BIODIVERSITY ASSESSMENT

FOR:

PROPOSED DEVELOPMENT OF A WASTE TRANSFER STATION IN MATSULU WITHIN MBOMBELA LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

April 2018

Report prepared by:

ENVIRONMENT RESEARCH CONSULTING

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1 EXECUTIVE SUMMARY

INTRODUCTION

This study was undertaken by Environment Research Consulting (ERC) in support of an EIA for the proposed development of a waste transfer station in Matsulu that is part of Mbombela Local Municipality, Mpumalanga Province.

This report presents the findings of the biodiversity assessment of which the fieldwork was conducted on site on 18 April 2018. The area that was studied in this assessment consists of portions of four different erwen in Mandela Park, Matsulu i.e. Erf 97, Erf 302, Erf 311 and Erf 312. Different preferred and alternative sites for the development are being investigated and is currently as follows:

- Erf 312 – original preferred site.
- Erf 302 – new preferred site.
- Erf 311 (southern section) – alternative site 1.
- Erf 97 and Erf 311 (northern section) – alternative site 2.

METHODOLOGY

Prior to visiting the site, a list of species that could potentially occur at the site was downloaded from the South African Biodiversity Institute's (SANBI) website. A visual reconnaissance of the study area was done before surveying commenced. Different homogenous vegetation units were identified and subsequently surveyed on foot in order to determine the floristic composition of each. A plotless sampling method was used to record data. Taxa observed in the study area during the time of the study were recorded and included in the species lists. The floristic composition of each of the identified broad vegetation units are described and discussed. Species identification and assessment of their general distribution was done following reputable websites, checklists and field guides. The faunal assessment was done mainly on a desktop level, supported by on-site observations. No faunal trapping or any other quantitative field species data capturing was, however, conducted.

No formal consultation process was conducted as part of this floristic study as it was not deemed necessary at the time of the study.

RECEIVING ENVIRONMENT

The study area is situated in Mandela Park of Matsulu, which is situated approximately 35 km east of Nelspruit in the Mbombela Local Municipality in Mpumalanga. The study area is situated on the north-western banks of the confluence of the Nsikazi and Crocodile Rivers and also on the boundary of the Kruger National Park (KNP), which is situated east of the study area. A sewage treatment facility is situated in the central parts of the study area but was not assessed as part of this study.

The study area falls in the Granite Lowveld (SVl3) vegetation type and other vegetation types occurring nearby are the Malelane Mountain Bushveld (SVl11) to the north, and southwards areas of Kaalrug Mountain Bushveld (SVl12) and Baberton Serpentine Sourveld (SVl13).

RESULTS AND DISCUSSION

Fauna Assessment

The main focus of this assessment was to include every species with the slightest chance of occurring within the study area.

Faunal diversity of the study area

A summary of the diversity of fauna theoretically expected to occur in the study area is provided (Table A). Detailed species lists are also included in the report.

Table A: Animal groups considered in this study along with the number of species per group possibly occurring in or near the study area.

Animal group	Number of species
Mammals	41
Reptiles	32
Birds	73
Frogs	19
Total:	**165**

Fauna species of conservation significance

Table B summarizes the numbers of species of conservation significance per animal group.

Table B: Animal groups considered in this study along with the number of species with formal protected statuses.

Animal group	Number of protected species
Mammals	2
Reptiles	0
Birds	1
Frogs	0
Total:	**3**

Flora Assessment

Floral diversity of the study area

The floral diversity of the study area is severely diminished from its original state due to long-term anthropogenic land uses. Only 149 plant species (from 46 plant families and 117 genera) (Table 3 and Appendix B, Table 19) were recorded in the studied area during the period of this study, which in my view indicates low plant diversity in the studied area. Of this number, 43 are trees or woody shrubs (17 exotic), 30 are graminoids (6 exotic) and 76 are herbs or herbaceous climbers, creepers or shrubs (36 exotic). Only 90 (60 %) of the plant species that were recorded are indigenous to South Africa. From available literature it was established that at least 66 of the recorded plant species in the studied area is to some extent used for some or other social activities (medicinal, food/nourishment and/or cultural).

Table C: Summary of the number of plant families, genera and species recorded in the study area.

	Families	Genera	Species
PTERIDOPHYTA (ferns):	0	0	0
ANGIOSPERMAE (seed plants): ***Dicotyledonae:***	7	31	36
Monocotyledonae:	39	86	113
Total:	**46**	**117**	**149**

During the survey, which was done on foot, taxa that were identifiable during the time of the study were noted and included in the species lists in the report. The distinct possibility exists that some plant species that emerge and bloom during summer or another time of the year or under very specific circumstances, or species that are locally rare could have been missed during the latest survey.

The SANBI POSA data for the 2531CB QDS provided records for 703 plant species that are associated with the QDS that the study area falls in. This presents high species diversity for the larger area surrounding the study site, and comparatively the study site has significantly lower species diversity and many more exotics than listed in the POSA data. This list of species is also included in the report.

Description of Broad Vegetation Units

The whole study area, including all erwen or portions thereof that are relevant to this assessment, are in a transformed ecological state mainly due to informal cultivation. No differentiation is made, on a floristic level, between any sections of the study area as even the riparian zone of the Crocodile River, which is not included in the proposed footprint area of the development or any alternative, is totally transformed into patches of cultivated land and vegetable gardens. A

large portion of Erf 312 has also been transformed by the construction of residential buildings and planting of gardens in the yards of most residences.

It is apparent that the largest surface area of the studied area has been utilized for cultivation for many years – perhaps even for generations. Some indigenous plants still occur on the fringes of cultivated lands, road reserves and as weeds in the cultivated lands and other transformed areas. Some specimens of indigenous trees are also preserved in the midst of cultivated lands (Figure 8) as well as other areas. Areas where soils are too shallow for cultivation have small remnants of natural vegetation but are generally severely overgrazed and extremely fragmented. A large population of exotic (alien / naturalized) plants were recorded and dominate the vegetation layer in places.

Flora species of conservation significance

Only three plant species of conservation significance were recorded in the study area during the assessment. All are tree species that are nationally protected by the National Forest Act of 1998. Collectively, 70 specimens of these species were recorded in total of which a list with their GPS coordinates are included in the Appendices of the report.

No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of Threatened or Protected Species, or any Red Listed plants (Raimondo *et al*, 2009), or provincially protected plants as listed by the Mpumalanga Nature Conservation Act (Act no. 10 of 1998) were recorded during the time of the study.

The list of plant species that was downloaded from POSA (http://posa.sanbi.org) for the 2525DC QDS, was also consulted for plant species of conservation significance that may occur in the study area. 13 such species are listed and during the fieldwork phase of the study, these species and their habitat requirements were also considered, none of them were, however, recorded. The probability of these species occurring in the studied area is highly unlikely.

Exotic Flora

A high number of exotic (alien) plants were recorded in the study area during the time of this study. 59 such species (17 trees/woody shrubs, 6 graminoids and 36 herbs or herbaceous/succulent shrubs) were recorded, of which 20 (10 trees/shrubs, 2 grasses and 8 herbs) are classified as alien weed and invader species and the remaining 39 are common ruderal and agrestal weeds.

CONSERVATION STATUS OF LOCAL ECOSYSTEMS

Threatened and protected ecosystems

No ecosystems that are listed in The National List of Ecosystems That Are Threatened and in Need of Protection (Government Gazette no. 34809 of 09 December 2011) under the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) occur in or in close vicinity to the study area.

Conservation of different land-use areas

The guidelines set by the Mpumalanga Biodiversity Sector Plan (2014) for the conservation of different land-use areas in the Mpumalanga Province was consulted. According to both terrestrial and fresh-water guidelines and mapping units, the study area falls in Heavily Modified Areas, but at the same time the whole study area and the areas surrounding it falls in a terrestrial Protected Area Buffer ESA, supporting the biodiversity and ecological conservation of the KNP directly adjacent to the study area on its eastern side.

HABITAT SENSITIVITY

The objective of a sensitivity mapping exercise is to determine the location and extent of all sensitive areas that must be protected from transforming land uses as far as possible.

The whole study area itself has been rated as having low sensitivity from a biodiversity point of view. This is mainly due to the high levels of habitat transformation and degradation observed. The Crocodile River and its riparian zone on the southern edge of the study area, as well as the Nsikazi River and its associated riparian habitat and the PA (KNP) just outside to the east of the study area, however, are rated as high in habitat sensitivity due to the ecological importance and/or conservation significance of these habitats.

IMPACT ASSESSMENT

Impact rating and mitigation

Four impacts and their mitigation measures were assessed:

- Impact 1: Loss of habitat for fauna and flora.
- Impact 2: Loss of indigenous species diversity and species of conservation significance.
- Impact 3: Degradation and/or destruction of sensitive habitats such as the adjacent Protected Area (KNP).

Assessment of the no-go alternative

Due the destructive nature of the proposed development to any natural habitat and biodiversity occurring in the directly affected (footprint) area on a local and regional scale, the no-go alternative will see the area stay in the current

condition and probably further decreasing in condition over time if the current land management strategies (or lack thereof) are continued. The current negative impact exerted on the area by the increasing populations of alien invasive weeds will remain and the remnants of natural vegetation in the area will be further transformed with the associated loss of habitat for biodiversity over time. Current and possible future developments on areas surrounding the study area will further isolate the habitat in the study area as a fragment, which will also have a detrimental effect on the ecological functioning of this area in the long run.

Due to the fact that this area is situated within or on the edge of an urban area where the pressure on the environment is mounting in terms of land for formal or informal housing, this area is not exempt from the formation of an illegal settlement, which will also have a major negative impact on the natural environment.

Therefore, if for whatever reason the no-go alternative is enforced, it will see the present ecological status of the biodiversity and the habitats in the study area stay the same or probably decline over time, taking natural fluctuations and external anthropogenic impacts in to consideration.

Monitoring requirements

From a floristic point of view, the following should be monitored during all phases of the proposed development:

- Floristic diversity of the non-affected areas of the development as well as areas directly adjacent – especially the area of the KNP directly adjacent to the proposed waste dumping and transfer site.
- Populations of threatened or protected species in the study area and on neighboring properties / areas must be assessed and monitored during all project phases.
- The removal of any threatened or protected plant species must be well monitored and managed. Authorization, through a provincial and/or national permitting system, is to be obtained from relevant conservation authorities for such species to be disturbed, damaged or destroyed.
- It is strongly advised that an ecological specialist is appointed during all phases prior to and after construction to monitor impacts and related mitigation measures regarding Red Listed and protected species as well as sensitive habitats. Any conservation recommendations and measures that aim to mitigate the impacts of this development must also be monitored by such a specialist during the operational phase of the development.
- The management of the KNP should be well informed of the proposed project and should allow monitoring of the section of the KNP neighboring the area to be properly inspected and monitored in terms of ecological status and possible negative impacts to biodiversity.

FINAL COMMENTS AND RECOMMENDATIONS

Based on the data presented in this report as well as observations made during the survey and comments above, the following is recommended in conclusion:

- Take note of and as far as possible comply with the mitigation measures and recommendations given in this report.
- During the planning, construction and operational phases all recommendations made and concerns raised in this document should be taken into consideration.
- It is strongly advised that an ecological specialist is appointed during all project phases to monitor impacts and related mitigation measures regarding protected species as well as sensitive habitats from time to time.
- From a biodiversity point of view the preferred site on Erf 302 should be perused for the proposed construction. It is furthest away from any sensitive areas and is totally transformed with the lowest population of protected trees. The site alternative of Erf 97/Erf311 is also viable from a biodiversity point of view as long as a buffer zone between the planned development and the sensitive area to the east (KNP) is maintained. The options on Erf 312 and its alternative on Erf 311 is least viable form a biodiversity point of view.
- There are no serious objections against the proposed development activities, and as long as mitigation measures and recommendations are seriously considered and implemented, and as long as due diligence is practiced in terms of environmental legislation and other relevant policies and guidelines, the project may be favorably considered.

2 DECLARATION OF INDEPENDENCE AND SUMMARY OF EXPERTISE OF SPECIALIST INVESTIGATOR

2.1 Declaration of independence

The specialist investigator responsible for conducting this particular specialist vegetation study declares that:

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP).
- at the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity.
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favorable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being a member of the general public.
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data.
- I do not have any influence over decisions made by the governing authorities.
- should I, at any point, consider myself to be in conflict with any of the above declarations, I shall formally submit a Notice of Withdrawal to all relevant parties and formally register as an Interested and Affected Party.
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant.
- I have expertise and experience in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity.

- this document and all information contained herein is and will remain the intellectual property Environment Research Consulting and the specialist investigator responsible for conducting the study. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigator.
- I will comply with the Act, regulations and all other applicable legislation.

- All the particulars furnished by me in this document are true and correct.
- I realize that a false declaration is an offence in terms of Regulation 71 of NEMA and is punishable in terms of section 24F of the Act.

A.R. Götze (M.Sc.; *Pr.Sci.Nat.*)

2.2 Summary of expertise

Specialist investigator:	Albert R. Götze
Highest tertiary qualification:	M.Sc. *cum laude* (Phytosociology and Restoration Ecology, NWU-Potchefstroom).
Professional affiliation:	SACNASP (since 2008, Membership no: 400011/08).

I have been a professional ecologist, botanist and soil scientist since 2002. I gained valuable experience in the fields of vegetation classification, various restoration disciplines, faunal trapping and surveying, soil surveying and wetland delineations during my post graduate studies and later as fieldwork mentor for post graduate ecology students of the Northwest University (2008 - 2014), and on occasion for game ranch management students of the Tshwane University of Technology. I have experience in various types of scientific floral and faunal studies in the grassland and savannah in Gauteng, North West, Limpopo, Mpumalanga, Free State, Eastern and Northern Cape. I have also on occasion performed vegetation studies in the KwaZulu-Natal savannah and Indian Ocean Coastal Belt, the Eastern Cape thicket, the Western Cape fynbos, Namaqualand, the Karoo and Swaziland. I have 15 years' experience in specialist biodiversity, soil and wetland studies and have performed numerous (at least 124) such studies since 2002. I also have wide experience in monitoring of rehabilitated mine dumps, opencast and other similar areas for several large mining groups in South Africa. I have authored two and co-authored four scientific papers for various local scientific publications since 2004.

3 INTRODUCTION

This study was undertaken by Environment Research Consulting (ERC) in support of an EIA for the proposed development of a waste transfer station in Matsulu that is part of Mbombela Local Municipality, Mpumalanga Province.

This report presents the findings of the biodiversity assessment of which the fieldwork was conducted on site (Figures 1 and 2) on 18 April 2018. The area that was studied in this assessment consists of portions of four different erwen in Mandela Park, Matsulu i.e. Erf 97, Erf 302, Erf 311 and Erf 312 (Figure 3). Different preferred and alternative sites for the development are being investigated and is currently as follows:

- Erf 312 – original preferred site.
- Erf 302 – new preferred site.
- Erf 311 (southern section) – alternative site 1.
- Erf 97 and Erf 311 (northern section) – alternative site 2.

Figure 1: Google earth image indicating the regional setting of the study area.

Figure 2: Google earth image indicating the local setting of the study area.

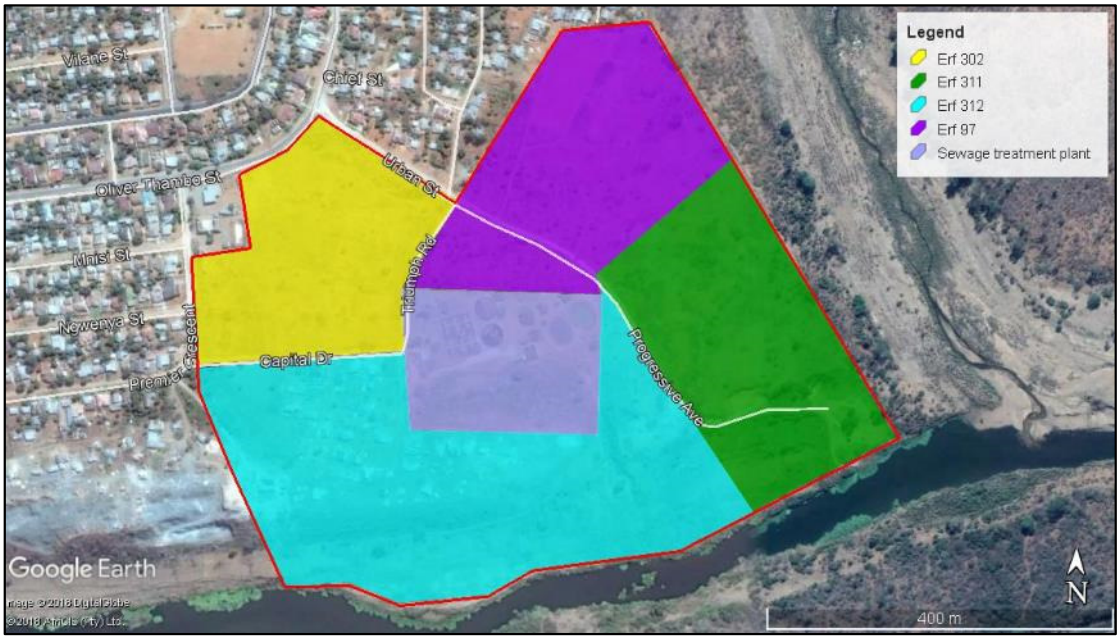

Figure 3: Distribution of different erwen over the studied area.

3.1 Scope of work

- Description of the baseline receiving environment specific to the field of expertise (general surrounding as well as site specific environment).
    - General description of the ecology and biodiversity of the study area.
    - Description and mapping of the broad vegetation units and/or habitat types (if more than one) identified in the study area.
    - Assess the fauna and flora diversity of the study area and compile relevant species lists.
    - Record the presence and diversity of species of conservation significance (ToPS, Red data, Protected, etc.) in the study area.
- Identification and description of any sensitive receptors in terms of biodiversity and ecology that occur in the study area.
- Mapping of sensitive receptors in the study area, based on available maps, database information and site inspection.
- Identification and description of any impacts that may result from the proposed development activities during all phases of the project.
- Provide detailed mitigation/management measures for the management of the identified impacts.
- Analyze the Mpumalanga Biodiversity Sector Plan (MBSP) data, in relation to the proposed project.
- Identification of any legislated constraints (e.g., 'No-Go' areas or buffer zones).

3.2 Assumptions and Limitations

- It is assumed that plant species flowering only during specific times of the year could be confused with a very similar species of the same genus.
- Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- Due to habitat conditions encountered during the time of this study some species could only be identified up to genus level and some could not be identified at all.
- In order to obtain a comprehensive understanding of the dynamics of the biodiversity of the study area, surveys should ideally have been replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this survey was conducted in one season during a once-off site visit of one day.
- Data collection in this study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis.
- No quantitative data was collected or analyzed for the calculation of ecological veld and/or habitat condition. Any comments or observations

made in this regard are based on observations, the expert knowledge and relevant professional experience of the specialist investigator.

- No faunal trapping was conducted as part of this study. The faunal assessment relied heavily on desktop and literature studies, supported by on-site observations.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

3.3 Methodology

Prior to visiting the site, a list of species that could potentially occur at the site was downloaded from "Plants of Southern Africa" (POSA) on the South African Biodiversity Institute's (SANBI) website at http://posa.sanbi.org. This list is provided at the quarter degree square (QDS) level of accuracy for the QDS 2531CB, which the study area is situated in, and included in Appendix B. At this broad scale, the list often includes many species that may not be found at the proposed site. However, any species of conservation concern indicated on the list was researched before the site visit in order to know what species of conservation concern and their habitat should be looked out for during the field surveys.

A visual reconnaissance of the study area was done before surveying commenced. Where relevant, different homogenous vegetation units were identified and subsequently surveyed on foot in order to determine the floristic composition of each. The following data was recorded:

- All identifiable indigenous and exotic plant species in each identified vegetation unit.
- Sightings of faunal species.
- General ecological and habitat data that may assist in the description of the biodiversity of the study area.

A plotless sampling method was used to record data. Taxa observed in the study area during the time of the study were recorded and included in the species lists (Appendices A and B). The floristic composition of each of the identified broad vegetation units or development area are described and discussed. Species identification and assessment of their general distribution was done following reputable websites, checklists and field guides. Where necessary, plant material was collected and/or photographs taken of specimens for identification purposes and if necessary, SANBI in Pretoria and other specialists were consulted in order to assist in species identification.

The faunal assessment was done mainly on a desktop level, which was supported by on-site observations. No faunal trapping or any other quantitative field species data capturing was, however, conducted.

