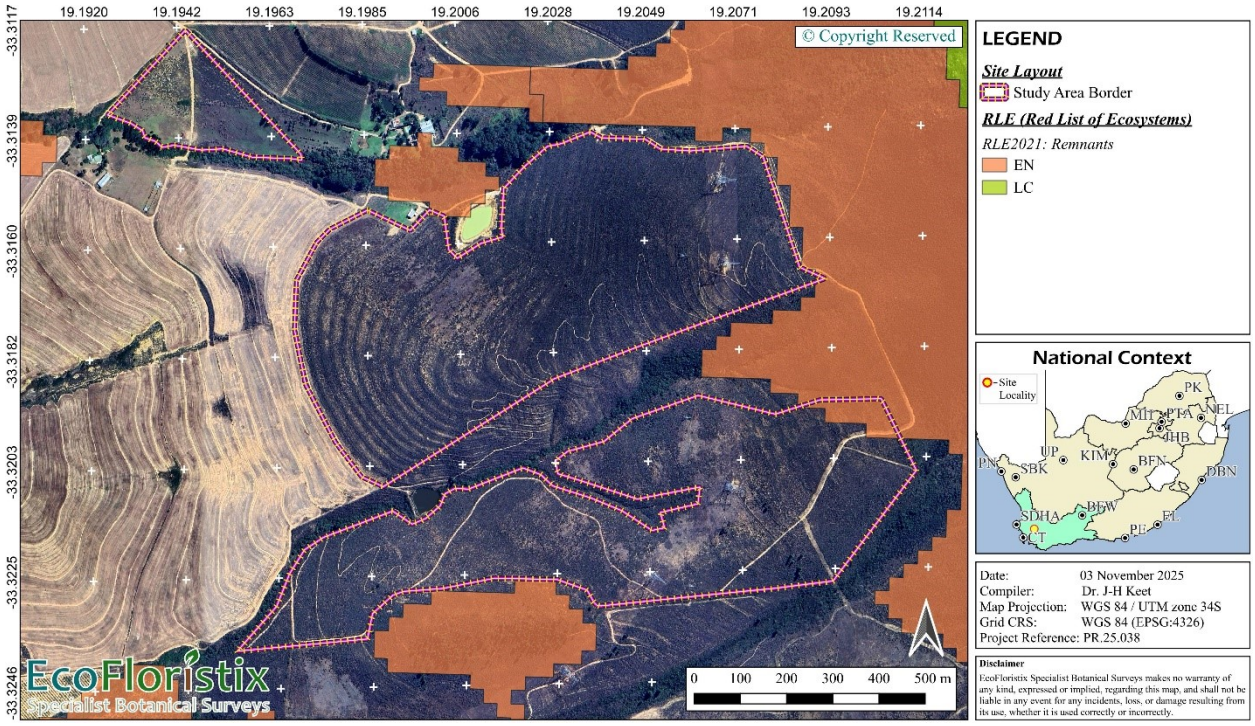
2.2. Desktop Analyses: Ecologically Important Landscape Features

2.2.1. Ecosystem Threat Status: RLE 2021 and NBA 2018



Map 7: Ecosystem Threat Status, according to the Red List of Ecosystems for South Africa (2021), associated with the study area and surrounds.

According to the Red List of Ecosystems for South Africa (RLE 2021) spatial dataset the study area only overlaps slightly with an Endangered ecosystem (specifically in Agterstekamp), namely Breede Shale Fynbos (Map 7). The National Biodiversity Assessment 2018 essentially presents the same information.

Ground truthing determined that Breede Shale Fynbos does not occur within the study area. However, it does occur to east of the study area border (near Damkamp and Agterstekamp), but will not be impacted by the proposed activities since it occurs upslope of the study area.

See section 9.2.1 for more details and notes on Ecosystem Threat Status categories.

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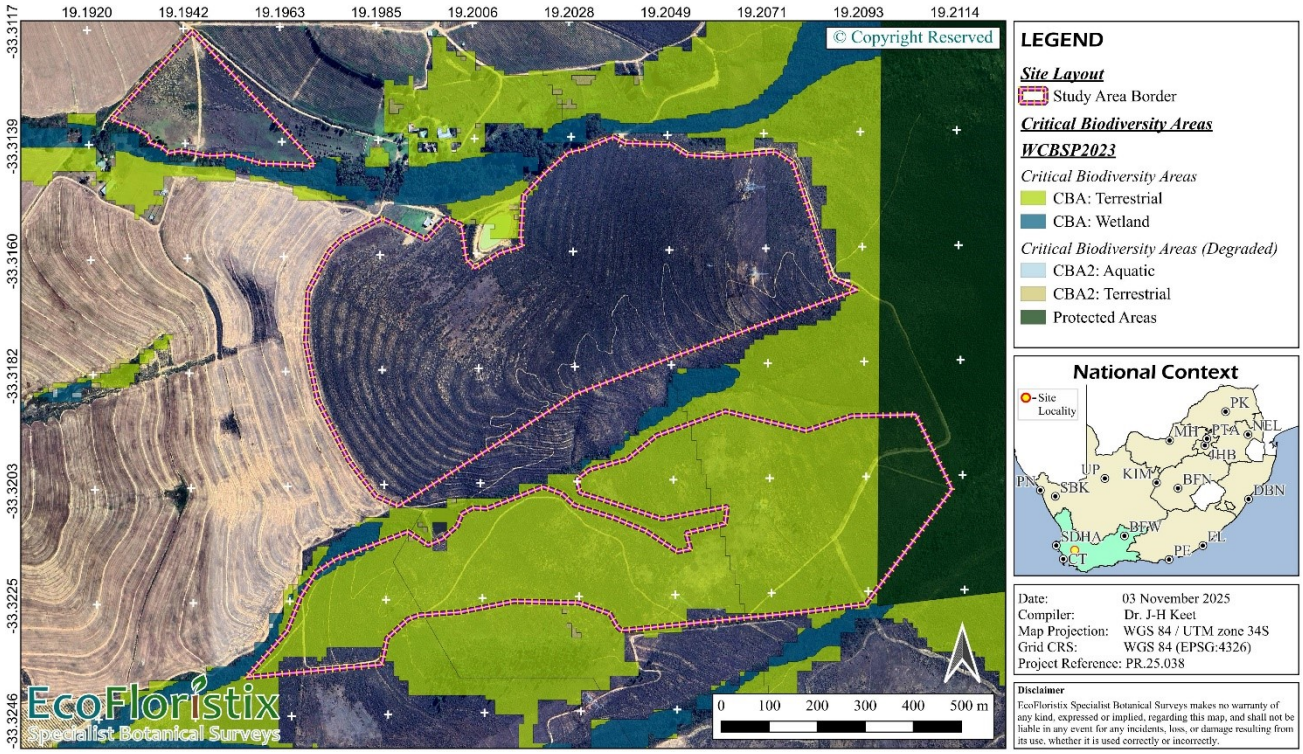
2.2.2. Critical Biodiversity Areas and Ecological Support Areas



Map 8: Layout of Critical Biodiversity Areas within the study area and surrounds.

The study area overlaps mostly with a CBA1 (Terrestrial) area, specifically in Agterstekamp (Map 8). A small section to the east of Agterstekamp overlaps with a Formal Protected Area (Witzenberg Nature Reserve).

The classification for Agterstekamp as being CBA1 is not correct, since CBA1 areas are those that are in a natural condition and are required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure. Thus, even though Secondary Renosterveld has developed over time given that the area has been laid fallow for almost 20 years (if not more), it still does not qualify for CBA1 or CBA2 status. This is because, despite the area harbouring some SCC, it is over dominated by renosterbos (*Dicerothamnus rhinocerotis*), which occurs in an extremely high density and makes up at least between 80 – 90% of this camp, as well as Damkamp (see photo D2 in Figure 2 and S2 in Figure 3). It therefore does not resemble true Breede Shale Renosterveld and does not qualify as CBA according to the definition (i.e., CBAs are of high biodiversity and ecological value and must be kept in a natural or near-natural state).

As such, these two camps (Damkamp and Agterstekamp) might better be considered as ESA1 areas since they are still functional, and even harbour SCC as mentioned, thereby acting as buffer areas to aid surrounding natural vegetation.

In contrast, nothing has been mapped for Driehoekkamp and this is correct since it is highly modified and does not contribute to potentially meeting any biodiversity targets.

See section 9.2.4 for more details and notes on CBA and ESA categories.

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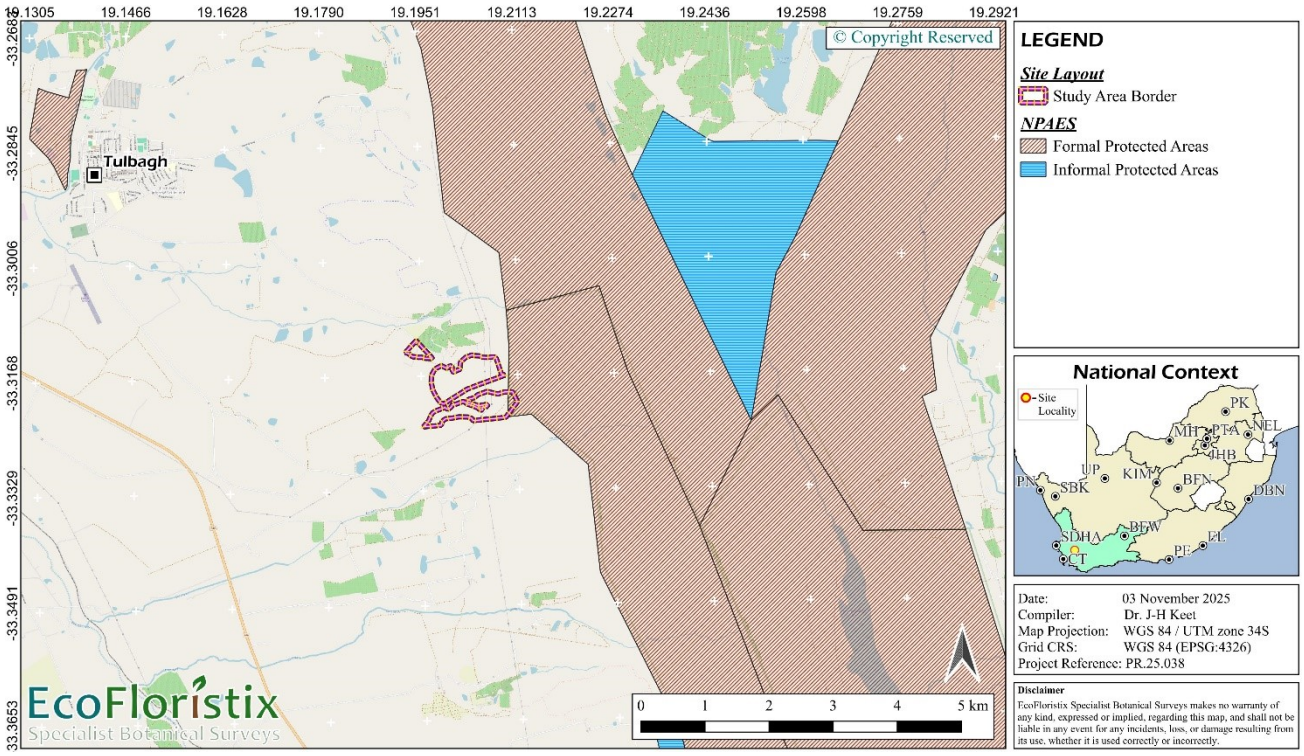
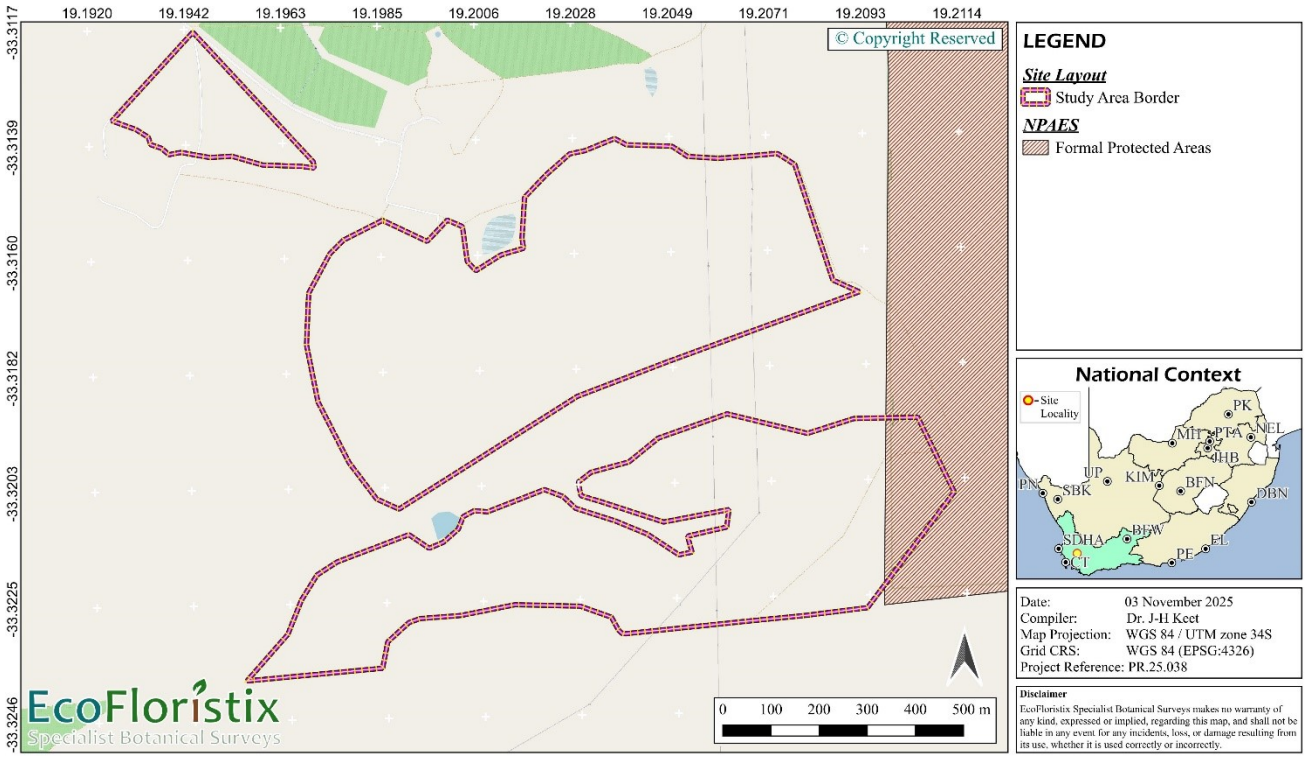
2.2.3. National Protected Area Expansion Strategy



Map 9: Study area locality in relation to designated areas of the National Protected Area Expansion Strategy (NPAES).



Map 10: Similar to Map 9, but specifically zoomed in to the study area.

The study area is not located within or near any NPAES Focus Areas (Map 9). However, a small part of it is located within a Formal Protected Area (Witzenberg Nature Reserve). This is specifically in the eastern section of Agterstekamp. This

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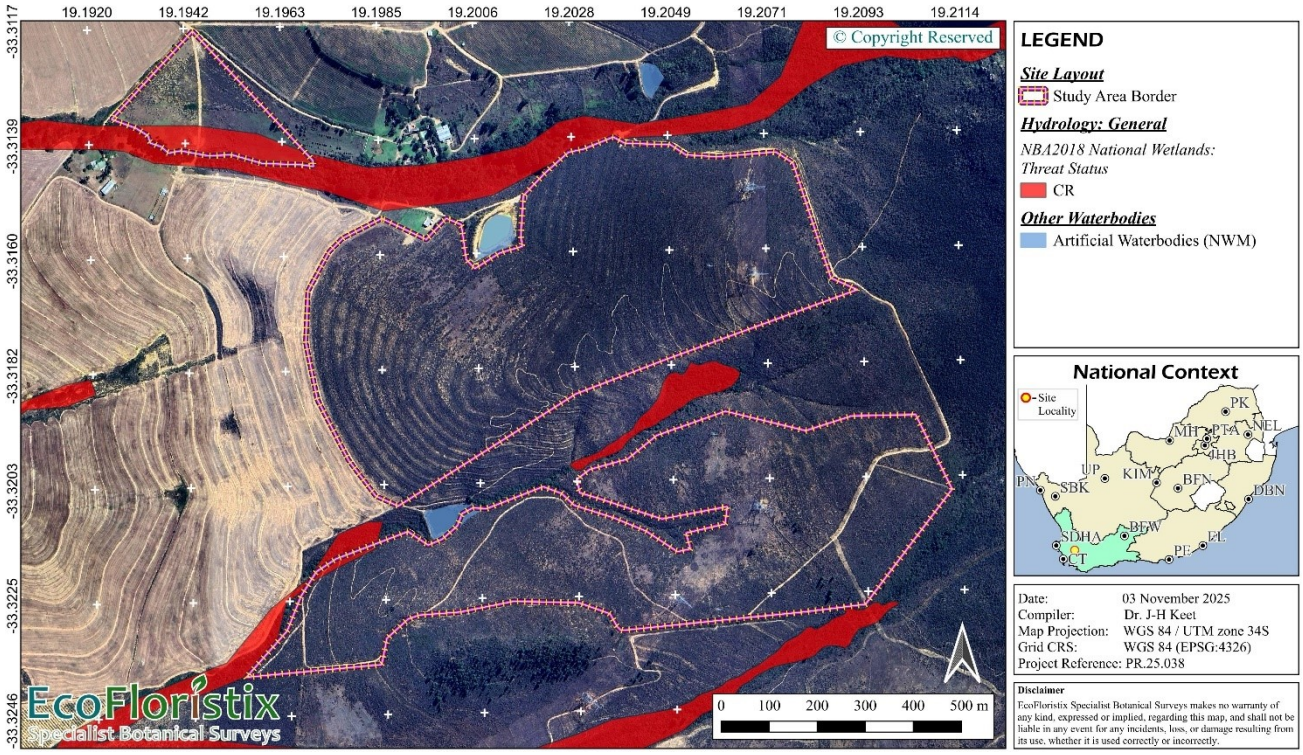
specific part should be excluded for consideration in the proposed activities since it is extremely unlikely that environmental authorization would be obtained to conduct the proposed activities within it. Note that this only applies to the portion of Agterstekamp that overlap with the Witzenberg Nature Reserve.

If the Witzenberg Nature Reserve area is excluded, then the Project will not have any major impacts on any NPAES area targets.

See section 9.2.3 for more details and notes on the NPAES.

2.2.4. Hydrological Features



Map 11: Hydrological setting of the study area and surrounds in the context of Strategic Water Source Areas (SWSA) and Freshwater Ecosystem Priority Areas (FEPA), as well as general hydrology .

The study area is not located within any SWSA ((Map 11).

A few areas mapped as wetlands (Critically Endangered) occur in between and around the study area, with some of them overlapping the study area itself. Firstly, these are watercourses with associated riparian vegetation, and should not be considered as wetlands. Secondly, the parts overlapping the study area border are mapped incorrectly since they do not reach that far. This is especially applicable to Driehoekkamp, where the "wetland" area has been mapped to overlie a agricultural field which in reality is disturbed and highly modified, and not a wetland.

Note that this section is intended to give a broad overview only and is not intended to replace an Aquatic Specialist Report if such a report is deemed necessary.

See sections 9.2.4 and 9.2.5 for more details and notes on NFEPA and SWSA.

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2.3. Fieldwork and Site Inspection: Assessment of the Proposed Development Site and Surrounds

This section describes the different habitats and vegetation patterns, as expressed in plant community types, observed within the study area and surrounds. As these are field-based observations, they are more reliable and applicable than the coarsely mapped results of VegMap, which does not yet adequately represent such finer details.

The botanical survey was conducted on 10 October 2025. This timeframe falls only slightly at the end of the optimum surveying period (which is generally accepted to be during spring; also see section 1.5 for assumptions and potential limitations). The vegetation was in a relatively good condition for surveying, and in fact quite a number bulbous and other species were in full flower, which was highly beneficial.

A total distance of ± 11 km was surveyed on foot across the study area as well as by vehicle. Together with this, numerous drone reconnaissance trips (total of ± 8.4 km) were made to gather data and insights on various landscape features, such as differences in vegetation composition and structure, watercourses, anomalies, potential infestations of invasive alien plant species, etc.

The study area was therefore well surveyed given that the widest point of any polygon is a maximum of ± 1.5 km, with the total area being about 91 ha and its total perimeter about 8.5 km.

2.3.1. Plant Community Types

The study area is mapped by VegMap as a mix of Breede Alluvium Fynbos, Breede Shale Fynbos, and Breede Shale Renosterveld, the latter two of which are mapped to occupy most of the site (section 2.1.1).

Firstly, Breede Alluvium Fynbos was not found on-site. This is likely partly due to the unit having being over-mapped (i.e., mapping is still too coarse) in this specific area, and partly due to the study area having been heavily modified by ploughing in the past. Secondly, Breede Shale Fynbos was also not observed on-site (though it does occur upslope of Agterstekamp and Damkamp, i.e., to the east). Similar to Breede Alluvium Fynbos, this is likely due to the study area having been heavily modified by ploughing in the past (Breede Shale Fynbos is specifically only mapped for Agterstekamp and Damkamp). There is nearly a complete absence of Proteaceae and Restionaceae, with only a few scattered individuals of *P. laurifolia* at the very eastern-most border (which is also the highest in elevation) and a few individuals of *Leucadendron salignum* and one of *L. lanigerum*. Other species characteristic and dominant of Breede Shale Fynbos, such as *P. nitida*, *Leucadendron eucalyptifolium*, *Dodonaea viscosa*, *Cliffortia ruscifolia*, *Erica hispida*, *E. versicolor*, and *Stoebe cinerea*, are also essentially absent or nearly so. It is only further upslope — i.e., further east of the study area border — that Breede Shale Fynbos becomes present. Thus, the only vegetation type occurring on-site, to which it also does not bear complete resemblance, is Breede Shale Renosterveld.

A total of 3 broad plant community types were found in the study area and surrounds:

- Disturbed Old Field
- Riparian Vegetation
- Secondary Renosterveld

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Further to this, for mapping purposes the so-called "Servitude Line and Low Vegetation" has been delineated separately, but it forms a subset of the Secondary Renosterveld plant community type. Regular clearing activities of this area supresses dominance of renosterbos (*Dicerothamnus rhinocerotis*) that characterizes the rest of the Secondary Renosterveld areas. A Brush-cut Area also exists below the Secondary Renosterveld plant community type which is mostly devoid of vegetation.

Plant community types are based on characteristic dominant plant species, and are discussed in more detail in the subsequent sections, with representative photos given where applicable. These were the major plant community types present in the study area; however, it must be noted that variation occurs across the landscape, and species presences and abundances are not constant.

The following is a brief overall summary (the sections hereafter present specific details): a total of 90 plant species were found within the surveyed areas, which consisted of 74 native, 6 SCC, 19 protected (note: this might include some of the SCC), 25 Western Cape Endemic, 16 alien, and 7 NEM:BA A&IS Regulations listed species.

Furthermore, a total of 15 species were recorded within the surveyed areas that were not recorded within online databases for the area (i.e., POSA and iNaturalist), 1 of which is protected and 4 are alien. Also see Table 2.

Table 2: Plant species summary statistics for the plant community types/subtypes of the study area and broader surrounding area (compare with Map 12). "Unique" species were only observed in the specific plant community type/subtype in question, and not in others (note: this does not mean such species cannot or do not occur in others, but only that they were not specifically observed in the others during surveying; see section 1.5 for general survey limitations). "Shared" species were shared between two or more types/subtypes. Note that overall total values might be less than the sum of all the respective values, given that species can be shared between plant community types. Also note that these are summary values, and are expanded more in-depth in the sections that follow. SCC = Species of Conservation Concern; THREAT = Threatened species ("CR PE", "CR", "EN", or "VU"; see section 9.3.1); PEN = Provincial 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/subtype that had the highest number of plant species, while the row in light-red indicates the plant community type/ subtype that had the lowest number of plant species. Note that only main plant community types are included here.

	Total	Shared	Unique	%Unique	SCC	THREAT	Protected	PEN	Native	Alien	NEM:BA
Plant Community											
Disturbed Old Field	18	6	12	67	0	0	0	0	9	9	2
Riparian Vegetation	25	6	19	76	0	0	2	2	20	5	3
Secondary Renosterveld	57	7	50	88	6	3	17	24	54	3	2
Totals											
N/A	90	N/A	N/A	N/A	6	3	19	25	74	16	7

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Table 3: Spatial extents of identified plant community types (as well as subtypes and/or other land types where applicable) within the study area. Also compare with Table 2.

Plant Community	Total Area (ha)	Total Area (percent)
Brush-cut Area	39.59	43.41
Disturbed Old Field	5.57	6.11
Secondary Renosterveld	39.92	43.77
Servitude Line and Low Vegetation	6.13	6.72
TOTAL	1373.71	100.00

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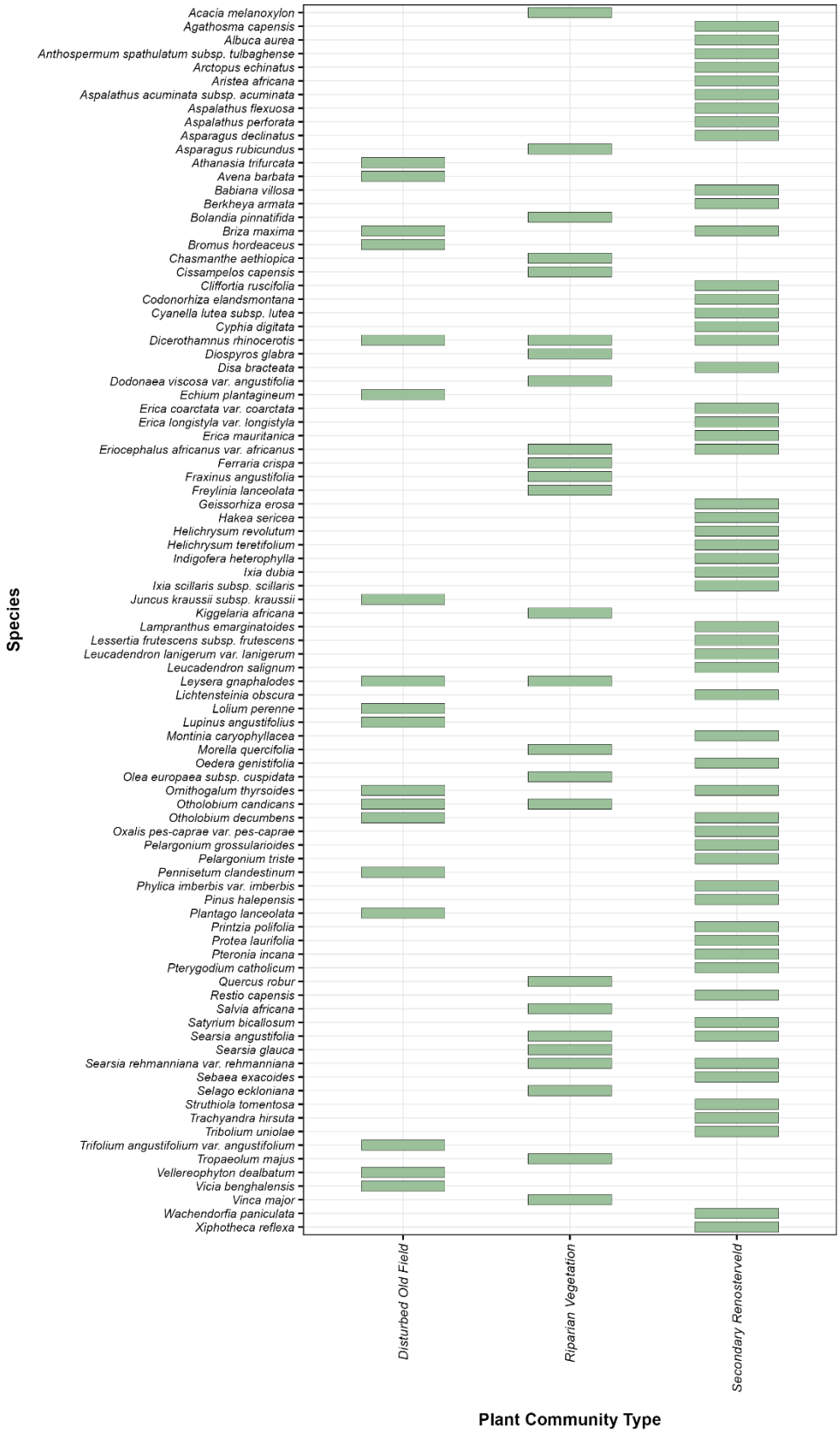

Figure 1: Presence/absence matrix of plant species for each plant community (or subcommunity) type within the study area and broader surrounds. The presence of a block indicates the presence of the respective plant species within the respective plant community. This figure is a valuable reference to visually determine either how many (and which) species occurred in a specific plant community, or in how many (and which) plant communities a specific species occurred.

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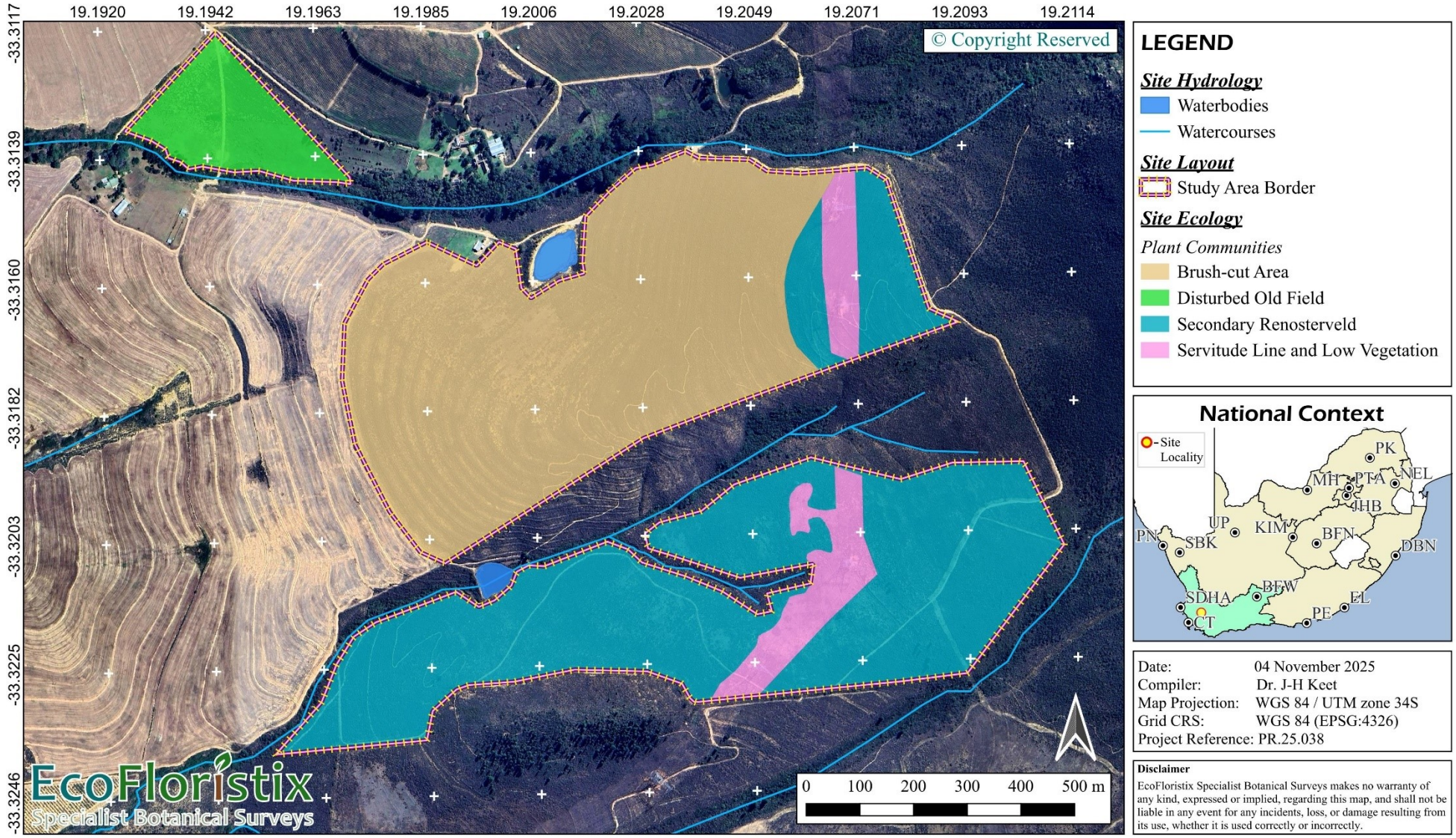

Map 12: Plant communities and other land types that were observed in the study area and immediate surrounds. See Figure 2 and Figure 3 for photos.

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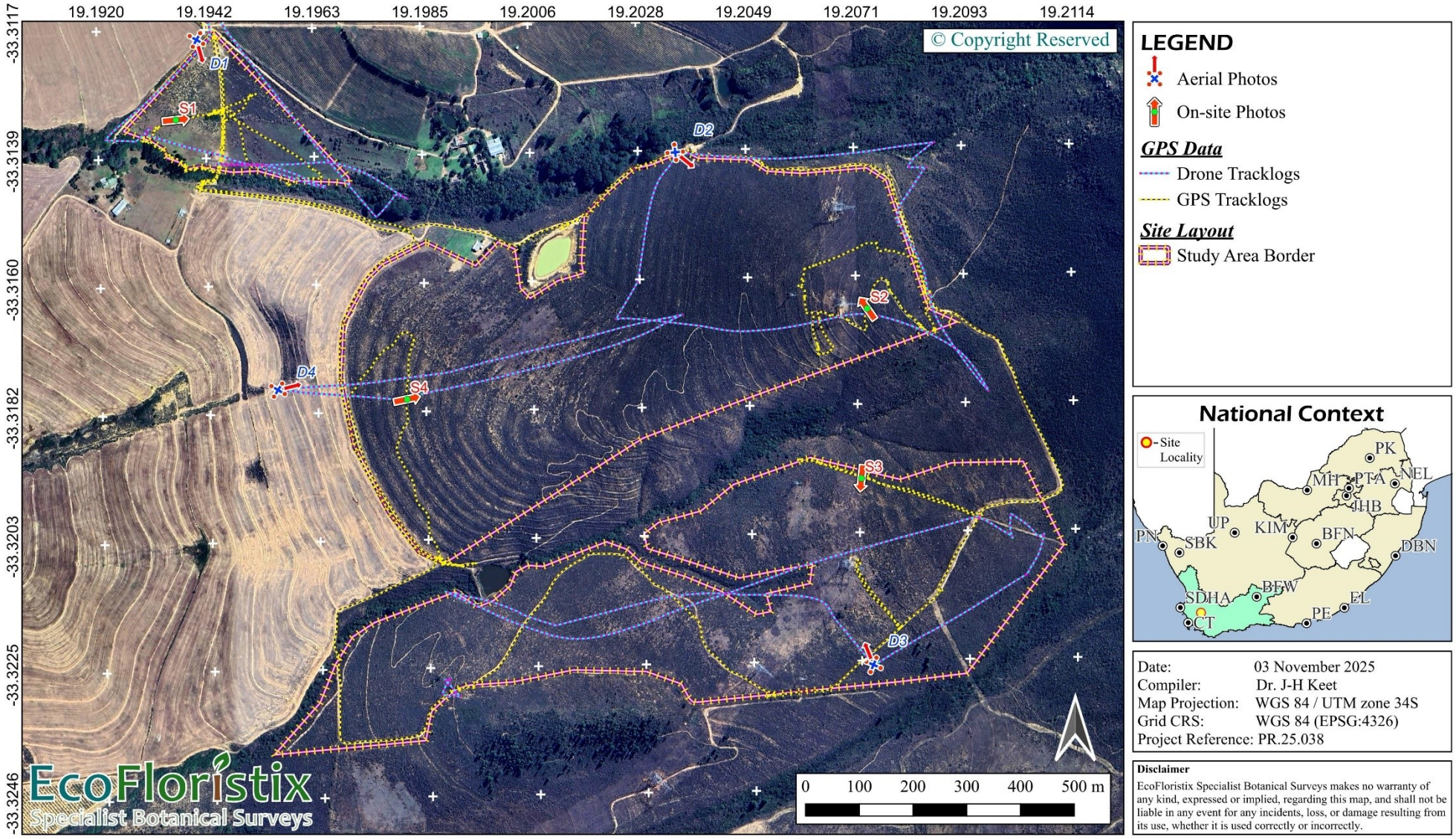

Map 13: Photo localities and survey tracklogs for the study area. See Figure 2 and Figure 3 for photos.

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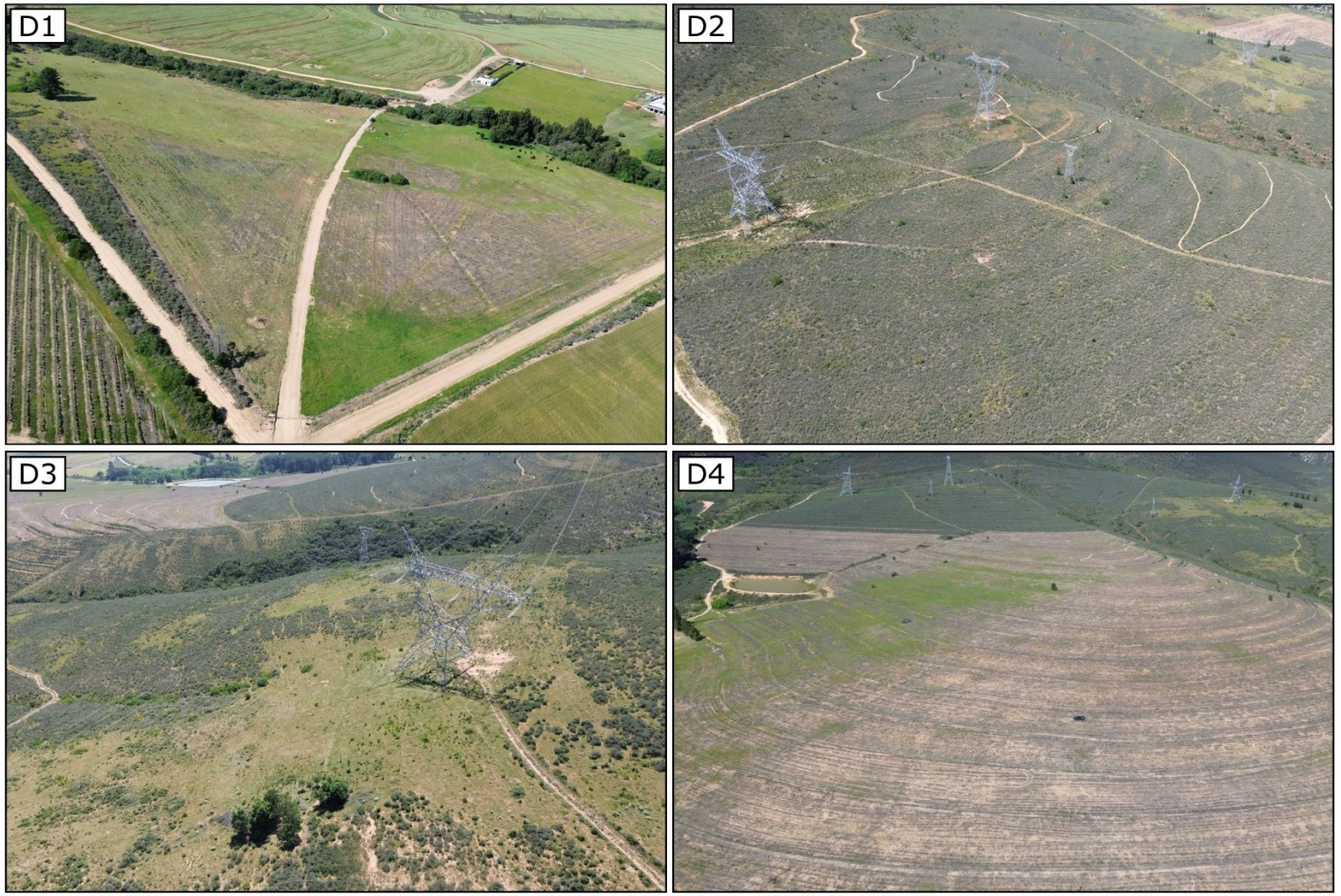

Figure 2: Representative aerial photos of the landscape and plant communities observed in the study area and surrounds; see Map 13 for photo localities and directions and Figure 2 to Figure 3 for on-site photos. D1) View of the Disturbed Old Field community (corresponding to Driehoekkamp). D2) Secondary Renosterveld in Damkamp. D3) The Servitude Line and Low Vegetation community showing a more open vegetation structure. D4) The Brush-cut Area occurring to the west of the Secondary Renosterveld community.

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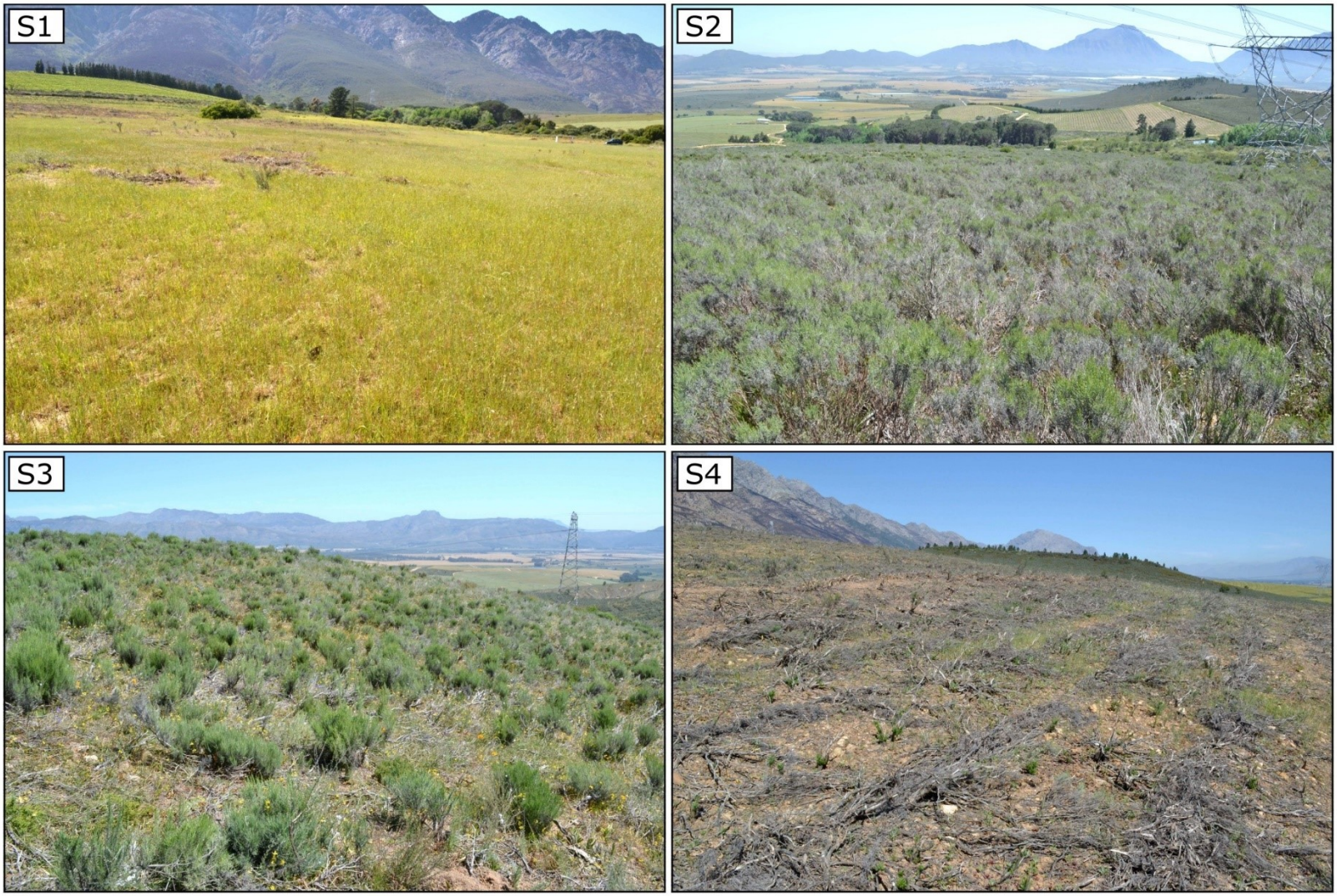

Figure 3. On-site photos of the various plant community types. These correspond to Figure 2, and are S1) Disturbed Old Field community, S2) Secondary Renosterveld, S3) Servitude Line and Low Vegetation community, and S4) Brush-cut Area. See Map 13 for photo localities.

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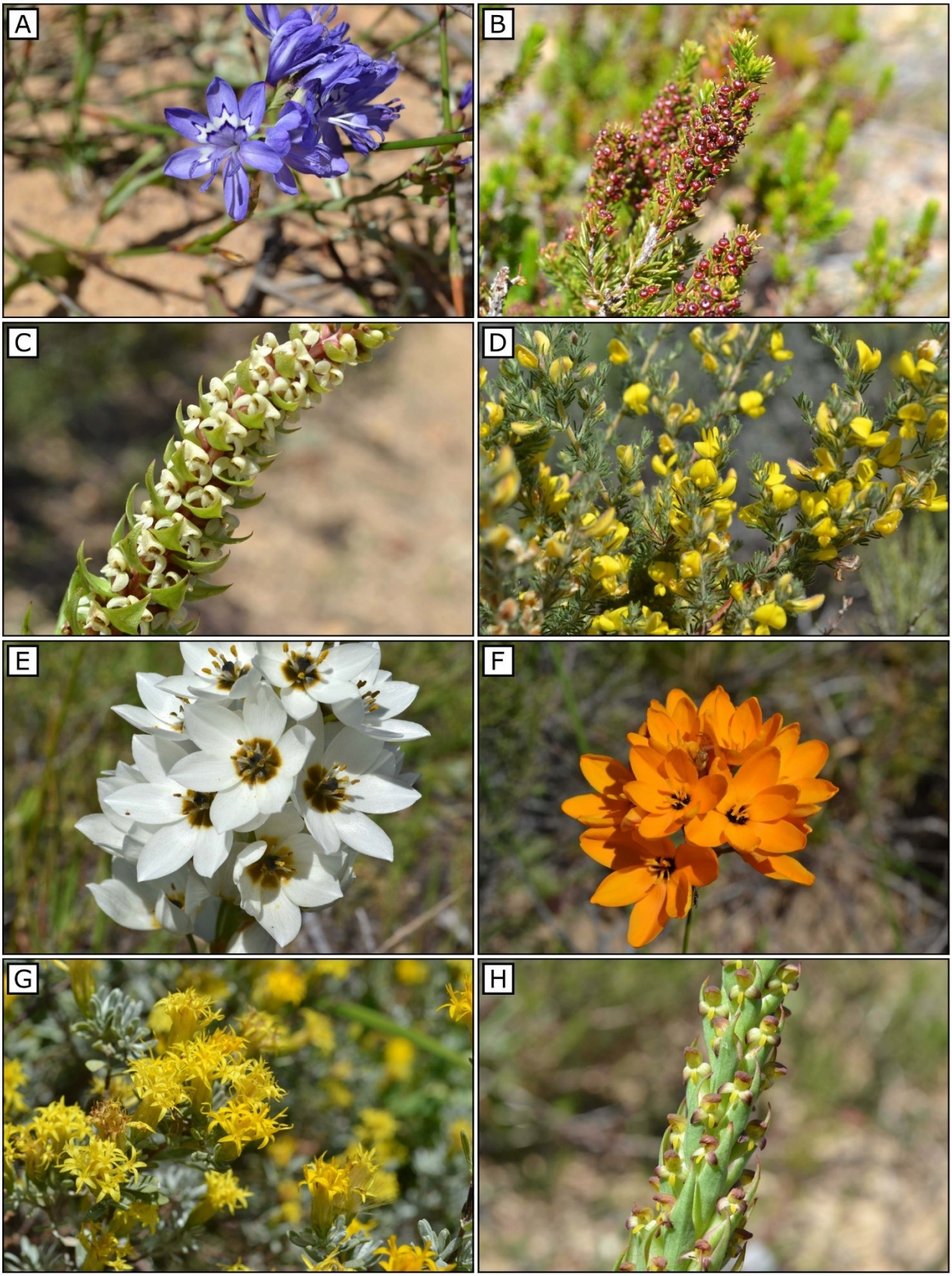

Figure 4: Selected representative plant species that were found within the study area and surrounds: A) *Codonorhiza elandsmontana*, B) *Erica coarctata* var. *coarctata*, C) *Satyrium bicallosum*, D) *Aspalathus flexuosa*, E) *Ornithogalum thyrsoides*, F) *Ixia dubia*, G) *Pteronia incana*, and H) *Disa bracteata*.

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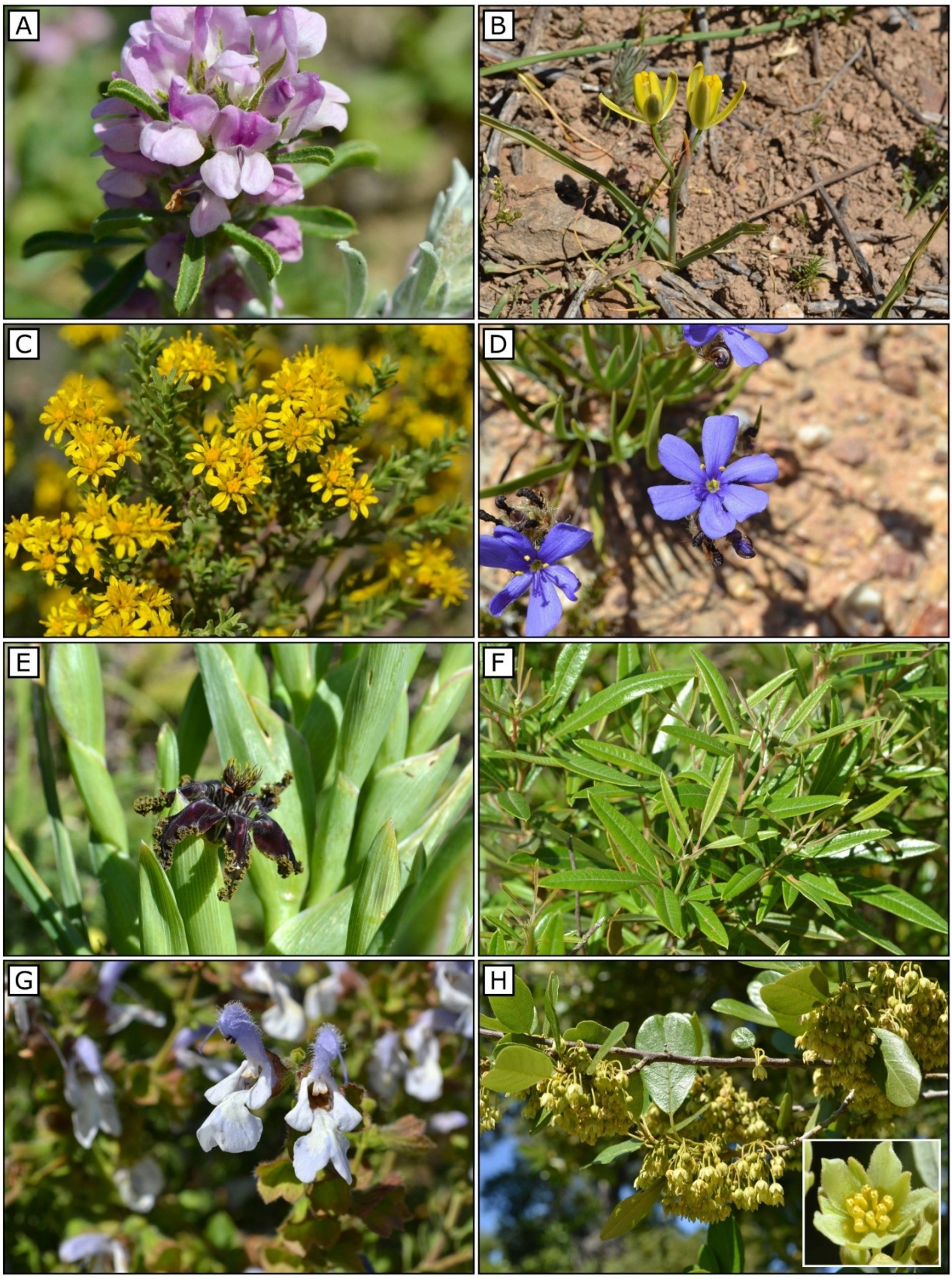

Figure 5: More selected representative plant species that were found within the study area and surrounds: A) ***Psoralea decumbens*****, B)** ***Albuca aurea*****, C)** ***Oedera genistifolia*****, D)** ***Aristea africana*****, E)** ***Ferraria crispa*****, F)** ***Searsia angustifolia*****, G)** ***Salvia africana*****, and H)** ***Kiggelaria africana*****.**

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2.3.1.a) Secondary Renosterveld

Species Summary Statistics:

Total: 56

Shared:	7	SCC:	6	Native:	53
Unique:	50	Threatened:	3	Alien:	3
%Unique:	88	Protected:	17	NEM:BA:	2
		PEN:	24		

Vegetation Structure Summary:

Vegetation Density (%): > 75

Tree Layer Height (cm):	300	Tree Layer Cover (%):	< 1
Shrub Layer Height (cm):	100 – 150	Shrub Layer Cover (%):	80
Forb Layer Height (cm):	30	Forb Layer Cover (%):	5
Graminoid Layer Height (cm):	50	Graminoid Layer Cover (%):	1

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community. PEN — Provincial Endemic

This plant community type is located in Damkamp and Agterstekamp. It comprises a total area size of about 39.92 ha (43.77%) within the study area.

The topography is characterized by steep slopes with a western to southwestern aspect. Soils are clayey and typical of renosterveld. The vegetation is dominated by renosterbos (*Dicerothamnus rhinocerotis*), and is quite dense (> 75% cover).

The community conforms slightly to the VegMap vegetation type Breede Shale Renosterveld. These areas of Secondary Renosterveld have developed over historically ploughed fields. The majority of these have been fallow for almost 20 years, as can be seen by historic satellite imagery (specifically see Map 3). While the vegetation seems to have recovered well from these ploughing activities, especially given the relatively high diversity and presence of SCC currently on-site, the historic disturbance and lack of fire in the area has caused an extremely high dominance and cover of renosterbos.

An extremely high dominance of renosterbos could be detrimental, or at least hindering, to renosterveld ecosystems. Such a high dominance is usually an indicator of veld degradation. In this context it is not surprising given that the area was indeed heavily disturbed in the past. While the reestablishment and presence of renosterbos in this context has been very valuable for multiple reasons (stabilizing soils and protecting against erosion, modifying the environment to be more hospitable to less hardy species, providing shelter for fauna etc.), its continued proliferation and over-dominance can eventually crowd out other plant types that are also essential for supporting local fauna. Dense, monotonous renosterbos stands might hamper an increase of biodiversity in this context, which could diminish the potentially rich and complex floral structure that defines renosterveld.

Furthermore, a lack of fire critically hampers the long-term health and diversity of fire-prone renosterveld (and fynbos) ecosystems. These habitats are fire-adapted, and many indigenous species, including numerous geophytes and reseeding

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shrubs, require the heat, smoke, or removal of old growth provided by fire to germinate, flower, and successfully complete their life cycles. Without periodic burning, the vegetation becomes senescent (over-mature) and dense. This accumulation of dead biomass suppresses new growth, prevents seeds from germinating, and ultimately leads to an impoverished species composition and reduced overall ecosystem function. Fire is therefore a natural and necessary disturbance that rejuvenates the veld, promotes species diversity, and prevents the complete dominance of a few aggressive species like renosterbos.