No formal consultation process was conducted as part of this floristic study as it was not deemed necessary at the time of the study.

3.4 Legislative and policy framework

The following national and provincial legislative guidelines and requirements were followed as part of this study:

The National Environmental Management Act (107 of 1998) (NEMA)

This act embraces all three fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures.

National Environmental Management Act. Regulation 543, Section 32

This report has been prepared in terms of the *National Environmental Management Act* (107 of 1998) (NEMA) and is compliant with Regulation 385 Section 33 – Specialist reports and reports on specialised processes under the Act. Relevant clauses of the above regulation are quoted below and reflect the required information in the "control sheet for specialist report".

Regulation 33 (1): An applicant or the Environmental Assessment Practitioner managing an application may appoint a person who is independent to carry out a specialist study or specialised processes.

Regulation 33 (2): A specialist report or a report on a specialised process prepared in terms of these Regulations must contain:

a. Details of the person who prepared the report and the expertise of that person to carry out the specialist study or specialised process.
b. A declaration that the person is independent in a form specified by the competent authority.
c. An indication of the scope of, and the purpose for which, the report was prepared.
d. A description of the methodology adopted in preparing the report or carrying out the specialised process.
e. A description of any assumptions made any uncertainties or gaps in knowledge.
f. A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment.
g. Recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority.
h. A description of any consultation process that was undertaken during the course of carrying out the study.
i. A summary and copies of any documents that were received during any consultation process.
j. Any other information requested by the competent authority.

Conservation of Agricultural Resources Act (43 of 1983) (CARA, 1983)

This act regulates the utilisation and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

The National Forest Act (84 of 1998)

The National Forest Act (NFA, 1998):

- Promotes the sustainable management and development of forests for the benefit of all.
- Creates the conditions necessary to restructure forestry in South Africa.
- Provide special measures for the protection of certain forests and protected trees.
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.
- Promotes community forestry.
- Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

National Environmental Management: Biodiversity Act (10 of 2004)

The National Environmental Management: Biodiversity Act (10 of 2004), (NEMBA) was signed into law in mid-2004 and entered into effect on 1 September, 2004. The Act provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.

Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

Also considered were:

- The Mpumalanga Nature Conservation Act (MNCA, 1998).
- Mpumalanga Biodiversity Sector Plan Handbook (MTPA, 2014).
- Mpumalanga Biodiversity Conservation Plan Handbook (Ferrar & Lötter, 2007).

4 RECEIVING ECOLOGICAL ENVIRONMENT

The study area is situated in Mandela Park of Matsulu, which is situated approximately 35 km east of Nelspruit in the Mbombela Local Municipality in Mpumalanga. The study area is situated on the north-western banks of the confluence of the Nsikazi and Crocodile Rivers and also on the boundary of the Kruger National Park (KNP), which is situated east of the study area. A sewage treatment facility is situated in the central parts of the study area but was not assessed as part of this study.

According to Mucina and Rutherford (2006) the study area falls in the Granite Lowveld (SVl3) vegetation type (Figure 4). Other vegetation types occurring nearby are the Malelane Mountain Bushveld (SVl11) to the north, and southwards areas of Kaalrug Mountain Bushveld (SVl12) and Baberton Serpentine Sourveld (SVl13).

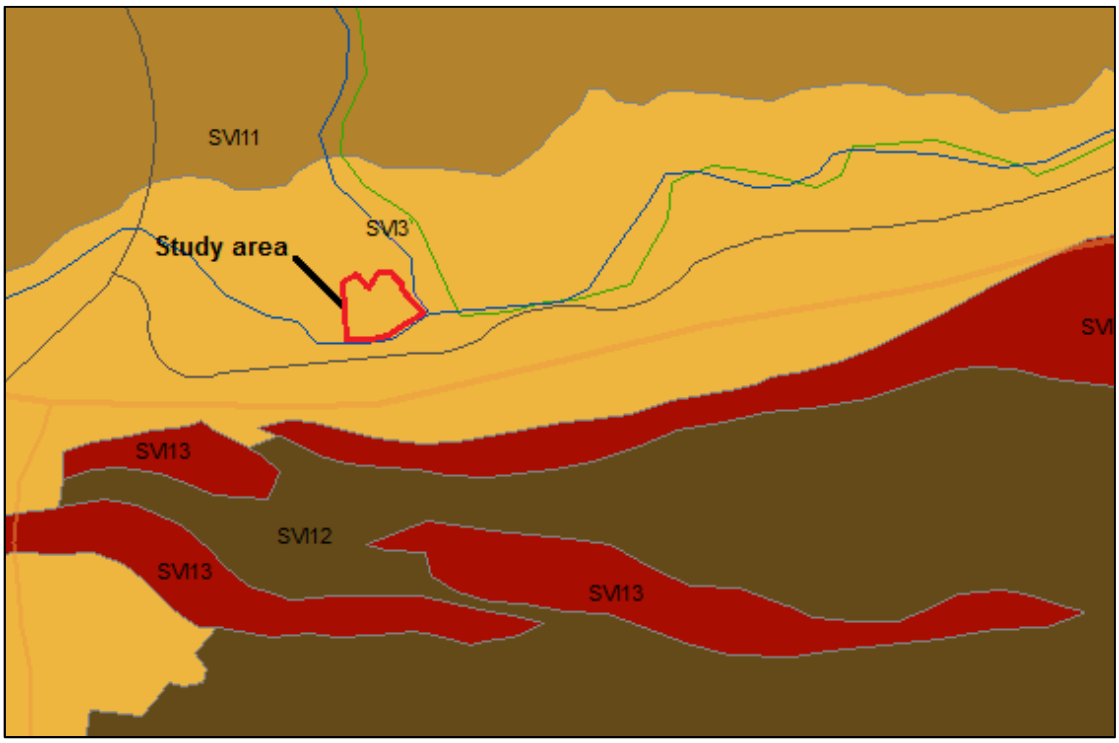

Figure 4: Distribution of vegetation types in and around the study according to Mucina and Rutherford (2006).

The description of SVl3 below was summarized from Mucina & Rutherford (2006).

4.1 Granite Lowveld (SVl3)

SVl3 occurs in Limpopo and Mpumalanga provinces, Swaziland and also marginally in KwaZulu-Natal. It spans in a north-south belt on the plains east of the escarpment from Thohoyandou in the north, interrupted in the Bolobedu area, continued in the Bavati area extending eastwards on the plains of the Murchison Mountain Range and southwards to Abel Erasmus Pass, Mica and Hoedspruit areas to the areas east of Bushbuckridge. Large areas of SVl3

occur in the Kruger National Park from just east of Orpen Camp southwards through Skukuza and the area west thereof, further to Mkuhlu and to the basin of the Mbyamiti River. It continues further southwards to the Hectorspruit area with a narrow westward extension up to the Crocodile River Valley past Malelane, Kaapmuiden and the Kaap River Valley, entering Swaziland between Jeppe' Reef in the west and the Komati River in the east and eventually entering KwaZulu-Natal near Pongola.

The area varies between 250 to 700 m in altitude and receives summer rainfall (MAP 450 mm in the east and 900 mm near the escarpment in the west). Summers are hot and winters mild and generally frost free. The geology changes from north to south including the Swazian Goudplaats Gneiss, Makhutswi Gneiss and Nelspruit Suite (granite gneiss and migmatite), and further southstill, the younger Mpuluzi Granite. Archaean granite and gneiss weather into sandy soils in the bottomlands and clayey soils with high sodium content in the lowlands.

The vegetation of SVI3 is dominated by tall shrubland with few trees to moderately low woodland on deep sandy uplands with *Terminalia sericea, Sclerocarya birrea* subsp*. caffra, Combretum zeyheri* and *C. apiculatum* and the herbaceous layer including Pogonarthria squarrosa, *Tricholaena monachne* and *Eragrostis rigidior*. Dense thicket to open savanna in the bottomlands with *Acacia nigrescens, Dichrostachys cineria, Combretum imberbe* and *Grewia bicolor* in the woody layer and a dense herbaceous layer containing the dominant *Digitaria eriantha, Panicum maximum* and *Aristida congesta* on fine-textured soils, while brackish bottomlands support *Sporobolus nitens, Urochloa mosambicensis* and *Chloris virgata*. At seep lines, where convex topography changes to concave, a dense fringe of *Terminalia sericea* occurs, with *Eragrostis gummiflua* in the undergrowth.

From a conservation point of view SVI3 is escribed as vulnerable. 17% of the surface are of this vegetation type is statutorily conserved in the Kruger National Park and about the same amount in different private reserves (Selati, Klaserie, Timbavati, Mala Mala, Sabi Sand and Manyaeleti Reserves). More than 20% is transformed due to mainly cultivation and settlement development. SVI3 is described by Acocks (1953) as Lowveld (VT 10) and Arid Lowveld (VT 11), and by Low & Rebelo (1996) as Mixed Lowveld Bushveld (LR 19).

5 RESULTS AND DISCUSSION

5.1 Faunal assessment

The main focus of this assessment was to include every species with the slightest chance of occurring within the study area (Appendix A, Tables 15 to 18). The characteristics of the site and the prominent features surrounding it, as shortly discussed below, play a key role in whether an animal would theoretically inhabit the study area. In assessing species occurrence, first their approximate distribution and habitat requirements were considered. Therefore, only animal groups for which distribution data are available have been considered in this assessment.

A visit to the site made it clear that the site has been absolutely transformed through anthropogenic land uses, which includes cultivation, urbanization, dumping of refuse, etc. Much of the site has been cleared of natural vegetation with relatively little herbaceous plant cover remaining and does not provide much opportunity to be inhabited by native fauna, plants being an essential resource providing food, shade and shelter to animals. Situated on the outskirts of a sub-urban area with formal and informal housing situated within and adjacent to the site, there are bound to be domestic and feral cats and dogs, which through predation, these animals can cause a decrease in faunal diversity in the immediate environment (Lepczyk et al. 2004).

The Crocodile river is an important habitat feature determining the occurrence of semi-aquatic animals and may additionally facilitate the creation of seasonal, stagnant pools which are important resources in frog and dragonfly / damselfly reproduction. Although trees are sparsely distributed throughout the site they remain an important structural component of the ecosystem and are important especially for the occurrence of birds.

Dragonflies, damselflies and butterflies were all considered in the present assessment. However, in its current ecological state these animals cannot be supported here. It can be reported with some certainty (as much as can be provided from the available literature) that no protected dragonfly, damselfly or butterfly occurs on or near the site (Samways 2006; Henning et al. 2009). These animals are well-studied indicators of habitat quality and could not, especially if endangered, survive within a site as intensely transformed as the site concerned. Arachnida (spiders and scorpions) have been excluded in the present study as no official conservation assessment has been conducted to determine the protected status of South African spiders (*Arachnida: Araneae*) or scorpions (*Arachnida: Scorpiones*) and limited knowledge exists to their specific habitat preferences. It is none the less expected that the arachnids occurring on the site to be generalists, well adapted to human disturbance and of no conservation concern.

Regarding the faunal species lists included in Appendix A, it is important to note that distribution maps are often constructed with limited ecological knowledge available for the species under question and are thus not consistently reliable in predicting a species' occurrence (Hernandez et al. 2006; Newbold 2010). Where literature allowed, a species was listed with regards to the number of sightings for that species near the relevant locality (i.e. Matsulu). Furthermore, some uncertainty remains regarding the conservation priority for a great deal of

southern African fauna as not all have been assessed and may classify as “Not listed” or “Data deficient”.

5.1.1 Faunal diversity of the study area

In this section a summary of the diversity of fauna theoretically expected to occur in or in close proximity to the study area (Table 1) is provided.

Table 1: Animal groups considered in this study along with the number of species per group possibly occurring in or near the study area.

Animal group	Number of species
Mammals	41
Reptiles	32
Birds	73
Frogs	19
Total:	**165**

5.1.2 Fauna species of conservation significance

Table 2 presents the number of protected species per animal group that may occur in the study area. The distribution and habitat preferences of these 3 animals overlap with the study area. These species are clearly highlighted in the relevant species lists in Appendix A.

Table 2: Animal groups considered in this study along with the number of species with formal protected statuses.

Animal group	Number of protected species
Mammals	2
Reptiles	0
Birds	1
Frogs	0
Total:	**3**

5.2 Floristic assessment

5.2.1 Floral diversity of the study area

The floral diversity of the study area is severely diminished from its original state due to long-term anthropogenic land uses. The whole area that was assessed (including all preferred and alternative sites) are totally transformed due to urbanization, cultivation and overgrazing. Very small, severeliy degraded fragments of natural vegetation were observed but contribute very little to the overall biodiversity that was recorded. Compared to the natural vegetation of the KNP directly east of the study area, no similarities were observed other than the presence of some large indigenous Marula and Apple-leaf trees. The floristic composition of the study area is described in more detail in the next section (5.2.2).

Only 149 plant species (from 46 plant families and 117 genera) (Table 3 and Appendix B, Table 19) were recorded in the studied area during the period of this study, which in my view indicates low plant diversity in the studied area. Of this number, 43 are trees or woody shrubs (17 exotic), 30 are graminoids (6 exotic) and 76 are herbs or herbaceous climbers, creepers or shrubs (36 exotic). Only 90 (60 %) of the plant species that were recorded are indigenous to South Africa.

From available literature (Pujol 1988; Pooley, 1998; Schmidt *et* al 2002; Shearing and Van Heerden 1994; Van Wyk *et al* 1997; Van Wyk and Gericke 2003) it was established that at least 66 of the recorded plant species in the studied area is to some extent used for some or other social activities (medicinal, food/nourishment and/or cultural).

Table 3: Summary of the number of plant families, genera and species recorded in the whole study area.

	Families	Genera	Species
PTERIDOPHYTA (ferns):	0	0	0
ANGIOSPERMAE (seed plants): ***Monocotyledonae:***	7	31	36
Dicotyledonae:	39	86	113
Total:	**46**	**117**	**149**

During the survey, which was done on foot, taxa that were identifiable during the time of the study were noted and included in the species lists in Appendix B (Tables 20 to 24). The distinct possibility exists that some plant species that emerge and bloom during summer or another time of the year or under very specific circumstances, or species that are locally rare could have been missed during the latest survey.

The mentioned species lists contain the plant family name and scientific and common names of all plant species that were observed in the study area during the time of the study. Also included is, where applicable, the status of a species,

which provides information on conservation status. Information on whether a species is utilized for medicinal, cultural or nutritional uses is also provided in the mentioned species lists.

Appendix B, Table 19 presents the diversity of plant families, genera and species recorded in the study area. A check list of plant species recorded during this study is included in Tables 20 to 24 of Appendix B.

The SANBI POSA data for the 2531CB QDS provided records for 703 plant species that are associated with the QDS that the study area falls in. This presents high species diversity for the larger area surrounding the study site, and comparatively the study site has significantly lower species diversity and many more exotics than listed in the POSA data. This list of species is also included in Appendix B (Table 25).

5.2.2 Description of Broad Vegetation Units

The whole study area, including all erwen or portions thereof that are relevant to this assessment, are in a transformed ecological state mainly due to informal cultivation (Figure 5). No differentiation is made, on a floristic level, between any sections of the study area as even the riparian zone of the Crocodile River, which is not included in the proposed footprint area of the development or any alternative, is totally transformed into patches of cultivated land and vegetable gardens (Figure 6). A large portion of Erf 312 has also been transformed by the construction of residential buildings and planting of gardens in the yards of most residences (Figure 7).

It is apparent that the largest surface area of the studied area has been utilized for cultivation for many years – perhaps even for generations. Some indigenous plants still occur on the fringes of cultivated lands, road reserves and as weeds in the cultivated lands and other transformed areas. Some specimens of indigenous trees are also preserved in the midst of cultivated lands (Figure 8) as well as other areas. Areas where soils are too shallow for cultivation have small remnants of natural vegetation but are generally severely overgrazed and extremely fragmented. A large population of exotic (alien / naturalized) plants were recorded and dominate the vegetation layer in places. A list of dominant and other important plant species that were recorded are presented in Table 4. A number of crop plants that are cultivated in the area are also listed in Table 4.

Note: In table 4, exotic (alien / naturalized) plant species are preceded by an asterisk in the species name column (*).

Table 4: Summary of dominant and other commonly occurring plant species.

	Species Name	Common Name
Trees & woody shrubs:	*Dichrostachys cinerea*	Sickle-bush
	Ehretia amoena	Sandpaper-bush
	**Lantana camara*	Lantana / Christmas Berry
	**Leucaena leucocephala*	Leucaena
	**Melia azedarach*	Seringa
	Philenoptera violacea	Apple-leaf / Rain Tree

	Species Name	Common Name
	Sclerocarya birrea subsp. *caffra*	Marula
	**Senna occidentalis*	Stinking Weed / Wild Coffee
Graminoids:	*Aristida congesta* subsp. *congesta*	Spreading Three-awn
	Cenchrus ciliaris	Foxtail Buffalo Grass
	Chloris pycnothrix	Spiderweb Grass
	Cynodon dactylon	Couch Grass
	Enneapogon cenchroides	Nine-awned Grass
	Heteropogon contortus	Spear Grass
	Melinis repens subsp. *repens*	Natal Red Top
	Panicum maximum	Guinea Grass
	Urochloa mosambicensis	Bushveld Signal Grass
Herbaceous shrubs, climbers, forbs, etc.:	*Acalypha indica* L.	
	**Acanthospermum hispidum*	Upright Starbur
	**Alternanthera pungens*	Paper Thorns
	**Amaranthus hybridus*	Pigweed
	Amaranthus thunberghii	Red Pigweed
	**Bidens pilosa*	Blackjack
	**Boerhavia* c.f. *erecta*	Erect Spiderling
	Cleome monophylla	Spindlepod
	**Cocculus hirsutus*	
	**Corchorus olitorius*	
	Ipomoea sinensis	
	Momordica balsamina	Laloentjie
	**Portulaca oleracea*	Purslane / Pigweed
	Sida cordifolia	Flannel Weed
	Tribulus terrestris	Devil's Thorn
	Vernonia poskeana	
Cultivated crops & fruit trees:	**Abelmoschus esculentus*	Ocra
	**Arachis hypogaea*	Peanut
	**Carica papaya*	Papaya
	**Cucurbita* species	Pumpkin
	**Ipomoea batatas*	Sweet potato
	**Mangifera indica*	Mango
	**Manihot esculenta*	Cassava
	**Moringa oleifera*	Moringa
	**Phaseolus* c.f. *coccineus*	Runner Bean
	**Saccharum officinarum*	Sugarcane
	**Zea mays*	Mielie / Corn
	**Musa* species	Banana

Figure 5: Section of a cultivated land in the study area.

Figure 6: Transformed riparian zone next to the Crocodile River – a well maintained sheltered cultivated crop garden.

Figure 7: Area where houses have been constructed on Erf 312.

Figure 8: A specimen of a Marula tree that is preserved in the midst of a cultivated peanut land.

5.2.3 Flora species of conservation significance

Only three plant species of conservation significance were recorded in the study area during the assessment. All are tree species that are nationally protected by the National Forest Act (NFA, 1998) (Table 5). Collectively, 70 specimens of these species were recorded in total (Table 5). A list of these specimens with their GPS coordinates are included in Appendix C (Table 26) and their geographical positions visually presented in Figure 9.

Table 5: List of protected tree species recorded in the study area

FAMILY	SPECIES NAME	COMMON NAME	NO OF SPECIMENS RECORDED
ANACARDIACEAE	*Sclerocarya birrea* subsp. *caffra*	Marula	53
COMBRETACEAE	*Combretum imberbe*	Leadwood	1
FABACEAE	*Philenoptera violacea*	Apple-leaf / Rain Tree	16
		Total specimens recorded:	70

No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of Threatened or Protected Species (TOPS) as published in Government Gazette no. 36375 of 16 April 2013 (TOPS, 2013), Red Listed plants (Raimondo *et al*, 2009) or provincially protected plants as listed by the Mpumalanga Nature Conservation Act – Act no. 10 of 1998 (MNCA, 1998), were recorded during the time of the study.

The list of plant species that was downloaded from POSA (http://posa.sanbi.org) for the 2531CB QDS, was also consulted for plant species of conservation significance that may occur in the study area. Table 6 presents a list of those species. During the fieldwork phase of the study, these species and their habitat requirements were also considered, none of them were, however, recorded. Due to the transformed nature of the study area, the probability of these or any other species of conservation significance occurring in the studied area is highly unlikely.

Figure 9: Geographical positions of specimens of protected tree species relevant to Erf numbers in the study area (label numbers coincide with the label numbers presented in Table 26, Appendix C).