Secondary Renosterveld currently only occupies most of Agterstekamp, but only the upper slopes of Damkamp, since the areas below it have been brush-cut (D4 in Figure 2 and S4 in Figure 3).

A total of 6 SCC and 17 protected species were found in this plant community type. The SCC occur mostly in the eastern — that is, the higher elevation — parts of Damkamp and Agterstekamp. They are:

- *Babiana villosa* (NT; Protected [Provincial Schedule 4])
- *Geissorhiza erosa* (EN; Protected [Provincial Schedule 4])
- *Ixia scillaris subsp. scillaris* (NT; Protected [Provincial Schedule 4])
- *Lampranthus emarginatoides* (DDT; Protected [Provincial Schedule 4])
- *Leucadendron lanigerum var. lanigerum* (EN; Protected [Provincial Schedule 4])
- *Xiphotheca reflexa* (EN)

The protected plant species are (all are protected under Provincial Schedule 4):

- *Agathosma capensis*
- *Aristea africana*
- *Codonorhiza elandsmontana*
- *Disa bracteata*
- *Erica coarctata var. coarctata*
- *Erica longistyla var. longistyla*
- *Erica mauritanica*
- *Ixia dubia*
- *Leucadendron salignum*
- *Protea laurifolia*
- *Pterygodium catholicum*
- *Satyrium bicallosum*

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.

Two NEM:BA A&IS Regulations listed invasive plant species was observed, and in relatively low abundances, namely *Hakea sericea* (Silky hakea; Category 1b) and *Pinus halepensis* (Aleppo pine; Category Multi).

The following species were only observed in this plant community type (however, this does not mean such species cannot or do not occur in the other types, but only that they were not specifically observed in the other types during surveying):

- *Agathosma capensis* (LC; Protected [Provincial Schedule 4])
- *Albuca aurea* (LC)
- *Anthospermum spathulatum subsp. tulbaghense* (LC)
- *Arctopus echinatus* (LC)
- *Aristea africana* (LC; Protected [Provincial Schedule 4])
- *Aspalathus acuminata subsp. acuminata* (LC)
- *Aspalathus flexuosa* (LC)
- *Aspalathus perforata* (LC)
- *Asparagus declinatus* (LC)
- *Babiana villosa* (NT; Protected [Provincial Schedule 4])
- *Berkheya armata* (LC)
- *Cliffortia ruscifolia* (LC)

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- *Codonorhiza elandsmontana* (Protected [Provincial Schedule 4])
- *Cyanella lutea subsp. lutea* (LC)
- *Cyphia digitata* (LC)
- *Disa bracteata* (LC; Protected [Provincial Schedule 4])
- *Erica coarctata var. coarctata* (LC; Protected [Provincial Schedule 4])
- *Erica longistyla var. longistyla* (LC; Protected [Provincial Schedule 4])
- *Erica mauritanica* (LC; Protected [Provincial Schedule 4])
- *Geissorhiza erosa* (EN; Protected [Provincial Schedule 4])
- *Hakea sericea* (Not Evaluated)
- *Helichrysum revolutum* (LC)
- *Helichrysum teretifolium* (LC)
- *Indigofera heterophylla* (LC)
- *Ixia dubia* (LC; Protected [Provincial Schedule 4])
- *Ixia scillaris subsp. scillaris* (NT; Protected [Provincial Schedule 4])
- *Lampranthus emarginatoides* (DDT; Protected [Provincial Schedule 4])
- *Lessertia frutescens subsp. frutescens* (LC)
- *Leucadendron lanigerum var. lanigerum* (EN; Protected [Provincial Schedule 4])
- *Leucadendron salignum* (LC; Protected [Provincial Schedule 4])
- *Lichtensteinia obscura* (LC)
- *Montinia caryophyllacea* (LC)
- *Oxalis pes-caprae var. pes-caprae* (LC)
- *Pelargonium grossularioides* (LC)
- *Pelargonium triste* (LC)
- *Phylica imberbis var. imberbis* (LC)
- *Pinus halepensis* (Not Evaluated)
- *Printzia polifolia* (LC)
- *Protea laurifolia* (LC; Protected [Provincial Schedule 4])
- *Pteronia incana* (LC)
- *Pterygodium catholicum* (LC; Protected [Provincial Schedule 4])
- *Restio capensis* (LC)
- *Satyrium bicallosum* (LC; Protected [Provincial Schedule 4])
- *Sebaea exacoides* (LC)
- *Struthiola tomentosa* (LC)
- *Trachyandra hirsuta* (LC)
- *Tribolium uniolae* (LC)
- *Wachendorfia paniculata* (LC)
- *Xiphotheca reflexa* (EN)

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2.3.1.b) Disturbed Old Field

Species Summary Statistics:

Total:	**18**				
Shared:	6	SCC:	0	Native:	9
Unique:	12	Threatened:	0	Alien:	9
%Unique:	67	Protected:	0	NEM:BA:	2
		PEN:	0		

Vegetation Structure Summary:

Vegetation Density (%):	>75		
Tree Layer Height (cm):	0	Tree Layer Cover (%):	0
Shrub Layer Height (cm):	200	Shrub Layer Cover (%):	5
Forb Layer Height (cm):	40	Forb Layer Cover (%):	5
Graminoid Layer Height (cm):	20	Graminoid Layer Cover (%):	85

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community. PEN — Provincial Endemic

This plant community type is located in the northwestern section of the study area, and specifically occurs in Driehoekkamp. It is the smallest of the three study area polygons, comprising approximately 5.57 ha (6.11%).

The community does not conform to any of the VegMap vegetation types mapped for the region, primarily due to high levels of disturbance that have been present for at least 20 years or more (see Map 3). It is still used to house livestock.

The topography is characterized by moderate slopes with a southwestern aspect. The vegetation of this plant community type is dominated by alien grasses and other alien plant species, with scattered individuals of native shrubs and forbs. Vegetation cover is high (> 75%).

Dominant species include *Avena barbata*, *Briza maxima*, *Lolium perenne*, and *Pennisetum clandestinum*. No SCC or protected plant species were observed in this plant community type. A total of 9 alien species were observed, of which only one is a NEM:BA A&IS Regulations listed species, namely *Echium plantagineum* (Patterson's curse; Category 1b).

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

- *Athanasia trifurcata* (LC)
- *Avena barbata* (Not Evaluated)
- *Briza maxima* (Not Evaluated)
- *Bromus hordeaceus* (Not Evaluated)
- *Dicerothamnus rhinocerotis* (LC)
- *Echium plantagineum* (Not Evaluated)
- *Juncus kraussii subsp. kraussii* (LC)
- *Leysera gnaphalodes* (LC)
- *Lolium perenne* (Not Evaluated)
- *Lupinus angustifolius* (Not Evaluated)
- *Ornithogalum thyrsoides* (LC)
- *Otholobium candicans* (LC)
- *Otholobium decumbens* (LC)
- *Pennisetum clandestinum* (Not Evaluated)
- *Plantago lanceolata* (LC)

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- *Trifolium angustifolium var. angustifolium* (Not Evaluated)
- *Vellereophyton dealbatum* (LC)
- *Vicia benghalensis* (Not Evaluated)

2.3.1.c) Riparian Vegetation

Species Summary Statistics:

Total: 25

Shared:	6	SCC:	0	Native:	20
Unique:	19	Threatened:	0	Alien:	5
%Unique:	76	Protected:	2	NEM:BA:	3
		PEN:	2		

Vegetation Structure Summary:

Vegetation Density (%): > 75

Tree Layer Height (cm):	500	Tree Layer Cover (%):	30
Shrub Layer Height (cm):	250	Shrub Layer Cover (%):	50
Forb Layer Height (cm):	50	Forb Layer Cover (%):	5
Graminoid Layer Height (cm):	50	Graminoid Layer Cover (%):	1

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community. PEN — Provincial Endemic

This plant community type is located directly to the south of Driehoekkamp and to the north of Damkamp. It also occurs as border a small watercourse that flows in between the borders of Driehoekkamp and Agterstekamp, as well as a small watercourse to the south of Agterstekamp. It is not mapped since it does not occur within the study area border; however, it is presented here for comprehensiveness.

The vegetation of this plant community type is mostly dominated by native shrubs such as *Asparagus rubicundus*, *Diospyros glabra*, *Dodonaea viscosa* var. *angustifolia*, *Freylinia lanceolata*, *Kiggelaria africana*, *Morella quercifolia*, and *Salvia africana*. The lower portion of the area to the southwest of Driehoekkamp is dominated by tall alien trees, notably *Acacia melanoxylon*, *Fraxinus angustifolia*, and *Quercus robur*. Vegetation cover is typically high (> 75%).

This community is mostly in good condition, with a few disturbances occurring in some places, notably the occurrence of mentioned alien species.

Given the nature of this plant community type, namely that it is a riparian area, it should be regarded as a No-Go area. Fortunately it falls outside the study area and will likely not be impacted by the proposed activities, but it must be noted that a Water Use Licence might be necessary to commence the proposed activities within 32 m of the watercourse (see section 2.3.5 for more information).

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

- *Acacia melanoxylon* (Not Evaluated)
- *Asparagus rubicundus* (LC)

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- *Bolandia pinnatifida* (LC)
- *Chasmanthe aethiopica* (LC; Protected [Provincial Schedule 4])
- *Cissampelos capensis* (LC)
- *Dicerothamnus rhinocerotis* (LC)
- *Diospyros glabra* (LC)
- *Dodonaea viscosa var. angustifolia* (LC)
- *Eriocephalus africanus var. africanus* (LC)
- *Ferraria crispa* (LC; Protected [Provincial Schedule 4])
- *Fraxinus angustifolia* (Not Evaluated)
- *Freylinia lanceolata* (LC)
- *Kiggelaria africana* (LC)
- *Leysera gnaphalodes* (LC)
- *Morella quercifolia* (LC)
- *Olea europaea subsp. cuspidata* (LC)
- *Otholobium candicans* (LC)
- *Quercus robur* (Not Evaluated)
- *Salvia africana* (LC)
- *Searsia angustifolia* (LC)
- *Searsia glauca* (LC)
- *Searsia rehmanniana var. rehmanniana* (LC)
- *Selago eckloniana* (LC)
- *Tropaeolum majus* (Not Evaluated)
- *Vinca major* (Not Evaluated)

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2.3.2. Species of Conservation Concern (SCC)

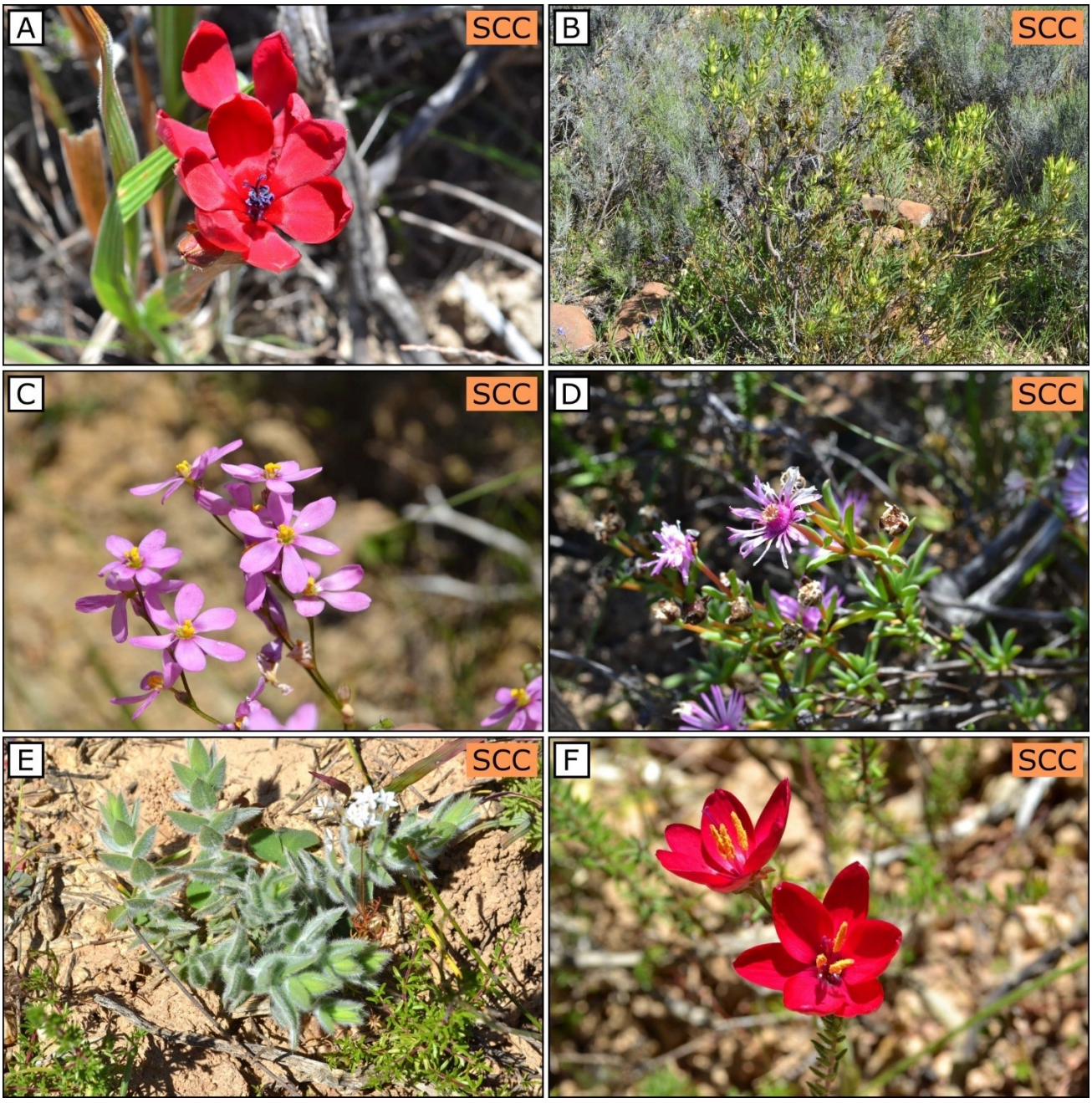

Figure 6: Six plant SCC were observed in the study area, namely: A) *Babiana villosa*, B) *Leucadendron lanigerum* var. *lanigerum*, C) *Ixia scillaris* subsp. *scillaris*, D) *Lampranthus emarginatoides*, E) *Xiphotheca reflexa*, and F) *Geissorhiza erosa*.

Ground truthing confirmed the occurrence of 6 SCC and 19 protected plant species (see Figure 5). Specifically, 5 of the SCC are also protected. The SCC are:

- *Babiana villosa* (NT; Protected [Provincial Schedule 4])
- *Geissorhiza erosa* (EN; Protected [Provincial Schedule 4])
- *Ixia scillaris subsp. scillaris* (NT; Protected [Provincial Schedule 4])
- *Lampranthus emarginatoides* (DDT; Protected [Provincial Schedule 4])

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- *Leucadendron lanigerum var. lanigerum* (EN; Protected [Provincial Schedule 4])
- *Xiphotheca reflexa* (EN)

Furthermore, the protected plant species found on site (all protected under Provincial Schedule 4), excluding those already listed as SCC, were:

- *Agathosma capensis*
- *Aristea africana*
- *Chasmanthe aethiopica*
- *Disa bracteata*
- *Erica coarctata var. coarctata*
- *Erica longistyla var. longistyla*
- *Erica mauritanica*
- *Ferraria crispa*
- *Ixia dubia*
- *Leucadendron salignum*
- *Micranthus tubulosus*
- *Protea laurifolia*
- *Pterygodium catholicum*
- *Satyrium bicallosum*

The SCC mostly occur on the upper slopes of Damkamp — that is, in the eastern section (Map 14) — with *Babiana villosa* also occurring in Agterstekamp. Of these, *Babiana villosa* was found to be the most abundant, while the rest of the SCC were observed mostly as point localities.

Babiana villosa has a limited distribution range, with an extent of occurrence (EOO) of 5 822 km², and an area of occupancy (AOO) of 136 km². It is declining across its range due to ongoing habitat loss and degradation, but is still locally common in remnant fragments of renosterveld, occurring at more than 10 locations. Therefore, it nearly meets the thresholds for Vulnerable under criterion B and is assessed as Near Threatened.

The *B. villosa* population is quite large, and it is estimated that between 100 – 500 individuals might occur in this area, and potentially even more. Thus, while it is indicated as point localities on Map 14, the area outlined for it is where it occurs abundantly or could highly likely occur. These areas should preferably be excluded from the proposed activities since it is unlikely that this entire population could be relocated given its size. Moreover, a loss of this area would likewise in any case entail a loss of all the other SCC listed here since they all occur within this area.

Only a single individual of *Xiphotheca reflexa* was found, though it is possible that others occur in the area. Likewise, only a few individuals of *Geissorhiza erosa* were found. However, given that it is very cryptic when not flowering, it is highly likely that more of them occur in the area. Due to the extensive transformation and fragmentation of this species' habitat, all subpopulations remain on small, isolated fragments and continue to decline due to the ongoing loss and degradation of the remaining habitat. Monitoring data from iNaturalist and the Custodians of Rare and Endangered Wildflowers programme indicate that the majority of subpopulations are small (fewer than 50 plants), and more than 50% of the population occurs in small and isolated patches.

Ixia scillaris subsp. *scillaris* did not occur as abundantly as *B. villosa*, though quite a few individuals were found. A formerly abundant species, it has declined extensively but is still fairly common in remaining suitable habitat on the Cape lowlands. It continues to decline due to ongoing habitat loss and degradation.

Leucadendron lanigerum var. *lanigerum* was not found in high abundances within the study area or the surrounding area, and only one individual was observed. Over 50% of its global population has been lost over the past three generations; this

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loss is inferred from the fact that 79% of this taxon's suitable habitat has been irreversibly modified. As a long-lived resprouter, this taxon has a high persistence in isolated remnants and road verges, but mortality has been recorded in senescent veld. Although often persisting well, many isolated remnants have only a handful of plants, with a very marked male-biased sex ratio, and observed differential increased female mortality. The global population is declining due to ongoing habitat conversion

Finally, a single individual of *Lampranthus emarginatoides* was found. This species is listed as Data Deficient – Taxonomically Problematic (DDT). This listing is due to the need for taxonomic revision rather than an imminent threat of extinction, so it cannot be assessed properly since it still unknown whether it is a distinct species or whether it is actually another, possibly widespread, species.

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.

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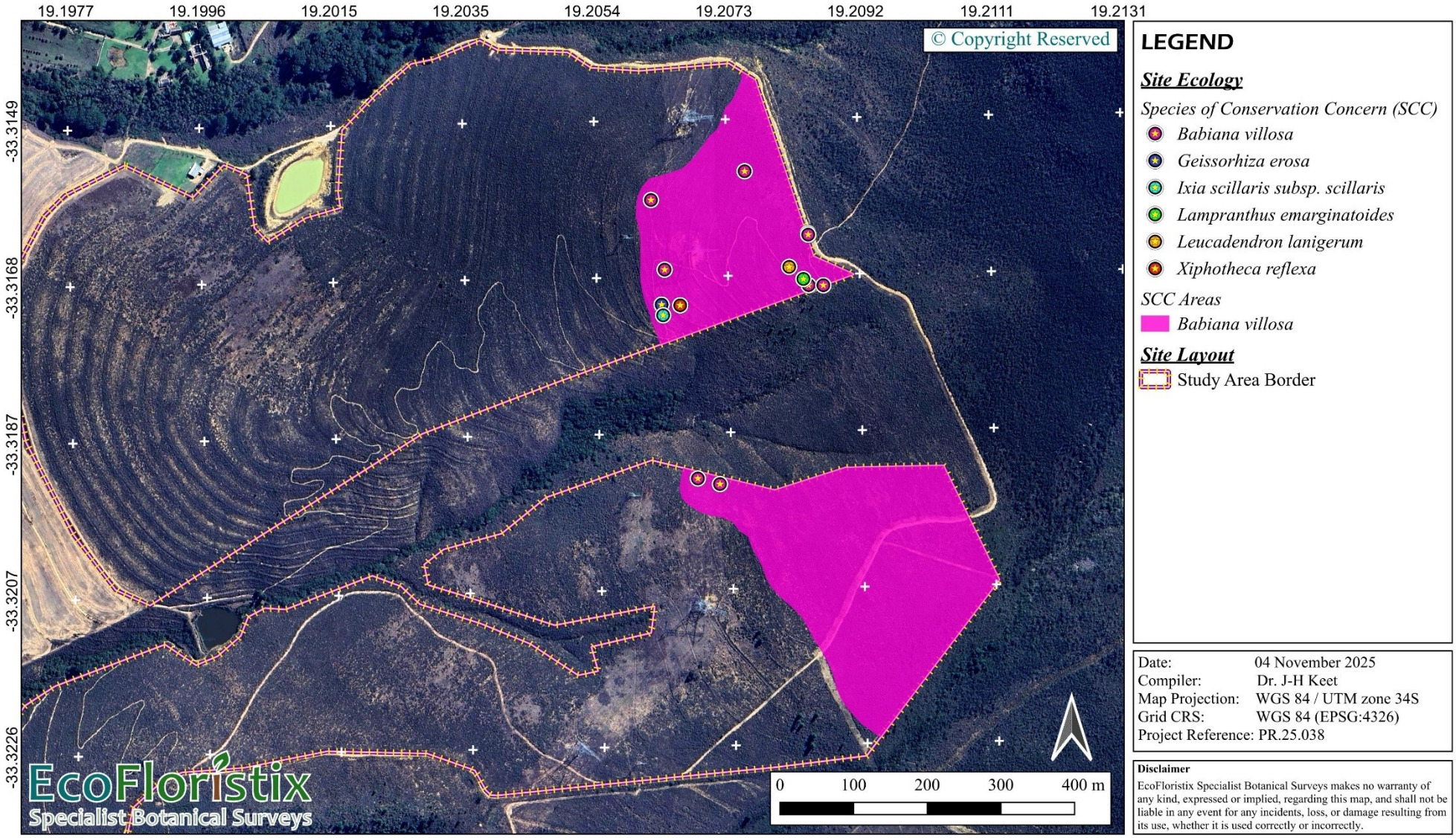

Map 14: Localities of plant Species of Conservation Concern (SCC) that were observed within the study area.

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2.3.3. Alien and Invasive Plant Species

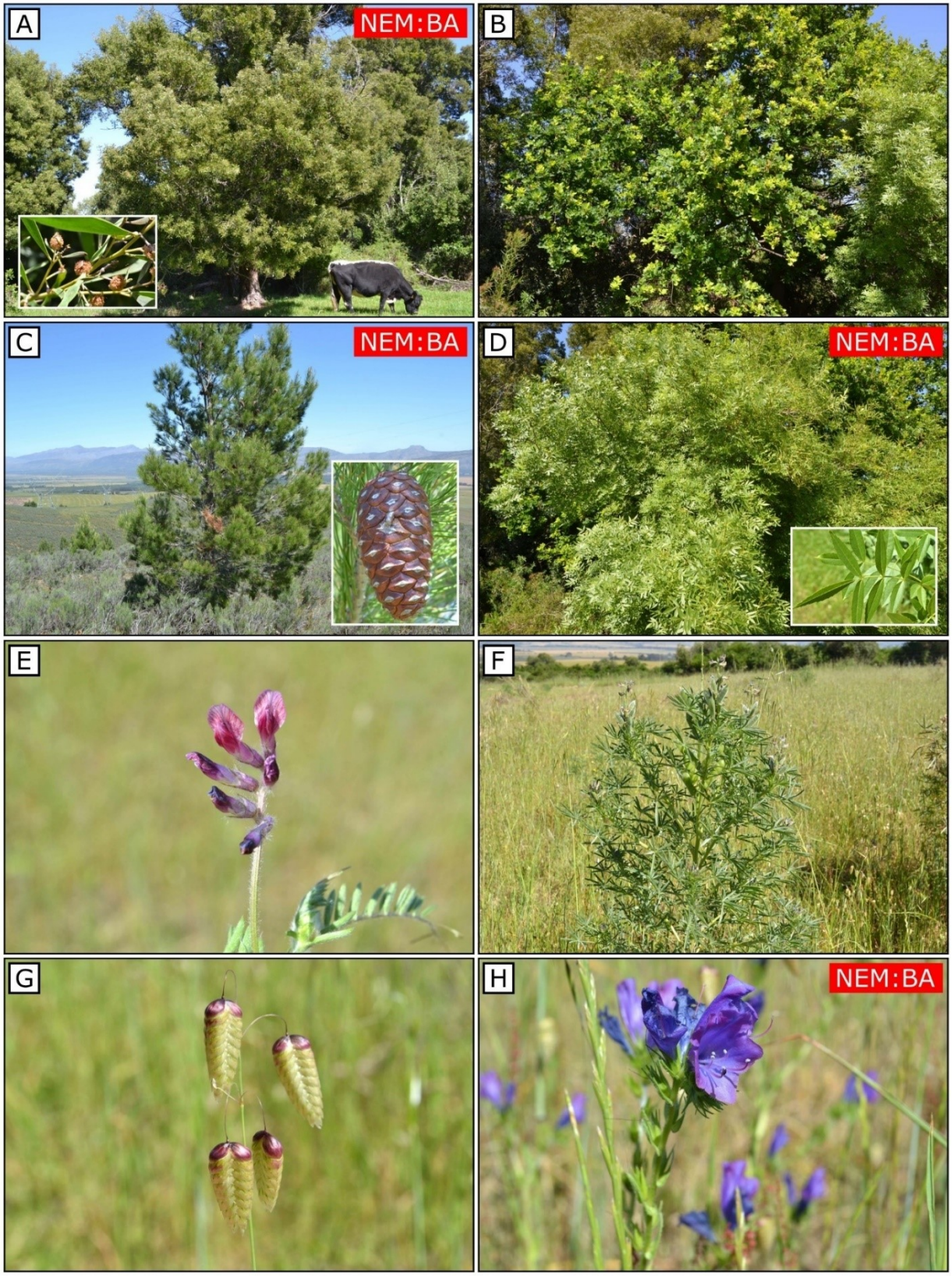

Figure 7: Selected photos of some alien or NEM:BA A&IS Regulations listed plant species that were observed in the study area. A) *Acacia melanoxylon*, B) *Quercus robur*, C) *Pinus halepensis*, D) *Fraxinus angustifolia*, E) *Vicia benghalensis*, F) *Lupinus angustifolius*, G) *Briza maxima*, and H) *Echium plantagineum*.

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A total of 16 alien plant species were found within the study area, of which 5 are NEM:BA A&IS Regulations listed invasive species, namely:

- *Acacia melanoxylon* (Australian blackwood; Category 2)
- *Echium plantagineum* (Patterson's curse; Category 1b)
- *Fraxinus angustifolia* (Algerian ash; Category 3)
- *Hakea sericea* (Silky hakea; Category 1b)
- *Pinus halepensis* (Aleppo pine; Category 3)
- *Vinca major* (Greater periwinkle; Category 1b)

No serious infestations of NEM:BA A&IS Regulations listed species were observed. *Pinus halepensis* was found on the slopes of Damkamp and Agterstekamp, but not elsewhere. *Acacia melanoxylon* and *Fraxinus angustifolia* was found bordering the watercourse to the southwestern section of Driehoekkamp, and only *Acacia melanoxylon* occurred as quite a few individuals. *Echium plantagineum* occurred within the open field of Driehoekkamp itself and in very low abundances. Finally, *Vinca major* is associated with the Riparian Vegetation bordering on Driehoekkamp, but does not occur in the camp itself. Instead Driehoekkamp is mostly overrun by alien grasses such as *Avena barbata*, *Briza maxima*, *Lolium perenne*, and *Pennisetum clandestinum*.

2.3.4. Site Ecological Importance Assessment (SEI)

Note that highly disturbed areas or any infrastructure are by default considered as having a Very Low Site Ecological Importance (SEI).