Table 6: List of Red Listed plant species recorded for the 2531CB QDS (http://posa.sanbi.org)

Species name	Red List Status (Raimondo *et al* 2009)
Adenia gummifera var. *gummifera*	Declining
Alepidea peduncularis	Data deficient
Aloe cooperi subsp. *cooperi*	Declining
Clivia miniata var. *miniata*	Vulnerable
Crinum stuhlmannii	Declining
Crotalaria pearsonii	Rare
Cyrtanthus eucallus	Vulnerable
Elaeodendron transvaalense	Near Threatened
Eulophia speciosa	Declining
Euryops hypnoides	Vulnerable
Plectranthus esculentus	Data deficient
Schizochilus cecilii subsp. *culveri*	Rare
Siphonochilus aethiopicus	Critically Endangered

5.2.4 Exotic Flora

A high number of exotic (alien) plants were recorded during the time of this study. 59 such species (17 trees/woody shrubs, 6 graminoids and 36 herbs or herbaceous/succulent shrubs) were recoded, which comprises 40% of the recorded floristic species diversity. According to the Conservation of Agricultural Resources Act (Act No. 43 of 1983) in Henderson (2001) and the National Environmental Management Biodiversity Act's 2014 list of proposed weeds and invaders (NEMBA, 2014), 20 of these species (10 trees/shrubs, 2 grasses and 8 herbs) are classified as alien weed and invader species (Table 7) and the remaining 39 are common ruderal and agrestal weeds.

All exotic plant species in the species lists (Appendix B: Tables 19 – 24) are preceded by an asterisk (*) and/or indicated by the letter "E" in the Species Status column in the case of uncategorized exotic species. In the case of declared or proposed weeds or invaders the invasive status of the species, according to CARA (1983) (Table 8) and NEMBA (2014) (Table 9) are indicated in the Conservation Status column of the species lists in Appendix B as follows:

- C1 – declared weed category 1 (CARA, 1983).
- C2 – declared invader category 2 (CARA, 1983).
- C3 – declared invader category 3 (CARA, 1983).
- N1b – NEMBA (2014) category 1b.
- N2 – NEMBA (2014) category 2.

Table 7: List of declared alien weeds and invaders recorded in the studied area.

SPECIES NAME	COMMON NAME	GROWTH FORM	INVASIVE STATUS
Anredera cordifolia	Madeira Vine	Herb	C1 / N1b
Arundo donax	Spanish Reed	Reed	C1 / N1b
Cereus jamacaru	Queen of the Night Cactus	Cactus / Tree	C1 / N1b
Datura ferox	Large Thorn Apple	Herb	C1 / N1b
Eichornia crassipes	Water Hyacinth	Hydrophyte	C1 / N1b
Flaveria bidentis	Smelter's Bush	Herb	N1b
Ipomoea alba	Moonflower / Wooden Rose Creeper	Herb, climber	C1 / N1b
Ipomoea purpurea	Common Morning Glory	Herb, climber	C1 / N1b
Lantana camara	Lantana / Christmas Berry	Shrub / tree	C1 / N1b
Leucaena leucocephala	Leucaena	Tree	C2 / N2
Melia azedarach	Seringa	Tree	C3 / N1b
Morus alba	Common / White Mulberry	Tree	C3 / N2
Parthenium hysterophorus	Feverfew / Famine Weed	Herb	C1 / N1b
Ricinus communis	Castor-oil Plant	Tree	C2 / N1b
Senna didymobotrya	Peanut butter Cassia	Tree	C3 / N1b
Senna occidentalis	Stinking Weed / Wild Coffee	Shrub	N1b
Sorghum halepense	Johnson Grass	Grass	C2 / N2
Tecoma stans	Yellow Bells	Tree	C1 / N1b
Thevetia peruviana	Yellow Oleander	Shrub / tree	C1 / N1b
Xanthium strumarium	Large Cocklebur	Herb	C1 / N1b

Table 8: Description of the invasive status of exotic plant species according to CARA (1983).

Invasive status (category)	Description
Declared weed (category 1) **– C1** Proposed weed **– CX1**	• Prohibited on any land or water surface in South Africa. • Must be controlled or eradicated were possible (except in biological control reserves).
Declared invader (category 2) **– C2** Proposed invader **– CX2**	• Allowed only in demarcated areas under controlled conditions. • Import of propagative material and trading allowed only by permit holders. • Outside demarcated areas, it must be controlled, or eradicated where possible (except in biological control reserves). • Prohibited within 30 m of the 1:50 year flood-line of watercourses or wetlands unless authorization is obtained.

Invasive status (category)	Description
Declared invader (category 3) **– C3** Proposed invader **– CX3**	• No further plantings of these species are allowed (except with special permission). • Trade of propagative material is strictly prohibited. • Existing plants may remain but must be prevented from spreading. • Prohibited within 30 m of the 1:50 year flood-line of watercourses or wetlands, or as directed.
Potential Transformer **– C (T)**	• Plants that are already invading natural or semi-natural habitats and have the potential to dominate a vegetation layer but not yet having a marked effect. They are either transformers elsewhere in the world or showing signs of this ability in Southern Africa.

Table 9: Description of the invasive status of exotic plant species according to NEMBA (2014)

Invasive status (category)	Description
Category 1b **– N1b**	• Invasive species requiring compulsory control as part of an invasive species control program • Remove and destroy • These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management program • No permits will be issued
Category 2 **– N2**	• Invasive species regulated by area • A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants • No permits will be issued for these plants to exist in riparian zones
Category 3 **– N3**	• Invasive species regulated by activity • An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species • No permits will be issued for Cat 3 plants to exist in riparian zones

6 CONSERVATION STATUS OF LOCAL ECOSYSTEMS AND LAND-USE AREAS

6.1 Threatened and protected ecosystems

No ecosystems that are listed in The National List of Ecosystems That Are Threatened and in Need of Protection (Government Gazette no. 34809 of 09 December 2011) under the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA, 2011) occur in or in close vicinity of the study area.

6.2 Conservation of different land-use areas

The Mpumalanga Biodiversity Sector Plan (MTPA, 2014) gives guidelines regarding the conservation of different land-use areas in the Mpumalanga Province. For this purpose, Protected Areas (PA's), Critical Biodiversity Areas (CBA's) and Ecological Support Areas (ESA's) were identified and mapped. Also defined are Other Natural Areas (ONA's) and Heavily or Moderately Modified Areas (HMMA's). Descriptions of these terms and their desired management objectives are summarized in Table 10.

Table 10: Descriptions of mapping categories, definitions and desired management objectives (MTPA, 2014).

Map Category	Definition	Land Management Objective
PA	Those areas that are proclaimed as protected areas under national or provincial legislation, including gazetted Protected Environments.	Areas that are meeting biodiversity targets and therefore must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.
CBA	Areas that are required to meet biodiversity targets, for species, ecosystems or ecological processes.	Must be kept in a natural state, with no further loss of habitat. Only low-impact, biodiversity-sensitive land-uses are appropriate.
ESA	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services.	Maintain in a functional, near-natural state, but some habitat loss is acceptable. A greater range of land-uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives are not compromised.
ONA	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions. Although they have not been prioritised for	An overall management objective should be to minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. These areas offer the greatest flexibility in terms of management objectives and permissible land-uses, but some authorisation

Map Category	Definition	Land Management Objective
	biodiversity, they are still an important part of the natural ecosystem.	may still be required for high-impact land-uses.
HMMA	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructural functions, even if they are never prioritised for conservation action.	Such areas offer the most flexibility regarding potential land-uses, but these should be managed in a biodiversity-sensitive manner, aiming to maximise ecological functionality and authorisation is still required for high-impact land-uses. Moderately modified areas (old lands) should be stabilised and restored where possible, especially for soil carbon and water-related functionality.

The mapping of the conservation status of different land-use areas in Mpumalanga has been divided into terrestrial and fresh-water categories. According to the mapping units of both categories, the study area falls in Heavily Modified Areas (Figures 10 and 11), but at the same time the whole study area falls in a terrestrial Protected Area Buffer ESA, supporting the biodiversity and ecological conservation of the Kruger National Park (KNP) directly adjacent to the study area on its eastern side.

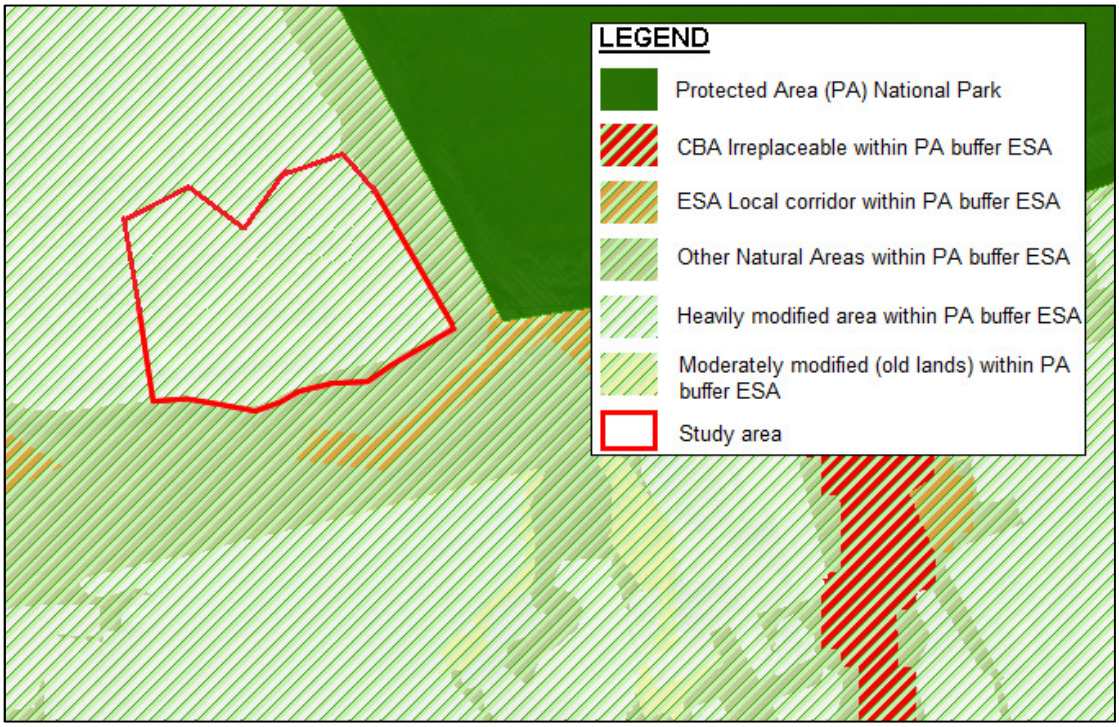

Figure 10: Image showing the terrestrial CBAs, ESAs in and around the study area.

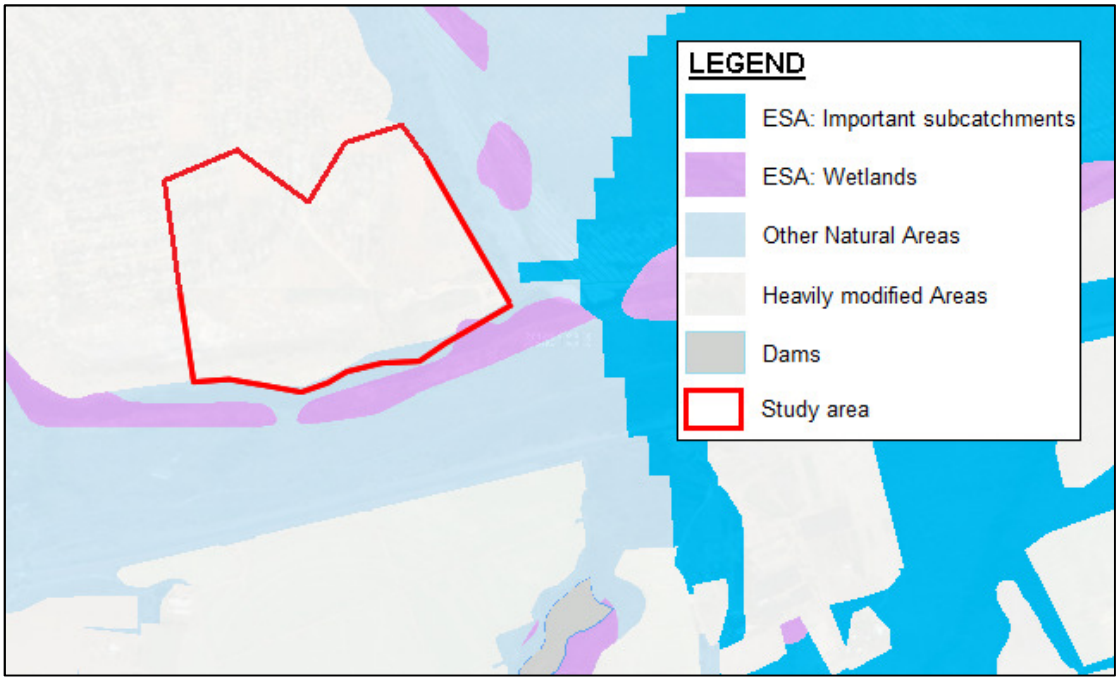

Figure 11: Image showing the fresh water CBAs, ESAs in and around the study area.

7 HABITAT SENSITIVITY

The objective of a sensitivity mapping exercise is to determine the location and extent of all sensitive areas that must be protected from transforming land uses as far as possible. A development proposal should only to be considered compatible with the biodiversity sensitivities of the site if all sensitive areas are avoided and are incorporated into an open space system (GDARD, 2014b). A number of criteria are generally used to determine habitat sensitivity of which the following are some of the main ones:

- Ecological function. This relates to the degree of ecological connectivity between systems within a landscape matrix. Therefore, systems with a high degree of landscape connectivity amongst one another are perceived to be more sensitive and will be those contributing to ecosystem service (e.g. wetlands) or overall preservation of biodiversity. The potential of the habitat to deliver ecosystem services within itself and to other neighboring habitats are also taken in to consideration.
- Conservation importance. This relates to species diversity, endemism (unique species or unique processes) and the high occurrence of threatened and protected species or ecosystems protected by legislation.
- Other factors.
    - Current diversity of exotic species.
    - Degree to which the natural habitat has been degraded due to various factors.
    - Degree of habitat transformation.
    - Degree of habitat fragmentation.
    - Degree of bush encroachment.

Three ratings were considered to describe the sensitivity of the study area:

High – sensitive ecosystem with either low inherent resistance or low resilience towards disturbance factors or highly dynamic systems considered being important for the maintenance of ecosystem integrity. Most of these systems represent ecosystems with high connectivity with other important ecological systems or with high species diversity and usually provide suitable habitat for a number of species of conservation significance. These areas should be protected.

Moderate/Medium – These are slightly modified systems which occur along gradients of disturbances of low-medium intensity with some degree of connectivity with other ecological systems or ecosystems with intermediate levels of species diversity but may include potential ephemeral habitat for species of conservation significance.

Low – Degraded and highly disturbed / transformed systems with little ecological function and are generally very poor in species diversity.

The whole study area itself has been rated as having low sensitivity from a biodiversity point of view. This is mainly due to the high levels of habitat transformation and degradation observed. The Crocodile River and its riparian zone on the southern edge of the study area, as well as the Nsikazi River and its associated riparian habitat and the PA (KNP) just outside to the east of the study area, however, are rated as high in habitat sensitivity due to the ecological importance and/or conservation significance of these habitats.

Figure 12 presents the distribution of the ecological sensitivity of habitats in the study area.

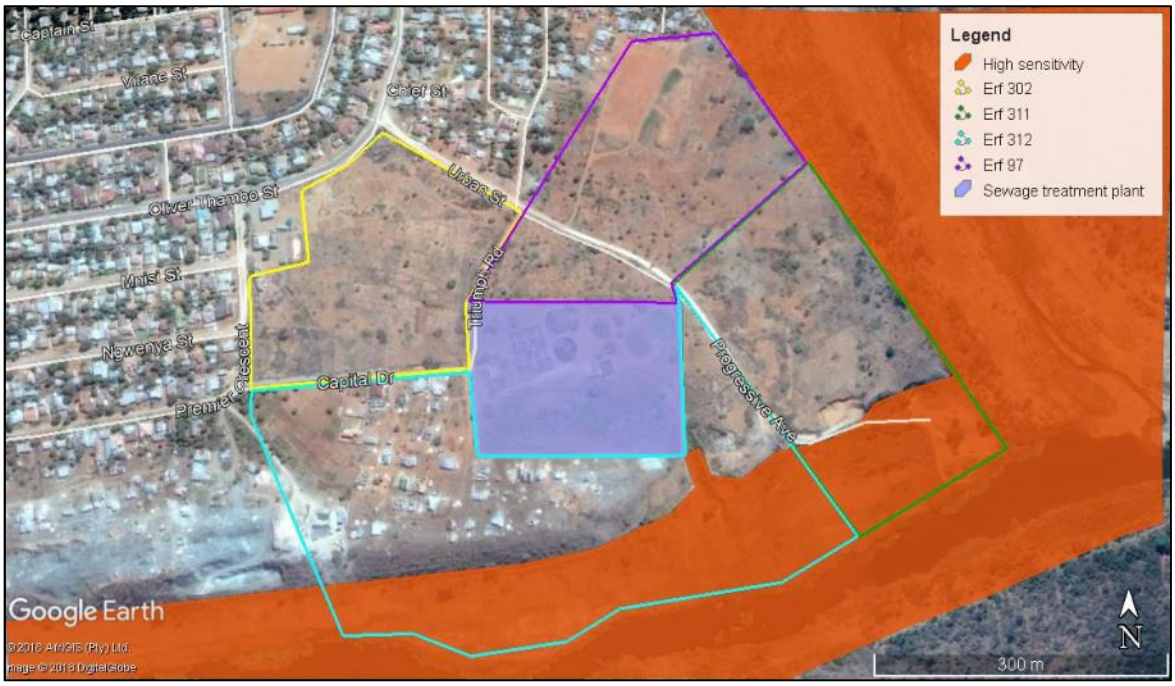

Figure 12: Sensitive habitats in and around the study area.

8 IMPACT ASSESSMENT

8.1 Impact rating and mitigation

The tables in the section below serve to summarize the significance of expected and potential impacts on the fauna, flora and habitat features occurring on or directly adjacent to the study area. A list of expected construction and operational phase impacts are provided. No significant impacts, other than the ones currently exerted on the environment, are expected during the pre-construction phase. Tables 12 to 14 present the descriptions of impacts as well as impact assessments according to the method and rating system described in Table 11. In addition, these tables also indicate migratory and management measures needed to minimize the expected ecological impacts.

Table 11: Rating system for the evaluation of impacts related to the proposed development

NATURE		
A brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).

4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	**Impact significance rating**	**Description**
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

Table 12: Assessment of Impact 1: Loss of habitat for faunal and floral species

Impact	Construction phase	Operational phase
IMPACT 1: Loss of habitat for faunal and floral species.	Additional site clearing and the removal of vegetation and topsoil leading to loss of habitat.	Ongoing disturbance of soils with general operational activities leading to altered floral habitat.
	Site clearing and the disturbance of soils leading to increased erosion.	Increased run off from paved areas and access roads causing erosion in adjacent areas; Insufficient maintenance of run off systems leading to erosion.
	Compaction of soils by construction vehicles and pedestrians (informal paths).	Ongoing compaction of soils on informal paths and roads.
	Movement of construction vehicles and people impacting on habitat trough pollution by littering, noise, fuel, oils, hydraulic fluids, chemicals, etc.	Continued movement of vehicles and people in the area impacting on habitat trough pollution by littering, noise, fuel, oils, hydraulic fluids, household chemicals, etc.
	Availability of food and shelter for animal groups inhabiting the site will decrease even more or be totally lost. Mammals, reptiles, frogs and scorpions frequently excavate and occupy burrows in the top soil layer and may be killed if this layer is mechanically removed during construction	Availability of food and shelter for animals that could potentially inhabit the site and broader area will continue to be in a decreased state.
	Restriction of movement of land-based animals by construction and residential related fences, ditches, etc.	Restriction of movement of land-based animals by residential fences, ditches, roads, etc.

	Disturbance of the soil will transform the vegetation in the study area and create conditions favorable for the establishment of larger populations of alien and invader plant species as well as common weeds.	Lack of management of transformed habitat will create favorable conditions for the spread of populations of alien and invader plant species to neighboring sensitive natural habitats causing further transformation.
	With the development of any infrastructure the fragmentation of natural habitats can occur with the negative effect that the flow of ecosystem services (seed dispersal, pollination, exchanging of genes from one area to the next, etc.) may be interrupted having a negative long-term effect on isolated fragments.	Long term isolation of fragments habitats with negative impacts as discussed alongside.