The Relative Plant Species Theme Sensitivity for the study area and surrounds, according to the online screening tool, is scored as a combination of Low and Medium (Figure 8). More specifically, Agterstekamp is scored as Medium, while Driehoekkamp and Damkamp are scored Low. This is based on the fact that no SCC or sensitive species are recorded in the broad area in online databases (see sections 9.3.1 and 2.1.2). SCC and sensitive species were indeed confirmed to occur in the study area (see section 2.3.2). However, this was only for easternmost sections of Damkamp and Agterstekamp. Given that three of the species found are listed as Endangered, the true Relative Plant Species Theme Sensitivity for these areas can be considered as High according to the criteria given by Government Notice 1150 of Government Gazette 43855 (October 2020; see section 1.6 and 10.2). The brush-cut area of Damkamp, as well as Driehoekkamp, can instead be regarded as Low.

The Relative Biodiversity Theme Sensitivity for the study area and surrounds, according to the online screening tool, was scored as "Very High" (Figure 8). This is due to the area being mapped as occurring in CBA1 and CBA2 areas, an SWSA (Boland), as well as three Endangered vegetation types, namely Breede Alluvium Fynbos, Breede Shale Fynbos, and Breede Shale Renosterveld. Firstly, Breede Alluvium Fynbos and Breede Shale Fynbos do not occur on-site. Then, regarding Breede Shale Renosterveld: while vegetation does occur that has elements of this vegetation type, notably renosterbos, it does not conform fully to the VegMap vegetation type given the excessively high dominance of renosterbos, as well as lacking many of the other characteristic species. This is likely due to the area having been ploughed in the past. Nevertheless, despite such a major disturbance, the area has been laid fallow for almost 20 years (possibly even longer), and has rehabilitated well, albeit in a secondary form of renosterveld. Thus, while not truly conforming to CBA1 or CBA2 conditions given that it is not natural or near-natural, it might well be classified as ESA1 since it is a very valuable

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supporting area not only for the adjacent protected area (Witzenberg Nature Reserve), but also for housing SCC and thus serving as a buffer against losses of these species elsewhere. The true Relative Biodiversity Theme Sensitivity is thus correct in being Very High for the areas that have intact Secondary Renosterveld, while the other areas should be considered as being Low. However, given that only two categories ["Very High" and "Low"] are provided by Gazetted Protocol 43110 No. 32, the Site Ecological Importance score with more categories, as discussed below, is still preferable. More categories are preferred because they allow for a more nuanced and accurate representation of the varying degrees of vulnerability across different ecosystems, species, or areas. Using only two categories risks oversimplifying complex ecological realities.

Field observations, together with the SEI assessment presented here (see section 10.2 for details), indicated that the study area should be classified as having a combination of Very Low and Medium SEI scores (Table 4 and Map 15). The following specific reasons contributed towards this score:

- SCC were observed on site. Specifically, six SCC were observed, of which three are Endangered (*Geissorhiza erosa*, *Leucadendron lanigerum* var. *lanigerum*, *Xiphotheca reflexa*). This increases SEI scores.
- Mostly minor ecological impacts, as well as a high habitat connectivity and functional integrity, exists specifically for Secondary Renosterveld units. This contributes to increasing SEI scores.
- Large ecological impacts and high habitat degradation specifically exists for the Disturbed Old Field community. This reduces the SEI score.
- Finally, all of the areas have a high Receptor Resilience with the majority of species being able to return after the impact has ceased. This is because, despite the existence of SCC in Secondary Renosterveld, the rest of the species are widespread and common (in all plant community types), and their occurrences and even proliferation (including the Near Threatened *Babiana villosa*) in areas that have historically been highly disturbed, demonstrates their resilience. This lowers SEI scores.

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 (specifically see Figure 11 and details given in section 10.2):

- "Very Low": Minimization mitigation.
- "Medium: Minimization and restoration mitigation.

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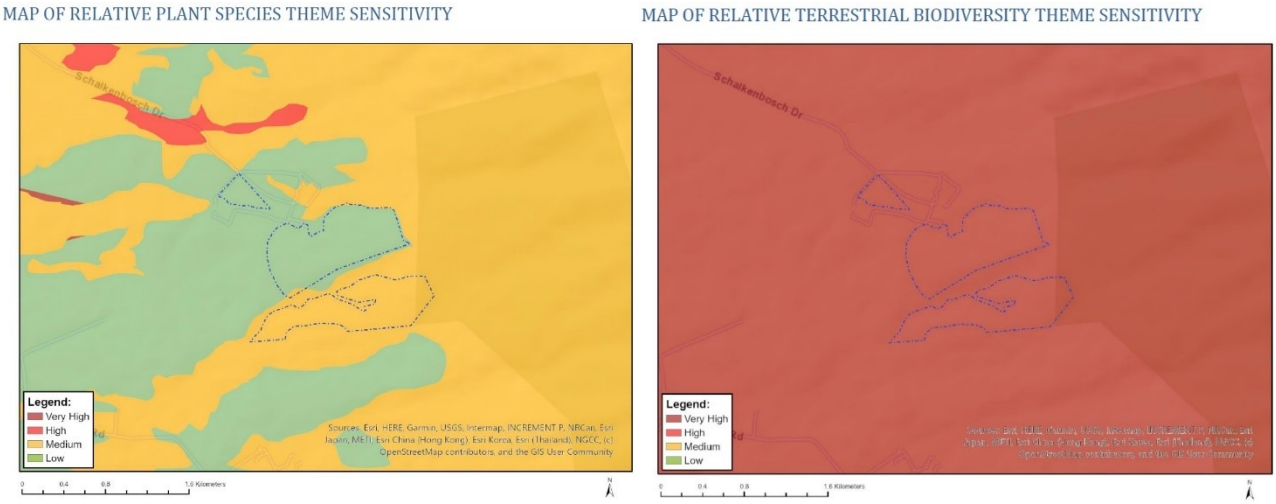

Figure 8: Relative Plant Species and Terrestrial Biodiversity Theme Sensitivities for the study area and surrounds, as indicated by the National Web-based Environmental Screening Tool.

Table 4: Evaluation of Site Ecological Importance (SEI) for the plant community type(s) within the study area. BI = Biodiversity Importance. See section 10.2 for more details.

Plant Community Type / Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	SEI
Disturbed Old Field	Low: Less than 50% of receptor contains natural habitat with limited potential to support SCC. Very Low: No confirmed and highly unlikely populations of SCC.	Very Low: Several major current negative ecological impacts.	Very High: Habitat that can recover rapidly (less than 5 years) to restore > 75% of the original species composition and receptor functionality.	Very Low (BI: Very Low)
Riparian Vegetation	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., small population of alien and invasive flora) and a few signs of minor past disturbance.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality and or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring.	Low (BI: Medium)
Secondary Renosterveld	High: Confirmed or highly likely occurrence of CR, EN, or VU species that have a global EOO of > 10 km^2. Medium: More than 50% of receptor contains natural habitat with potential to support SCC.	Very High: High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. High: Only minor current negative ecological impacts (e.g. burning overdue). The area was ploughed in the past, but more than 20 years ago. Area has rehabilitated well.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality.	Medium (BI: High)
Brush-cut Area	Very Low: No confirmed and highly	Low: Several minor and major	High: Habitat that can recover relatively quickly (5–10	Very Low (BI: Very Low)

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	unlikely populations of SCC.	current negative ecological impacts.	years) to restore > 75% of the original species composition and receptor functionality.	

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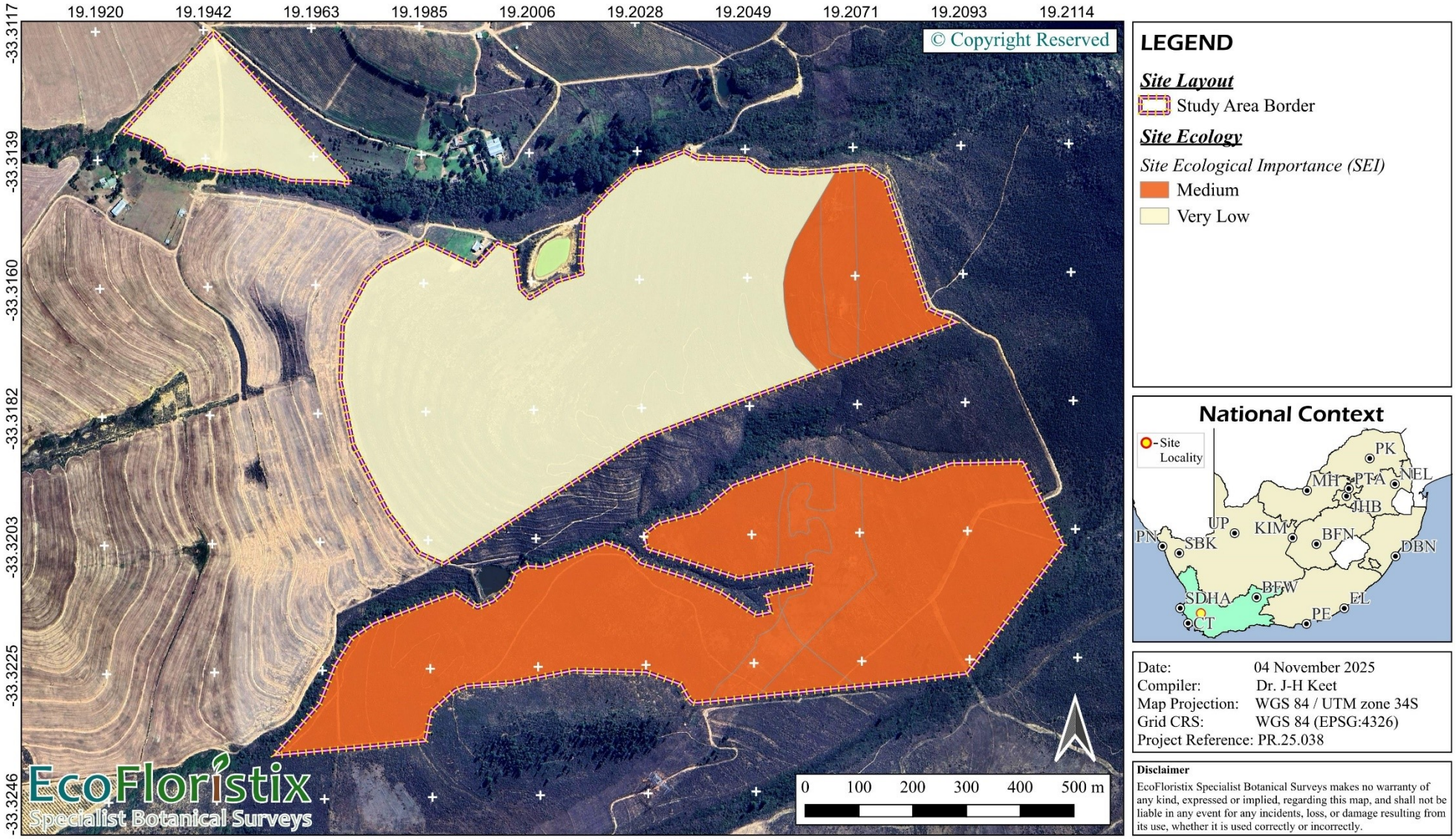

Map 15: Site Ecological Importance (SEI) for the study area (see Table 4 for more details).

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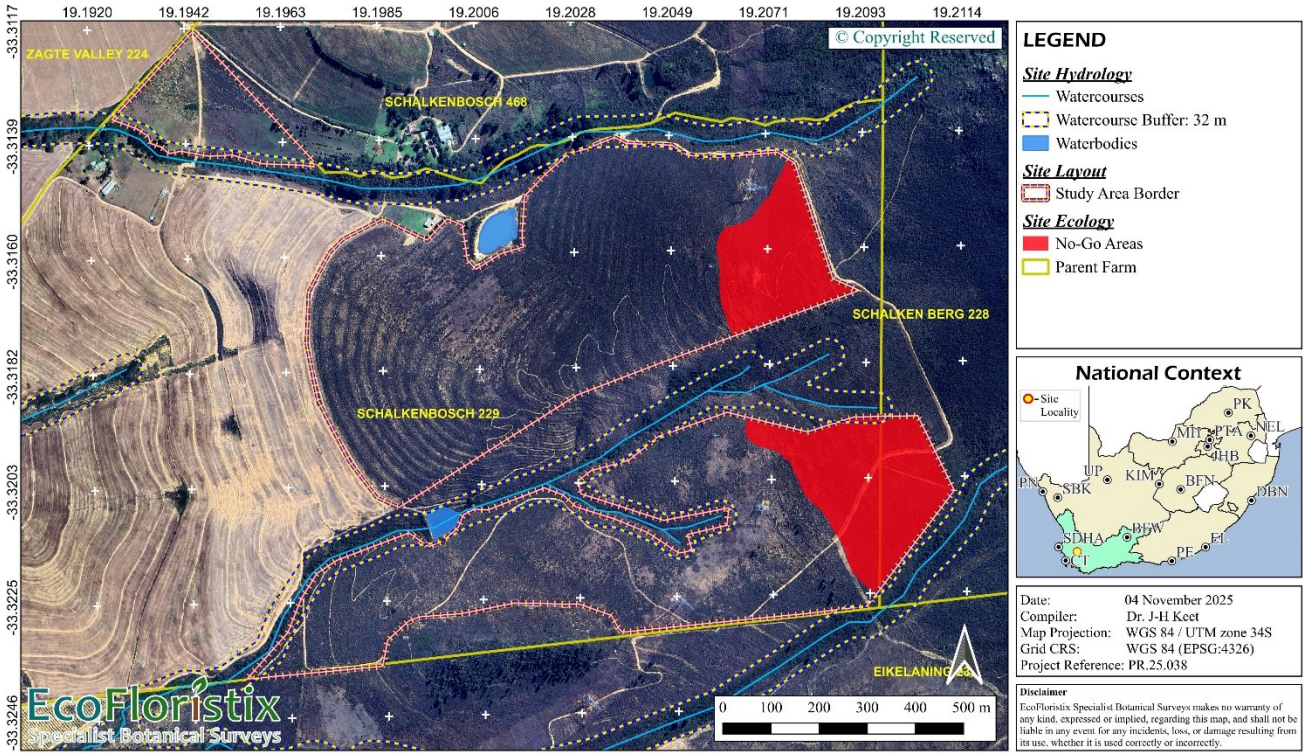
2.3.5. No-Go Areas



Map 16: No-Go areas identified within the study area.

Given the information presented in the previous sections, the easternmost parts of Agterstekamp and Damkamp should be regarded as No-Go areas (Map 16). These essentially correspond to the localities of the SCC. Furthermore, a part of Agterstekamp overlaps with a protected area, namely the Witzenberg Nature Reserve, which is essentially represented as Schalken Berg 228 on Map 16 (also see section 2.2.3). This would by default be regarded as a No-Go area and not eligible for the proposed activities.

Furthermore, although this report is not an official Aquatic Specialist report, the existence of various watercourses has been identified around the study area (also see section 2.3.1.c). It must be noted that a Water Use Licence (WUL) might be required to commence with the proposed activities within 32 m of a watercourse. If this is the case, then a decision might have to be made to pursue the acquirement of a WUL. Otherwise, these 32 m buffer zones (see Map 16) should be regarded as No-Go areas, some of which marginally overlap with the study area. Fortunately, these areas can easily be avoided.

3. Impact Risk Assessment

This section describes and summarizes the significance of perceived impacts on the terrestrial ecology of the study area. Potential impacts were evaluated based on desktop and field assessment data. The relevant impacts associated with the proposed activities were then subjected to the impact assessment methodology as described in section 10.4. Finally, relevant maps should be consulted as presented in section 2.3.

As discussed in section 1.3, two Alternatives are assessed, namely the proposed activities and associated areas (A1), as well as the so-called "Baseline" scenario.

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More specifically, the Baseline scenario is where no development or proposed activities occur. It is also sometimes referred to as the "No Development Scenario", "No-Go Option", or the "Do Nothing Scenario" — that is, maintaining the present circumstances and not proceeding with the proposed Project (the term "Baseline" is preferred here to avoid confusion with No-Go areas). This can be seen as a baseline against which to measure impacts. Note that this is not always the best scenario, since development can actively mitigate against unwanted and negative on-site conditions (for example proliferation of invasive alien plant species). That is, existing environmental problems may remain unaddressed and can worsen over time due to a lack of innovation, investment in sustainable solutions, or adaptation to ongoing changes. Moreover, important opportunities to implement cleaner technologies and restore ecosystems might be missed.

3.1. Present Impacts to Biodiversity

Anthropogenic activities and influences occur within the landscape, and a few current negative impacts to biodiversity were observed within the study area and surrounds, including:

- The use of Driehoekkamp to house and graze livestock contributes to the camp being completely transformed and disturbed. It is dominated by alien grasses and other weedy species.
- Invasive alien plant species: a number of IAPs occur within the study area. Fortunately, none of these occur as dense infestations anywhere in the study area, except for an area close to the southwestern section of Driehoekkamp where *Acacia melanoxylon* occurs as a number of individuals near the watercourse, and which most likely impacts this watercourse.
- Brush-cutting: within Damkamp, bush-cutting activities to control renosterbos dominance might be beneficial for creating ecological gaps for other species to proliferate, but it simultaneously contributes to creating a harsher environment since denuded areas are often prone to being colonized by pioneering weedy species, and even potentially IAPs.

3.2. Identification and Assessment of Specific Potential Impacts

The assessment of impact significance usually considers both pre- and post-mitigation scenarios. Moreover, it may consider any one, or a combination of, these scenarios for all the phases during the project lifecycle:

- Construction: The construction phase refers to the period of construction when all proposed features of the Project are constructed.
- Operational: The operational phase refers to the period when the construction phase has been completed, and the proposed activities of the Project commences.
- Decommissioning (if applicable): The phase where regular operational activities have ceased, and the Project has ended.

Only construction phase and cumulative impacts are assessed here. This is because the biggest impacts of the proposed activities are related to these phases.

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3.2.1. Construction

3.2.1.a) Loss of Plant Communities

Specific Impact(s): Complete loss, which is mostly associated with Secondary Renosterveld in Agterstekamp and Damkamp.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: The areas of Secondary Renosterveld in Agterstekamp and Damkamp do not fully constitute Breede Shale Renosterveld, and as such no listed vegetation types occur on-site. This is because the area was ploughed in the past. Nevertheless, since the area has been laid fallow for almost two decades (or more), it has rehabilitated to such an extent as to house a number of SCC. The extremely high dominance of renosterbos, however, does mean that the area's full potential amount of diversity will likely not be realizes.

Mitigation Measures: This can be mitigated somewhat by the No-Go areas proposed in section 2.3.5 since these would contain fragments of Secondary Renosterveld. Moreover, if those specific areas can be set-aside, it will also mitigate effectively against the loss of SCC. However, given that ploughing will completely remove plant communities currently present, mitigation will remain limited.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Short-term	Long-term	Long-term
Magnitude	Very Low	High	Medium
Consequence	**Very Low**	**High**	**Medium**
Probability	Improbable	Highly Probable	Probable
Loss of Irreplaceable Resource	No loss	Marginal loss	Marginal loss
Reversibility	Fully reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**High**	**Medium**
Avoidance			Limited Avoidance
Management			Limited Effectiveness
Mitigation			Moderately Effective
Residual Impact			Medium

3.2.1.b) Loss of ESA1 Areas

Specific Impact(s): Complete loss of ESA1 areas, which is mostly associated with Secondary Renosterveld in Agterstekamp and Damkamp.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: The area does not truly conform to CBA1 or CBA2 conditions as indicated by desktop data, given that it is not natural or near-natural (section 2.2.2). However, it might well be classified as ESA1 since it is a valuable

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supporting area not only for the adjacent protected area (Witzenberg Nature Reserve), but also for housing SCC and thus serving as a buffer against losses of these species elsewhere.

Mitigation Measures: Similar to the previous impact, loss of ESA1 areas can be mitigated somewhat by the No-Go areas proposed in section 2.3.5 since these would contain fragments of Secondary Renosterveld. However, given that ploughing will completely remove plant communities currently present, mitigation will remain limited

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Short-term	Long-term	Long-term
Magnitude	Low	High	Medium
Consequence	**Very Low**	**High**	**Medium**
Probability	Improbable	Highly Probable	Probable
Loss of Irreplaceable Resource	No loss	Reasonable loss	Reasonable loss
Reversibility	Fully reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**High**	**Medium**
Avoidance			Limited Avoidance
Management			Limited Effectiveness
Mitigation			Partially Effective
Residual Impact			Medium

3.2.1.c) Loss of SCC and/or Protected Species

Specific Impact(s): Complete loss of at least one large SCC population (*Babiana villosa*), as well as individuals of other SCC. Also, complete loss of some protected plant species.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: A total of 6 SCC were found in the study area, and mostly occur on the upper slopes of Damkamp, with a few occurrences in Agterstekamp. Of these, *Babiana villosa* was found to be the most abundant and represented by a large population, while the rest of the SCC were observed mostly as point localities. Furthermore, a total of 15 protected plant species (apart from 5 of the SCC which are also protected) were also found on-site, but unlike the SCC, these occur much more widespread and more abundantly. Given that these species have established despite major historic disturbance, they will likely continue to persist if baseline conditions persist. However, a fire would be greatly beneficial for increasing diversity and rejuvenating the veld.

Mitigation Measures: This impact can greatly be mitigated (from High to Low) by simply setting aside the No-Go areas as indicated in section 2.3.5. This would preserve all the SCC observed on-site. More specifically, a large and valuable population of *Babiana villosa* (Near Threatened) will also be preserved in doing so. It is unlikely that this large of a population would completely and successfully be relocated (even though the species biology itself makes it a good candidate for relocation effects). Loss of some protected plant species would still occur, since they are either too numerous

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or do not have a physiology that is well suited to relocation efforts (for example, having very deep or sensitive root systems). However, given that all of them are widespread and listed as Least Concern, their loss might be deemed acceptable.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Local	Site-specific
Duration	Long-term	Long-term	Short-term
Magnitude	Very Low	High	Very Low
Consequence	**Very Low**	**High**	**Very Low**
Probability	Improbable	Definite	Probable
Loss of Irreplaceable Resource	Marginal loss	Substantial loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**High**	**Low**
Avoidance			Complete Avoidance
Management			Highly Effective
Mitigation			Highly Effective
Residual Impact			Low

3.2.1.d) Invasive Alien Plant Species

Specific Impact(s): Ploughing will remove some of the larger IAPs such as the *Pinus halepensis* trees and *Hakea sericea* shrubs, but will render the area vulnerable to other agricultural invasives such as *Echium plantagineum*.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: Driehoekkamp is currently overrun by alien grasses, though they are not NEM:BA A&IS Regulations listed species. Although the invasive *Echium plantagineum* is present in this camp, it did not occur in high abundances. However, its abundances can potentially increase if not controlled. Regarding Driehoekkamp and Agterstekamp, invasive *Pinus halepensis* trees and *Hakea sericea* shrubs are currently present, but in low densities. It seems that *Pinus halepensis* is slowly spreading and multiplying, given that few large individuals are present, but quite a few smaller plants. Thus, in all probability they will continue to multiply and spread in these camps.

Mitigation Measures: This impact can be mitigated by implementing active IAPs clearing and monitoring. Care must also be taken to prevent the further introduction of any new IAPs. If any IAPs establish on site, then they must be removed using approved clearing methods. Regular monitoring must follow any IAPs removal to prevent regrowth/reestablishment and ensure seedbanks become depleted.

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), both require that listed alien species are controlled in accordance with these Acts.

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Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Long-term	Long-term	Medium-term
Magnitude	Medium	Medium	Low
Consequence	**Medium**	**Medium**	**Very Low**
Probability	Highly Probable	Highly Probable	Probable
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Medium**	**Medium**	**Low**
Avoidance			Partial Avoidance
Management			Highly Effective
Mitigation			Highly Effective
Residual Impact			Low

3.2.2. Cumulative

3.2.2.a) Conservation Targets

Specific Impact(s): The loss of listed vegetation types on a cumulative basis from the broader area negatively impacts provincial and national conservation targets. Although the areas of Secondary Renosterveld in Agterstekamp and Damkamp do not fully constitute Breede Shale Renosterveld, and thus cannot be considered loss of a listed vegetation type, they nevertheless still harbour SCC, one of which (*Babiana villosa*) occurs in high abundances.

Furthermore, any destruction of SCC might contribute either directly or indirectly to their conservation statuses. On a cumulative basis, their loss might in future contribute to affecting national listings if similar habitats in the surrounding area also disappear.

In contrast, the vegetation of Driehoekkamp is highly degraded and cannot contribute to any conservation targets.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: The Secondary Renosterveld fragments occurring in the study area do not specifically contribute to conservation targets since they cannot be considered true and pristine Breede Shale Renosterveld. However, they do harbour SCC.

Mitigation Measures: This impact can greatly be mitigated (from High to Low) by simply setting aside the No-Go areas as indicated in section 2.3.5. This would preserve all the SCC observed on-site. More specifically, a large and valuable population of *Babiana villosa* (Near Threatened) will also be preserved in doing so. The No-Go areas would also at least partially mitigate against loss of the rest of the Secondary Renosterveld that occurs lower down the slopes of Agterstekamp.

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Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Local	Site-specific
Duration	Short-term	Medium-term	Short-term
Magnitude	Very Low	High	Low
Consequence	**Very Low**	**Medium**	**Very Low**
Probability	Improbable	Definite	Improbable
Loss of Irreplaceable Resource	Marginal loss	Reasonable loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium-High**	**Low**
Avoidance			Partial Avoidance
Management			Highly Effective
Mitigation			Highly Effective
Residual Impact			Medium-Low

3.2.2.b) Broad-Scale Ecological Processes

Specific Impact(s): Disruption of broad-scale ecological processes.

Habitat destruction and fragmentation can potentially disrupt the connectivity of the landscape for fauna and flora, and impair their ability to respond to environmental fluctuations. It can also eventually lead indirectly to the loss of local plant community types, SCC, protected plant species, and genetic diversity, among other things, if these occur on a cumulative basis in the surrounding areas.

Nature and Type of Impact: Negative, Indirect.

Baseline Conditions: The Secondary Renosterveld in Agterstekamp and Driehoekkamp contributes to ecological processes such as serving as cover (and thus a corridor) and habitat for fauna (and even food to some degree, for example nectar and pollen for native pollinators), serving as habitat for plant SCC and other plant species (the presence of even common plant species serves as a source genetic diversity and propagules), carbon sequestration, and water infiltration and runoff control (thus stabilizing slopes against erosion), among other things. In contrast, Driehoekkamp does not significantly contribute to broad-scale ecological processes, save for the fact that its vegetation cover, even though mostly alien and highly modified, protects the environment against soil erosion.

Mitigation Measures: If the No-Go area is to be set aside, it will mitigate to some degree against the disruption of these ecological processes. However, given that the area will be ploughed, mitigation will remain limited.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Local	Local	Local
Duration	Short-term	Long-term	Long-term
Magnitude	Very Low	Medium	Medium
Consequence	**Very Low**	**Medium**	**Medium**

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	Baseline	A1 Before Mitigation	A1 After Mitigation
Probability	Improbable	Highly Probable	Probable
Loss of Irreplaceable Resource	Marginal loss	Reasonable loss	Reasonable loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium**	**Medium**
Avoidance			Partial Avoidance
Management			Limited Effectiveness
Mitigation			Partially Effective
Residual Impact			Medium-Low

3.3. Summary of Anticipated Impacts

The following table offers a brief overview of the anticipated impacts within the PAOI, and draws from the assessments presented in the previous section. It intends solely to be a concise summary, and the previous section should be consulted for a detailed overview. Abbreviations: A1 — Alternative 1.

Phase	Impact	Baseline	A1 Before Mitigation	A1 After Mitigation
Construction	Loss of plant community types	Low	High	Medium
Construction	Loss of ESA areas	Low	High	Medium
Construction	Loss of SCC and/or protected species	Low	High	Low
Construction	Spread and/or establishment of alien and/or invasive species.	Medium	Medium	Low
Cumulative	Reduced ability to meet conservation targets	Low	Medium-High	Low
Cumulative	Disruption of broad-scale ecological processes	Low	Medium	Medium

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4. Proposed Impact Management Actions

4.1. Proposed Mitigation Measures for Consideration in the EMPr

Operational Phase	
Impact	**Mitigation**
Potential impacts on plant communities, and SCC and/or protected plant species.	Any landowners must adhere to their legal obligations to actively eradicate and manage alien vegetation infestations present on the applicable and surrounding properties SCC and/or protected plant species should be avoided wherever possible. If individuals cannot be avoided, then a permit for their destruction must be obtained from the relevant local authority No plant species, whether native or exotic, should be brought into, or removed from, the study area, to prevent the spread of exotic or invasive species or the illegal collection of plants. No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the Contractor's EO or without the relevant permits. Blanket clearing of vegetation must be limited to the proposed footprint, and only where necessary; no clearing outside of permitted areas may take place. Clearing of vegetation should be minimized and avoided where possible. Immediately rehabilitate all areas outside of the proposed development site that were disturbed and implement mitigation measures to prevent associated impacts from re-occurring.
Spread and/or establishment of alien and/or invasive species.	IAPs, wherever present, must be removed from the site as per NEM:BA requirement where applicable and must not be allowed to spread. Clearing methods should aim to keep disturbance to a minimum and must be undertaken in accordance with relevant guidelines. Any area that is cleared of IAPs must receive regular follow-up treatments (preferably at least three follow-ups) to ensure that populations do no re-establish after such initial clearing efforts. Any chemicals/herbicides used during clearing efforts must strictly be used only in accordance with the manufactures guidelines. Under no circumstances should unqualified persons be allowed to conduct IAPs clearing using chemicals/herbicides without supervision from a suitably qualified pest control officer. Such a qualified pest control officer must be present on site at all times during IAPs clearing. No planting or importing of any alien species to the site for landscaping, rehabilitation, or any other purpose should be allowed.

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Cumulative Impacts	
Impact	**Mitigation**
Reduced ability to meet conservation obligations and targets and Impacts on broad-scale ecological processes.	Avoid unnecessary damage to vegetation wherever possible. Any signs of erosion resulting from the project activities must be rectified immediately and monitored thereafter to ensure that they do not re-occur. All affected areas resulting from the proposed activities, and that are no part of the proposed activities, should be re-vegetated with locally occurring native species, to bind the soil and limit erosion potential. Avoid No-Go area wherever possible.

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5. Conclusion and Impact Statement

5.1. Conclusion

EcoFloristix Specialist Botanical Surveys was appointed to conduct a Terrestrial Biodiversity and Plant Species Impact Assessment in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), for vegetation clearing on farm Schalkenbosch 229 Tulbagh, Western Cape.

The ecological assessment confirms that while the study area is heavily modified and does not contain pristine, listed vegetation types as suggested by initial mapping, the Secondary Renosterveld that has rehabilitated over the last two decades over historically ploughed fields is of ecological value, particularly within the eastern sections of Damkamp and Agterstekamp. The confirmed occurrence of six Species of Conservation Concern (SCC), including three Endangered species and a substantial population of the Near Threatened *Babiana villosa*, increases the ecological sensitivity of these areas. Furthermore, the functional role of these camps as a buffer and supporting habitat warrants their classification as Ecological Support Area 1 (ESA1). The proposed activities, specifically ploughing, would result in direct, large, and long-term negative impacts on these ecological features, as well as on broader ecological processes and conservation targets, if left unmitigated.

The proposed activities should preferably be excluded from the most sensitive portions of the site. Avoidance of the easternmost parts of Agterstekamp and Damkamp — the areas hosting the majority of the SCC — is imperative and represents the single most effective mitigation measure, reducing the impact on SCC from High to Low significance. Similarly, the area overlapping the Witzenberg Nature Reserve, as well as 32 m watercourse buffer zones if the applicant wished to avoid a Water Use Licence Application, must also be excluded as No-Go areas. While the establishment of these No-Go areas would largely prevent the loss of all identified SCC and mitigate the cumulative impact on conservation targets, the residual impact on the remaining Secondary Renosterveld and its ESA1 function will remain at a Medium significance. Given that the plant community loss is irreversible in the short to medium term and cannot be fully offset by the limited effectiveness of proposed relocation efforts for all species, the preservation of the designated No-Go areas is an important consideration.

The mitigations, management, and associated monitoring regarding all the impacts identified in this report are the most important factors of this project and must be considered by the competent authority.

5.2. Impact Statement

FINAL STATEMENT

Considering all the findings of this report, no fatal flaws were evident, but only as far as the suggested mitigation measures are implemented.

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PART 2: References, Methodology, and Supplementary Information

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7. Appendix A: Plant Species List

The plant species list presented here is a combination of online databases (e.g., POSA and iNaturalist) and site survey data, and is indented to provide a comprehensive overview of important species that could potentially occur in the study area and surrounds. However, note that while all species that were observed on site are listed, only SCC from online databases are included.

Descriptions of colours and symbols are given below:

Species in **bold**:	Species that were observed during the Site Sensitivity Verification.
Species marked with *:	Protected plant species.
Species marked with ~:	Plant Species of Conservation Concern (SCC).
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 PEN:	Provincial Endemic.
Small letters in []:	Vegetation/plant community type in which the species was found: • a: Disturbed Old Field • b: Riparian Vegetation • c: Secondary Renosterveld

Family	Species	IUCN	Family	Species	IUCN	Family	Species	IUCN
Fabaceae	***Acacia melanoxylon*** (NEM:BA)[b]	**NE**	Iridaceae	~**Freesia caryophyllacea* (PEN)	NT	Proteaceae	~**Paranomus bracteolaris* (PEN)	NT
Rutaceae	~**Acmadenia macradenia* (PEN)	NT	**Scrophulariaceae**	***Freylinia lanceolata*** [b]	**LC**	Proteaceae	~**Paranomus lagopus* (PEN)	NT
Rutaceae	~**Acmadenia matroosbergensis* (PEN)	Rare	Iridaceae	~**Geissorhiza brehmii* (PEN)	EN	Proteaceae	~**Paranomus longicaulis* (PEN)	EN
Molluginaceae	~*Adenogramma congesta* (PEN)	DDD	**Iridaceae**	***~*Geissorhiza erosa*** (PEN)[c]	**EN**	Hypoxidaceae	~*Pauridia alba* (PEN)	VU
Molluginaceae	~*Adenogramma natans* (PEN)	Critically Rare	Iridaceae	~**Geissorhiza esterhuyseniae* (PEN)	Criticall y Rare	Hypoxidaceae	~*Pauridia minuta*	NT
Rutaceae	~**Agathosma adenandriflora* (PEN)	NT	Iridaceae	~**Geissorhiza exilis* (PEN)	EN	Hypoxidaceae	~*Pauridia pygmaea*	EN
Rutaceae	~**Agathosma bathii* (PEN)	Rare	Iridaceae	~**Geissorhiza exscapa*	NT	Hypoxidaceae	~*Pauridia umbraticola* (PEN)	DDD
Rutaceae	****Agathosma capensis*** [c]	**LC**	Iridaceae	~**Geissorhiza furva* (PEN)	EN	Geraniaceae	~*Pelargonium citronellum* (PEN)	Rare
Rutaceae	~**Agathosma conferta* (PEN)	EN	Iridaceae	~**Geissorhiza geminata* (PEN)	EN	Geraniaceae	~*Pelargonium elandsmontanum*	Critically Rare
Rutaceae	~**Agathosma cordifolia* (PEN)	Rare	Iridaceae	~**Geissorhiza imbricata* subsp. *bicolor*	NT	**Geraniaceae**	***Pelargonium grossularioides*** [c]	**LC**
Rutaceae	~**Agathosma corymbosa* (PEN)	CR	Iridaceae	~**Geissorhiza imbricata* subsp. *imbricata* (PEN)	NT	Geraniaceae	~*Pelargonium heterophyllum*	CR
Rutaceae	~**Agathosma decurrens* (PEN)	Rare	Iridaceae	~**Geissorhiza louisabolusiae* (PEN)	EN	Geraniaceae	~*Pelargonium leptum* (PEN)	VU
Rutaceae	~**Agathosma glandulosa* (PEN)	EN	Iridaceae	~**Geissorhiza monanthos* (PEN)	VU	Geraniaceae	~*Pelargonium saxatile* (PEN)	Critically Rare
Rutaceae	~**Agathosma insignis* (PEN)	Rare	Iridaceae	~**Geissorhiza purpurascens* (PEN)	EN	Geraniaceae	~*Pelargonium ternifolium* (PEN)	NT

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Rutaceae	~*Agathosma lancifolia (PEN)	DDD	Iridaceae	~*Geissorhiza purpureolutea (PEN)	NT	**Geraniaceae**	***Pelargonium triste*** [c]	**LC**
Rutaceae	~*Agathosma latipetala (PEN)	EN	Iridaceae	~*Geissorhiza radians (PEN)	NT	Geraniaceae	~*Pelargonium viciifolium* (PEN)	EN
Rutaceae	~*Agathosma marifolia (PEN)	NT	Iridaceae	~*Geissorhiza rupicola (PEN)	Critically Rare	**Poaceae**	***Pennisetum clandestinum*** (NEM:BA)[a]	**NE**
Rutaceae	~*Agathosma pulchella (PEN)	VU	Iridaceae	~*Geissorhiza setacea (PEN)	EN	Poaceae	~*Pentameris bachmannii*	EN
Rutaceae	~*Agathosma trichocarpa (PEN)	VU	Iridaceae	~*Geissorhiza silenoides (PEN)	VU	Poaceae	~*Pentameris caulescens*	Rare
Rutaceae	~*Agathosma tulbaghensis (PEN)	Rare	Iridaceae	~*Geissorhiza tulbaghensis (PEN)	EN	Poaceae	~*Pentameris ecklonii*	EN
Hyacinthaceae	~*Albuca albucoides* (PEN)	EN	Amaryllidaceae	~*Gethyllis ciliaris* subsp. *ciliaris* (PEN)	NT	Poaceae	~*Pentameris pholiuroides*	EN
Hyacinthaceae	***Albuca aurea*** (PEN)[c]	**LC**	Iridaceae	~*Gladiolus exilis* (PEN)	NT	Asteraceae	~*Phaneroglossa bolusii*	Rare
Hyacinthaceae	~*Albuca echinosperma*	NT	Iridaceae	~*Gladiolus meliusculus* (PEN)	NT	Molluginaceae	~*Pharnaceum lanuginosum* (PEN)	EN
Asphodelaceae	~*Aloe perfoliata*	DDD	Iridaceae	~*Gladiolus phoenix* (PEN)	Critically Rare	Rhamnaceae	~*Phylica alticola* (PEN)	Rare
Malvaceae	~*Anisodontea biflora* (PEN)	VU	Iridaceae	~*Gladiolus watsonius* (PEN)	NT	Rhamnaceae	~*Phylica altigena* (PEN)	Rare
Apiaceae	~*Annesorhiza articulata* (PEN)	EN	Scrophulariaceae	~*Globulariopsis obtusiloba* (PEN)	Critically Rare	Rhamnaceae	~*Phylica ampliata* (PEN)	VU
Apiaceae	~*Annesorhiza burttii* (PEN)	Rare	Asteraceae	~*Gnaphalium declinatum* (PEN)	NT	Rhamnaceae	~*Phylica chionocephala* (PEN)	Rare
Apiaceae	~*Annesorhiza refracta* (PEN)	EN	Thymelaeaceae	~*Gnidia humilis* (PEN)	EN	Rhamnaceae	~*Phylica chionophila* (PEN)	Rare
Restionaceae	~*Anthochortus insignis* (PEN)	VU	Thymelaeaceae	~*Gnidia insignis* (PEN)	EN	Rhamnaceae	~*Phylica comosa*	DDT
Restionaceae	~*Anthochortus singularis* (PEN)	VU	Thymelaeaceae	~*Gnidia parviflora* (PEN)	DDT	Rhamnaceae	~*Phylica cylindrica*	VU
Rubiaceae	~*Anthospermum ericifolium* (PEN)	EN	Asteraceae	~*Gorteria personata*	NT	Rhamnaceae	~*Phylica glabrata* (PEN)	DDD
Rubiaceae	***Anthospermum spathulatum*** subsp. ***tulbaghense*** (PEN)[c]	**LC**	Grubbiaceae	~*Grubbia rourkei* (PEN)	Rare	**Rhamnaceae**	***Phylica imberbis*** var. ***imberbis*** (PEN)[c]	**LC**
Aizoaceae	~*Antimima aristulata* (PEN)	EN	Amaryllidaceae	~*Haemanthus pumilio* (PEN)	CR	Rhamnaceae	~*Phylica plumosa* var. *horizontalis* (PEN)	VU
Aizoaceae	~*Antimima fergusoniae* (PEN)	Rare	**Proteaceae**	***Hakea sericea*** (NEM:BA)[c]	**NE**	Rhamnaceae	~*Phylica stenopetala* var. *stenopetala* (PEN)	VU
Aizoaceae	~*Antimima microphylla* (PEN)	DDT	Asteraceae	~*Helichrysum incarnatum* (PEN)	VU	Rhamnaceae	~*Phylica strigulosa*	VU
Aizoaceae	~*Antimima mucronata* (PEN)	VU	**Asteraceae**	***Helichrysum revolutum*** [c]	**LC**	Rhamnaceae	~*Phylica thunbergiana* (PEN)	EN
Aponogetonaceae	~*Aponogeton angustifolius* (PEN)	NT	**Asteraceae**	***Helichrysum teretifolium*** [c]	**LC**	Rhamnaceae	~*Phylica trachyphylla* (PEN)	Rare
Apiaceae	~*Arctopus dregei* (PEN)	NT	Brassicaceae	~*Heliophila cedarbergensis* (PEN)	Rare	Rhamnaceae	~*Phylica velutina* (PEN)	NT
Apiaceae	***Arctopus echinatus*** (PEN)[c]	**LC**	Brassicaceae	~*Heliophila elata*	VU	**Pinaceae**	***Pinus halepensis*** (NEM:BA)[c]	**NE**
Iridaceae	***Aristea africana*** (PEN)[c]	**LC**	Malvaceae	~*Hermannia rugosa* (PEN)	VU	**Plantaginaceae**	***Plantago lanceolata*** [a]	**LC**
Iridaceae	~*Aristea lugens* (PEN)	EN	Caryophyllaceae	~*Herniaria pearsonii*	NT	Fabaceae	~*Podalyria argentea*	EN
Iridaceae	~*Aristea nigrescens* (PEN)	EN	Iridaceae	~*Hesperantha brevifolia* (PEN)	VU	Fabaceae	~*Podalyria microphylla* (PEN)	CR
Iridaceae	~*Aristea simplex* (PEN)	NT	Iridaceae	~*Hesperantha montigena* (PEN)	Rare	Fabaceae	~*Polhillia ignota* (PEN)	CR
Restionaceae	~*Askidiosperma alticolum* (PEN)	Rare	Iridaceae	~*Hesperantha pilosa* subsp. *pilosa*	NT	Scrophulariaceae	~*Polycarena capensis* (PEN)	NT
Restionaceae	~*Askidiosperma andreaeanum* (PEN)	NT	Iridaceae	~*Hesperantha radiata*	NT	Scrophulariaceae	~*Polycarena gilioides* (PEN)	DDT
Restionaceae	~*Askidiosperma insigne* (PEN)	VU	Iridaceae	~*Hesperantha spicata* subsp. *spicata* (PEN)	NT	**Asteraceae**	***Printzia polifolia*** [c]	**LC**

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Restionaceae	~*Askidiosperma longiflorum* (PEN)	NT	Asteraceae	~*Hydroidea elsiae* (PEN)	Rare	Campanulaceae	~*Prismatocarpus implicatus* (PEN)	Rare
Fabaceae	~*Aspalathus acanthoclada* (PEN)	VU	Restionaceae	~*Hypodiscus rugosus* (PEN)	EN	Proteaceae	~**Protea acaulos* (PEN)	NT
Fabaceae	~*Aspalathus aculeata* (PEN)	VU	Fabaceae	~*Indigofera fulcrata*	Rare	Proteaceae	~**Protea angustata* (PEN)	VU
Fabaceae	***Aspalathus acuminata* subsp. *acuminata*** **(PEN)[c]**	**LC**	**Fabaceae**	***Indigofera heterophylla*** **[c]**	**LC**	Proteaceae	~**Protea aspera* (PEN)	VU
Fabaceae	~*Aspalathus amoena* (PEN)	CR	Fabaceae	~*Indigofera psoraloides* (PEN)	EN	Proteaceae	~**Protea burchellii* (PEN)	VU
Fabaceae	~*Aspalathus araneosa* (PEN)	VU	Fabaceae	~*Indigofera quinquefolia* (PEN)	EN	Proteaceae	~**Protea cordata* (PEN)	NT
Fabaceae	~*Aspalathus attenuata*	EN	Fabaceae	~*Indigofera triquetra* (PEN)	VU	Proteaceae	~**Protea cryophila* (PEN)	VU
Fabaceae	~*Aspalathus compacta* (PEN)	CR	Isoetaceae	~*Isoetes capensis* (PEN)	EN	Proteaceae	~**Protea effusa* (PEN)	NT
Fabaceae	~*Aspalathus densifolia* (PEN)	DDD	Isoetaceae	~*Isoetes stephanseniae* (PEN)	CR	Proteaceae	~**Protea grandiceps*	NT
Fabaceae	~*Aspalathus desertorum* (PEN)	NT	Cyperaceae	~*Isolepis leucoloma* (PEN)	VU	Proteaceae	~**Protea lacticolor* (PEN)	VU
Fabaceae	~*Aspalathus fasciculata* (PEN)	EN	Cyperaceae	~*Isolepis minuta* (PEN)	DDD	**Proteaceae**	****Protea laurifolia*** **(PEN)[c]**	**LC**
Fabaceae	***Aspalathus flexuosa*** **(PEN)[c]**	**LC**	Cyperaceae	~*Isolepis pusilla* (PEN)	DDD	Proteaceae	~**Protea longifolia* (PEN)	NT
Fabaceae	~*Aspalathus horizontalis* (PEN)	CR	Iridaceae	~**Ixia abbreviata* (PEN)	VU	Proteaceae	~**Protea lorea* (PEN)	NT
Fabaceae	~*Aspalathus intervallaris* (PEN)	NT	Iridaceae	~**Ixia aurea* (PEN)	EN	Proteaceae	~**Protea mucronifolia* (PEN)	EN
Fabaceae	~*Aspalathus intricata* subsp. *intricata* (PEN)	Rare	Iridaceae	~**Ixia campanulata* (PEN)	CR	Proteaceae	~**Protea obtusifolia* (PEN)	NT
Fabaceae	~*Aspalathus lanifera* (PEN)	VU	Iridaceae	~**Ixia capillaris*	NT	Proteaceae	~**Protea pityphylla* (PEN)	NT
Fabaceae	~*Aspalathus latifolia* (PEN)	VU	Iridaceae	~**Ixia contorta* (PEN)	NT	Proteaceae	~**Protea recondita* (PEN)	NT
Fabaceae	~*Aspalathus lebeckioides* (PEN)	VU	**Iridaceae**	****Ixia dubia*** **(PEN)[c]**	**LC**	Proteaceae	~**Protea restionifolia* (PEN)	VU
Fabaceae	~*Aspalathus lenticula* (PEN)	CR	Iridaceae	~**Ixia erubescens* (PEN)	EN	Proteaceae	~**Protea rupicola*	EN
Fabaceae	~*Aspalathus leptocoma* (PEN)	Rare	Iridaceae	~**Ixia longistylis* (PEN)	CR	Proteaceae	~**Protea scabra* (PEN)	VU
Fabaceae	~*Aspalathus linearifolia*	NT	Iridaceae	~**Ixia metelerkampiae* (PEN)	NT	Proteaceae	~**Protea scolymocephala* (PEN)	VU
Fabaceae	~*Aspalathus muraltioides* (PEN)	EN	Iridaceae	~**Ixia monadelpha* (PEN)	EN	Proteaceae	~**Protea scorzonerifolia* (PEN)	VU
Fabaceae	~*Aspalathus pendula* (PEN)	NT	Iridaceae	~**Ixia mostertii* (PEN)	EN	Salicaceae	~*Pseudoscolopia polyantha*	NT
Fabaceae	***Aspalathus perforata*** **(PEN)[c]**	**LC**	Iridaceae	~**Ixia rouxii* (PEN)	CR	Scrophulariaceae	~*Pseudoselago prolixa* (PEN)	Rare
Fabaceae	~*Aspalathus puberula* (PEN)	EN	Iridaceae	~**Ixia sarmentosa* (PEN)	EN	Scrophulariaceae	~*Pseudoselago quadrangularis* (PEN)	Rare
Fabaceae	~*Aspalathus recurva* (PEN)	VU	Iridaceae	~**Ixia saundersiana* (PEN)	Rare	Fabaceae	~*Psoralea alata* (PEN)	VU
Fabaceae	~*Aspalathus secunda* (PEN)	EN	**Iridaceae**	***~*Ixia scillaris* subsp. *scillaris*** **(PEN)[c]**	**NT**	Fabaceae	~*Psoralea cataracta* (PEN)	CR
Fabaceae	~*Aspalathus stricticlada* (PEN)	EN	Iridaceae	~**Ixia stricta* (PEN)	NT	Fabaceae	~*Psoralea elegans* (PEN)	Rare
Fabaceae	~*Aspalathus suaveolens* (PEN)	Rare	Iridaceae	~**Ixia tenuis* (PEN)	VU	Fabaceae	~*Psoralea odoratissima* (PEN)	NT
Fabaceae	~*Aspalathus sulphurea* (PEN)	CR	Iridaceae	~**Ixia vinacea* (PEN)	CR	Fabaceae	~*Psoralea tenuissima* (PEN)	Rare
Fabaceae	~*Aspalathus ternata* (PEN)	NT	Iridaceae	~**Ixia viridiflora* (PEN)	EN	**Asteraceae**	***Pteronia incana*** **[c]**	**LC**
Fabaceae	~*Aspalathus truncata* (PEN)	Rare	**Juncaceae**	***Juncus kraussii* subsp. *kraussii*** **[a]**	**LC**	**Orchidaceae**	****Pterygodium catholicum*** **[c]**	**LC**
Fabaceae	~*Aspalathus tulbaghensis* (PEN)	CR	**Achariaceae**	***Kiggelaria africana*** **[b]**	**LC**	Orchidaceae	~**Pterygodium cleistogamum*	VU
Fabaceae	~*Aspalathus ulicina* subsp. *ulicina* (PEN)	Rare	Iridaceae	~**Klattia flava* (PEN)	VU	Orchidaceae	~**Pterygodium inversum* (PEN)	EN

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Fabaceae	~Aspalathus varians (PEN)	EN	Hyacinthaceae	~*Lachenalia aloides (PEN)	VU	Orchidaceae	~*Pterygodium microglossum (PEN)	EN
Fabaceae	~Aspalathus wurmbeana (PEN)	EN	Hyacinthaceae	~*Lachenalia bachmannii (PEN)	EN	**Fagaceae**	***Quercus robur*** [b]	**NE**
Asparagaceae	***Asparagus declinatus*** [c]	**LC**	Hyacinthaceae	~*Lachenalia contaminata (PEN)	NT	Fabaceae	~Rafnia crispa (PEN)	CR
Asparagaceae	~Asparagus lignosus (PEN)	NT	Hyacinthaceae	~*Lachenalia corymbosa (PEN)	VU	Fabaceae	~Rafnia diffusa	NT
Asparagaceae	***Asparagus rubicundus*** [b]	**LC**	Hyacinthaceae	~*Lachenalia mediana subsp. mediana (PEN)	VU	Fabaceae	~Rafnia lancea (PEN)	EN
Asparagaceae	~Asparagus stipulaceus (PEN)	NT	Hyacinthaceae	~*Lachenalia nardousbergensis	NT	Restionaceae	~Restio alticola (PEN)	Rare
Asteraceae	~Athanasia adenantha	EN	Hyacinthaceae	~*Lachenalia polyphylla (PEN)	EN	**Restionaceae**	***Restio capensis*** [c]	**LC**
Asteraceae	~Athanasia capitata (PEN)	EN	Hyacinthaceae	~*Lachenalia stayneri (PEN)	VU	Restionaceae	~Restio coactilis (PEN)	VU
Asteraceae	~Athanasia crenata (PEN)	EN	Hyacinthaceae	~*Lachenalia thunbergii (PEN)	Rare	Restionaceae	~Restio durus (PEN)	Rare
Asteraceae	~Athanasia hirsuta (PEN)	Rare	Thymelaeaceae	~Lachnaea alpina (PEN)	Rare	Restionaceae	~Restio duthieae (PEN)	VU
Asteraceae	***Athanasia trifurcata*** [a]	**LC**	Thymelaeaceae	~Lachnaea capitata (PEN)	VU	Restionaceae	~Restio elsieae (PEN)	Rare
Poaceae	***Avena barbata*** [a]	**NE**	Thymelaeaceae	~Lachnaea densiflora (PEN)	NT	Restionaceae	~Restio esterhuyseniae (PEN)	Rare
Iridaceae	~*Babiana angustifolia (PEN)	NT	Thymelaeaceae	~Lachnaea funicaulis (PEN)	NT	Restionaceae	~Restio montanus (PEN)	Critically Rare
Iridaceae	~*Babiana arenicola (PEN)	EN	Thymelaeaceae	~Lachnaea grandiflora (PEN)	VU	Restionaceae	~Restio nodosus (PEN)	Rare
Iridaceae	~*Babiana blanda (PEN)	EN	Thymelaeaceae	~Lachnaea pedicellata (PEN)	Rare	Restionaceae	~Restio paludosus (PEN)	VU
Iridaceae	~*Babiana fragrans (PEN)	NT	Thymelaeaceae	~Lachnaea pusilla (PEN)	VU	Restionaceae	~Restio papillosus	VU
Iridaceae	~*Babiana inclinata (PEN)	EN	Thymelaeaceae	~Lachnaea uniflora (PEN)	VU	Restionaceae	~Restio parthenocarpos (PEN)	EN
Iridaceae	~*Babiana leipoldtii (PEN)	EN	Aizoaceae	~*Lampranthus aduncus	DDT	Restionaceae	~Restio pratensis (PEN)	EN
Iridaceae	~*Babiana nervosa (PEN)	NT	Aizoaceae	~*Lampranthus altistylus (PEN)	DDT	Restionaceae	~Restio rigoratus (PEN)	EN
Iridaceae	~*Babiana secunda (PEN)	EN	Aizoaceae	~*Lampranthus aureus (PEN)	VU	Restionaceae	~Restio saxatilis (PEN)	Rare
Iridaceae	***~*Babiana villosa*** (PEN)[c]	**NT**	Aizoaceae	~*Lampranthus calcaratus (PEN)	DDT	Restionaceae	~Restio subtilis (PEN)	Rare
Iridaceae	~*Babiana villosula (PEN)	NT	Aizoaceae	~*Lampranthus coccineus (PEN)	CR	Fabaceae	~Rhynchosia viscidula (PEN)	DDT
Asteraceae	***Berkheya armata*** [c]	**LC**	Aizoaceae	~*Lampranthus debilis (PEN)	EN	Iridaceae	~*Romulea albomarginata (PEN)	VU
Bruniaceae	~*Berzelia ecklonii (PEN)	Rare	Aizoaceae	~*Lampranthus dilutus (PEN)	EN	Aizoaceae	~*Ruschia diversifolia (PEN)	VU
Iridaceae	~*Bobartia fasciculata (PEN)	NT	Aizoaceae	~*Lampranthus dulcis (PEN)	DDT	Aizoaceae	~*Ruschia geminiflora (PEN)	VU
Iridaceae	~*Bobartia lilacina (PEN)	Rare	**Aizoaceae**	***~*Lampranthus emarginatoides*** (PEN)[c]	**DDT**	Aizoaceae	~*Ruschia parviflora	DDT
Asteraceae	***Bolandia pinnatifida*** [b]	**LC**	Aizoaceae	~*Lampranthus filicaulis (PEN)	VU	Aizoaceae	~*Ruschia pungens	DDT
Poaceae	***Briza maxima*** [ac]	**NE**	Aizoaceae	~*Lampranthus glaucus (PEN)	NT	Aizoaceae	~*Ruschia rubricaulis (PEN)	VU
Poaceae	***Bromus hordeaceus*** [a]	**NE**	Aizoaceae	~*Lampranthus leipoldtii (PEN)	DDT	**Lamiaceae**	***Salvia africana*** [b]	**LC**
Bruniaceae	~*Brunia myrtoides (PEN)	VU	Aizoaceae	~*Lampranthus leptaleon (PEN)	EN	Lamiaceae	~Salvia thermarum (PEN)	VU
Bruniaceae	~*Brunia oblongifolia (PEN)	Rare	Aizoaceae	~*Lampranthus lewisiae (PEN)	DDT	**Orchidaceae**	***Satyrium bicallosum*** (PEN)[c]	**LC**
Bruniaceae	~*Brunia purpurea (PEN)	Rare	Aizoaceae	~*Lampranthus peacockiae (PEN)	VU	Cyperaceae	~Schoenus exilis (PEN)	DDT
Bruniaceae	~*Brunia sphaerocephala (PEN)	VU	Aizoaceae	~*Lampranthus reptans (PEN)	NT	**Anacardiaceae**	***Searsia angustifolia*** [bc]	**LC**
Bruniaceae	~*Brunia tulbaghensis (PEN)	DDT	Aizoaceae	~*Lampranthus rupestris (PEN)	CR	**Anacardiaceae**	***Searsia glauca*** [b]	**LC**