Impact assessment (before mitigation):

Geographical Extent	Probability	Duration	Intensity / Magnitude	Reversibility	Irreplaceable loss of resources	Cumulative Effect	Significance
1	2	4	3	3	1	3	**42 (negative medium impact)**

Mitigation of Impact 1:

1. Injudicious and unnecessary destruction of natural vegetation, other than the footprint area of the proposed development(s), must be avoided at all cost.

2. Plan the development in such a way that the most degraded or already transformed portions are included in the development footprint and veld that is in a least degraded state and the ridge to the north-east is excluded as far as possible.

3. Plan and design the development in such a way as to conserve “green” corridors of relatively natural vegetation to retain connectability to similar habitats outside the development area. This will ensure the continued functioning of the natural habitat to a certain degree and create pathways for the distribution of biodiversity and the ecosystem services involved.

4. To prevent the erosion of topsoil, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas susceptible to erosion. Water control structures should be constructed and well maintained to minimize erosion and to create a favorable habitat for the establishment of vegetation during the operation of the development and after decommissioning and rehabilitation.

5. Wherever possible, any soil that can serve as a growth medium for plants must be stripped and stockpiled for future landscaping and/or rehabilitation after or during the construction phase and should be used as soon as possible after "harvesting" to ensure that seed sources does not become worthless due to decomposition of the seed over time. It must be ensured that such topsoil stockpiles are located outside of any drainage lines, wetlands and areas susceptible to erosion or siltation. Stockpiles should also be placed away from areas known to contain hazardous substances such as fuel.

6. Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the development/ decommissioning footprint. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled. A management plan and proper follow-up strategy for the prevention of the establishment and/or further spread of new populations of such species should be developed and enforced.

7. Construction vehicles should be well maintained to prevent oil and other chemically based materials to enter the area. Refueling points should be well managed and if any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site.

Impact assessment (after mitigation):

Geographical Extent	Probability	Duration	Intensity / Magnitude	Reversibility	Irreplaceable loss of resources	Cumulative Effect	Significance
1	2	4	2	3	1	2	**26 (negative low impact)**

Table 13: Assessment of Impact 2: Loss of indigenous species diversity and species of conservation significance.

IMPACT 2: Loss of indigenous species diversity and species of conservation significance.	Proliferation of alien plant species may alter plant community structure. Failure to implement a comprehensive alien weed control plan leading to an increase in alien vegetation encroachment.	An increase in alien species leading to altered plant community structure and composition especially in adjacent habitats.
	Erosion and/or sedimentation as a result of construction activities leading to a loss of natural habitat and species diversity including species of conservation significance.	Erosion and sedimentation as a result of operational activities leading to a loss of natural habitat and species diversity.
	Site clearance and removal of vegetation leading to a loss of any recorded and unrecorded species of conservation significance such as ToPS, Red Listed species, protected species (nationally and/or provincially), plant species with medicinal or other cultural value.	An increase in alien plant species in adjacent habitats leading to the loss of species of conservation significance such as ToPS, Red Listed species, protected species (nationally and/or provincially), plant species with medicinal or other cultural value by out competing these species.

Impact assessment (before mitigation):

Geographical Extent	Probability	Duration	Intensity / Magnitude	Reversibility	Irreplaceable loss of resources	Cumulative Effect	Significance
2	2	4	3	2	2	3	**45 (negative medium impact)**

Mitigation of Impact 2:

1. According to SANBI's Guidelines for Environmental Impact Assessments (http://redlist.sanbi.org/eiaguidelines.php), *in situ* conservation of species of conservation significance is vital and is recommended as the only option for conserving species of conservation concern. *Ex situ* conservation, i.e. the removal of a subpopulation from its natural habitat to an artificial environment, a practice often termed "search and rescue", will result in the erosion of the inherent genetic diversity and characteristics of that species and increase its risk of extinction in the wild. Similarly, translocation of subpopulations is an unacceptable conservation measure. Translocations are expensive and rarely successful.

Even if they are successful, translocated individuals may harm other species within the receiving environment, the translocated individuals may transmit pathogens and/or parasites, and translocation may result in rapid changes in the species itself.

2. Populations of species of conservation significance (ToPS, Red / Orange Listed species, protected species (nationally and/or provincially), plant species with medicinal or other value) occurring directly outside the areas that will be directly impacted by the proposed development, needs to be actively conserved in order to conserve a viable, non-fragmented gene pool of these species in the local area.

3. If possible, developments that jeopardize any large populations of species of conservation significance should be planned in such a way as to avoid the populations and their habitat by the conservation of prescribed buffer zones.

4. Any specimens of protected plant species known to occur in the vicinity of or directly adjacent to the development footprint and may potentially be impacted by the development activities, are to be fenced off for the duration of the activity. If these species fall within the development footprint special authorization is to be obtained from relevant conservation authorities for such species to be cut, disturbed, damaged or destroyed. Applications for such activities should be made to the responsible official within the provincial conservation department and/or SANBI.

5. An alien vegetation control plan has to be implemented in order to manage alien plant species occurring within the developed and surrounding area.

6. Removal of the alien invader and weed species encountered on the property must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational, closure/decommissioning and rehabilitation/ maintenance phases. Care should be taken with the choice of herbicides to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicides used. Proper training should be given to contractors/applicators to avoid spraying indigenous vegetation.

7. Landscaping with local indigenous species is preferable and should include forage and host plants required by pollinators.

8. After the construction phase reseeding of local indigenous plant species should be done in between the developed infrastructure and all affected areas to re-establish plant species diversity. These re-seeded areas should be well maintained during the operational phase.

Impact assessment (after mitigation):							
Geographical Extent	Probability	Duration	Intensity / Magnitude	Reversibility	Irreplaceable loss of resources	Cumulative Effect	Significance
2	2	3	2	2	2	2	**26** (negative low impact)

Table 14: Assessment of Impact 4: Degradation and/or destruction of sensitive habitats such as the adjacent Protected Area (KNP).

Impact	**Construction phase**	**Operational phase**
IMPACT 4: Degradation and/or destruction of sensitive habitats such as the adjacent Protected Area (KNP).	Sedimentation of natural drainage lines / rivers due to soil erosion as a result of construction activities nearby leading to a loss of natural functioning.	Sedimentation of natural drainage lines / rivers due to soil erosion as a result of operational activities nearby leading to a loss of natural functioning.
	Proliferation of alien species may further alter plant and animal community structures. Failure to implement a comprehensive alien weed control plan leading to an increase in alien vegetation encroachment to and transforming neighboring natural habitats such as the area of the KNP adjacent to the study area and beyond.	An increase in alien species leading to altered plant and animal community structures and composition especially in neighboring natural habitats.
	Degradation of a portion of a vulnerable Protected Area (KNP) and other sensitive habitats directly adjacent to the study area as a result of pollution and other forms of habitat destruction.	Continued degradation of adjacent vulnerable ecosystems and other nearby sensitive habitats.

Impact assessment (before mitigation):							
Geographical Extent	Probability	Duration	Intensity / Magnitude	Reversibility	Irreplaceable loss of resources	Cumulative Effect	Significance
2	2	3	3	4	3	3	**51** (negative high impact)

Mitigation of impact 4:

1. During excavations, soil stockpiling should be as far as possible away from the edge of sensitive areas to avoid siltation of these areas from soil stock piles.

2. Construction machinery and vehicles may not be allowed to enter sensitive areas. Strictly no re-fueling of vehicles or machinery should be allowed to take place in any construction area close to a river, riparian zone, wetland/drainage line or other sensitive area.

3. If constructed, the waste transfer station should be managed in such a way as to minimize pollution of sensitive areas by maintaining buffer zones adjacent to such areas.

4. An alien vegetation control plan has to be implemented in order to manage alien plant species occurring within the developed and surrounding area.

5. Regarding the loss of vulnerable ecosystems and other sensitive habitats as well as CBA's and ESA's in and adjacent to the study area and the possibility of future degradation and loss of such areas the no-go option or viable alternatives may be considered.

Impact assessment (after mitigation):							
Geographical Extent	Probability	Duration	Intensity / Magnitude	Reversibility	Irreplaceable loss of resources	Cumulative Effect	Significance
1	2	3	2	3	2	2	**26** (negative low impact)

8.2 Assessment of the no-go alternative

Due the destructive nature of the proposed development to any natural habitat and biodiversity occurring in the directly affected (footprint) area on a local and regional scale, the no-go alternative will see the area stay in the current condition and probably further decreasing in condition over time if the current land management strategies (or lack thereof) are continued. The current negative impact exerted on the area by the increasing populations of alien invasive weeds will remain and the remnants of natural vegetation in the area will be further transformed with the associated loss of habitat for biodiversity over time. Current and possible future developments on areas surrounding the study area will further isolate the habitat in the study area as a fragment, which will also have a detrimental effect on the ecological functioning of this area in the long run.

Due to the fact that this area is situated within or on the edge of an urban area where the pressure on the environment is mounting in terms of land for formal or informal housing, this area is not exempt from the formation of an illegal settlement, which will also have a major negative impact on the natural environment.

Therefore, if for whatever reason the no-go alternative is enforced, it will see the present ecological status of the biodiversity and the habitats in the study area stay the same or probably decline over time, taking natural fluctuations and external anthropogenic impacts in to consideration.

8.3 Monitoring requirements

From a floristic point of view, the following should be monitored during all phases of the proposed development:

- Floristic diversity of the non-affected areas of the development as well as areas directly adjacent – especially the area of the KNP directly adjacent to the proposed waste dumping and transfer site.
- Populations of threatened or protected species in the study area and on neighboring properties / areas must be assessed and monitored during all project phases.
- The removal of any threatened or protected plant species must be well monitored and managed. Authorization, through a provincial and/or national permitting system, is to be obtained from relevant conservation authorities for such species to be disturbed, damaged or destroyed.
- It is strongly advised that an ecological specialist is appointed during all phases prior to and after construction to monitor impacts and related mitigation measures regarding Red Listed and protected species as well as sensitive habitats. Any conservation recommendations and measures that aim to mitigate the impacts of this development must also be monitored by such a specialist during the operational phase of the development.
- The management of the KNP should be well informed of the proposed project and should allow monitoring of the section of the KNP neighboring

the area to be properly inspected and monitored in terms of ecological status and possible negative impacts to biodiversity.

9 FINAL COMMENTS AND RECOMMENDATIONS

The loss of topsoil and fragmentation of natural habitats that is virtually unavoidable with any type of development, has a negative impact on the regional ecosystem as it disrupts the natural flow of ecosystem services and affects all fauna and flora that are dependent on those habitats. Linear ridges, cliff lines, water courses, drainage lines, etc. are especially sensitive to and easily fragmented. A high conservation value is attributed to the plant communities and faunal assemblages of these areas as they contribute significantly to the biodiversity of a region. Care should be taken not to unnecessarily clear or destroy natural vegetation and where possible the rehabilitation of transformed areas and restoration of degraded natural veld should take place in order to improve the ecological health of the floristic component on the property. Development and planned activities should therefore be planned in such a way that totally transformed or degraded areas are chosen for major developments and natural veld and especially any highly sensitive areas are avoided as far as possible. These natural areas may be utilised and managed as areas of biodiversity conservation.

Based on the data presented in this report as well as observations made during the survey and comments above, the following is recommended in conclusion:

- Take note of and as far as possible comply with the mitigation measures and recommendations given in this report.
- During the planning, construction and operational phases all recommendations made and concerns raised in this document should be taken into consideration.
- It is strongly advised that an ecological specialist is appointed during all project phases to monitor impacts and related mitigation measures regarding protected species as well as sensitive habitats from time to time.
- From a biodiversity point of view the preferred site on Erf 302 should be perused for the proposed construction. It is furthest away from any sensitive areas and is totally transformed with the lowest population of protected trees. The site alternative of Erf 97/Erf311 is also viable from a biodiversity point of view as long as a buffer zone between the planned development and the sensitive area to the east (KNP) is maintained. The options on Erf 312 and its alternative on Erf 311 is least viable form a biodiversity point of view.
- There are no serious objections against the proposed development activities, and as long as mitigation measures and recommendations are seriously considered and implemented, and as long as due diligence is practiced in terms of environmental legislation and other relevant policies and guidelines, the project may be favorably considered.

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11 APPENDIX A: lists of fauna that may occur in the study area.

Table 15: Mammals

Order	Family	Common name	Species name	Status or commonality
Eulipotyphla	Soricidae	Forest shrew	*Myosorex varius*	Least concern
		Tiny musk shrew	*Crocidura fuscomurina*	Least concern
		Swamp musk shrew	*Crocidura mariquensis*	Near threatened
		Reddish-grey musk shrew	*Crocidura cyanea*	Least concern
		Lesser red musk shrew	*Crocidura hirta*	Least concern
		Greater dwarf shrew	*Suncus lixus*	Least concern
Chiroptera	Pteropodidae	Wahlberg's epauletted fruit-bat	*Epomophorus wahlbergi*	Least concern
	Emballonuridae	Mauritian tomb bat	*Taphozous mauritianus*	Least concern
	Nycteridae	Egyptian slit-faced bat	*Nycteris thebaica*	Least concern
	Rhinolophidae	Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Least concern
	Miniopteridae	Natal long-fingered bat	*Miniopterus natalensis*	Least concern
	Vespertilionidae	Welwitch's hairy bat	*Myotis welwitschii*	Least concern
		Cape serotine bat	*Neoromicia capensis*	Least concern
		Dusk pipistrelle	*Pipistrellus hesperidus*	Least concern
		Schlieffen's bat	*Nycticeinops schlieffeni*	Least concern
		Yellow-bellied house bat	*Scotophilus dinganii*	Least concern

Order	Family	Common name	Species name	Status or commonality
	Molossidae	Egyptian free-tailed bat	*Tadarida aegyptiaca*	Least concern
		Little free-tailed bat	*Chaerephon pumilus*	Least concern
Lagomorpha	Leporidae	Scrub hare	*Lepus saxatilis*	Least concern
Rodentia	Sciuridae	Tree squirrel	*Paraxerus cepapi*	Least concern
	Myoxidae	Woodland dormouse	*Graphiurus murinus*	Least concern
	Pedetidae	Southern African springhare	*Pedetes capensis*	Least concern
	Bathyergidae	Common mole-rate	*Cryptomys hottentotus*	Least concern
	Muridae	Pouched mouse	*Saccostumus campestris*	Least concern
		Fat mouse	*Steatomys pratensis*	Least concern
		Grey climbing mouse	*Dendromus melanotis*	Least concern
		Bushveld gerbil	*Gerbilliscus leucogaster*	Least concern
		Tete veld rat	*Aethomys ineptus*	Least concern
		African striped grass mouse	*Rhabdomys dilectus*	Least concern
		Single-striped grass mouse	*Lemniscomys rosalia*	Least concern
		Pygmy mouse	*Mus minutoides*	Least concern
		Multimammate mouse	*Mastomys spp.*	Least concern
		Angoni vlei rat	*Otomys angoniensis*	Least concern
Carnivora	Mustelidae	Cape clawless otter	*Aonyx capensis*	Near threatened
		Striped polecat	*Ictonyx striatus*	Least concern

Order	Family	Common name	Species name	Status or commonality
	Herpestidae	Water mongoose	*Atilax paludinosus*	Least concern
		White-tailed mongoose	*Ichneumia albicauda*	Least concern
	Viverridae	Small-spotted genet	*Genetta genetta*	Least concern
		Common large-spotted genet	*Genetta maculata*	Least concern
	Felidae	African wildcat	*Felis silvestris cafra*	Least concern
Cetartiodactyla	Bovidae	Steenbok	*Raphicerus campestris*	Least concern

Table 16: Reptiles

Order	Family	Common name	Species name	Status or commonality
Testudines	Testudinidae	Speke's hinged-back tortoise	*Kinixys spekii*	Least concern
Squamata	Gekkonidae	Turner's gecko	*Chondrodactylus turneri*	Least concern
		Common tropical house gecko	*Hemidactylus mabouia*	Least concern
		Wahlberg's velvet gecko	*Homopholis wahlbergii*	Least concern
		Common dwarf gecko	*Lygodactylus capensis capensis*	Least concern
		Speckled gecko	*Pachydactylus punctatus*	Least concern
	Lacertidae	Savanna lizard	*Meroles squamulosus*	Least concern
		Spotted sandveld lizard	*Nucras intertexta*	Least concern
	Cordylidae	Jones' girdled lizard	*Cordylus jonesii*	Least concern
	Gerrhosauridae	Yellow-throated plated lizard	*Gerrhosaurus flavigularis*	Least concern
	Scincidae	Wahlberg's snake-eyed skink	*Afroapblepharus wahlbergii*	Least concern

Order	Family	Common name	Species name	Status or commonality
		Sundevall's writhing skink	*Mochlus sundevallii sundevallii*	Least concern
		Striped skink	*Trachylepis striata*	Least concern
	Chamaeleonidae	Common flap-neck chameleon	*Chamaeleo dilepis dilepis*	Least concern
	Agamidae	Eastern ground agama	*Agama aculeata distanti*	Least concern
		Southern tree agama	*Acanthocercus atricollis atricollis*	Least concern
	Typhlopidae	Bibron's blind snake	*Afrotyphlops bibronii*	Least concern
	Leptotyphlopidae	Peter's thread snake	*Leptotyphlops scutifrons*	Least concern
	Viperidae	Puff adder	*Bitis arietans*	Least concern
		Rhombic night adder	*Causus rhombeatus*	Least concern
	Lamprophiidae	Black-headed centipede-eater	*Aparallactus capensis*	Least concern
		Bibron's stiletto snake	*Atractaspis bibronii*	Least concern
		Common house snake	*Boaedon capensis*	Least concern
		Cape wolf snake	*Lycophidion capense capense*	Least concern
		Spotted grass snake	*Psammophylax rhombeatus rhombeatus*	Least concern
		Striped grass snake	*Psammophylax tritaeniatus*	Least concern
		Mole snake	*Pseudaspis cana*	Least concern
	Elapidae	Snouted cobra	*Naja annulifera*	Least concern
	Colubridae	Red-lipped snake	*Crotaphopeltis hotamboeia*	Least concern
		Rhombic egg-eater	*Dasypeltis scabra*	Least concern
		Boomslang	*Dispholidus typus*	Least concern
		Eastern tiger snake	*Telescopus semiannulatus semiannulatus*	Least concern

Table 17: Frogs

Order	Family	Common name	Species name	Status or commonality
Anura	Brevicipitidae	Bushveld rain frog	*Breviceps adspersus*	Least concern
		Mozambique rain frog	*Breviceps mossambicus*	Least concern
	Bufonidae	Eastern olive toad	*Amietohprynus garmani*	Least concern
		Guttural toad	*Amietophrynus gutturalis*	Least concern
		Flat-backed toad	*Amietophrynus maculatus*	Least concern
		Raucous toad	*Amietophrynus rangeri*	Least concern
		Red toad	*Schismaderma carens*	Least concern
	Hemisotidae	Mottled shovel-nosed frog	*Hemisus marmoratus*	Least concern
	Microhylidae	Banded rubber frog	*Phrynomantis bifasciatus*	Least concern
	Phrynobatrachidae	Dwarf puddle frog	*Phrynobatrachus mababiensis*	Least concern
		Snoring puddle frog	*Phrynobatrachus natalensis*	Least concern
	Ptychadenidae	Ornate frog	*Hildebrandtia ornata*	Least concern
		Plain grass frog	*Ptychadena anchietae*	Least concern
		Sharp-nosed grass frog	*Ptychadena oxyrhynchus*	Least concern
	Pyxicephalidae	Boettger's caco	*Cacosternum boettgeri*	Least concern
		Common river frog	*Amietia quecketti*	Least concern
		Striped stream frog	*Strongylopus fasciatus*	Least concern
		Tremolo sand frog	*Tomopterna cryptotis*	Least concern
		Natal sand frog	*Tomopterna natalensis*	Least concern

Table 18: Birds

Order	Family	Common name	Species name	Status or commonality
Galliformes	Phasianidae	Natal spurfowl	*Pternistis natalensis*	Least concern
		Crested francolin	*Dendroperdix sephaena*	Least concern
		Swainson's spurfowl	*Pternistis swainsonii*	Least concern
	Numididae	Helmeted guineafowl	*Numida meleagris*	Least concern
Charadriiformes	Turnicidae	Black-rumped buttonquail	*Turnix nanus*	Endangered
Anseriformes	Anatidae	Egyptian goose	*Alopochen aegyptiaca*	Least concern
		Spur-winged goose	*Plectropterus gambensis*	Least concern
Piciformes	Picidae	Olive woodpecker	*Dendropicos griseocephalus*	Least concern
	Lybiidae	Black-collared barbet	*Lybius torquatus*	Least concern
		Crested barbet	*Trachyphonus vaillantii*	Least concern
		Acacia pied barbet	*Tricholaema leucomelas*	Least concern
Bucerotiformes	Upupidae	African hoopoe	*Upupa africana*	Least concern
Coraciiformes	Alcedinidae	Malachite kingfisher	*Alcedo cristata*	Least concern
		Brown-hooded kingfisher	*Halcyon albiventris*	Least concern
		Giant kingfisher	*Megaceryle maxima*	Least concern
		Pied kingfisher	*Ceryle rudis*	Least concern
Coliiformes	Coliidae	Red-faced mousebird	*Urocolius indicus*	Least concern
		Speckled mousebird	*Colius striatus*	Least concern
Psittaciformes	Psittacidae	Brown-headed parrot	*Poicephalus cryptoxanthus*	Least concern
Apodiformes	Apodidae	Little swift	*Apus affinis*	Least concern
Musophagiformes	Musophagidae	Purple-crested turaco	*Gallirex porphyreolophus*	Least concern
Strigiformes	Tytonidae	Barn owl	*Tyto alba*	Least concern
	Strigidae	Spotted eagle owl	*Bubo africanus*	Least concern

Order	Family	Common name	Species name	Status or commonality
Columbiformes	Columbidae	Speckled pigeon	*Columba guinea*	Least concern
		African olive pigeon	*Columba arquatrix*	Least concern
		Laughing dove	*Streptopelia senegalensis*	Least concern
		Cape turtle dove	*Streptopelia capicola*	Least concern
		Red-eyed dove	*Streptopelia semitorquata*	Least concern
Ciconiiformes	Burhinidae	Spotted thick-knee	*Burhinus capensis*	Least concern
Charadriiformes	Charadriidae	Blacksmith lapwing	*Vanellus armatus*	Least concern
		Crowned lapwing	*Vanellus coronatus*	Least concern
	Glareolidae	Temminck's courser	*Cursorius temminckii*	Least concern
Accipitriformes	Accipitridae	Black-shouldered kite	*Elanus caeruleus*	Least concern
		Black sparrowhawk	*Accipiter melanoleucus*	Least concern
		African goshawk	*Accipiter tachiro*	Least concern
Pelecaniformes	Ardeidae	Cattle egret	*Bubulcus ibis*	Least concern
Passeriformes	Eurylaimidae	Black-headed oriole	*Oriolus larvatus*	Least concern
	Dicruridae	Fork-tailed drongo	*Dicrurus adsimilis*	Least concern
	Malaconotidae	Bokmakierie	*Telophorus zeylonus*	Least concern
	Laniidae	Common fiscal	*Lanius colaris*	Least concern
	Paridae	Southern black tit	*Parus niger*	Least concern
	Hirundinidae	Brown-throated martin	*Riparia paludicola*	Least concern
	Zosteropidae	Cape white-eye	*Zosterops virens*	Least concern
	Cisticolidae	Neddicky	*Cisticola fulvicapilla*	Least concern
		Zitting cisticola	*Cisticola juncidis*	Least concern
	Alaudidae	Monotonous lark	*Mirafra passerina*	Least concern
		Rufous-naped lark	*Mirafra africana*	Least concern

Order	Family	Common name	Species name	Status or commonality
		Chestnut-backed sparrowlark	*Eremopterix leucotis*	Least concern
	Muscicapidae	Fiscal flycatcher	*Sigelus silens*	Least concern
		Cape robin-chat	*Cossypha caffra*	Least concern
		White-browed robin-chat	*Cossypha heuglini*	Least concern
		African stonechat	*Saxicola torquatus*	Least concern
		Familiar chat	*Cercomela familiaris*	Least concern
		Capped wheateater	*Oenanthe pileata*	Least concern
	Nectariniidae	Amethyst sunbird	*Chalcomitra amathystina*	Least concern
	Ploceidae	Village weaver	*Ploceus cucullatus*	Least concern
		Red-collared widowbird	*Euplectes ardens*	Least concern
		Thick-billed weaver	*Amblyospiza albifrons*	Least concern
	Estrildidae	African quailfinch	*Ortygospiza atricollis*	Least concern
		Common waxbill	*Estrilda astrild*	Least concern
		African firefinch	*Lagonosticta rubricata*	Least concern
		Jameson's firefinch	*Lagonosticta rhodopareia*	Least concern
	Viduidae	Village indigobird	*Vidua chalybeata*	Least concern
		Dusky indigobird	*Vidua funerea*	Least concern
		Pin-tailed whydah	*Vidua macroura*	Least concern
	Passeridae	House sparrow	*Passer domesticus*	Least concern
		Southern grey-headed sparrow	*Passer diffusus*	Least concern
		Yellow-throated petronia	*Petronia superciliaris*	Least concern
	Motacillidae	Cape wagtail	*Motacilla capensis*	Least concern
		Plain-backed pipit	*Anthus leucophrys*	Least concern

Order	Family	Common name	Species name	Status or commonality
		Buffy pipit	*Anthus vaalensis*	Least concern
	Fringillidae	Yellow-fronted canary	*Crithagra mozambica*	Least concern
		Black-throated canary	*Crithagra atrogularis*	Least concern

12 APPENDIX B: lists of flora families, genera and species recorded or possibly occurring in the study area.

Abbreviations used in Tables 20 – 24 of Appendix A are declared as follows:

Under the column SPECIES STATUS:

P(SA)	Protected nationally (NFA, 1998)
E	Exotic – no formal invasive status (ruderal and agrestal weeds)
C1	Exotic – Declared weed category 1 (CARA, 1983)
C2	Exotic – Declared invader category 2 (CARA, 1983)
C3	Exotic – Declared invader category 3 (CARA, 1983)
N1b	Exotic – Category 1b (NEMBA, 2014)
N2	Exotic – Category 2 (NEMBA, 2014)

Under the column SOCIAL USE:

F – Food/nourishment

M – Medicinal

C – Cultural

NOTES:

- All exotic taxa in the flora species lists are preceded by an asterisk (*).
- The species presented in Tables 19 – 24 were recorded in the study area during the time of this study.
- The species presented in Table 25 were not necessarily recorded in the study area but may occur in or nearby the study area according to SANBI's POSA data base.

Table 19: Plant Families and Genera recorded in the study area

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
ANGIOSPERMAE				
MONOCOTYLEDONAE				
ARECACEAE	1	1	*Phoenix*	1
ASPARAGACEAE	1	1	*Asparagus*	1
COMMELINACEAE	1	1	*Commelina*	1
MUSACEAE	1	1	**Musa*	1
POACEAE	1	25	*Aristida*	2
			**Arundo*	1
			Bothriochloa	1
			**Bromus*	1
			Cenchrus	1
			Chloris	2
			Cynodon	1
			Dactyloctenium	1
			Echinochloa	1
			Eleusine	1
			Enneapogon	1
			Eragrostis	3
			Heteropogon	1
			Leptochloa	1
			Melinis	1
			Panicum	1
			**Paspalum*	1
			Phragmites	1
			**Saccharum*	1
			Setaria	1
			**Sorghum*	1
			Tragus	1
			Tricholaena	1
			Urochloa	2
			**Zea*	1
PONTEDERIACEAE	1	1	**Eichornia*	1
TYPHACEAE	1	1	*Typha*	1
Total:	**7**	**31**		**36**
DICOTYLEDONAE				
ACANTHACEAE	1	1	*Justicia*	1
AMARANTHACEAE	1	2	**Alternanthera*	2

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
			Amaranthus	3
ANACARDIACEAE	1	2	**Mangifera*	1
			Sclerocarya	1
APOCYNACEAE	1	1	**Thevetia*	1
ASTERACEAE	1	11	**Acanthospermum*	1
ASTERACEAE			**Aster*	1
ASTERACEAE			**Bidens*	3
ASTERACEAE			**Flaveria*	1
ASTERACEAE			*Nidorella*	1
ASTERACEAE			**Parthenium*	1
ASTERACEAE			**Schkuhria*	1
ASTERACEAE			**Tridax*	1
ASTERACEAE			*Vernonia*	1
ASTERACEAE			**Xanthium*	1
ASTERACEAE			**Zinnia*	1
BASELLACEAE	1	1	**Anredera*	1
BIGNONIACEAE	1	1	**Tecoma*	1
BORAGINACEAE	1	2	*Ehretia*	1
			Trichodesma	1
CACTACEAE	1	1	**Cereus*	1
CAPPARACEAE	1	3	*Capparis*	1
			Cleome	2
			Maerua	1
CARICACEAE	1	1	**Carica*	1
CELASTRACEAE	1	1	*Gymnosporia*	1
COMBRETACEAE	1	1	*Combretum*	3
CONVOLVULACEAE	1	2	*Convolvulus*	1
			Ipomoea	8
CUCURBITACEAE	1	4	*Citrullus*	1
			**Cucurbita*	1
			Lagenaria	1
			Momordica	1
EBENACEAE	1	1	*Diospyros*	1
EUPHORBIACEAE	1	5	*Acalypha*	1
			**Euphorbia*	2
			Flueggea	1
			**Manihot*	1
			**Ricinus*	1

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
FABACEAE	1	14	**Arachis*	1
			Crotalaria	1
			Dichrostachys	1
			Indigofera	1
			**Leucaena*	1
			Ormocarpum	1
			**Phaseolus*	1
			Philenoptera	1
			Rhynchosia.	1
			Senegalia	1
			Senna	3
			Tephrosia	2
			Vachellia	1
			Xanthocercis	1
LAMIACEAE	1	3	*Becium*	1
			Leonotis	1
			Leucas	1
MALVACEAE	1	5	**Abelmoschus*	1
			Abutilon	2
			Hibiscus	1
			**Malvastrum*	1
			Sida	2
MELIACEAE	1	2	**Melia*	1
			Trichilia	1
MENISPERMACEAE	1	1	**Cocculus*	1
MOLLUGINACEAE	1	1	*Corbichonia*	1
MORACEAE	1	2	*Ficus*	3
			**Morus*	1
MORINGACEAE	1	1	**Moringa*	1
NYCTAGINACEAE	1	1	**Boerhavia*	1
OXALIDACEAE	1	1	*Oxalis*	1
PEDALIACEAE	1	1	*Sesamum*	1
PLUMBAGINACEAE	1	1	*Plumbago*	1
POLYGONACEAE	1	1	**Persicaria*	1
PORTULACACEAE	1	1	**Portulaca*	1
RHAMNACEAE	1	1	*Ziziphus*	1
RUBIACEAE	1	1	**Richardia*	1
RUTACEAE	1	1	**Citrus*	2

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
SOLANACEAE	1	2	**Datura*	1
			Solanum	2
STERCULIACEAE	1	1	*Waltheria*	1
TILIACEAE	1	2	*Corchorus*	2
			Grewia	2
VERBENACEAE	1	2	**Lantana*	1
			**Verbena*	1
ZYGOPHYLLACEAE	1	1	*Tribulus*	1
Total:	**39**	**86**		**113**
TOTAL:	**46**	**117**		**149**

Table 20: Woody Species – ANGIOSPERMAE – Monocotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
**Musa* species	MUSACEAE	Tree	*Piesang	*Banana	E	F/C
Phoenix reclinata Jacq.	ARECACEAE	Tree/shrub	Wildedadelboom	Wild Date-palm		M/F/C

Table 21: Woody Species – ANGIOSPERMAE – Dicotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Capparis tomentosa Lam.	CAPPARACEAE	Tree	Wollerige Kapperbos	Woolly Caper Bush		M/C
**Carica papaya* L.	CARICACEAE	Tree	*Papaja	*Papaya	E	F
**Cereus jamacaru* DC.	CACTACEAE	Cactus / Tree	*Nagblom Kaktus	*Queen of the Night Cactus	C1 / N1b	F
**Citrus limon* (L.) Osbeck	RUTACEAE	Tree	*Suurlemoen	*Lemon	E	M/F
**Citrus × sinensis* (L.) Osbeck	RUTACEAE	Tree	*Soetlemoen	*Sweet Orange	E	M/F
Combretum hereroense Schinz	COMBRETACEAE	Tree	Kierieklapper	Russet Bushwillow		M/C
Combretum imberbe Wawra	COMBRETACEAE	Tree	Hardekool	Leadwood	P(SA)	C
Combretum microphyllum Klotzsch	COMBRETACEAE	Tree	Vlamklimop	Flame Climbing Bushwillow		
Dichrostachys cinerea (L.) Wight & Arn. subsp. a*fricana* Brenan & Brummit	FABACEAE	Tree	Kleinblaar-sekelbos	Small-leaved Sickle-bush		M
Diospyros mespiliformis Hochst. ex A.DC.	EBENACEAE	Tree	Jakkalsbessie	Jackal-berry / African Ebony		F/C
Ehretia amoena Klotzsch	BORAGINACEAE	Tree	Skurweblaarbos	Sandpaper-bush		M/F/C
Ficus salicifolia Vhal	MORACEAE	Tree	Wonderboom-vy	Wonderboom Fig		
Ficus sur Forssk.	MORACEAE	Tree	Besemtrosvy	Broom Cluster Fig		M/C/F

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Ficus sycomorus L. subsp. *sycomorus*	MORACEAE	Tree	Gewone Trosvy / Geelriviervy	Common Cluster / Sycamore Fig		M/C/F
Flueggea virosa (Roxb. Ex Willd.) Voigt subsp. *virosa*	EUPHORBIACEAE	Tree	Witbessiebos	White-berry Bush		M/C/F
Grewia bicolor Juss. var. *bicolor*	TILIACEAE	Tree	Witrosyntjie	White Raisin		F/C
Grewia flavescens Juss. var. *flavescens*	TILIACEAE	Tree	Skurwerosyntjie	Sandpaper Raisin		F/C
Gymnosporia senegalensis (Lam.) Loes.	CELASTRACEAE	Tree	Rooipendoring	Red Spike-thorn		M/C
**Lantana camara* L.	VERBENACEAE	Shrub / tree	*Lantana	*Lantana / Christmas Berry	C1 / N1b	
**Leucaena leucocephala* (Lam.) de Wit	FABACEAE	Tree	*Reusewattel	*Leucaena	C2 / N2	
Maerua angolensis DC.	CAPPARACEAE	Tree	Knoppiesboontjieboom	Bead-bean Tree		
**Melia azedarach* L.	MELIACEAE	Tree	*Maksering	*Seringa	C3 / N1b	M
**Mangifera indica* L.	ANACARDIACEAE	Tree	*Mango	*Mango	E	F
**Manihot esculenta* Crantz	EUPHORBIACEAE	Shrub / tree	*Kasava	*Cassava	E	F
**Moringa oleifera* Lam.	MORINGACEAE	Tree	*Moringa	*Moringa	E	M/F
**Morus alba* L.	MORACEAE	Tree	*Gewone / Wit Moerby	*Common / White Mulberry	C3 / N2	F/C
Ormocarpum trichocarpum (Taub.) Engl.	FABACEAE	Tree	Rusperboontjie	Caterpillar Bush		M/C
Philenoptera violacea (Klotzsch) Schrire	FABACEAE	Tree	Appelblaar	Apple-leaf / Rain Tree	P(SA)	M/C
Plumbago auriculata Lam.	PLUMBAGINACEAE	Woody shrub	Blousyselbos	Blue Plumbago		M
**Ricinus communis* L.	EUPHORBIACEAE	Tree	*Kasterolieboom	*Castor-oil Plant	C2 / N1b	M/F
Sclerocarya birrea (A.Rich.) Hochst. subsp. *caffra* (Sond.) Kokwaro	ANACARDIACEAE	Tree	Maroela	Marula	P(SA)	M/F/C
Senegalia nigrescens Oliv.	FABACEAE	Tree	Knoppiesdoring	Knob Thorn		
**Senna didymobotrya* (Fresen.) Irwin & Barneby	FABACEAE	Tree	*Grondboontjiebotter-kassia	*Peanut butter Cassia	C3 / N1b	
**Senna occidentalis* (L.) Link.	FABACEAE	Shrub		*Stinking Weed / Wild Coffee	N1b	M/F

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Senna petersiana (Bolle) Lock	FABACEAE	Tree / shrub	Apiespeul	Eared Senna / Monkey Pod		M/F
**Tecoma stans* (L.) Kunth	BIGNONIACEAE	Tree	*Geelklokkies	*Yellow Bells	C1 / N1b	
**Thevetia peruviana* (Pers.) K.Schum.	APOCYNACEAE	Shrub / tree	*Geel-oleander	*Yellow Oleander	C1 / N1b	
Trichilia emetica Vahl.	MELIACEAE	Tree	Rooiessenhout	Natal Mahogany		M/C
Vachellia tortilis (Forssk.) Hayne subsp. *heteracantha* (Burch.) Brenan	FABACEAE	Tree	Haak-en-steek	Umbrella Thorn		M/C
Xanthocercis zambesiaca (Baker) Dumaz-le-Grand	FABACEAE	Tree				F
Ziziphus mucronata Willd. subsp. *mucronata*	RHAMNACEAE	Tree	Blinkblaar-wag-'n-bietjie	Buffalo-thorn		M/F/C

Table 22: Graminoids – ANGIOSPERMAE – Monocotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Aristida adscensionis L.	POACEAE	Grass	Eenjarige steekgras	Annual three-awn		
Aristida congesta Roem. & Schult. subsp. *congesta*	POACEAE	Grass	Lossteekgras	Spreading Three-awn		
**Arundo donax* L.	POACEAE	Reed	*Spaanseriet	*Spanish Reed	C1 / N1b	C
Bothriochloa insculpta (A. Rich) A.Camus	POACEAE	Grass	Stippelgras	Pinhole Grass		
**Bromus catharticus* Vahl	POACEAE	Grass	*Reddingsgras	*Rescue Grass	E	
Cenchrus ciliaris L.	POACEAE	Grass	Bloubuffelgras	Foxtail Buffalo Grass		
Chloris pycnothrix Trin.	POACEAE	Grass	Spinnerakgras	Spiderweb Grass		
Chloris virgata Sw.	POACEAE	Grass	Witpluim-chloris	Feather-top chloris		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Cynodon dactylon (L.) Pers.	POACEAE	Grass	Kweekgras	Couch Grass		
Dactyloctenium aegyptium (L.) Willd.	POACEAE	Grass	Hoenderspoor	Common Crowfoot		
Echinochloa colona (L.) Link	POACEAE	Grass	Watergras	Jungle Rice		
Eleusine coracana (L.) Gaertn. subsp. *africana* (Kenn.-O'Byrne) Hilu & de Wet	POACEAE	Grass	Afrikaanse Osgras	Goose Grass		
Enneapogon cenchroides (Roem. & Schult.) C.Eragrostis Hubb.	POACEAE	Grass	Negenaaldgras	Nine-awned Grass		
Eragrostis biflora Hack. ex Schinz	POACEAE	Grass	Skadu-eragrostis	Shade Eragrostis		
Eragrostis pseudosclerantha Chiov.	POACEAE	Grass	Voetpadgras	Footpath Love Grass		
Eragrostis trichophora Coss. & Durieu	POACEAE	Grass	Harige Pluimgras	Hairy Love Grass		
Heteropogon contortus (L.) Roem. & Schult.	POACEAE	Grass	Assegaaigras	Spear Grass		
Leptochloa fusca (L.) Kunth	POACEAE	Grass	Kuilgras	Swamp Grass		
Melinis repens (Willd.) Zizka subsp. *repens*	POACEAE	Grass	Fluweelgras / Natal Rooipluim	Natal Red Top		
Panicum maximum Jacq.	POACEAE	Grass	Buffelsgras	Guinea Grass		
**Paspalum dilatatum* Poir.	POACEAE	Grass	*Gewone Paspalum	*Dallis Grass	E	
Phragmites australis (Cav.) Steud.	POACEAE	Reed	Fluitjiesriet	Common Reed		
**Saccharum officinarum* L.	POACEAE	Reed	*Suikerriet	*Sugarcane	E	F
Setaria pumila (Poir.) Roem. & Schult.	POACEAE	Grass	Skadu- / Tuinmannagras	Shade- / Garden Bristle Grass		
**Sorghum halepense* (L.) Pers.	POACEAE	Grass	*Johnson-gras	*Johnson Grass	C2 / N2	F
Tragus berteronianus Schult.	POACEAE	Grass	Kousklits	Carrot-seed Grass		
Tricholaena monachne (Trin.) Stapf & C.E.Hubb.	POACEAE	Grass	Blousaadgras	Blue-seed grass		
Urochloa mosambicensis (Hack.) Dandy	POACEAE	Grass	Bosveldbeesgras	Bushveld Signal Grass		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Urochloa panicoides P.Beauv.	POACEAE	Grass	Tuinbeesgras	Garden Urochloa		
**Zea mays* L.	POACEAE	Grain	*Mielie	*Mielie / Corn	E	F/M