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Amaryllidaceae	~*Brunsvigia elandsmontana (PEN)	Critically Rare
Asphodelaceae	~Bulbine muscicola (PEN)	DDT
Hemerocallidaceae	~Caesia capensis (PEN)	Rare
Hemerocallidaceae	~Caesia sabulosa	VU
Restionaceae	~Cannomois arenicola (PEN)	EN
Asteraceae	~Capelio caledonica (PEN)	Rare
Cyperaceae	~Carpha schlechteri (PEN)	DDD
Apiaceae	~Centella capensis (PEN)	NT
Dipsacaceae	~Cephalaria scabra (PEN)	VU
Aizoaceae	~*Cephalophyllum parviflorum (PEN)	CR
Orchidaceae	~*Ceratandra venosa (PEN)	NT
Apiaceae	~Chamarea esterhuyseniae (PEN)	Critically Rare
Iridaceae	***Chasmanthe aethiopica** [b]	**LC**
Agavaceae	~Chlorophytum monophyllum (PEN)	DDD
Asteraceae	~Cineraria alchemilloides subsp. alchemilloides	Rare
Menispermaceae	***Cissampelos capensis** [b]	**LC**
Rosaceae	~Cliffortia acockii (PEN)	CR
Rosaceae	~Cliffortia marginata (PEN)	EN
Rosaceae	~Cliffortia pilifera (PEN)	VU
Rosaceae	***Cliffortia ruscifolia** [c]	**LC**
Iridaceae	~*Codonorhiza azurea	EN
Asteraceae	~Corymbium elsiae (PEN)	Rare
Asteraceae	~Cotula filifolia	NT
Asteraceae	~Cotula pusilla (PEN)	VU
Crassulaceae	~Crassula bergioides (PEN)	NT
Crassulaceae	~Crassula lasiantha	Rare
Amaryllidaceae	~*Crossyne flava	NT
Asteraceae	~Curio crassulifolius	DDT
Asteraceae	~Curio repens (PEN)	DDT
Asteraceae	~Curio talinoides	DDT
Tecophilaeaceae	~Cyanella alba subsp. flavescens (PEN)	Rare
Aizoaceae	~*Lampranthus scaber (PEN)	EN
Aizoaceae	~*Lampranthus sociorum (PEN)	EN
Aizoaceae	~*Lampranthus spiniformis (PEN)	VU
Aizoaceae	~*Lampranthus stenopetalus (PEN)	VU
Aizoaceae	~*Lampranthus vallis-gratiae (PEN)	DDT
Asteraceae	~Lamprocephalus montanus (PEN)	Rare
Fabaceae	~Lebeckia grandiflora	Rare
Fabaceae	~Lebeckia meyeriana (PEN)	EN
Fabaceae	~Lebeckia plukenetiana (PEN)	EN
Brassicaceae	~Lepidium pinnatum (PEN)	VU
Fabaceae	***Lessertia frutescens** subsp. ***frutescens** [c]	**LC**
Fabaceae	~Lessertia pappeana (PEN)	DDT
Fabaceae	~Lessertia tomentosa (PEN)	NT
Proteaceae	~*Leucadendron argenteum (PEN)	VU
Proteaceae	~*Leucadendron chamelaea (PEN)	CR
Proteaceae	~*Leucadendron coniferum (PEN)	NT
Proteaceae	~*Leucadendron corymbosum (PEN)	NT
Proteaceae	~*Leucadendron daphnoides (PEN)	NT
Proteaceae	~*Leucadendron dubium (PEN)	NT
Proteaceae	~*Leucadendron floridum (PEN)	EN
Proteaceae	~*Leucadendron gydoense (PEN)	EN
Proteaceae	~*Leucadendron lanigerum (PEN) var. laevigatum	CR
Proteaceae	***~Leucadendron lanigerum (PEN)[c]** var. ***lanigerum**	**EN**
Proteaceae	~*Leucadendron procerum	VU
Proteaceae	***Leucadendron salignum** [c]	**LC**
Proteaceae	~*Leucadendron sessile (PEN)	NT
Proteaceae	~*Leucadendron stellare (PEN)	EN
Proteaceae	~*Leucospermum catherinae (PEN)	VU
Proteaceae	~*Leucospermum cordifolium (PEN)	NT
Proteaceae	~*Leucospermum grandiflorum (PEN)	VU
Proteaceae	~*Leucospermum hypophyllocarpodendron (PEN) subsp. canaliculatum	EN
Anacardiaceae	***Searsia rehmanniana** var. ***rehmanniana** [bc]	**LC**
Gentianaceae	***Sebaea exacoides** [c]	**LC**
Scrophulariaceae	***Selago eckloniana** (PEN)[b]	**LC**
Asteraceae	~Senecio albifolius (PEN)	Rare
Asteraceae	~Senecio cadiscus (PEN)	CR
Asteraceae	~Senecio erysimoides	DDT
Asteraceae	~Senecio leucoglossus (PEN)	DDT
Asteraceae	~Senecio odontopterus (PEN)	DDD
Asteraceae	~Senecio rehmannii (PEN)	DDT
Asteraceae	~Senecio umbricola (PEN)	Rare
Geraniaceae	~Sensitive Species X10 (PEN)	VU
Orchidaceae	~*Sensitive Species X11 (PEN)	Rare
Orchidaceae	~*Sensitive Species X12 (PEN)	CR
Orchidaceae	~*Sensitive Species X13 (PEN)	VU
Geraniaceae	~Sensitive Species X14 (PEN)	VU
Orchidaceae	~*Sensitive Species X15 (PEN)	Rare
Hyacinthaceae	~*Sensitive Species X16 (PEN)	VU
Iridaceae	~*Sensitive Species X17 (PEN)	VU
Iridaceae	~*Sensitive Species X18 (PEN)	EN
Iridaceae	~*Sensitive Species X19 (PEN)	VU
Asphodelaceae	~Sensitive Species X2 (PEN)	Rare
Asphodelaceae	~Sensitive Species X20 (PEN)	VU
Iridaceae	~*Sensitive Species X21 (PEN)	NT
Orchidaceae	~*Sensitive Species X22 (PEN)	EN
Orchidaceae	~*Sensitive Species X23 (PEN)	Rare
Geraniaceae	~Sensitive Species X24 (PEN)	EN
Lauraceae	~Sensitive Species X25 (PEN)	NT
Orchidaceae	~*Sensitive Species X26 (PEN)	VU
Iridaceae	~*Sensitive Species X27 (PEN)	CR
Iridaceae	~*Sensitive Species X28	VU
Iridaceae	~*Sensitive Species X3 (PEN)	NT

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Tecophilaeaceae	***Cyanella lutea* subsp. *lutea*** [c]	**LC**
Fabaceae	*~Cyclopia genistoides*	NT
Fabaceae	*~Cyclopia glabra* (PEN)	Rare
Fabaceae	*~Cyclopia intermedia* (PEN)	NT
Fabaceae	*~Cyclopia maculata* (PEN)	NT
Apiaceae	*~Cynorhiza meifolia* (PEN)	DDD
Lobeliaceae	*~Cyphia campestris*	VU
Lobeliaceae	***Cyphia digitata*** [c]	**LC**
Lobeliaceae	*~Cyphia incisa* (PEN)	NT
Lobeliaceae	*~Cyphia phyteuma* (PEN)	NT
Proteaceae	*~*Diastella myrtifolia* (PEN)	EN
Proteaceae	*~*Diastella parilis* (PEN)	CR
Iridaceae	*~*Dietes bicolor*	Rare
Rutaceae	*~*Diosma aspalathoides* (PEN)	NT
Rutaceae	*~*Diosma dichotoma* (PEN)	EN
Rutaceae	*~*Diosma pedicellata* (PEN)	NT
Ebenaceae	***Diospyros glabra*** [b]	**LC**
Orchidaceae	*~*Disa atrorubens*	NT
Orchidaceae	*~*Disa brachyceras* (PEN)	CR
Orchidaceae	****Disa bracteata*** [c]	**LC**
Orchidaceae	*~*Disa esterhuyseniae* (PEN)	Rare
Orchidaceae	*~*Disa flexuosa*	NT
Orchidaceae	*~*Disa marlothii*	Rare
Orchidaceae	*~*Disa ovalifolia* (PEN)	NT
Orchidaceae	*~*Disa spathulata* subsp. *spathulata*	DDD
Orchidaceae	*~*Disa spathulata* subsp. *tripartita* (PEN)	EN
Asteraceae	*~Disparago gongylodes* (PEN)	EN
Orchidaceae	*~*Disperis cucullata* (PEN)	NT
Sapindaceae	***Dodonaea viscosa* var. *angustifolia*** [b]	**LC**
Hyacinthaceae	*~Drimia albiflora* (PEN)	VU
Hyacinthaceae	*~Drimia minor*	DDT
Hyacinthaceae	*~Drimia minor*	DDT
Aizoaceae	*~*Drosanthemum calycinum* (PEN)	NT
Proteaceae	*~*Leucospermum hypophyllocarpodendron* subsp. *hypophyllocarpodendron* (PEN)	EN
Proteaceae	*~*Leucospermum innovans*	EN
Proteaceae	*~*Leucospermum lineare* (PEN)	NT
Proteaceae	*~*Leucospermum oleifolium* (PEN)	NT
Proteaceae	*~*Leucospermum reflexum* (PEN)	NT
Proteaceae	*~*Leucospermum rodolentum*	NT
Proteaceae	*~*Leucospermum tomentosum* (PEN)	NT
Proteaceae	*~*Leucospermum tottum* var. *tottum* (PEN)	NT
Proteaceae	*~*Leucospermum vestitum* (PEN)	VU
Asteraceae	***Leysera gnaphalodes*** [ab]	**LC**
Apiaceae	***Lichtensteinia obscura*** (PEN)[c]	**LC**
Fabaceae	*~Liparia capitata* (PEN)	Rare
Lobeliaceae	*~Lobelia limosa* (PEN)	DDT
Lobeliaceae	*~Lobelia nugax* (PEN)	DDD
Boraginaceae	*~Lobostemon capitatus* (PEN)	VU
Poaceae	***Lolium perenne*** [a]	**NE**
Fabaceae	*~Lotononis complanata* (PEN)	EN
Fabaceae	*~Lotononis densa* subsp. *densa* (PEN)	EN
Fabaceae	*~Lotononis oxyptera* (PEN)	DDD
Fabaceae	*~Lotononis perplexa* (PEN)	DDD
Fabaceae	*~Lotononis prostrata* (PEN)	NT
Fabaceae	*~Lotononis rigida* (PEN)	VU
Fabaceae	***Lupinus angustifolius*** [a]	**NE**
Asteraceae	*~Marasmodes macrocephala* (PEN)	CR
Asteraceae	*~Marasmodes oligocephala* (PEN)	EN
Asteraceae	*~Marasmodes oppositifolia*	CR
Asteraceae	*~Marasmodes spinosa* (PEN)	EN
Asteraceae	*~Marasmodes undulata* (PEN)	CR
Hyacinthaceae	*~Merwilla plumbea*	NT
Asteraceae	*~Metalasia adunca* (PEN)	NT
Asteraceae	*~Metalasia capitata* (PEN)	VU
Asteraceae	*~Metalasia octoflora* (PEN)	VU
Asteraceae	*~Metalasia rhoderoides* (PEN)	VU
Iridaceae	*~*Sensitive Species X4* (PEN)	VU
Iridaceae	*~*Sensitive Species X5* (PEN)	EN
Iridaceae	*~*Sensitive Species X6* (PEN)	Rare
Hyacinthaceae	*~*Sensitive Species X7* (PEN)	VU
Geraniaceae	*~Sensitive Species X8* (PEN)	EN
Iridaceae	*~*Sensitive Species X9* (PEN)	VU
Proteaceae	*~*Serruria adscendens* (PEN)	NT
Proteaceae	*~*Serruria aemula* (PEN)	CR
Proteaceae	*~*Serruria brownii* (PEN)	EN
Proteaceae	*~*Serruria candicans* (PEN)	VU
Proteaceae	*~*Serruria confragosa* (PEN)	Rare
Proteaceae	*~*Serruria cyanoides* (PEN)	VU
Proteaceae	*~*Serruria effusa* (PEN)	NT
Proteaceae	*~*Serruria furcellata* (PEN)	CR
Proteaceae	*~*Serruria millefolia* (PEN)	EN
Proteaceae	*~*Serruria pinnata* (PEN)	CR
Proteaceae	*~*Serruria reflexa* (PEN)	Rare
Proteaceae	*~*Serruria rosea* (PEN)	NT
Proteaceae	*~*Serruria roxburghii* (PEN)	EN
Proteaceae	*~*Serruria rubricaulis* (PEN)	VU
Proteaceae	*~*Serruria scoparia* (PEN)	CR
Proteaceae	*~*Serruria trilopha* (PEN)	CR
Proteaceae	*~*Serruria triternata* (PEN)	VU
Aizoaceae	*~*Skiatophytum skiatophytoides* (PEN)	VU
Proteaceae	*~*Sorocephalus capitatus* (PEN)	VU
Proteaceae	*~*Sorocephalus imbricatus* (PEN)	CR
Proteaceae	*~*Sorocephalus scabridus* (PEN)	CR
Iridaceae	*~*Sparaxis grandiflora*	NT
Iridaceae	*~*Sparaxis grandiflora* subsp. *fimbriata* (PEN)	NT
Iridaceae	*~*Sparaxis grandiflora* subsp. *grandiflora* (PEN)	EN
Iridaceae	*~*Sparaxis tricolor*	VU
Proteaceae	*~*Spatalla caudata* (PEN)	EN
Proteaceae	*~*Spatalla mollis* (PEN)	VU

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Aizoaceae	~*Drosanthemum eburneum	DDT
Aizoaceae	~*Drosanthemum hispifolium (PEN)	VU
Aizoaceae	~*Drosanthemum papillatum (PEN)	DDT
Aizoaceae	~*Drosanthemum striatum (PEN)	VU
Aizoaceae	~*Drosanthemum worcesterense (PEN)	EN
Droseraceae	~Drosera regia (PEN)	Rare
Boraginaceae	~Echiostachys ecklonianus (PEN)	EN
Boraginaceae	~Echiostachys incanus (PEN)	VU
Boraginaceae	***Echium plantagineum*** **(NEM:BA)[a]**	**NE**
Restionaceae	~Elegia amoena (PEN)	Rare
Restionaceae	~Elegia extensa (PEN)	EN
Restionaceae	~Elegia intermedia (PEN)	DDT
Restionaceae	~Elegia recta (PEN)	NT
Aizoaceae	~*Erepsia forficata (PEN)	Rare
Aizoaceae	~*Erepsia insignis (PEN)	Critically Rare
Aizoaceae	~*Erepsia patula (PEN)	VU
Aizoaceae	~*Erepsia ramosa (PEN)	VU
Ericaceae	~*Erica atrovinosa (PEN)	VU
Ericaceae	~*Erica capitata (PEN)	NT
Ericaceae	~*Erica caprina (PEN)	VU
Ericaceae	***Erica coarctata* var. *coarctata*** **(PEN)[c]**	**LC**
Ericaceae	~*Erica cremea (PEN)	VU
Ericaceae	~*Erica cymosa subsp. cymosa (PEN)	Rare
Ericaceae	~*Erica doliiformis (PEN)	VU
Ericaceae	~*Erica haemastoma (PEN)	DDT
Ericaceae	~*Erica hansfordii (PEN)	CR
Ericaceae	~*Erica hexensis (PEN)	Rare
Ericaceae	~*Erica hippurus (PEN)	EN
Ericaceae	~*Erica junonia var. junonia (PEN)	VU
Ericaceae	~*Erica leptantha (PEN)	DDT
Ericaceae	~*Erica leucosiphon (PEN)	Rare
Ericaceae	***Erica longistyla* var. *longistyla*** **(PEN)[c]**	**LC**
Ericaceae	~*Erica marlothii (PEN)	Rare
Ericaceae	***Erica mauritanica*** **(PEN)[c]**	**LC**
Asteraceae	~*Metalasia schlechteri (PEN)	CR
Asteraceae	~*Metalasia serrulata (PEN)	VU
Iridaceae	~*Micranthus thereianthoides (PEN)	VU
Lobeliaceae	~*Monopsis variifolia (PEN)	EN
Montiniaceae	***Montinia caryophyllacea*** **[c]**	**LC**
Iridaceae	~*Moraea angulata (PEN)	CR
Iridaceae	~*Moraea incurva (PEN)	VU
Iridaceae	~*Moraea maximiliani (PEN)	NT
Iridaceae	~*Moraea ogamana	CR
Iridaceae	~*Moraea tricolor (PEN)	EN
Iridaceae	~*Moraea tripetala subsp. violacea	NT
Iridaceae	~*Moraea variabilis (PEN)	EN
Iridaceae	~*Moraea villosa subsp. elandsmontana (PEN)	VU
Iridaceae	~*Moraea villosa subsp. villosa (PEN)	VU
Myricaceae	***Morella quercifolia*** **[b]**	**LC**
Polygalaceae	~Muraltia alba (PEN)	Rare
Polygalaceae	~Muraltia angustiflora (PEN)	DDD
Polygalaceae	~Muraltia concava (PEN)	NT
Polygalaceae	~Muraltia decipiens (PEN)	EN
Polygalaceae	~Muraltia macropetala (PEN)	VU
Polygalaceae	~Muraltia mixta (PEN)	DDD
Polygalaceae	~Muraltia montana (PEN)	Rare
Polygalaceae	~Muraltia spicata (PEN)	VU
Polygalaceae	~Muraltia tenuifolia (PEN)	VU
Polygalaceae	~Muraltia thunbergii (PEN)	NT
Polygalaceae	~Muraltia trinervia (PEN)	NT
Scrophulariaceae	~Nemesia lucida (PEN)	DDT
Scrophulariaceae	~Nemesia picta (PEN)	Rare
Rubiaceae	~Nenax elsieae (PEN)	Rare
Rubiaceae	~Nenax hirta subsp. hirta (PEN)	VU
Amaryllidaceae	~*Nerine ridleyi (PEN)	Rare
Asteraceae	~Oedera fruticosa (PEN)	NT
Asteraceae	***Oedera genistifolia*** **[c]**	**LC**
Asteraceae	~Oedera longipes (PEN)	EN
Proteaceae	~*Spatalla propinqua (PEN)	VU
Proteaceae	~*Spatalla salsoloides (PEN)	EN
Proteaceae	~*Spatalla setacea (PEN)	NT
Proteaceae	~*Spatalla thyrsiflora (PEN)	VU
Proteaceae	~*Spatalla tulbaghensis (PEN)	EN
Hyacinthaceae	~Spetaea lachenaliiflora (PEN)	VU
Bruniaceae	~*Staavia verticillata (PEN)	EN
Asteraceae	~Steirodiscus gamolepis (PEN)	EN
Amaryllidaceae	~*Strumaria watermeyeri subsp. watermeyeri	Rare
Thymelaeaceae	***Struthiola tomentosa*** **(PEN)[c]**	**LC**
Penaeaceae	~*Stylapterus ericoides subsp. ericoides (PEN)	CR
Asteraceae	~Syncarpha dykei (PEN)	Rare
Asteraceae	~Syncarpha marlothii (PEN)	Rare
Aizoaceae	~*Tetragonia caesia (PEN)	EN
Bruniaceae	~*Thamnea hirtella (PEN)	Rare
Bruniaceae	~*Thamnea thesioides (PEN)	Rare
Restionaceae	~Thamnochortus dumosus (PEN)	VU
Iridaceae	~*Thereianthus bulbiferus	EN
Iridaceae	~*Thereianthus elandsmontanus	EN
Iridaceae	~*Thereianthus ixioides (PEN)	Rare
Iridaceae	~*Thereianthus longicollis (PEN)	Rare
Santalaceae	~Thesium bathyschistum (PEN)	DDT
Santalaceae	~Thesium brachygyne (PEN)	DDT
Santalaceae	~Thesium frisea var. frisea	DDT
Stilbaceae	~Thesmophora scopulosa (PEN)	VU
Asphodelaceae	~Trachyandra chlamydophylla (PEN)	VU
Asphodelaceae	***Trachyandra hirsuta*** **(PEN)[c]**	**LC**
Cyperaceae	~Trianoptiles solitaria (PEN)	EN
Poaceae	***Tribolium uniolae*** **[c]**	**LC**
Scrophulariaceae	~Trieenea longipedicellata (PEN)	Rare
Fabaceae	***Trifolium angustifolium* var. *angustifolium*** **[a]**	**NE**
Iridaceae	~*Tritoniopsis elongata (PEN)	EN
Iridaceae	~*Tritoniopsis lesliei (PEN)	EN
Tropaeolaceae	***Tropaeolum majus*** **[b]**	**NE**

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Ericaceae	~*Erica micrandra (PEN)	DDD	**Oleaceae**	***Olea europaea* subsp. *cuspidata* [b]**	**LC**	Asteraceae	~*Ursinia coronopifolia* (PEN)	Rare
Ericaceae	~*Erica mitchellensis (PEN)	Rare	Hyacinthaceae	~*Ornithogalum esterhuyseniae* (PEN)	Rare	Asteraceae	~*Ursinia filipes* (PEN)	NT
Ericaceae	~*Erica monantha (PEN)	DDT	**Hyacinthaceae**	***Ornithogalum thyrsoides* [ac]**	**LC**	Asteraceae	~*Ursinia merxmuelleri* (PEN)	Rare
Ericaceae	~*Erica nana (PEN)	VU	Aizoaceae	~*Oscularia pedunculata* (PEN)	DDT	**Asteraceae**	***Vellereophyton dealbatum* [a]**	**LC**
Ericaceae	~*Erica oxysepala (PEN)	VU	Asteraceae	~*Osmitopsis nana* (PEN)	Rare	**Fabaceae**	***Vicia benghalensis* [a]**	**NE**
Ericaceae	~*Erica rehmii (PEN)	VU	Asteraceae	~*Osmitopsis tenuis* (PEN)	Rare	**Apocynaceae**	***Vinca major* (NEM:BA)[b]**	**NE**
Ericaceae	~*Erica salax (PEN)	DDT	**Fabaceae**	***Otholobium candicans* [ab]**	**LC**	Haemodoraceae	~*Wachendorfia brachyandra* (PEN)	VU
Ericaceae	~*Erica tarantulae	VU	Asteraceae	~*Othonna ciliata* (PEN)	VU	**Haemodoraceae**	***Wachendorfia paniculata* [c]**	**LC**
Ericaceae	~*Erica truncata (PEN)	DDT	Asteraceae	~*Othonna linearifolia*	EN	Campanulaceae	~*Wahlenbergia brachyphylla* (PEN)	Rare
Asteraceae	***Eriocephalus africanus* (PEN)[bc] var. *africanus***	**LC**	Oxalidaceae	~*Oxalis disticha*	NT	Campanulaceae	~*Wahlenbergia tomentosula* (PEN)	DDT
Ruscaceae	~*Eriospermum lanuginosum*	NT	Oxalidaceae	~*Oxalis droseroides* (PEN)	EN	Iridaceae	~*Watsonia borbonica* subsp. *arderneі* (PEN)	EN
Ruscaceae	~*Eriospermum spirale*	VU	Oxalidaceae	~*Oxalis hirta* var. *intermedia* (PEN)	DDT	Iridaceae	~*Watsonia distans (PEN)	EN
Rutaceae	~*Euchaetis pungens (PEN)	VU	Oxalidaceae	~*Oxalis leptocalyx* (PEN)	DDT	Fabaceae	~*Wiborgia tenuifolia* (PEN)	NT
Asteraceae	~*Euryops serra (PEN)	VU	Oxalidaceae	~*Oxalis meisneri* (PEN)	VU	Colchicaceae	~*Wurmbea inusta* (PEN)	VU
Stilbaceae	~*Euthystachys abbreviata* (PEN)	VU	Oxalidaceae	~*Oxalis natans*	CR	Fabaceae	~*Xiphotheca lanceolata* (PEN)	VU
Orchidaceae	~*Evotella rubiginosa* (PEN)	Rare	Oxalidaceae	~*Oxalis pardalis* (PEN)	DDT	**Fabaceae**	***~Xiphotheca reflexa* (PEN)[c]**	**EN**
Asteraceae	~*Felicia annectens* (PEN)	DDT	**Oxalidaceae**	***Oxalis pes-caprae* var. *pes-caprae* [c]**	**LC**	Asteraceae	~*Zyrphelis decumbens* (PEN)	Rare
Iridaceae	***Ferraria crispa* [b]**	**LC**	Oxalidaceae	~*Oxalis stokoei* (PEN)	DDD	Asteraceae	~*Zyrphelis pilosella* (PEN)	DDT
Cyperaceae	~*Ficinia distans* (PEN)	VU	Oxalidaceae	~*Oxalis strigosa* (PEN)	EN			
Oleaceae	***Fraxinus angustifolia* (NEM:BA)[b]**	**NE**	Orchidaceae	~*Pachites bodkinii* (PEN)	Rare			

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8. Appendix B: Disseminated Evidence of Observed SCC

This section contains information regarding the online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area as required by the Protocol for the Specialist Assessment and Minimum Report Content Requirements For Environmental Impacts on Terrestrial Plant Species (GN 1150, 43855, 30 October 2020). Observations were uploaded to iNaturalist (https://www.inaturalist.org/home).

Only selected species were uploaded and the list is not intended to be comprehensive. Sensitive species, as determined by the National Web Based Environmental Screening Tool, were not disseminated, and are not listed here since their identities will not be made public.

Taxon ID	Species	Common Name	Hyperlink
53344	*Acacia melanoxylon*	Blackwood	https://www.inaturalist.org/observations/320146489
570161	*Agathosma capensis*	Cape Buchu	https://www.inaturalist.org/observations/320238623
579390	*Albuca aurea*	Golden Tamarak	https://www.inaturalist.org/observations/320238622
579390	*Albuca aurea*	Golden Tamarak	https://www.inaturalist.org/observations/320238639
120089	*Albuca cooperi*	Dainty Tamarak	https://www.inaturalist.org/observations/320238745
579952	*Anthospermum spathulatum*	Spoon Flowerseed	https://www.inaturalist.org/observations/320146536
566627	*Aristea africana*	African Capeblue	https://www.inaturalist.org/observations/320146525
139725	*Aspalathus*	Capegorses	https://www.inaturalist.org/observations/320146514
139725	*Aspalathus*	Capegorses	https://www.inaturalist.org/observations/320238507
139725	*Aspalathus*	Capegorses	https://www.inaturalist.org/observations/320238541
139725	*Aspalathus*	Capegorses	https://www.inaturalist.org/observations/320238648
580397	*Aspalathus acuminata*	Longtip Capegorse	https://www.inaturalist.org/observations/320238508
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320146513
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238496
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238570
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238612
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238626
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238627
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238638
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238649
567137	*Aspalathus flexuosa*	Crooked Capegorse	https://www.inaturalist.org/observations/320238766
580549	*Aspalathus perforata*	Floppy Capegorse	https://www.inaturalist.org/observations/320146524
495846	*Asparagus retrofractus*	Zigzag Asparagus	https://www.inaturalist.org/observations/320146486
580932	*Babiana villosa*	Scarlet Bobbejaantjie	https://www.inaturalist.org/observations/320146526
580932	*Babiana villosa*	Scarlet Bobbejaantjie	https://www.inaturalist.org/observations/320146531
580932	*Babiana villosa*	Scarlet Bobbejaantjie	https://www.inaturalist.org/observations/320146542
580932	*Babiana villosa*	Scarlet Bobbejaantjie	https://www.inaturalist.org/observations/320146547
581053	*Berkheya armata*	Giant Capethistle	https://www.inaturalist.org/observations/320146558
581211	*Bolandia pinnatifida*		https://www.inaturalist.org/observations/320146509
57157	*Briza maxima*	Greater Quaking Grass	https://www.inaturalist.org/observations/320146499
52703	*Bromus hordeaceus*	Common Soft Brome	https://www.inaturalist.org/observations/320146506
582505	*Codonorhiza elandsmontana*	Elandsberg Paintpetal	https://www.inaturalist.org/observations/320146516
582505	*Codonorhiza elandsmontana*	Elandsberg Paintpetal	https://www.inaturalist.org/observations/320146545
582505	*Codonorhiza elandsmontana*	Elandsberg Paintpetal	https://www.inaturalist.org/observations/320238617
567751	*Cyphia digitata*	Finger Baroe	https://www.inaturalist.org/observations/320238596

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475002	*Disa bracteata*	Bract Disa	https://www.inaturalist.org/observations/320146539
60108	*Drosanthemum*	Dewfigs	https://www.inaturalist.org/observations/320238650
76764	*Echium plantagineum*	Paterson's Curse	https://www.inaturalist.org/observations/320146504
584746	*Erica coarctata*	Caterpillar Heath	https://www.inaturalist.org/observations/320238497
584984	*Erica longistyla*		https://www.inaturalist.org/observations/320146554
585005	*Erica mauritanica*	Keyhole Heath	https://www.inaturalist.org/observations/320146535
125857	*Ferraria crispa*	Black Spiderlily	https://www.inaturalist.org/observations/320146492
82881	*Fraxinus angustifolia*	Narrow-Leaved Ash	https://www.inaturalist.org/observations/320146495
586217	*Geissorhiza erosa*	Vineyard Satin	https://www.inaturalist.org/observations/320238547
119485	*Helichrysum revolutum*	Pale Everlasting	https://www.inaturalist.org/observations/320238557
426219	*Helichrysum teretifolium*	Needle Everlasting	https://www.inaturalist.org/observations/320146517
531575	*Indigofera heterophylla*	Diverse Indigo	https://www.inaturalist.org/observations/320146557
531575	*Indigofera heterophylla*	Diverse Indigo	https://www.inaturalist.org/observations/320238502
531575	*Indigofera heterophylla*	Diverse Indigo	https://www.inaturalist.org/observations/320238628
531575	*Indigofera heterophylla*	Diverse Indigo	https://www.inaturalist.org/observations/320238775
566074	*Ixia dubia*	Yellow Kalossie	https://www.inaturalist.org/observations/320146534
566074	*Ixia dubia*	Yellow Kalossie	https://www.inaturalist.org/observations/320146543
566074	*Ixia dubia*	Yellow Kalossie	https://www.inaturalist.org/observations/320238568
120463	*Ixia scillaris scillaris*		https://www.inaturalist.org/observations/320238530
119178	*Kiggelaria africana*	Wild Peach	https://www.inaturalist.org/observations/320146490
588540	*Lampranthus emarginatoides*	Abundant Brightfig	https://www.inaturalist.org/observations/320146561
589071	*Leucadendron lanigerum*	Common Shale Conebush	https://www.inaturalist.org/observations/320146564
589147	*Leysera gnaphalodes*	Dune Tortoisetea	https://www.inaturalist.org/observations/320238662
119661	*Lupinus angustifolius*	Narrow-Leaved Lupine	https://www.inaturalist.org/observations/320146502
589978	*Micranthus tubulosus*	Hollowleaf Combflower	https://www.inaturalist.org/observations/320238754
590286	*Morella quercifolia*	Oak Waxberry	https://www.inaturalist.org/observations/320146497
524508	*Oedera genistifolia*	Lesser Perdekaroo	https://www.inaturalist.org/observations/320238655
590724	*Oedera viscosa*	Gluey Perdekaroo	https://www.inaturalist.org/observations/320238643
322082	*Olea europaea cuspidata*	Asian Brown Olive	https://www.inaturalist.org/observations/320146484
522101	*Ornithogalum dubium*	Yellow Chincherinchee	https://www.inaturalist.org/observations/320238731
591426	*Passerina obtusifolia*	Oblong Gonna	https://www.inaturalist.org/observations/320238725
591426	*Passerina obtusifolia*	Oblong Gonna	https://www.inaturalist.org/observations/320238741
78376	*Pelargonium grossularioides*	Coconut Storksbill	https://www.inaturalist.org/observations/320238561
119327	*Pelargonium triste*	Sad Storksbill	https://www.inaturalist.org/observations/320146567
592010	*Phylica imberbis*	Hairy Hardleaf	https://www.inaturalist.org/observations/320146521
592010	*Phylica imberbis*	Hairy Hardleaf	https://www.inaturalist.org/observations/320146559
82722	*Pinus halepensis*	Aleppo Pine	https://www.inaturalist.org/observations/320146553
568146	*Printzia polifolia*	Fynbos Printzia	https://www.inaturalist.org/observations/320146562
1434306	*Psoralea candicans*	Silver Dottypea	https://www.inaturalist.org/observations/320146508
1434159	*Psoralea decumbens*	Carpet Dottypea	https://www.inaturalist.org/observations/320146507
1434159	*Psoralea decumbens*	Carpet Dottypea	https://www.inaturalist.org/observations/320146571
524304	*Pteronia incana*	Ash Gumbush	https://www.inaturalist.org/observations/320238635
119348	*Pterygodium catholicum*	Cowl Bonnet	https://www.inaturalist.org/observations/320146570
56133	*Quercus robur*	English Oak	https://www.inaturalist.org/observations/320146493
60321	*Ruschia*	Tentfigs	https://www.inaturalist.org/observations/320238736
938910	*Salvia africana*	African Blue Sage	https://www.inaturalist.org/observations/320146483
593732	*Satyrium bicallosum*	Ivory Satyre	https://www.inaturalist.org/observations/320146548
593914	*Searsia rehmanniana*	Blunt-Leaved Currant-Rhus	https://www.inaturalist.org/observations/320146485

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120119	*Sebaea exacoides*	Common Yellowwort	https://www.inaturalist.org/observations/320146549
120119	*Sebaea exacoides*	Common Yellowwort	https://www.inaturalist.org/observations/320238580
524611	*Selago eckloniana*	Kleinkaroo Bitterbush	https://www.inaturalist.org/observations/320146487
595007	*Struthiola tomentosa*	Woolly Capespray	https://www.inaturalist.org/observations/320146540
595566	*Trachyandra hirsuta*	Hairy Capespinach	https://www.inaturalist.org/observations/320146546
595629	*Tribolium echinatum*		https://www.inaturalist.org/observations/320238717
69939	*Trifolium angustifolium*	Narrow-Leaf Clover	https://www.inaturalist.org/observations/320146500
353929	*Vellereophyton dealbatum*	White Cudweed	https://www.inaturalist.org/observations/320146512
53333	*Vicia benghalensis*	Reddish Tufted Vetch	https://www.inaturalist.org/observations/320146505
574733	*Xiphotheca reflexa*	Sandveld Silverpea	https://www.inaturalist.org/observations/320238520

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9. Appendix C: Methodology Desktop Phase

This assessment was conducted according to the 2014 EIA Regulations, as amended on 7 April 2017, as well as according to 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) and the *Ecosystem Environmental Assessment Guideline: Draft* (http://opus.sanbi.org/jspui/handle/20.500.12143/7624).

A desktop assessment was undertaken using an appropriate Geographic Information System (GIS) and the latest available spatial datasets, as well as relevant online biodiversity databases and/or literature (these are listed where applicable). The aim of this was to develop local digital cartographs and species lists/databases. The various subsections that follow expand upon this desktop assessment.

It must be noted that during the entirety of this project it was assumed that all third-party information used — e.g., GIS software and data, satellite imagery, mapping algorithms, etc. — was correct and accurate at the time of their use. The author of this report accepts no liability for any erroneous data or algorithms produced by any third-parties, or any subsequent products derived from such data.

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9.1. Ecologically Important Landscape Features: Custom GIS Mapping

The GIS was used together with the latest satellite imagery to delineate and map observable landscape features in the study area and surrounds. Specifically, attention was given to homogenous units that could easily be recognized. Some examples of such features include watercourses, plains and floodplains, hill- and mountain tops, and hill- and mountains slopes (if present and if sufficiently large and distinct from surrounding features), as well as areas that have distinctly recognizable vegetation features, such as the presence/absence of large trees and/or shrubs, and vegetation patches of differing colours — these likely represent distinct plant community types. However, while satellite imagery is highly useful, it nevertheless suffers from several issues. For example, these include the generation of areas where image stitching has resulted in different colours for the same features, or imagery that might not have a high enough resolution, among other things. For this reason ground truthing is required to validate and refine the results of such desktop analyses.

9.2. Ecologically Important Landscape Features: Existing Data

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

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9.2.1. Red List of Ecosystems for South Africa

The Red List of Ecosystems (RLE; http://bgis.sanbi.org/Projects/Detail/1233/) for South Africa is a dataset containing the historical/potential extent, as well as the remaining remnants, of each ecosystem type. This represents a revision of the "List of terrestrial ecosystems that are threatened or in need of protection" published in December 2011. Ecosystems are categorised into one of four classes representing their risk of collapse, namely Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Least Concern (LC). The units of assessment for the RLE are the vegetation types of VegMap (see section 9.3.2).

9.2.2. National Biodiversity Assessment 2018

The National Biodiversity Assessment 2018 (NBA) (Skowno et al., 2019) assessed the state of South Africa's biodiversity based on the best available science to understand temporal trends, and informs policy and decision-making across a range of sectors. The NBA deals with three biodiversity components: 1) genetics, 2) species, and 3) ecosystems. The NBA also assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine, and marine environments. The two headline indicators assessed in the NBA are:

- **Ecosystem Threat Status**: An indicator of ecosystem wellbeing. This concerns the amount of change regarding ecosystem structure, function, and/or composition, based on the proportion of the original extent of each ecosystem type still currently in good ecological condition. Specifically, ecosystem threat levels are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), or Least Concern (LC).
- **Ecosystem Protection Level**: An indicator of how well ecosystems are adequately protected or under-protected. Specifically, ecosystems protection levels are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on biodiversity targets for each ecosystem type included within one or more protected areas. So-called "under-protected ecosystems" include NP, PP, or MP ecosystem types.

9.2.3. Protected Areas

National Protected Areas Expansion Strategy (NPAES; SANBI, 2010): NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These present the best opportunities for meeting ecosystem-specific protected area targets set out in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. NPAES focus areas are large, intact, and unfragmented, and are therefore highly important for biodiversity, climate resilience, and freshwater protection. Note that these areas are not necessarily future protected area boundaries — often times only a portion of a particular focus area would be required to meet protected area targets. Moreover, they do not replace fine scale planning. Such planning might identify many different priority sites based on local requirements, constraints, and opportunities.

9.2.4. Hydrological Features: Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) represent 10% of South Africa's land area that provides a disproportionate 50% of the country's water runoff. The localities of SWSAs are crucial for planning and managing water resources, including the ecosystems that support water quality and quantity (SWSAs extend into Lesotho and eSwatini).

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9.2.5. Hydrological Features: National Freshwater Ecosystem Priority Area Status

South African river systems are categorised based on ecological criteria (such as ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to better conserve aquatic ecosystems, and are represented by Freshwater Ecosystem Priority Areas (FEPAs) (Nel et al., 2011). FEPAs are intended to support conservation and are intended to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals.

9.2.6. Biodiversity Spatial Plan

Biodiversity Spatial Plans classify areas based on their contribution towards provincial conservation targets. Various land use types are classified according to their biodiversity and environmental importance as follows:

- **Critical Biodiversity Areas** (CBAs): areas that are required to meet biodiversity targets for species, ecosystems, or ecological processes and infrastructure. CBAs are of high biodiversity and ecological value and must be kept in a natural or near-natural state, with no further loss of habitat or species. Moreover, degraded areas should be rehabilitated to natural or near-natural conditions, and only low-impact, biodiversity-sensitive land uses are appropriate. Examples are areas required to meet biodiversity pattern (e.g. species and ecosystems) targets, Critically Endangered (CR) ecosystems, all areas required to meet ecological infrastructure targets, and critical corridors that maintain landscape connectivity. Two subtypes are distinguished:
    - CBA Irreplaceable (CBA 1): Areas that are critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable species populations and ecosystem functionality.
    - CBA Optimal (CBA 2): Areas which represent the best localities, from a potentially larger selection of available planning units, that are optimally located to meet conservation targets, as well as other criteria.
- **Ecological Support Areas** (ESAs): the ecological functioning and sustainability of CBAs require support from additional areas, namely ESAs. Although ESAs are not essential for meeting biodiversity targets, they are nevertheless important for supporting PAs or CBAs. ESAs are often crucial for delivering ecosystem services. For terrestrial and aquatic environments, such areas are functional, but not necessarily pristine and natural. However, they are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within CBAs, and also contribute significantly to the maintenance of ecological infrastructure. Two subtypes are distinguished:
    - ESA 1: Areas that might still be functional, and could be natural, near-natural, or moderately degraded.
    - ESA 2: Areas that are severely degraded or have no natural cover remaining and therefore require restoration.
- **Other Natural Areas** (ONAs): Some areas have not been identified as a priority in the current biodiversity spatial plan. However, they retain most of their natural character, and still perform many biodiversity and ecological infrastructure functions. Therefore, they are an important part of the natural ecosystem. It is desirable that ONAs, where possible, are managed or utilized to minimize habitat and species loss, and that ecosystem functionality through strategic landscape planning is ensured.
- **Severely Modified to No Natural Remaining** (NNR): These areas have been severely modified by human activity. They are no longer natural and do not contribute to biodiversity targets. However, these areas may still provide

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limited biodiversity and ecological infrastructure functions (and could potentially be useful for restoration/rehabilitation endeavours).

- **Protected Areas** (PAs): Areas that are formally protected by law in terms of the NEM:PAA. This includes gazetted private Nature Reserves and Protected Environments.

9.3. Botanical Assessment

The flora of the region was assessed both floristically (species identity) and compositionally (community assembly patterns).

9.3.1. Species Identities

Various reasons exist why the flora of a region cannot be fully catalogued within a limited timeframe (or even an extended timeframe; specifically see section 1.5). Therefore, the following data sources were used to obtain historical distribution records to develop a comprehensive list of plant species potentially occurring within the study area and broader region:

- **Botanical Database of Southern Africa** (BODATSA; also often referred to as POSA [Plants of southern Africa]): this is an electronic database hosted by the South African National Biodiversity Institute (SANBI) that provides herbarium records collected in the region (http://posa.sanbi.org/). Records were specifically extracted from a very large area surrounding the actual study area.
- **The Red List of South African Plants** (Raimondo et al., 2009): this online database (http://redlist.sanbi.org/) provides the most current national status of South Africa's vascular plant species. This was used to assess SCC[1], which are taxa (in this case plant species) that have a significant conservation importance for preserving South Africa's high biological diversity. SCC 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 9) (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 SCC occur in a study area or PAOI, the proposed activities could impact them and result in significant biodiversity loss — the loss of SCC populations might either increase the extinction risk of the respective species, or might even contribute toward their extinction. As such, it is very important to note that a permit must be obtained from the relevant local authorities to destroy or relocate any SCC (or even protected species).
- **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

[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 SCC) is preferable, or "Threatened" where applicable.

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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 study area. However, to minimize redundancy, and to provide the most likely set of plant species that might occur on site, the retrieved geospatial records were filtered by the vegetation types underlying the study area (as mapped by VegMap; see section 9.3.2).

- **National Web Based Environmental Screening Tool**: a geographically based, web-enabled governmental application (https://screening.environment.gov.za/screeningtool/#/pages/welcome) which allows a proponent intending on submitting an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended, to screen their study area for environmental sensitivity. Of specific interest for this report are the potential presences of so-called "sensitive plant species" that might occur in the study area and surrounds, as well as any terrestrial biodiversity features listed as having a "Very High" sensitivity rating.

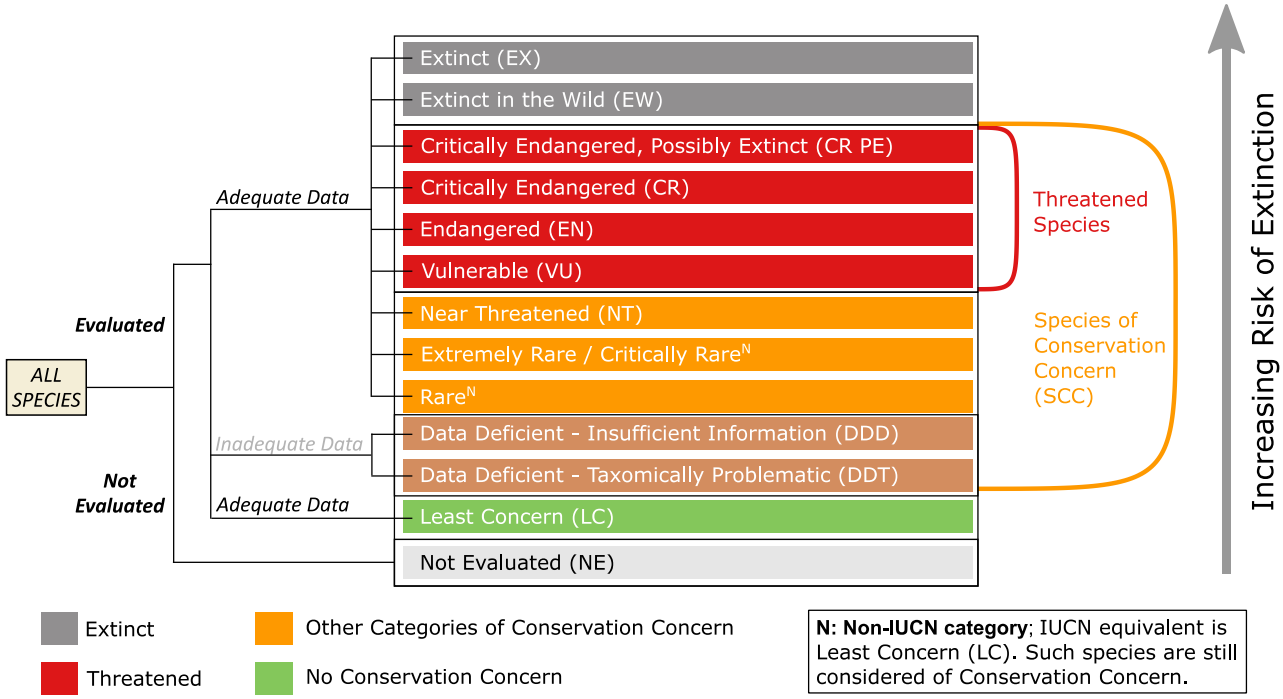

Figure 9: Red List and SCC categories used in this report as originally delineated according to SANBI's Red List of South African Plants (http://redlist.sanbi.org/redcat.php), and recently updated in the *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020).

Although not explicitly required by the relevant gazetted protocols, protected plant species were also surveyed for and included in this project. The lists obtained from the aforementioned databases were used to identify such protected plant species. These species are protected by NEM:BA, as well as other provincial legislation (see section 1.6). Briefly, no person may sell, buy, transport, destroy, or harvest a protected plant without a permit from the relevant authority.

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Finally, the lists obtained from these databases were used to identify invasive alien plant species (IAPs) that are listed in the NEM:BA A&IS Regulations. IAPs can dominate, and even replace, native flora. Therefore, they have the ability to completely transform the structure, composition, and functioning of ecosystems. IAPs must be controlled, and preferably eradicated, by means of an eradication and monitoring program (see below for details).

9.3.1.a) NEM:BA Alien and Invasive Species Regulations

The NEM:BA A&IS Regulations is the most current legislation regarding IAPs. The list of Alien Invasive Species was first published in August 2014 in terms of NEM:BA, with subsequent updates. The Alien and Invasive Species Regulations were published in the Government Gazette No. 44182, 24th of February 2021. The legislation requires the removal and/or control of Category 1a and 1b IAPs. In addition, unless authorised in terms of the National Water Act, no land user may allow Category 2 IAPs to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam, or wetland. Category 3 IAPs are also prohibited from occurring close to a watercourse.

The NEM:BA A&IS Regulations categories are, briefly, as follows:

- **Category 1a**: Invasive species requiring compulsory control. All specimens must be removed and destroyed, and the species must be eradicated from the environment. No permits will be issued.
- **Category 1b**: Invasive species requiring compulsory control as part of an invasive species control program. All specimens must be removed and destroyed. Since these IAPs can have a high invasive potential, infestations may qualify for a government sponsored invasive species management program. No permits will be issued.
- **Category 2**: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy, or accept as a gift any Category 2 IAPs. No permits will be issued for Category 2 plants to exist in riparian zones.
- **Category 3**: Invasive species regulated by activity. An individual plant permit is required to undertake restricted activities such as importing, possessing, growing, breeding, moving, selling, buying, or accepting as a gift any Category 3 IAPs. No permits will be issued for Category 3 plants to exist in riparian zones.

According to the NEM:BA A&IS Regulations, any person in control of a Category 1b IAPs must immediately:

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

9.3.2. Community Composition: Vegetation Types

The vegetation types (and their conservation statuses) of the study area, as well as the broader regions surrounding the study area, were verified using the South African National Vegetation Map, or simply "VegMap" (Dayaram et al., 2018; Mucina & Rutherford, 2006; South African National Biodiversity Institute, 2018) and the Red List of Ecosystems (see section 9.2.1). The latest version of VegMap was consulted for any updates of the respective regions. Although vegetation

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descriptions given in this report are as per VegMap 2006, these units were cross-validated with VegMap 2018 to inspect their respective extents.

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10. Appendix D: Methodology Fieldwork Phase

Briefly, the field surveys aimed to investigate the following on-site aspects:

- The occurrence of SCC and protected plant species;
- The specific vegetation types (identification, classification, and delineation); and
- The specific habitat/community types (classification and delineation).

10.1. Botanical Assessment Details

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 (sections 9.1 and 9.2). 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 (South African National Biodiversity Institute, 2020) within the respective community types. This combination is highly efficient for conducting floristic analyses. This allows plant species coverages and SCC 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 where applicable 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). Finally, any opportunistic observations were also made while surveying.

Various field guides and identification manuals were used for plant identification, as well as other relevant literature regarding the ecology of the region (Bromilow, 2010; Dorrat-Haaksma & Linder, 2012; Henderson, 2020; Johnson et al., 2015; Manning, 2007; Manning & Goldblatt, 2012; Manning & Helme, 2024), and are listed in section 6.

10.2. Sensitivities: Terrestrial Plant Species Sensitivity Criteria

The protocol for the *Specialist Assessment And Minimum Report Content Requirements For Environmental Impacts On Terrestrial Plant Species* (Gazette 43855 No. 1150) provides various criteria that define the plant species sensitivity categories Very High, High, Medium, and Low. These are provided below, together with relevant notes where applicable.

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Sensitivity	Criteria	Notes
Very High	• Critical Habitat for range restricted species of conservation concern that have a global range of less than 10 km^2. • SCC listed on the IUCN Red List of Threatened Species or on South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare • Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. • The number of mature individuals that ranks the site among the largest 10 aggregations known for the species.	These areas are irreplaceable in terms of SCC.
High	• Confirmed habitat for SCC. • SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria.	These areas are unsuitable for development due to a very likely impact on SCC.
Medium	• Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model. • SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	(None given)
Low	• Areas where no natural habitat remains. • Natural areas where there is no suspected occurrence of SCC.	(None given)

10.3. Sensitivities: Terrestrial Site Ecological Importance (SEI)

The most current site sensitivity methodology, namely the Site Ecological Importance (SEI), was 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 Project Area were delineated and identified based on field observations and satellite imagery (also see section 9.1). 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 10): 1) The Biodiversity Importance (BI) of the receptor (e.g., SCC, 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 (Figure 11). BI, FI, and RR categories are all circumscribed by various criteria (see Table 5, Table 6, and Table 7). The various criteria per category may be applied in combination or in isolation. See Figure 11 for guidelines on interpreting the resulting SEI categories. SEI is usually evaluated per plant community type / vegetation type.

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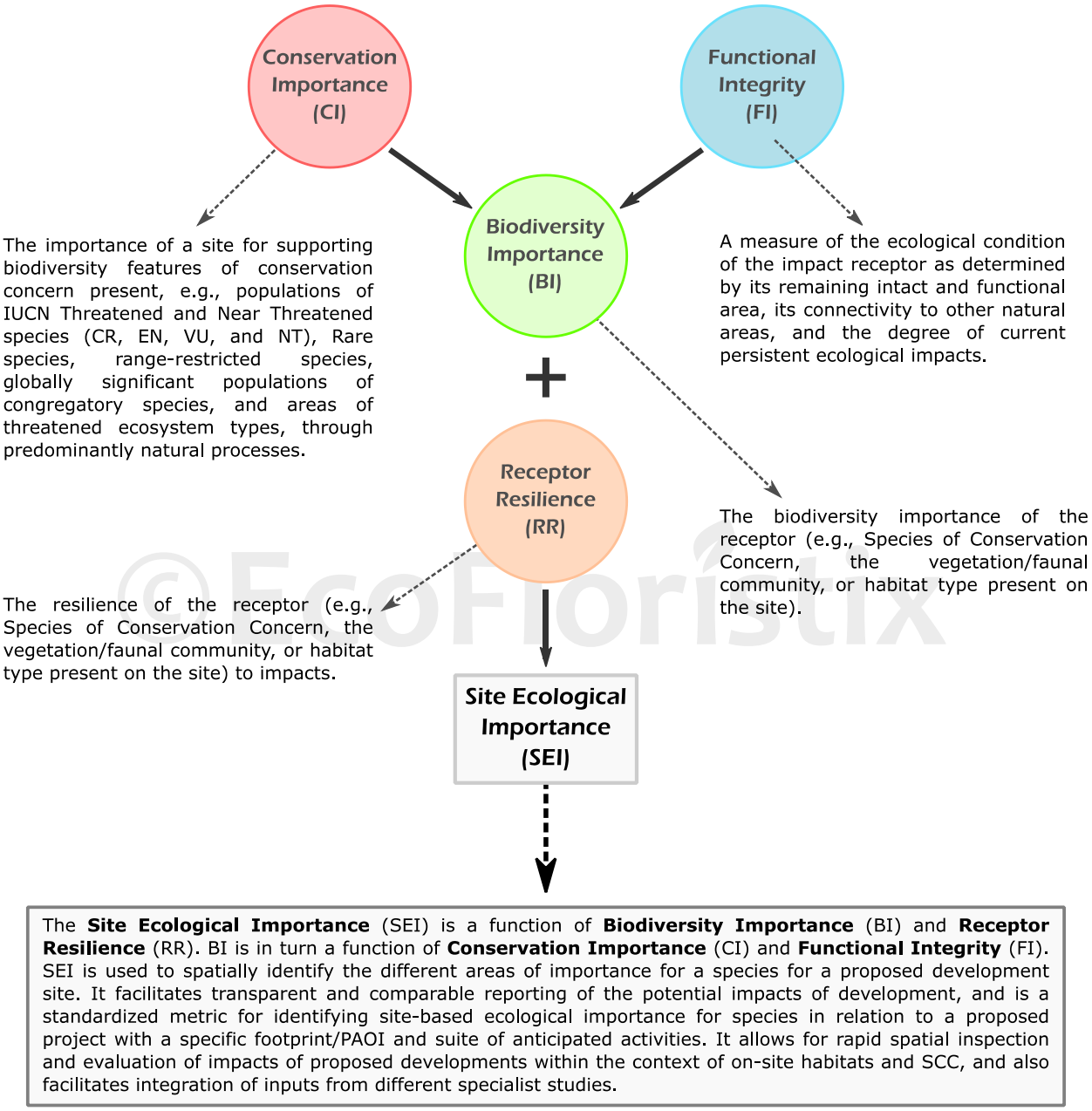

Figure 10: Details on the factors that contribute to the Site Ecological Importance value. Also see Figure 11.