Table 23: Herbaceous Shrubs & Forbs (Herbs) – ANGIOSPERMAE – Monocotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Asparagus setaceus (Kunth) Jessop	ASPARAGACEAE	Herbaceous climber		Asparagus Fern		
Commelina benghalensis L.	COMMELINACEAE	Herb	Blouselblommetjie	Benghal Wandering Jew		M
**Eichornia crassipes* (Mart.) Solms	PONTEDERIACEAE	Hydrophyte	*Waterhiasint	*Water Hyacinth	C1 / N1b	
Typha capensis (Rohrb.) N.E.Br.	TYPHACEAE	Herb, hydrophyte	Papkuil	Bulrush		M/F/C

Table 24: Herbaceous Shrubs & Forbs (Herbs) – ANGIOSPERMAE – Dicotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
**Abelmoschus esculentus* (L.) Moench	MALVACEAE	Herb / shrub	*Okra	*Ocra	E	F
Abutilon angulatum (Guill. & Perr.) Mast. var. *macrophyllum* (Baker f.) Hochr.	MALVACEAE	Herb				
Abutilon grandiflorum G.Don	MALVACEAE	Herb				
Acalypha indica L.	EUPHORBIACEAE	Herb / Dwarf shrub				
**Acanthospermum hispidum* DC.	ASTERACEAE	Herb	*Regopsterklits	*Upright Starbur	E	
**Alternanthera pungens* Kunth	AMARANTHACEAE	Herb	*Kakiedubbeltjie	*Paper Thorns	E	
**Alternanthera sessilis* (L.) DC.	AMARANTHACEAE	Herb			E	
**Amaranthus hybridus* L.	AMARANTHACEAE	Herb	*Misbredie	*Pigweed	E	F
Amaranthus thunberghii Moq.	AMARANTHACEAE	Herb	Rooimisbredie	Red Pigweed		F
**Amaranthus viridis* L.	AMARANTHACEAE	Herb	*Skraalmisbredie	*Slender Amaranth	E	F
**Anredera cordifolia* (Ten.) Steenis	BASELLACEAE	Herb	*Madeira Ranker	*Madeira Vine	C1 / N1b	
**Arachis hypogaea* L.	FABACEAE	Herb	*Grondboontjie	*Peanut	E	F
**Aster squamatus* (Spreng.) Hieron.	ASTERACEAE	Herb			E	
Becium angustifolium (Benth.) N.E.Br.	LAMIACEAE	Herb				
**Bidens bipinnata* L.	ASTERACEAE	Herb	*Spaanse knapsekêrel	*Spanish Blackjack	E	F
**Bidens biternata* (Lour.) Merr. & Sherff	ASTERACEAE	Herb	*Geel-blom knapsekêrel	*Yellow-flowered blackjack	E	F
**Bidens pilosa* L.	ASTERACEAE	Herb	*Knapsekêrel	*Blackjack	E	F
**Boerhavia* c.f. *erecta* L.	NYCTAGINACEAE	Herb	*Regop-boerhavia	*Erect Spiderling	E	
Citrullus lanatus (Thunb.) Matsum. & Nakai	CUCURBITACEAE	Herb, climber	Karkoer / Tsamma	Tsamma		F/C
Cleome gynandra L.	CAPPARACEAE	Herb	Snotterbelletjie	Spider-wisp		F

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Cleome monophylla L.	CAPPARACEAE	Herb	Rusperbossie	Spindlepod		M/C/F
**Cocculus hirsutus* (L.) Diels	MENISPERMACEAE	Herbaceous climber			E	
Convolvulus sagittatus Thunb.	CONVOLVULACEAE	Herb, climber	Bobejaantoutjie			
Corbichonia decumbens (Forssk.) Exell	MOLLUGINACEAE	Herb				
Corchorus asplenifolius Burch.	TILIACEAE	Herb				M/C/F
**Corchorus olitorius* L.	TILIACEAE	Herb			E	F
Crotalaria laburnifolia L. subsp. *australis* (Baker f.) Polhill	FABACEAE	Herbaceous shrub	Bruin-en-geel-voëltjieblom	Brown-and-yellow Birdflower		
**Cucurbita* species	CUCURBITACEAE	Herb, climber	*Gewone Pampoen	*Common Pumpkin	E	F
**Datura ferox* L.	SOLANACEAE	Herb	*Grootstinkblaar	*Large Thorn Apple	C1 / N1b	M
**Euphorbia heterophylla* L.	EUPHORBIACEAE	Herb	*Gekleurde Euphorbia	*Painted Euphorbia	E	
**Euphorbia hirta* L.	EUPHORBIACEAE	Herb	*Rooimelkkruid	*Red Milkweed	E	
**Flaveria bidentis* (L.) Kuntze	ASTERACEAE	Herb	*Smelterbossie	*Smelter's Bush	N1b	
Hibiscus trionum L.	MALVACEAE	Herb	Terblansbossie	Bladder Hibiscus		M
Indigofera astragalina DC.	FABACEAE	Herb		Large-leaved Indigo		
**Ipomoea alba* L.	CONVOLVULACEAE	Herb, climber	*Maanblom	*Moonflower / Wooden Rose Creeper	C1 / N1b	
Ipomoea albivenia (Lindl.) Sweet	CONVOLVULACEAE	Herb, climber	Wildekatoen	Wild Cotton		
**Ipomoea batatas* (L.) Lam.	CONVOLVULACEAE	Herb, climber	*Patat	*Sweet potato	E	F
Ipomoea c.f. *coscinosperma* Hochst. ex Choisy	CONVOLVULACEAE	Herb, climber				
Ipomoea magnusiana Schinz	CONVOLVULACEAE	Herb, climber		Small Pink Ipomoea		
Ipomoea obscura (L.) Ker-Gawl.	CONVOLVULACEAE	Herb, climber	Wildepatat	Yellow Ipomoea / Wild Petunia		M/F/C
**Ipomoea purpurea* (L.) Roth	CONVOLVULACEAE	Herb, climber	*Purperwinde	*Common Morning Glory	C1 / N1b	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Ipomoea sinensis (Desr.) Choisy	CONVOLVULACEAE	Herb, climber				
Justicia protracta (Nees) T.Anderson. subsp. *protracta*	ACANTHACEAE	Herb	Witgarnaalbos	Veld Justicia		
Lagenaria siceraria (Molina) Standl.	CUCURBITACEAE	Herbaceous climber	Kalbas	Calabash		M/F/C
Leonotis nepetifolia (L.) R.Br.	LAMIACEAE	Herb	Eenjarige Wildedagga	Annual Wild Dagga		M
Leucas neuflizeana Courbon	LAMIACEAE	Herb				
**Malvastrum coromandelianum* (L.) Garcke	MALVACEAE	Dwarf shrub		*Prickly Malvastrum	E	
Momordica balsamina L.	CUCURBITACEAE	Herb, climber	Laloentjie			M/F
Nidorella residifolia DC.	ASTERACEAE	Herb				
Oxalis depressa Echl. & Zeyh.	OXALIDACEAE	Geophyte	Suuring	Sorrel		
**Parthenium hysterophorus* L.	ASTERACEAE	Herb		*Feverfew / Famine Weed	C1 / N1b	M
**Persicaria lapathifolia* (L.) Gray	POLYGONACEAE	Herb	*Hanekam	*Spotted Knotweed	E	M/C
**Phaseolus* c.f. *coccineus* L.	FABACEAE	Herb, climber	*Rankboontjie	*Runner Bean	E	F
**Portulaca oleracea* L.	PORTULACACEAE	Herb, succulent	*Varkkos	*Purslane / Pigweed	E	
Rhynchosia caribaea (Jacq.) DC.	FABACEAE	Herb, climber				M
**Richardia* c.f. *brasiliensis* Gomes	RUBIACEAE	Herb	*Tropiese Richardia	*Tropical Richardia	E	
**Schkuhria pinnata* (Lam.) Cabrera	ASTERACEAE	Herb	*Kleinkakiebos	*Dwarf Marigold	E	
Sesamum triphyllum Welw. ex Asch. var. *triphyllum*	PEDALIACEAE	Herb	Wildesesam	Wild Sesame		F
Sida cordifolia L.	MALVACEAE	Herb	Verdompsterk	Flannel Weed		
Sida rhombifolia L. subsp. *rhombifolia*	MALVACEAE	Herb	Taaiman	Arrow-leaf Sida		
**Solanum lycopersicum* L.	SOLANACEAE	Herb	*Tamatie	*Tomato	E	F
Solanum panduriforme E.Mey.	SOLANACEAE	Herb	Gifappeltjie	Poison Apple		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE
			AFRIKAANS	ENGLISH		
Tephrosia polystachya E. Mey. var. *polystachya*	FABACEAE	Herb		Pioneer Tephrosia		
Tephrosia purpurea (L.) Pers.	FABACEAE	Herb		Silver Tephrosia		
Tribulus terrestris L.	ZYGOPHYLLACEAE	Herb	Dubbeltjie	Devil's Thorn		
Trichodesma zeylanicum (Burm.f.) R.Br.	BORAGINACEAE	Herb		Late Weed		
**Tridax procumbens* L.	ASTERACEAE	Herb	*Aster	*Tridax Daisy	E	
**Verbena officinalis* L.	VERBENACEAE	Herb	*Europese Verbena	*European Verbena	E	
Vernonia poskeana Vatke & Hildebr.	ASTERACEAE	Herb				
Waltheria indica L.	STERCULIACEAE	Herb	Meidebossie			
**Xanthium strumarium* L.	ASTERACEAE	Herb	*Kankerroos	*Large Cocklebur	C1 / N1b	
**Zinnia peruviana* (L.) L.	ASTERACEAE	Herb	*Wildejakobregop	*Redstar Zinnia	E	

Table 25: Plant species list downloaded from POSA for QDS 2531CB

FAMILY	SPECIES NAME	THREATENED STATUS
BRYOPHYTES & FUNGI		
AYTONIACEAE	Asterella muscicola (Steph.) S.W.Arnell	Not Evaluated
	Asterella wilmsii (Steph.) S.W.Arnell	Not Evaluated
BARTRAMIACEAE	Philonotis dregeana (Müll.Hal.) A.Jaeger	Not Evaluated
BRYACEAE	Brachymenium acuminatum Harv.	Not Evaluated
	Rhodobryum commersonii (Schwägr.) Paris	Not Evaluated
CALYPOGEIACEAE	Calypogeia longifolia Steph.	Not Evaluated
CATAGONIACEAE	Catagonium nitens (Brid.) Cardot subsp. maritimum (Hook.) S.H.Lin	Not Evaluated
CLADONIACEAE	Cladonia fimbriata (L.) Fr.	Not Evaluated
DICRANACEAE	Campylopus pyriformis (F.W.Schultz) Brid.	Not Evaluated
	Campylopus robillardei Besch.	Not Evaluated
	Dicranella subsubulata (Hampe ex Müll.Hal.) A.Jaeger	Not Evaluated
	Leucoloma rehmannii (Müll.Hal.) Rehmann ex Paris	Not Evaluated
	Leucoloma sprengelianum (Müll.Hal.) A.Jaeger	Not Evaluated
DITRICHACEAE	Ditrichum brachypodum (Müll.Hal.) Broth.	Not Evaluated
ERPODIACEAE	Erpodium beccarii Müll.Hal.	Not Evaluated
EXORMOTHECACEAE	Exormotheca pustulosa Mitt.	Not Evaluated
FISSIDENTACEAE	Fissidens beckettii Mitt.	Not Evaluated
	Fissidens erosulus (Müll.Hal.) Paris	Not Evaluated
	Fissidens ovatus Brid.	Not Evaluated
	Fissidens rufescens Hornsch.	Not Evaluated
	Fissidens submarginatus Bruch	Not Evaluated
FUNARIACEAE	Funaria longicollis Dixon	Not Evaluated
	Funaria rottleri (Schwägr.) Broth.	Not Evaluated
	Funaria succuleata (Wager & C.H.Wright) Broth. ex Magill	Not Evaluated
GEOCALYCACEAE	Lophocolea difformis Nees	Not Evaluated
	Lophocolea semiteres (Lehm.) Mitt.	Not Evaluated
HYPNACEAE	Isopterygium leucophanes (Hampe ex Müll.Hal.) A.Jaeger	Not Evaluated
	Isopterygium leucopsis (Müll.Hal.) Paris	Not Evaluated
	Vesicularia galerulata (Duby) Broth.	Not Evaluated
HYPOPTERYGIACEAE	Hypopterygium tamarisci (Sw.) Brid. ex Müll.Hal.	Not Evaluated
LOBARIACEAE	Pseudocyphellaria aurata (Ach.) Vain.	Not Evaluated
	Pseudocyphellaria clathrata (De Not.) Malme	Not Evaluated
METZGERIACEAE	Metzgeria furcata (L.) Dumort.	Not Evaluated
NECKERACEAE	Porothamnium stipitatum (Mitt.) Touw ex De Sloover	Not Evaluated
ORTHOTRICHACEAE	Schlotheimia ferruginea (Bruch ex Hook. & Grev.) Brid.	Not Evaluated
PALLAVICINIACEAE	Symphyogyna brasiliensis Nees & Mont.	Not Evaluated

FAMILY	SPECIES NAME	THREATENED STATUS
PARMELIACEAE	Usnea subflorida (Zahlbr.) Motyka	Not Evaluated
	Usnea submollis J.Steiner	Not Evaluated
PILOTRICHACEAE	Callicostella tristis (Müll.Hal.) Broth.	Not Evaluated
POLYTRICHACEAE	Pogonatum capense (Hampe) A.Jaeger	Not Evaluated
	Polytrichum commune Hedw.	Not Evaluated
POTTIACEAE	Hyophila involuta (Hook.) A.Jaeger	Not Evaluated
	Hypodontium dregei (Hornsch.) Müll.Hal.	Not Evaluated
	Trichostomum brachydontium Bruch	Not Evaluated
PTYCHOMITRIACEAE	Ptychomitrium exaratifolium H.Rob.	Not Evaluated
RACOPILACEAE	Racopilum capense Müll.Hal. ex Broth.	Not Evaluated
RAMALINACEAE	Ramalina celastri (Spreng.) Krog & Swinscow subsp. celastri	Not Evaluated
SEMATOPHYLLACEAE	Sematophyllum brachycarpum (Hampe) Broth.	Not Evaluated
PTERIDOPHYTA		
ANEMIACEAE	Anemia dregeana Kunze	Least Concern (LC)
	Mohria vestita Baker	LC
ASPLENIACEAE	Asplenium capense (Kunze) Bir, Fraser-Jenk. & Lovis	LC
	Asplenium rutifolium (P.J.Bergius) Kunze	LC
	Asplenium splendens Kunze subsp. splendens	LC
BLECHNACEAE	Blechnum attenuatum (Sw.) Mett.	LC
	Blechnum punctulatum Sw. var. punctulatum	LC
	Blechnum tabulare (Thunb.) Kuhn	LC
	Stenochlaena tenuifolia (Desv.) T.Moore	LC
DENNSTAEDTIACEAE	Microlepia speluncae (L.) T.Moore	LC
DRYOPTERIDACEAE	Dryopteris inaequalis (Schltdl.) Kuntze	LC
	Dryopteris lewalleana Pic.Serm.	LC
	Rumohra adiantiformis (G.Forst.) Ching	LC
EQUISETACEAE	Equisetum ramosissimum Desf. subsp. ramosissimum	LC
HYMENOPHYLLACEAE	Crepidomanes melanotrichum (Schltdl.) J.P.Roux	LC
MARATTIACEAE	Ptisana fraxinea (Sm.) Murdock var. salicifolia (Schrad.) Murdock	Not Evaluated
OSMUNDACEAE	Osmunda regalis L.	LC
	Todea barbara (L.) T.Moore	LC
PTERIDACEAE	Actiniopteris radiata (J.König ex Sw.) Link	LC
	Pteris catoptera Kunze var. catoptera	LC
SINOPTERIDACEAE	Cheilanthes multifida (Sw.) Sw. subsp. lacerata N.C.Anthony & Schelpe	LC
	Cheilanthes multifida (Sw.) Sw. var. multifida	Not Evaluated
	Cheilanthes viridis (Forssk.) Sw. var. glauca (Sim) Schelpe & N.C.Anthony	LC
	Cheilanthes viridis (Forssk.) Sw. var. viridis	LC
	Doryopteris concolor (Langsd. & Fisch.) Kuhn	LC
	Pellaea calomelanos (Sw.) Link var. calomelanos	LC

FAMILY	SPECIES NAME	THREATENED STATUS
TECTARIACEAE	Tectaria gemmifera (Fée) Alston	LC
THELYPTERIDACEAE	Christella dentata (Forssk.) Brownsey & Jermy	LC
	Christella gueinziana (Mett.) Holttum	LC
	Christella hispidula (Decne.) Holttum	LC
	Cyclosorus interruptus (Willd.) H.Itô	LC
ANGIOSPERMAE		
MONOCOTYLEDONAE		
ALLIACEAE	Tulbaghia ludwigiana Harv.	LC
AMARYLLIDACEAE	Clivia miniata (Lindl.) Regel var. miniata	Vulnerable (VU)
	Crinum stuhlmannii Baker	Declining
	Cyrtanthus bicolor R.A.Dyer	LC
	Cyrtanthus eucallus R.A.Dyer	VU
	Cyrtanthus galpinii Baker	LC
ANTHERICACEAE	Chlorophytum recurvifolium (Baker) C.Archer & Kativu	LC
ARACEAE	Gonatopus angustus N.E.Br.	LC
	Stylochaeton natalensis Schott	LC
	Zantedeschia albomaculata (Hook.) Baill. subsp. albomaculata	LC
ASPARAGACEAE	Asparagus falcatus L.	LC
	Asparagus laricinus Burch.	LC
	Asparagus nelsii Schinz	LC
	Asparagus setaceus (Kunth) Jessop	LC
ASPHODELACEAE	Aloe chabaudii Schönland var. chabaudii	LC
	Aloe cooperi Baker subsp. cooperi	Declining
	Aloe greatheadii Schönland var. davyana (Schönland) Glen & D.S.Hardy	LC
	Aloe parvibracteata Schönland	LC
	Bulbine frutescens (L.) Willd.	LC
COMMELINACEAE	Commelina modesta Oberm.	LC
	Cyanotis lanata Benth.	LC
CYPERACEAE	Cyperus compressus L.	LC
	Cyperus decurvatus (C.B.Clarke) C.Archer & Goetgh.	LC
	Cyperus distans L.f.	LC
	Cyperus obtusiflorus Vahl var. obtusiflorus	LC
	Cyperus sexangularis Nees	LC
	Fuirena hirsuta (P.J.Bergius) P.L.Forbes	LC
	Pycreus polystachyos (Rottb.) P.Beauv. var. polystachyos	LC
	Schoenoplectus senegalensis (Hochst. ex Steud.) Palla	LC
DIOSCOREACEAE	Dioscorea cotinifolia Kunth	LC
	Dioscorea sylvatica Eckl. var. sylvatica	Not Evaluated