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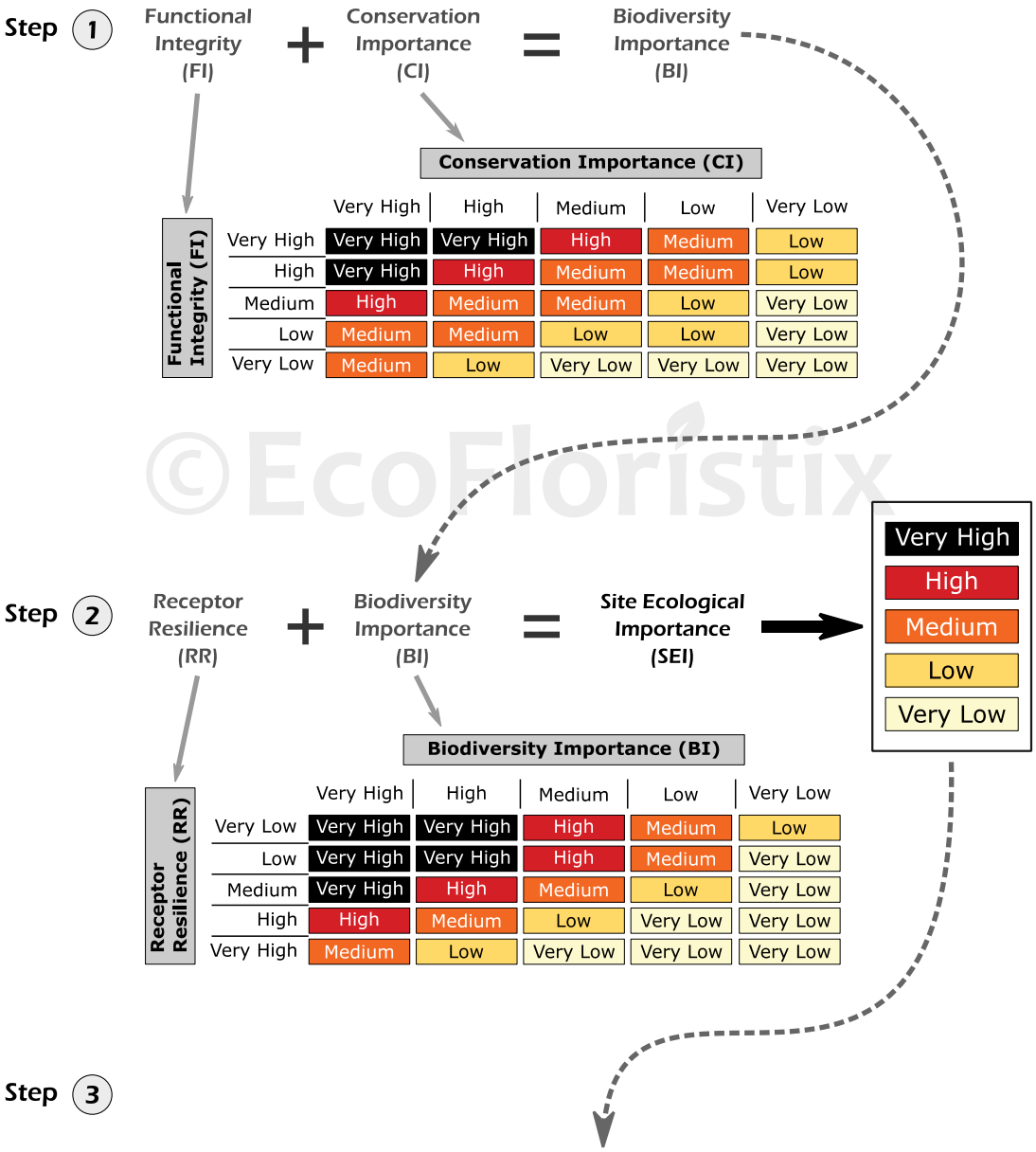

SEI	Interpretation in Relation to Proposed Development Activities
Very High	Avoidance mitigation — no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique 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 11: Calculations, scores, process, and guidelines for calculating and interpreting Site Ecological Importance (SEI) categories.

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Table 5: Details regarding Conservation importance (CI) categories.

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.

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Table 6: Details regarding Functional Integrity (FI) categories.

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.

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Table 7: Details regarding Receptor Resilience (RR) categories.

Receptor Resilience	Fulfilling criteria
Very high	• Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and 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 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 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.

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10.4. Impact Assessment Methodology

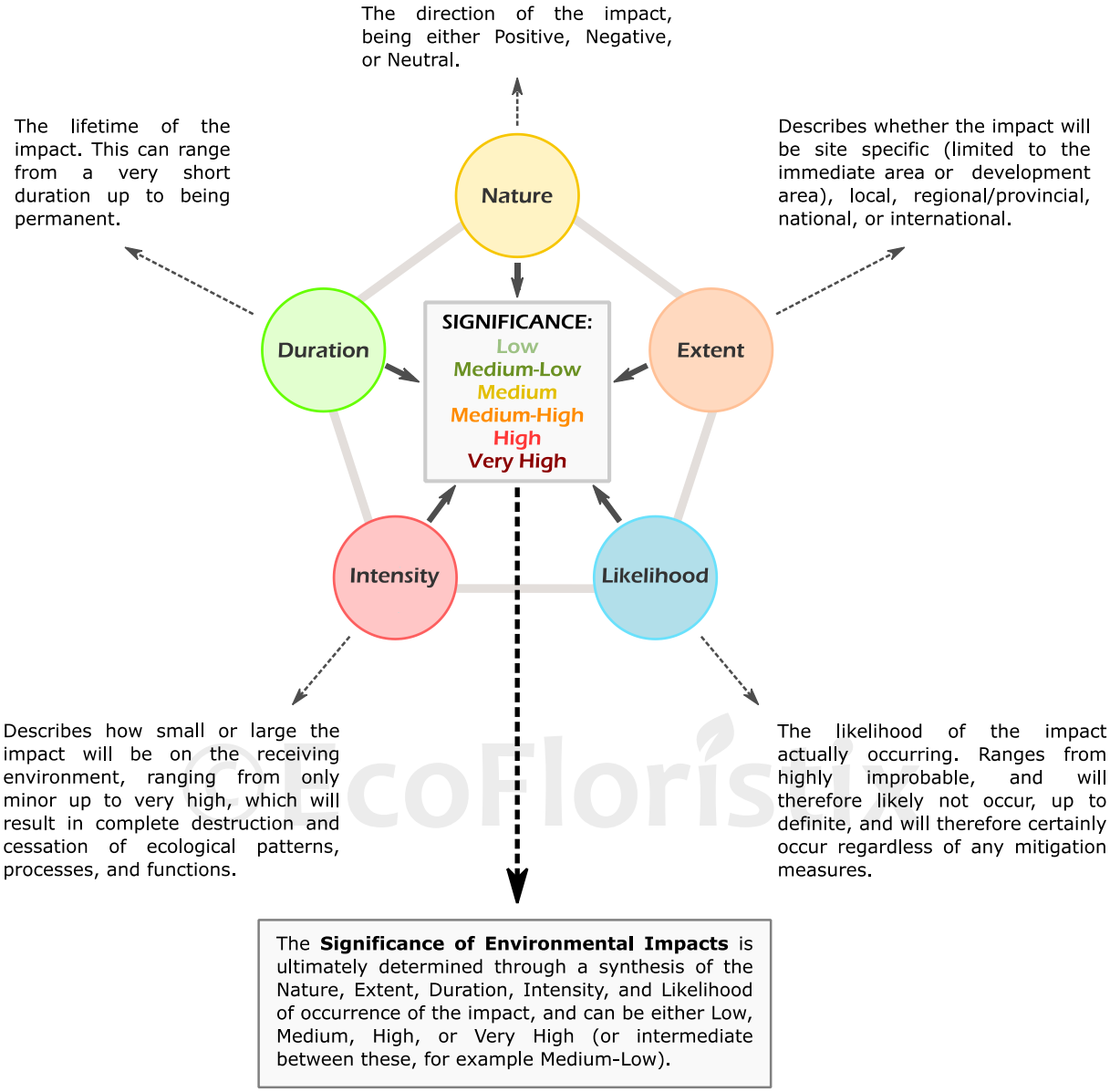

Figure 12: Details on the factors that contribute to Significance of Environmental Impacts values.

The Significance of Environmental Impacts was used to assess the impacts and risks associated with the proposed activities. The "Significance" of an environmental impact is a combination of the consequence and likelihood of an impact occurring (DFFE, 2023). The following factors must at least be considered as part of the process of assessing the significance of a negative impact on biodiversity (Figure 12):

- **Consequence** of an impact: a combination of the intensity, extent, and duration of the impact.
    - **Intensity** (severity) of the impact: the intensity of an ecological impact is given at a defined (usually spatial) scale.

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- **Extent** of the impact: the scale of expected impacts as a proportion or range of a given biodiversity feature. The greater the extent, the greater the consequence, and the more significant the impact.
- **Duration** of the impact: how long the impact will last, from short-term to permanent, where permanent is a period of thirty years and above (unless the receiving environment justifies a shorter consideration of permanent). The longer the duration, the greater the consequence, and the more significant the impact.

- **Likelihood** (or probability) of the occurrence of the impact: The more likely the impact, the greater the certainty of the impact significance.

Thus, the Significance of Environmental Impacts is primarily a function of 1) the present environmental aspects that are to be impacted on, 2) the likelihood of an impact occurring, and 3) the consequence of such an impact occurring before, and after, implementation of proposed mitigation measures.

In addition, the "nature" of the impact can be negative, neutral, or positive; this adds additional context to the significance values.

Implicitly considered is the degree to which impacts can be managed/mitigated, reversed, and/or may cause irreplaceable loss of resources.

10.5. The Mitigation Hierarchy

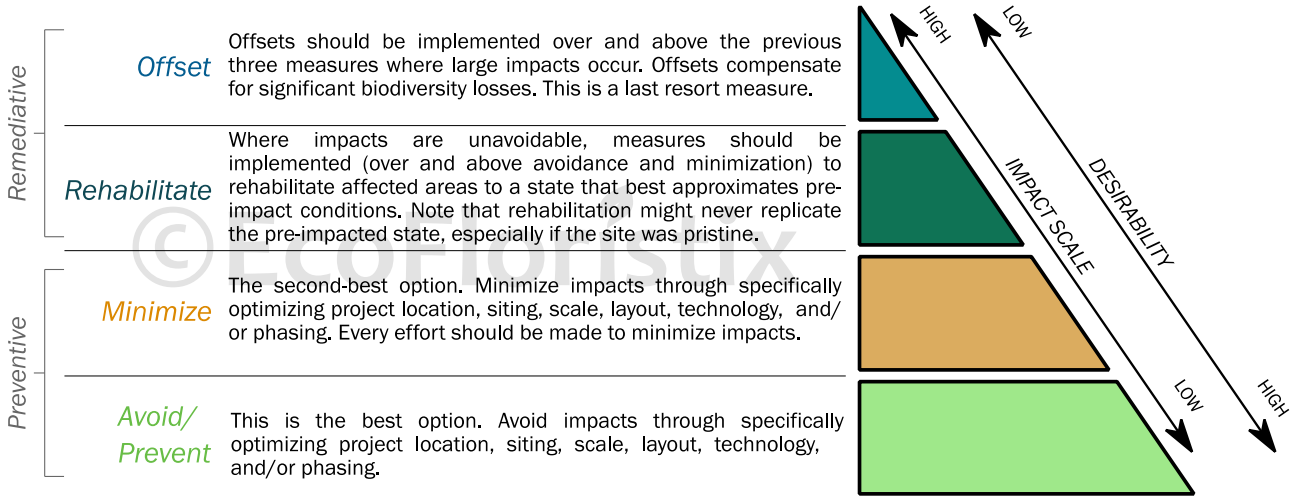

Figure 13: The Mitigation Hierarchy.

The mitigation hierarchy (Figure 13) is a fundamental and internationally recognized framework in environmental management, designed to systematically address and limit the negative impacts of human activities on biodiversity and ecosystems. It is a guiding principle that ensures a strategic and proactive approach to environmental impact assessment and management. The hierarchy prioritizes actions, starting with those that offer the greatest environmental benefit and least risk, and progressively moves towards less desirable options when the preferred ones are not entirely achievable. In essence, it encourages the consideration of alternatives that avoid significant impacts. The best-case scenario (most desirable) is thus the one with the lowest impacts.

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The hierarchy consists of four sequential steps:

1. **Avoidance/Prevention:** This is the most crucial and preferred step. It focuses on preventing impacts from occurring in the first place. This can be achieved through careful project planning, strategic site selection to bypass sensitive areas, or by redesigning project components to eliminate potential harm entirely. Effective avoidance at the earliest stages of a project's lifecycle, often during feasibility and conceptual design, can significantly reduce the need for subsequent, more costly, and often less effective mitigation measures.

2. **Minimization/Reduction:** Where complete avoidance is not feasible, the next step involves minimizing or reducing the intensity, duration, timing, and/or extent of unavoidable impacts. This requires implementing measures to lessen the severity of the anticipated harm. Examples include adopting less impactful construction methods, restricting the operational footprint of a development, or implementing seasonal restrictions on activities to avoid sensitive periods for wildlife (e.g., breeding seasons). Minimization often involves adaptive management, where the effectiveness of measures is monitored, and adjustments are made as needed to further reduce impacts.

3. **Restoration/Rehabilitation:** This comes into play after impacts have occurred, and is the start of remediative processes. It focuses on actively restoring or rehabilitating degraded ecosystems and habitats to a former or desired state. Rehabilitation typically aims to re-establish basic ecological functions and productivity, while restoration strives to achieve a fully functioning ecosystem comparable to the original, pre-impact condition. This can involve measures such as re-vegetating disturbed areas with indigenous species, restoring hydrological flows in altered wetlands, or remediating contaminated soils. The goal is to repair the damage as much as possible on-site, bringing the affected area back to an ecologically viable state.

4. **Offsetting/Compensation:** As the last resort, when significant residual impacts remain after all reasonable avoidance, minimization, and restoration measures have been implemented, offsetting (also known as compensation) is considered. This involves providing measurable conservation gains elsewhere to compensate for the unavoidable loss of biodiversity or ecosystem services. Offsets should ideally target the same type of biodiversity or ecosystem services that have been impacted. Examples include the establishment of new protected areas, the restoration of degraded habitats off-site, or funding long-term conservation programmes that directly benefit the impacted species or ecosystems. In South Africa, the concept of biodiversity offsets aims to ensure that they genuinely contribute to "no net loss" or even a "net positive gain" for biodiversity, recognizing that offsets are complex and require robust monitoring and long-term commitment.

The effective application of the mitigation hierarchy is crucial for achieving sustainable development outcomes. It promotes a transparent and accountable approach to environmental management. It guides decision-making towards minimizing ecological footprints and ensures that biodiversity considerations are integrated throughout a project's lifecycle.

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11. Appendix E: Notes on SCC and Protected Plant Species

This section includes relevant definitions and regulations pertaining to SCC and protected plant species as determined by national legislation. Briefly, a permit is required to perform any restricted activity, as defined by NEM:BA, on specimens of any SCC or protected plant species, whether such specimens are living or dead. Note: this is NOT an exhaustive account of NEM:BA.

11.1. National Environmental Management: Biodiversity Act, 2004 (Act No. 10, 2004, Vol. 467, No. 26436)

NEM:BA Definition of "specimen" (Chapter 1, Definitions):

a) any living or dead animal, plant or other organism;

b) a seed, egg, gamete or propagule or part of an animal, plant or other organism capable of propagation or reproduction or in any way transferring genetic traits;

c) any derivative of any animal, plant or other organism; or any goods which-

   i. contain a derivative of an animal, plant or other organism; or

   ii. from an accompanying document, from the packaging or mark or label, or from any other indications, appear to be or to contain any derivative of an animal, plant or other organism.

NEM:BA Definition of "restricted activity" (Chapter 1, Definitions):

(a) in relation to a specimen of a listed threatened or protected species, means-

i. hunting, catching, capturing or killing any living specimen of a listed threatened or protected species by any means, method or device whatsoever, including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen;
ii. gathering, collecting or plucking any specimen of a listed threatened or protected species;
iii. picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species;
iv. importing into the Republic, including introducing from the sea, any specimen of a listed threatened or protected species;
v. exporting from the Republic, including re-exporting from the Republic, any specimen of a listed threatened or protected species;
vi. having in possession or exercising physical control over any specimen of a listed threatened or protected species;
vii. growing, breeding or in any other way propagating any specimen of a listed threatened or protected species, or causing it to multiply;
viii. conveying, moving or otherwise translocating any specimen of a listed threatened or protected species;
ix. selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed threatened or protected species; or
x. any other prescribed activity which involves a specimen of a listed threatened or protected species

Restricted activities involving listed threatened or protected species, Part 2, 57:

(1) A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 (Permits).

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11.2. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): Threatened or Protected Species Regulations

"**Biodiversity Act**" means the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), including any amendment thereof;

"**protected species**" means any species listed as protected in terms of section 56(1)(d) of the Biodiversity Act;

"**threatened species**" means an indigenous species listed as critically endangered, endangered or vulnerable species in terms of section 56(1)(a), (b) and (c) of the Biodiversity Act;

Chapter 2 (Permit System for Listed Threatened or Protected Species), Part 1 Application for permits: Carrying out a restricted activity

4. (1) A person may carry out a restricted activity involving a specimen of a listed threatened or protected species, only if he or she is the holder of a permit issued-

a) in terms of section 57(1) of the Biodiversity Act;
b) in accordance with Chapter 7 of the Biodiversity Act, and
c) in accordance with these Regulations;

unless the Minister has exempted the carrying out of such restricted activity involving such specimen in terms of section 57(4) of the Biodiversity Act.

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12. Appendix F: Abbreviated Curriculum Vitae of the Specialist

Personal and Company Details:

- Name: Dr. Jan-Hendrik Keet
- Address: Somerset West, Western Cape, 7130
- Cell: 071 451 4853
- Email: info@ecofloristix.co.za
- Date of Birth: 07 November 1988
- Website: https://ecofloristix.co.za/
- LinkedIn: https://za.linkedin.com/company/ecofloristix
- Instagram: @ecofloristix

Expertise and Experience:

- Current: Botanical & Terrestrial Biodiversity Specialist Consultant (EcoFloristix Specialist Botanical Surveys)
- Current: Freelance Academic/Technical Editor, Proof-reader, and Dissertation Specialist
- 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:

- Botany and Ecology
- Invasive Species Biology (PhD in Botany [Stellenbosch University] with a focus on Invasive Alien Plant Species and their environmental impacts)
- Plant Biogeography
- Plant Identification and Taxonomy
- Vegetation Surveys and Mapping
- Biodiversity Informatics
- 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:

- Citations >700
- Global Publication Reads >9000
- Scopus h-index 11
- Google Scholar h-index 11
- 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)

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- 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
- 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)
- South African Association of Botanists (SAAB) Ordinary Member (No.: 821)
- 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), 2012

Selected Peer-reviewed Scientific Publications and Book Chapters (a full list is available on request)**:**

- **Keet J-H** & Hui C (2025) One-hectare fine-scale dataset of a fynbos plant community in the Cape Floristic Region. *Data in Brief*, https://doi.org/10.1016/j.dib.2025.111334
- Yannelli F, **Keet J-H**, Kritzinger-Klopper S, Le Roux JJ (2025) Legacy effects of an invasive legume more strongly impact bacterial than plant communities in a Mediterranean-type ecosystem. *Journal of Environmental Management* 373:123802, https://doi.org/10.1016/j.jenvman.2024.123802
- **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.

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- 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 (a full list is available on request)**:**

- 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**

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- 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

Selected EIAs and other works (a full list is available on request)**:**

- Plant Species, Terrestrial Biodiversity, and Faunal Impact Assessment for the East London Industrial Development Zone (ELIDZ), Zones 1A, 1B, and 1C, Eastern Cape. In collaboration with Nkurenkuru Ecology and Biodiversity (October 2025). Report prepared for AGES Omega. Reference: PR.25.017B.
- Plant Species and Terrestrial Biodiversity Compliance Statement for an industrial development on Farm RE/37/168, Fisantekraal, Western Cape (September 2025). Report prepared for Doug Jeffrey Environmental. Reference: PR.25.002.
- Terrestrial Biodiversity Impact Assessment / Plant Species Impact Assessment for the clearing of vegetation on Portion 20 of Farm 323, Ceres (Koelefontein), Western Cape Province (August 2025). Report prepared for Doug Jeffrey Environmental. Reference: PR.25.010.
- Plant Species and Terrestrial Biodiversity Impact assessment for the proposed clearing of vegetation for a proposed access road and house on Portion 124 of Farm 559 Hangklip, Betty's Bay, Western Cape (August 2025). Report prepared for Ohana Environmental. Reference: PR.25.011.
- Botanical survey to identify Saldanha Limestone Strandveld on farms Yzerfontein 560 (partly), Tygerfontein 564, Coffee Fontein 563, Plot 2717, and the green corridors within Yzerfontein, Western Cape (August 2025). Report prepared for Jos de Villiers Belleggings Trust. Reference: PR.25.030.
- Terrestrial Biodiversity Impact Assessment / Plant Species Impact Assessment for a Proposed Green Technology and Industrial Development on the remainder of Erf 277, Atlantis, Cape Town, Western Cape Province (June 2025). Report prepared for Ohana Environmental. Reference: IA.25.012.
- Invasive Alien Plant Species Management Framework for the East London Industrial Development Zone (IDZ), East London, Eastern Cape Province, South Africa (June 2025). Report prepared for AGES Omega. Reference: PR.25.017.
- Terrestrial Desktop Sensitivity for a Prospecting Right Application on Farm 622 for Uranium ore in the Namaqualand Magisterial District in the Northern Cape Province, South Africa (May 2025). Report prepared for Greenmined Environmental. Reference: PR.24.016.
- Terrestrial Desktop Sensitivity for a Proposed Prospecting Right On Farm Kamaggas no. 200, Drie Rivier No. 268, Polly's Kloof No. 267, Sannagas No. 269, and Klipfontein no. 266, for Uranium Ore in the Northern Cape Province, South Africa (May 2025). Report prepared for Greenmined Environmental. Reference: PR.24.018.
- Terrestrial Desktop Sensitivity for a Prospecting Right Application for Targeted Blocks on Farms Tusschen In 143, Aardvark 164, Steenbok 165, and Gifkop 166 near Steinkopf, Northern Cape Province, South Africa (May 2025). Report prepared for Greenmined Environmental. Reference: IA.25.006.
- Terrestrial Biodiversity Impact Assessment / Plant Species Impact Assessment for an industrial development on the proposed expansion of the bulk water pipeline on Portion 1 of Farm La Parisa No. 888, Paarl, Western Cape Province (May 2025). Report prepared for Doug Jeffrey Environmental. Reference: IA.25.003.
- Plant Species and Terrestrial Biodiversity Compliance Statement for illegal repairs to an old road through a watercourse and the removal of material from a water impoundment dam near Infanta, Western Cape (April 2025). Report prepared for EarthGrace. Reference: IA.25.016.
- Invasive Alien Species Risk Analysis Review of the Canetsfontein Wine Farm I&AS Risk Assessment Report (November 2024). Report prepared for Earthguard Consulting.
- Terrestrial Biodiversity and Plant Species Compliance Statement for a mining permit application project on Bonne Esperance Farm 83 near Tulbagh in the Western Cape Province (November 2024). Report prepared for Greenmined Environmental. Reference: IA.24.023.
- Section 24G Botanical Assessment for the construction of two unlawful dams on Farm 497 Portion 3 Weltevreden, Western Cape Province. Report prepared for Doug Jeffery Environmental (November 2024). Report prepared for Doug Jeffrey Environmental. Reference: IA.24.021.
- Invasive Alien Species Risk Analysis Review of the Canetsfontein Wine Farm I&AS Risk Assessment Report (November 2024). Report prepared for Earthguard Consulting.

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- N6 Galway City (Ireland) Ring Road Environmental Impact Assessment Report: Assistance with Data Analysis, Modelling, and Validation (July 2024 – January 2025). In collaboration with Scott Cawley, Ireland.
- Plant and Terrestrial Biodiversity Assessment for a Mining Permit Extension application for the mining site Norrabees near Henkries, Northern Cape Province (May 2024). Report prepared for Site Plan Consulting. Reference: IA.24.010A.
- Plant and Terrestrial Biodiversity Assessment for a Mining Permit Application for the mining site Spodumene Kop near Henkries, Northern Cape Province (May 2024). Report prepared for Site Plan Consulting. Reference: IA.24.010B
- Terrestrial Biodiversity (Fauna, Flora and Terrestrial Biodiversity) study and impact Report for the Grid Connection Solution for the Proposed Onderstepoort Solar 1 and 2 Facilities Near Boshoek in the North West Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (April 2024). Report prepared for Atlantic Energy Partners.
- Specialist Invasive Alien Plant Species Assessment. (March 2024). Report prepared for Mpact Corrugated. Reference: IA.24.006.
- Terrestrial Biodiversity (Fauna, Flora, and Ecological EIA Phase Assessment) Report for the Proposed Kingston Solar PV Energy Facility Near Bothaville, Free State Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (March 2024). Report prepared for Atlantic Energy Partners.
- Terrestrial Biodiversity (Fauna, Flora, and Ecological EIA Phase Assessment) Report for the Proposed Crecy Photovoltaic Solar 4 Energy Facility and Associated Infrastructure near Mookgopong, Limpopo Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (February 2024). Report prepared for Atlantic Energy Partners.
- Plant and Terrestrial Biodiversity Assessment for a Solar Photovoltaic Facility near Northam, Limpopo. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (November 2023). Report prepared for Atlantic Energy Partners.
- Botanical Impact Assessment for a proposed rerouting of a sewer pipeline on Erf 5076, Khayalethu, Knysna, Western Cape. In collaboration with Keep Rooted (PTY) Ltd. (October 2023). Report prepared for Ohana Environmental. Reference: IA.23.015.
- Screening report for a proposed Solar PV plant near Boshoek, Northwest Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (September 2023). Report prepared for Atlantic Energy Partners.
- Plant and Terrestrial Biodiversity Assessment for a Powerline Corridor near Boshoek, Northwest Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (September 2023). Report prepared for Atlantic Energy Partners.
- Botanical Assessment and Motivation for a Mining Stockpile Area within a non-CBA zone on Farm Steinkopf no. 22 near Steinkopf, Northern Cape. (August 2023). Report prepared for Greenmined Environmental. Reference: IA.23.010.
- Botanical Impact Assessment: Development of portion 223 of Farm 559, Betty's Bay, Western Cape. (July 2023). Report prepared for Ohana Environmental. Reference: IA.23.007.
- 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.

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- 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

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