FAMILY	SPECIES NAME	THREATENED STATUS
HYACINTHACEAE	Albuca setosa Jacq.	LC
	Dipcadi glaucum (Burch. ex Ker Gawl.) Baker	LC
	Dipcadi marlothii Engl.	LC
	Ledebouria apertiflora (Baker) Jessop	LC
	Ledebouria cooperi (Hook.f.) Jessop	LC
	Ledebouria revoluta (L.f.) Jessop	LC
IRIDACEAE	Aristea angolensis Baker subsp. angolensis	LC
	Aristea galpinii N.E.Br. ex Weim.	LC
	Dietes iridioides (L.) Sweet ex Klatt	LC
	Gladiolus woodii Baker	LC
	Hesperantha baurii Baker subsp. baurii	LC
	Moraea moggii N.E.Br. subsp. moggii	LC
	Watsonia pulchra N.E.Br. ex Goldblatt	LC
ORCHIDACEAE	Disa baurii Bolus	LC
	Disa nervosa Lindl.	LC
	Disa stachyoides Rchb.f.	LC
	Disperis anthoceros Rchb.f. var. anthoceros	LC
	Disperis fanniniae Harv.	LC
	Disperis lindleyana Rchb.f.	LC
	Eulophia parviflora (Lindl.) A.V.Hall	LC
	Eulophia speciosa (R.Br. ex Lindl.) Bolus	Declining
	Habenaria cornuta Lindl.	LC
	Mystacidium venosum Harv. ex Rolfe	LC
	Satyrium longicauda Lindl. var. longicauda	LC
	Schizochilus cecilii Rolfe subsp. culveri (Schltr.) H.P.Linder	Rare
	Stenoglottis fimbriata Lindl. subsp. fimbriata	LC
POACEAE	Alloteropsis semialata (R.Br.) Hitchc. subsp. eckloniana (Nees) Gibbs Russ.	LC
	Aristida adscensionis L.	LC
	Aristida congesta Roem. & Schult. subsp. barbicollis (Trin. & Rupr.) De Winter	LC
	Aristida transvaalensis Henrard	LC
	Bothriochloa bladhii (Retz.) S.T.Blake	LC
	Bothriochloa insculpta (Hochst. ex A.Rich.) A.Camus	LC
	Brachiaria deflexa (Schumach.) C.E.Hubb. ex Robyns	LC
	Chloris virgata Sw.	LC
	Digitaria diagonalis (Nees) Stapf var. diagonalis	LC
	Digitaria eriantha Steud.	LC
	Digitaria milanjiana (Rendle) Stapf	LC
	Digitaria velutina (Forssk.) P.Beauv.	LC
	Echinochloa pyramidalis (Lam.) Hitchc. & Chase	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Enneapogon cenchroides (Licht. ex Roem. & Schult.) C.E.Hubb.	LC
	Enteropogon monostachyus (Vahl) K.Schum. subsp. africanus Clayton	Not Evaluated
	Eragrostis aspera (Jacq.) Nees	LC
	Eragrostis habrantha Rendle	LC
	Eragrostis inamoena K.Schum.	LC
	Eragrostis lehmanniana Nees var. lehmanniana	LC
	Eragrostis rotifer Rendle	LC
	Eragrostis superba Peyr.	LC
	Hyparrhenia filipendula (Hochst.) Stapf var. filipendula	LC
	Hyparrhenia gazensis (Rendle) Stapf	LC
	Hyparrhenia hirta (L.) Stapf	LC
	Hyperthelia dissoluta (Nees ex Steud.) Clayton	LC
	Melinis nerviglumis (Franch.) Zizka	LC
	Melinis repens (Willd.) Zizka subsp. repens	LC
	Oplismenus hirtellus (L.) P.Beauv.	LC
	Panicum deustum Thunb.	LC
	Panicum maximum Jacq.	LC
	Phragmites australis (Cav.) Steud.	LC
	Schmidtia pappophoroides Steud.	LC
	Setaria holstii R.A.W.Herrm. monstr. composita de Wit	Not Evaluated
	Setaria sagittifolia (A.Rich.) Walp.	LC
	Sporobolus nitens Stent	LC
	Sporobolus panicoides A.Rich.	LC
	Sporobolus pyramidalis P.Beauv.	LC
	Tricholaena monachne (Trin.) Stapf & C.E.Hubb.	LC
	Urochloa mosambicensis (Hack.) Dandy	LC
	Urochloa oligotricha (Fig. & De Not.) Henrard	LC
ZINGIBERACEAE	Siphonochilus aethiopicus (Schweinf.) B.L.Burtt	Critically Endangered (CR)
DICOTYLEDONAE		
ACANTHACEAE	Barleria crossandriformis C.B.Clarke	LC
	Barleria elegans S.Moore ex C.B.Clarke	LC
	Barleria gueinzii Sond.	LC
	Barleria lancifolia T.Anderson subsp. lancifolia	LC
	Barleria obtusa Nees	LC
	Blepharis integrifolia (L.f.) E.Mey. ex Schinz var. integrifolia	LC
	Blepharis subvolubilis C.B.Clarke	LC
	Chaetacanthus burchellii Nees	LC
	Crossandra greenstockii S.Moore	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Crossandra zuluensis W.T.Vos & T.J.Edwards	LC
	Duvernoia aconitiflora A.Meeuse	LC
	Duvernoia adhatodoides E.Mey. ex Nees	LC
	Dyschoriste fischeri Lindau	LC
	Dyschoriste rogersii S.Moore	LC
	Hygrophila auriculata (Schumach.) Heine	LC
	Hypoestes aristata (Vahl) Sol. ex Roem. & Schult. var. aristata	LC
	Isoglossa grantii C.B.Clarke	LC
	Justicia betonica L.	LC
	Justicia flava (Vahl) Vahl	LC
	Justicia matammensis (Schweinf.) Oliv.	LC
	Justicia protracta (Nees) T.Anderson subsp. protracta	LC
	Metarungia longistrobus (C.B.Clarke) Baden	LC
	Monechma debile (Forssk.) Nees	LC
	Monechma divaricatum (Nees) C.B.Clarke	LC
	Ruellia malacophylla C.B.Clarke	LC
	Ruttya ovata Harv.	LC
	Thunbergia atriplicifolia E.Mey. ex Nees	LC
	Thunbergia neglecta Sond.	LC
	Thunbergia pondoensis Lindau	LC
AMARANTHACEAE	*Achyranthes aspera L. var. sicula L.	Not Evaluated
	Aerva leucura Moq.	LC
	Hermbstaedtia odorata (Burch.) T.Cooke var. odorata	LC
	Kyphocarpa angustifolia (Moq.) Lopr.	LC
	Pupalia lappacea (L.) A.Juss. var. lappacea	LC
ANACARDIACEAE	Ozoroa engleri R.Fern. & A.Fern.	LC
	Protorhus longifolia (Bernh.) Engl.	LC
	Searsia dentata (Thunb.) F.A.Barkley	LC
	Searsia grandidens (Harv. ex Engl.) Moffett	LC
	Searsia leptodictya (Diels) T.S.Yi, A.J.Mill. & J.Wen forma leptodictya	Not Evaluated
	Searsia natalensis (Bernh. ex C.Krauss) F.A.Barkley	LC
	Searsia pentheri (Zahlbr.) Moffett	LC
	Searsia pyroides (Burch.) Moffett var. integrifolia (Engl.) Moffett	LC
	Searsia rehmanniana (Engl.) Moffett var. rehmanniana	LC
	Searsia rogersii (Schönland) Moffett	LC
	Searsia tumulicola (S.Moore) Moffett var. meeuseana (R.& A.Fern.) Moffett forma meeuseana	Not Evaluated
ANNONACEAE	Annona senegalensis Pers. subsp. senegalensis	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Monanthotaxis caffra (Sond.) Verdc.	LC
APIACEAE	Alepidea peduncularis A.Rich.	Data Deficient (DDT)
	Steganotaenia araliacea Hochst. var. araliacea	LC
APOCYNACEAE	Asclepias albens (E.Mey.) Schltr.	LC
	Asclepias aurea (Schltr.) Schltr.	LC
	Asclepias crassinervis N.E.Br.	LC
	Brachystelma rubellum (E.Mey.) Peckover	LC
	Carissa bispinosa (L.) Desf. ex Brenan	LC
	Ceropegia carnosa E.Mey.	LC
	Ceropegia haygarthii Schltr.	LC
	Ceropegia nilotica Kotschy var. nilotica	LC
	Ceropegia rendallii N.E.Br.	LC
	Cryptolepis oblongifolia (Meisn.) Schltr.	LC
	Cynanchum validum N.E.Br.	LC
	Diplorhynchus condylocarpon (Müll.Arg.) Pichon	LC
	Duvalia polita N.E.Br.	LC
	Gomphocarpus fruticosus (L.) Aiton f. subsp. fruticosus	LC
	Gomphocarpus glaucophyllus Schltr.	LC
	Gomphocarpus tomentosus Burch. subsp. tomentosus	LC
	Huernia hystrix (Hook.f.) N.E.Br. subsp. hystrix	LC
	Huernia kirkii N.E.Br.	LC
	Oncinotis tenuiloba Stapf	LC
	Orbea rogersii (L.Bolus) Bruyns	LC
	Pachycarpus asperifolius Meisn.	LC
	Pachycarpus grandiflorus (L.f.) E.Mey. subsp. tomentosus (Schltr.) Goyder	LC
	Pachypodium saundersii N.E.Br.	LC
	Raphionacme galpinii Schltr.	LC
	Raphionacme velutina Schltr.	LC
	Riocreuxia torulosa (E.Mey.) Decne. var. torulosa	LC
	Sarcostemma viminale (L.) R.Br. subsp. viminale	LC
	Secamone alpini Schult.	LC
	Secamone parvifolia (Oliv.) Bullock	LC
	Sisyranthus huttoniae (S.Moore) S.Moore	LC
	Tabernaemontana elegans Stapf	LC
	Tabernaemontana ventricosa Hochst. ex A.DC.	LC
	Tacazzea apiculata Oliv.	LC
	Tylophora lycioides (E.Mey.) Decne.	LC
	Xysmalobium acerateoides (Schltr.) N.E.Br.	LC
	Xysmalobium asperum N.E.Br.	LC

FAMILY	SPECIES NAME	THREATENED STATUS
ASTERACEAE	Adenostemma viscosum J.R.& G.Forst.	LC
	Athrixia phylicoides DC.	LC
	Berkheya bipinnatifida (Harv.) Roessler subsp. echinopsoides (Baker) Roessler	LC
	Berkheya echinacea (Harv.) O.Hoffm. ex Burtt Davy subsp. echinacea	LC
	Berkheya latifolia J.M.Wood & M.S.Evans	LC
	Berkheya setifera DC.	LC
	Blumea dregeanoides Sch.Bip. ex A.Rich.	LC
	Brachylaena transvaalensis E.Phillips & Schweick.	LC
	Conyza gouanii (L.) Willd.	LC
	Cyanthillium vernonioides (Muschl.) H.Rob.	LC
	Dicoma anomala Sond. subsp. gerrardii (Harv. ex F.C.Wilson) S.Ortíz & Rodr.Oubiña	LC
	Dicoma tomentosa Cass.	LC
	Euryops hypnoides B.Nord.	VU
	*Flaveria bidentis (L.) Kuntze	Not Evaluated
	*Gamochaeta pensylvanica (Willd.) Cabrera	Not Evaluated
	Geigeria ornativa O.Hoffm. subsp. ornativa	LC
	Haplocarpha scaposa Harv.	LC
	Helichrysum acutatum DC.	LC
	Helichrysum argyrolepis MacOwan	LC
	Helichrysum aureonitens Sch.Bip.	LC
	Helichrysum cerastioides DC. var. cerastioides	LC
	Helichrysum chionosphaerum DC.	LC
	Helichrysum galpinii N.E.Br.	LC
	Helichrysum miconiifolium DC.	LC
	Helichrysum mixtum (Kuntze) Moeser var. grandiceps Hilliard	LC
	Helichrysum mutabile Hilliard	LC
	Helichrysum polycladum Klatt	LC
	Hilliardiella aristata (DC.) H.Rob.	LC
	Inezia integrifolia (Klatt) E.Phillips	LC
	Litogyne gariepina (DC.) Anderb.	LC
	Lopholaena disticha (N.E.Br.) S.Moore	LC
	Macledium zeyheri (Sond.) S.Ortíz subsp. zeyheri	LC
	*Melanthera triternata (Klatt) Wild	Not Evaluated
	Osteospermum striatum Burtt Davy	LC
	Pegolettia senegalensis Cass.	LC
	Phymaspermum bolusii (Hutch.) Källersjö	LC
	Phymaspermum montanum (Hutch.) Källersjö	LC
	Pluchea bojeri (DC.) Humbert	LC
	Psiadia punctulata (DC.) Vatke	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Schistostephium crataegifolium (DC.) Fenzl ex Harv.	LC
	Schistostephium heptalobum (DC.) Oliv. & Hiern	LC
	Senecio barbatus DC.	LC
	Senecio macrocephalus DC.	LC
	Senecio pleistocephalus S.Moore	LC
	Senecio venosus Harv.	LC
	Sphaeranthus peduncularis DC. subsp. peduncularis	LC
	Tarchonanthus parvicapitulatus P.P.J.Herman	LC
	Tarchonanthus trilobus DC. var. galpinii (Hutch. & E.Phillips) Paiva	LC
	Tenrhynea phylicifolia (DC.) Hilliard & B.L.Burtt	LC
	Vernonia fastigiata Oliv. & Hiern	LC
	*Xanthium strumarium L.	Not Evaluated
BALSAMINACEAE	Impatiens hochstetteri Warb. subsp. hochstetteri	LC
BIGNONIACEAE	Kigelia africana (Lam.) Benth.	LC
	Tecoma capensis (Thunb.) Lindl.	LC
BORAGINACEAE	Ehretia amoena Klotzsch	LC
	Ehretia rigida (Thunb.) Druce subsp. nervifolia Retief & A.E.van Wyk	LC
	Heliotropium nelsonii C.H.Wright	LC
	Heliotropium ovalifolium Forssk.	LC
	Trichodesma zeylanicum (Burm.f.) R.Br.	LC
BURSERACEAE	Commiphora harveyi (Engl.) Engl.	LC
	Commiphora schimperi (O.Berg) Engl.	LC
CAMPANULACEAE	Wahlenbergia capillacea (L.f.) A.DC. subsp. capillacea	LC
CAPPARACEAE	Boscia mossambicensis Klotzsch	LC
	Capparis fascicularis DC. var. fascicularis	LC
	Capparis tomentosa Lam.	LC
	Cleome angustifolia Forssk. subsp. petersiana (Klotzsch ex Sond.) Kers	LC
	Cleome monophylla L.	LC
	Maerua cafra (DC.) Pax	LC
	Maerua juncea Pax subsp. crustata (Wild) Wild	LC
	Maerua rosmarinoides (Sond.) Gilg & Gilg-Ben.	LC
CARYOPHYLLACEAE	Corrigiola litoralis L. subsp. litoralis var. litoralis	LC
CELASTRACEAE	Elaeodendron transvaalense (Burtt Davy) R.H.Archer	Near Threatened (NT)
	Gymnosporia glaucophylla Jordaan	LC
	Gymnosporia heterophylla (Eckl. & Zeyh.) Loes.	LC
	Gymnosporia maranguensis (Loes.) Loes.	LC
	Gymnosporia nemorosa (Eckl. & Zeyh.) Szyszyl.	LC
	Gymnosporia rubra (Harv.) Loes.	LC
	Gymnosporia senegalensis (Lam.) Loes.	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Maytenus peduncularis (Sond.) Loes.	LC
	Maytenus undata (Thunb.) Blakelock	LC
	Mystroxylon aethiopicum (Thunb.) Loes. subsp. aethiopicum	LC
	Pterocelastrus galpinii Loes.	LC
CELTIDACEAE	Trema orientalis (L.) Blume	LC
CHENOPODIACEAE	*Chenopodium ambrosioides L.	Not Evaluated
COMBRETACEAE	Combretum apiculatum Sond. subsp. apiculatum	LC
	Combretum collinum Fresen. subsp. suluense (Engl. & Diels) Okafor	LC
	Combretum imberbe Wawra	LC
	Combretum microphyllum Klotzsch	LC
	Combretum tenuipes Engl. & Diels	LC
	Combretum zeyheri Sond.	LC
	Terminalia phanerophlebia Engl. & Diels	LC
	Terminalia sericea Burch. ex DC.	LC
CONVOLVULACEAE	Convolvulus farinosus L.	LC
	Hewittia malabarica (L.) Suresh	LC
	Ipomoea albivenia (Lindl.) Sweet	LC
	Ipomoea coscinosperma Hochst. ex Choisy	LC
	Ipomoea crassipes Hook. var. crassipes	LC
	Ipomoea magnusiana Schinz	LC
	Ipomoea obscura (L.) Ker Gawl. var. obscura	LC
	Ipomoea papilio Hallier f.	LC
	Ipomoea plebeia R.Br. subsp. africana A.Meeuse	LC
	Ipomoea robertsiana Rendle	LC
	Ipomoea wightii (Wall.) Choisy var. wightii	LC
	Jacquemontia tamnifolia (L.) Griseb.	LC
	Xenostegia tridentata (L.) D.F.Austin & Staples subsp. angustifolia (Jacq.) Lejoly & Lisowski	LC
CRASSULACEAE	Crassula expansa Dryand. subsp. fragilis (Baker) Toelken	LC
	Kalanchoe luciae Raym.-Hamet subsp. luciae	LC
	Kalanchoe rotundifolia (Haw.) Haw.	LC
CUCURBITACEAE	Coccinia rehmannii Cogn.	LC
	Cucumis anguria L. var. longaculeatus J.H.Kirkbr.	LC
	Cucumis hirsutus Sond.	LC
	Cucumis myriocarpus Naudin subsp. myriocarpus	LC
	Kedrostis foetidissima (Jacq.) Cogn.	LC
	Momordica boivinii Baill.	LC
	Momordica cardiospermoides Klotzsch	LC
	*Momordica charantia L.	Not Evaluated
	Momordica foetida Schumach.	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Trochomeria hookeri Harv.	LC
DIPSACACEAE	Scabiosa columbaria L.	LC
EBENACEAE	Diospyros lycioides Desf. subsp. sericea (Bernh.) De Winter	LC
	Diospyros mespiliformis Hochst. ex A.DC.	LC
	Diospyros whyteana (Hiern) F.White	LC
	Euclea crispa (Thunb.) Gürke subsp. crispa	LC
	Euclea divinorum Hiern	LC
	Euclea natalensis A.DC. subsp. angustifolia F.White	LC
ERICACEAE	Erica drakensbergensis Guthrie & Bolus	LC
ERYTHROXYLACEAE	Erythroxylum delagoense Schinz	LC
EUPHORBIACEAE	Acalypha indica L. var. indica	LC
	Acalypha villicaulis Hochst.	LC
	Clutia virgata Pax & K.Hoffm.	LC
	Croton menyharthii Pax	LC
	Croton sylvaticus Hochst.	LC
	Ctenomeria capensis (Thunb.) Harv. ex Sond.	LC
	Dalechampia capensis A.Spreng.	LC
	Dalechampia galpinii Pax	LC
	Euphorbia complexa R.A.Dyer	LC
	Euphorbia cooperi N.E.Br. ex A.Berger var. cooperi	LC
	*Euphorbia cyathophora Murray	Not Evaluated
	Euphorbia epicyparissias E.Mey. ex Boiss.	LC
	Euphorbia transvaalensis Schltr.	LC
	Euphorbia triangularis Desf. ex A.Berger	LC
	Jatropha zeyheri Sond.	LC
	Suregada africana (Sond.) Kuntze	LC
	Synadenium cupulare (Boiss.) L.C.Wheeler	LC
FABACEAE	Abrus laevigatus E.Mey.	LC
	*Acacia melanoxylon R.Br.	Not Evaluated
	Albizia adianthifolia (Schumach.) W.Wight var. adianthifolia	LC
	Albizia anthelmintica (A.Rich.) Brongn.	LC
	Albizia versicolor Welw. ex Oliv.	LC
	Argyrolobium tomentosum (Andrews) Druce	LC
	Bauhinia galpinii N.E.Br.	LC
	Bolusanthus speciosus (Bolus) Harms	LC
	*Caesalpinia decapetala (Roth) Alston	Not Evaluated
	*Caesalpinia pulcherrima (L.) Sw.	Not Evaluated
	Calpurnia aurea (Aiton) Benth. subsp. aurea	LC
	Chamaecrista absus (L.) H.S.Irwin & Barneby	LC
	Crotalaria lanceolata E.Mey. subsp. lanceolata	LC
	Crotalaria pearsonii Baker f.	Rare

FAMILY	SPECIES NAME	THREATENED STATUS
	Crotalaria schinzii Baker f.	LC
	Dalbergia melanoxylon Guill. & Perr.	LC
	Decorsea schlechteri (Harms) Verdc.	LC
	Dichrostachys cinerea (L.) Wight & Arn. subsp. africana Brenan & Brummitt var. africana	LC
	Dolichos trilobus L. subsp. transvaalicus Verdc.	LC
	Eriosema burkei Benth. ex Harv. var. burkei	LC
	Eriosema pauciflorum Klotzsch var. pauciflorum	LC
	Indigastrum costatum (Guill. & Perr.) Schrire subsp. macrum (E.Mey.) Schrire	LC
	Indigofera astragalina DC.	LC
	Indigofera charlieriana Schinz var. charlieriana	LC
	Indigofera dregeana E.Mey.	LC
	Indigofera lupatana Baker f.	LC
	Indigofera sanguinea N.E.Br.	LC
	Indigofera schimperi Jaub. & Spach var. schimperi	LC
	Indigofera swaziensis Bolus	LC
	Indigofera swaziensis Bolus var. swaziensis	LC
	Lotus discolor E.Mey. subsp. discolor	LC
	Neonotonia wightii (Wight. ex Arn.) J.A.Lackey	LC
	Neorautanenia mitis (A.Rich.) Verdc.	LC
	Ormocarpum trichocarpum (Taub.) Engl.	LC
	Otholobium wilmsii (Harms) C.H.Stirt.	LC
	Pearsonia aristata (Schinz) Dummer	LC
	Pearsonia uniflora (Kensit) Polhill	LC
	Peltophorum africanum Sond.	LC
	Philenoptera violacea (Klotzsch) Schrire	LC
	Piliostigma thonningii (Schumach.) Milne-Redh.	LC
	Psoralea arborea Sims	LC
	Psoralea glabra E.Mey.	LC
	Psoralea pinnata L. var. pinnata	LC
	Pterocarpus angolensis DC.	LC
	Ptycholobium plicatum (Oliv.) Harms subsp. plicatum	LC
	Rhynchosia crassifolia Benth. ex Harv.	LC
	Rhynchosia galpinii Baker f.	LC
	Rhynchosia minima (L.) DC. var. minima	LC
	Rhynchosia monophylla Schltr.	LC
	Rhynchosia nitens Benth. ex Harv.	LC
	Rhynchosia sublobata (Schumach.) Meikle	LC
	Rhynchosia totta (Thunb.) DC. var. totta	LC
	Rhynchosia venulosa (Hiern) K.Schum.	Not Evaluated
	Rhynchosia woodii Schinz	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Schotia brachypetala Sond.	LC
	Senegalia nigrescens Oliv.	LC
	Senegalia senegal (L.) Willd. var. leiorhachis Brenan	LC
	Senegalia burkei Benth.	LC
	Sesbania macrantha Welw. ex E.Phillips & Hutch. var. levis J.B.Gillett	LC
	Sesbania sesban (L.) Merr. subsp. sesban var. nubica Chiov.	LC
	Tephrosia longipes Meisn. subsp. longipes var. longipes	LC
	Tephrosia multijuga R.G.N.Young	LC
	Tephrosia purpurea (L.) Pers. subsp. leptostachya (DC.) Brummitt var. leptostachya	LC
	Tephrosia semiglabra Sond.	LC
	Teramnus labialis (L.f.) Spreng. subsp. labialis	LC
	Tylosema fassoglense (Schweinf.) Torre & Hillc.	LC
	Vachellia davyi N.E.Br.	LC
	Vachellia swazica Burtt Davy	LC
	Vachellia tortilis (Forssk.) Hayne subsp. heteracantha (Burch.) Brenan	LC
	Vigna unguiculata (L.) Walp. subsp. unguiculata var. unguiculata	LC
	Zornia capensis Pers. subsp. capensis	LC
FLACOURTIACEAE	Flacourtia indica (Burm.f.) Merr.	LC
	Gerrardina foliosa Oliv.	LC
GENTIANACEAE	Anthocleista grandiflora Gilg	LC
	Enicostema axillare (Lam.) A.Raynal subsp. axillare	LC
	Sebaea leiostyla Gilg	LC
GERANIACEAE	Geranium wakkerstroomianum R.Knuth	LC
GESNERIACEAE	Streptocarpus confusus Hilliard subsp. confusus	LC
	Streptocarpus wilmsii Engl.	LC
GREYIACEAE	Greyia radlkoferi Szyszyl.	LC
	Greyia sutherlandii Hook. & Harv.	LC
HETEROPYXIDACEAE	Heteropyxis natalensis Harv.	LC
HYPERICACEAE	Hypericum aethiopicum Thunb. subsp. sonderi (Bredell) N.Robson	LC
ICACINACEAE	Apodytes dimidiata E.Mey. ex Arn. subsp. dimidiata	LC
KIRKIACEAE	Kirkia wilmsii Engl.	LC
LAMIACEAE	Aeollanthus rehmannii Gürke	LC
	Clerodendrum glabrum E.Mey.	LC
	Clerodendrum ternatum Schinz	LC
	Leonotis ocymifolia (Burm.f.) Iwarsson	LC
	Leucas neuflizeana Courbon	LC
	Ocimum americanum L. var. americanum	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Ocimum labiatum (N.E.Br.) A.J.Paton	LC
	Ocimum serratum (Schltr.) A.J.Paton	LC
	Orthosiphon suffrutescens (Thonn.) J.K.Morton	LC
	Plectranthus esculentus N.E.Br.	Data Deficient (DDD)
	Plectranthus fruticosus L'Hér.	LC
	Plectranthus hadiensis (Forssk.) Schweinf. ex Spreng. var. woodii (Gürke) Codd	LC
	Plectranthus petiolaris E.Mey. ex Benth.	LC
	Plectranthus strigosus Benth.	LC
	Plectranthus tetensis (Baker) Agnew	LC
	Plectranthus verticillatus (L.f.) Druce	LC
	Rotheca myricoides (Hochst.) Steane & Mabb.	LC
	Stachys natalensis Hochst. var. galpinii (Briq.) Codd	LC
	Syncolostemon eriocephalus I.Verd.	LC
	Syncolostemon modestus (Codd) D.F.Otieno	LC
	Syncolostemon transvaalensis (Schltr.) D.F.Otieno	LC
	Thorncroftia succulenta (R.A.Dyer & E.A.Bruce) Codd	LC
	Tinnea barbata Vollesen	LC
	Vitex harveyana H.Pearson	LC
	Vitex obovata E.Mey. subsp. obovata	LC
	Vitex obovata E.Mey. subsp. wilmsii (Gürke) C.L.Bredenkamp & D.J.Botha	LC
	*Cassytha filiformis L.	Not Evaluated
	Cryptocarya woodii Engl.	LC
LENTIBULARIACEAE	Utricularia stellaris L.f.	LC
LOBELIACEAE	Lobelia flaccida (C.Presl) A.DC. subsp. flaccida	LC
	Lobelia flaccida (C.Presl) A.DC. subsp. mossiana (R.D.Good) Thulin	LC
	Lobelia malowensis E.Wimm.	LC
LYTHRACEAE	Galpinia transvaalica N.E.Br.	LC
	Nesaea passerinoides (Welw. ex Hiern) Koehne	LC
MAESACEAE	Maesa lanceolata Forssk.	LC
MALPIGHIACEAE	Sphedamnocarpus pruriens (A.Juss.) Szyszyl. subsp. pruriens	LC
MALPIGHIACEAE	Triaspis hypericoides (DC.) Burch. subsp. nelsonii (Oliv.) Immelman	LC
MALVACEAE	Abutilon angulatum (Guill. & Perr.) Mast. var. angulatum	LC
	Abutilon austro-africanum Hochr.	LC
	Abutilon galpinii A.Meeuse	LC
	Abutilon grandiflorum G.Don	LC
	Abutilon mauritianum (Jacq.) Medik.	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Cienfuegosia hildebrandtii Garcke	LC
	Cola greenwayi Brenan var. greenwayi	LC
	Corchorus confusus Wild	LC
	Corchorus longipedunculatus Mast.	LC
	*Corchorus trilocularis L.	Not Evaluated
	Dombeya cymosa Harv.	LC
	Dombeya pulchra N.E.Br.	LC
	Dombeya rotundifolia (Hochst.) Planch. var. rotundifolia	LC
	Gossypium herbaceum L. subsp. africanum (Watt) Vollesen	LC
	Grewia bicolor Juss. var. bicolor	LC
	Grewia flavescens Juss.	LC
	Grewia monticola Sond.	LC
	Grewia subspathulata N.E.Br.	LC
	Grewia villosa Willd. var. villosa	LC
	Hermannia glanduligera K.Schum.	LC
	Hibiscus calyphyllus Cav.	LC
	Hibiscus cannabinus L.	LC
	Hibiscus dongolensis Delile	LC
	Hibiscus engleri K.Schum.	LC
	Hibiscus micranthus L.f. var. micranthus	LC
	Hibiscus nigricaulis Baker f.	LC
	Hibiscus pusillus Thunb.	LC
	Hibiscus sidiformis Baill.	LC
	Hibiscus surattensis L.	LC
	Hibiscus vitifolius L. subsp. vulgaris Brenan & Exell	LC
	Melhania forbesii Planch. ex Mast.	LC
	Melhania prostrata DC.	LC
	Sida alba L.	LC
	Sida cordifolia L. subsp. cordifolia	LC
	Sida dregei Burtt Davy	LC
	Sida rhombifolia L. subsp. rhombifolia	LC
	Sterculia murex Hemsl.	LC
	Triumfetta pentandra A.Rich. var. pentandra	LC
	Triumfetta rhomboidea Jacq. var. rhomboidea	LC
MELASTOMATACEAE	Memecylon natalense Markgr.	LC
MELIACEAE	Trichilia emetica Vahl subsp. emetica	LC
	Turraea obtusifolia Hochst.	LC
MENISPERMACEAE	Cissampelos mucronata A.Rich.	LC
	Tiliacora funifera (Miers) Oliv.	LC
MOLLUGINACEAE	*Mollugo nudicaulis Lam.	Not Evaluated
	Psammotropha myriantha Sond.	LC

FAMILY	SPECIES NAME	THREATENED STATUS
MONIMIACEAE	Xymalos monospora (Harv.) Baill.	LC
MORACEAE	Ficus abutilifolia (Miq.) Miq.	LC
	Ficus capreifolia Delile	LC
	Ficus petersii Warb.	LC
	Ficus sansibarica Warb. subsp. sansibarica	LC
	Ficus sycomorus L. subsp. sycomorus	LC
	Maclura africana (Bureau) Corner	LC
MYRTACEAE	Syzygium cordatum Hochst. ex C.Krauss subsp. cordatum	LC
	Syzygium guineense (Willd.) DC. subsp. guineense	LC
NYCTAGINACEAE	Boerhavia coccinea Mill. var. coccinea	LC
	*Boerhavia diffusa L. var. diffusa	Not Evaluated
	Commicarpus pentandrus (Burch.) Heimerl	LC
OCHNACEAE	Ochna arborea Burch. ex DC. var. arborea	LC
	Ochna confusa Burtt Davy & Greenway	LC
	Ochna natalitia (Meisn.) Walp.	LC
OLACACEAE	Olax dissitiflora Oliv.	LC
OLEACEAE	Jasminum fluminense Vell. subsp. fluminense	LC
	Jasminum multipartitum Hochst.	LC
	Olea europaea L. subsp. africana (Mill.) P.S.Green	LC
OROBANCHACEAE	Alectra orobanchoides Benth.	LC
	Alectra sessiliflora (Vahl) Kuntze var. sessiliflora	LC
	Rhamphicarpa fistulosa (Hochst.) Benth.	LC
	Striga elegans Benth.	LC
	Striga gesnerioides (Willd.) Vatke	LC
PASSIFLORACEAE	Adenia digitata (Harv.) Engl.	LC
	Adenia gummifera (Harv.) Harms var. gummifera	Declining
	Basananthe sandersonii (Harv.) W.J.de Wilde	LC
PEDALIACEAE	Ceratotheca sesamoides Endl.	LC
	Ceratotheca triloba (Bernh.) Hook.f.	LC
	Dicerocaryum senecioides (Klotzsch) Abels	LC
	Harpagophytum zeyheri Decne. subsp. zeyheri	LC
	Sesamum alatum Thonn.	LC
	Sesamum capense Burm.f.	LC
PHYLLANTHACEAE	Antidesma venosum E.Mey. ex Tul.	LC
	Bridelia cathartica G.Bertol. subsp. cathartica	LC
	Bridelia cathartica G.Bertol. subsp. melanthesoides (Baill.) J.Léonard var. lingelsheimii (Gehrm.) Radcl.-Sm. forma fischeri (Pax) Radcl.-Sm.	LC
	Flueggea virosa (Roxb. ex Willd.) Voigt subsp. virosa	LC
	Phyllanthus parvulus Sond. var. garipensis (E.Mey. ex Drège) Radcl.-Sm.	LC
PIPERACEAE	Peperomia blanda (Jacq.) Kunth	LC

FAMILY	SPECIES NAME	THREATENED STATUS
PITTOSPORACEAE	Pittosporum viridiflorum Sims	LC
PLUMBAGINACEAE	Plumbago auriculata Lam.	LC
POLYGALACEAE	Heterosamara galpinii (Hook.f.) Paiva	LC
	Muraltia empetroides Chodat	LC
	Polygala hottentotta C.Presl	LC
	Polygala sphenoptera Fresen. var. sphenoptera	LC
	Polygala transvaalensis Chodat subsp. transvaalensis	LC
	Polygala uncinata E.Mey. ex Meisn.	LC
POLYGONACEAE	Oxygonum dregeanum Meisn. subsp. canescens (Sond.) Germish. var. lobophyllum Germish.	LC
	*Persicaria lapathifolia (L.) Gray	Not Evaluated
PORTULACACEAE	Portulaca quadrifida L.	LC
	Portulacaria afra Jacq.	LC
PROTEACEAE	Faurea rochetiana (A.Rich.) Chiov. ex Pic.Serm.	LC
	Protea gaguedi J.F.Gmel.	LC
	Protea roupelliae Meisn. subsp. roupelliae	LC
RHAMNACEAE	Berchemia zeyheri (Sond.) Grubov	LC
	Helinus integrifolius (Lam.) Kuntze	LC
	Rhamnus prinoides L'Hér.	LC
	Ziziphus mucronata Willd. subsp. mucronata	LC
ROSACEAE	Cliffortia linearifolia Eckl. & Zeyh.	LC
	Rubus x proteus C.H.Stirt.	Not Evaluated
RUBIACEAE	Breonadia salicina (Vahl) Hepper & J.R.I.Wood	LC
	Burchellia bubalina (L.f.) Sims	LC
	Canthium armatum (K.Schum.) Lantz	LC
	Catunaregam taylorii (S.Moore) Bridson	LC
	Cephalanthus natalensis Oliv.	LC
	Coddia rudis (E.Mey. ex Harv.) Verdc.	LC
	Galopina circaeoides Thunb.	LC
	Gardenia volkensii K.Schum. subsp. volkensii var. volkensii	LC
	Kraussia floribunda Harv.	LC
	Oldenlandia herbacea (L.) Roxb. var. herbacea	LC
	Otiophora cupheoides N.E.Br.	LC
	Pachystigma latifolium Sond.	LC
	Pachystigma macrocalyx (Sond.) Robyns	LC
	Pavetta barbertonensis Bremek.	LC
	Pavetta edentula Sond.	LC
	Pavetta galpinii Bremek.	LC
	Pavetta inandensis Bremek.	LC
	Pavetta schumanniana F.Hoffm. ex K.Schum.	LC
	Pentanisia angustifolia (Hochst.) Hochst.	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	Psychotria capensis (Eckl.) Vatke subsp. capensis var. capensis	LC
	*Richardia scabra L.	Not Evaluated
RUTACEAE	Vepris reflexa I.Verd.	LC
	Zanthoxylum davyi (I.Verd.) P.G.Waterman	LC
	Zanthoxylum leprieurii Guill. & Perr.	LC
SALICACEAE	Homalium dentatum (Harv.) Warb.	LC
	Scolopia mundii (Eckl. & Zeyh.) Warb.	LC
SANTALACEAE	Thesium pallidum A.DC.	LC
	Thesium triflorum Thunb. ex L.f.	LC
	Thesium utile A.W.Hill	LC
SAPINDACEAE	*Cardiospermum grandiflorum Sw.	Not Evaluated
	Cardiospermum halicacabum L. var. microcarpum (Kunth) Blume	LC
	Hippobromus pauciflorus (L.f.) Radlk.	LC
SAPOTACEAE	Englerophytum natalense (Sond.) T.D.Penn.	LC
	Mimusops obtusifolia Lam.	LC
	Sideroxylon inerme L. subsp. inerme	LC
SCROPHULARIACEAE	Aptosimum lineare Marloth & Engl. var. lineare	LC
	Bowkeria cymosa MacOwan	LC
	Hebenstretia comosa Hochst.	LC
	Jamesbrittenia grandiflora (Galpin) Hilliard	LC
	Jamesbrittenia huillana (Diels) Hilliard	LC
	Tetraselago longituba (Rolfe) Hilliard & B.L.Burtt	LC
SOLANACEAE	Solanum anguivi Lam.	LC
	Solanum giganteum Jacq.	LC
	Solanum retroflexum Dunal	LC
STRYCHNACEAE	Strychnos madagascariensis Poir.	LC
	Strychnos mitis S.Moore	LC
	Strychnos spinosa Lam. subsp. spinosa	LC
THEOPHRASTACEAE	Samolus valerandi L.	LC
THYMELAEACEAE	Gnidia albosericea Moss ex B.Peterson	LC
	Gnidia caffra (Meisn.) Gilg	LC
	Gnidia rubescens B.Peterson	LC
	Gnidia splendens Meisn.	LC
	Passerina montana Thoday	LC
	Peddiea africana Harv.	LC
TURNERACEAE	Tricliceras laceratum (Oberm.) Oberm.	LC
	Tricliceras tanacetifolium (Klotzsch) R.Fern.	LC
URTICACEAE	Pouzolzia mixta Solms var. mixta	LC
VAHLIACEAE	Vahlia capensis (L.f.) Thunb. subsp. capensis	LC
VERBENACEAE	Chascanum hederaceum (Sond.) Moldenke var. natalense (H.Pearson) Moldenke	LC

FAMILY	SPECIES NAME	THREATENED STATUS
	*Duranta erecta L.	Not Evaluated
	*Lantana camara L.	Not Evaluated
	Lantana rugosa Thunb.	LC
	Lippia javanica (Burm.f.) Spreng.	LC
	Priva cordifolia (L.f.) Druce var. abyssinica (Jaub. & Spach) Moldenke	LC
	Priva meyeri Jaub. & Spach var. meyeri	LC
VITACEAE	Cissus fragilis E.Mey. ex Kunth	LC
	Cyphostemma woodii (Gilg & M.Brandt) Desc.	LC
	Rhoicissus rhomboidea (E.Mey. ex Harv.) Planch.	LC
	Rhoicissus tridentata (L.f.) Wild & R.B.Drumm. subsp. tridentata	Not Evaluated

13 APPENDIX C: GPS coordinates and other information relating to protected tree species that were recorded in the study area.

Table 26: List of GPS coordinates, number of specimens recorded and other information relating to protected tree species.

Label no.	Species	Coordinates		Erf no.	No. of specimens
		longitude (S)	Latitude (E)		
1	*Philenoptera violacea*	25˚ 31' 37.4"	31˚ 22' 01.1"	97	2
2	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 37.4"	31˚ 22' 03.3"	97	1
3	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 36.8"	31˚ 22' 04.1"	97	1
4	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 36.3"	31˚ 22' 05.3"	97	2
5	*Philenoptera violacea*	25˚ 31' 36.0"	31˚ 22' 06.9"	97	2
6	*Philenoptera violacea*	25˚ 31' 37.5"	31˚ 22' 07.6"	311	3
	Sclerocarya birrea subsp. *caffra*				2
7	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 38.9"	31˚ 22' 08.8"	311	1
8	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 40.1"	31˚ 22' 07.0"	311	1
9	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 39.0"	31˚ 22' 06.3"	311	1
10	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 40.1"	31˚ 22' 02.9"	97	2
11	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 40.3"	31˚ 22' 01.3"	97	1
12	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 41.4"	31˚ 22' 01.7"	97	2
13	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 41.4"	31˚ 22' 00.6"	97	4
14	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 40.6"	31˚ 21' 59.4"	97	1
15	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 39.5"	31˚ 21' 59.6"	97	1
16	*Sclerocarya birrea* subsp. *caffra*	25° 31' 37.9"	31° 21' 59.5"	97	3
17	*Combretum imberbe*	25˚ 31' 45.9"	31˚ 22' 03.4"	312	1
18	*Philenoptera violacea*	25˚ 31' 45.2"	31˚ 22' 10.5"	311	1
19	*Philenoptera violacea*	25˚ 31' 44.9"	31˚ 22' 07.6"	311	1
20	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 46.1"	31˚ 22' 07.5"	311	1
21	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 45.8"	31˚ 22' 06.4"	311	1
22	*Philenoptera violacea*	25˚ 31' 47.4"	31˚ 22' 05.7"	312	1
	Sclerocarya birrea subsp. *caffra*				1
23	*Philenoptera violacea*	25˚ 31' 44.5"	31˚ 22' 05.3"	311	1
24	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 43.5"	31˚ 22' 08.3"	311	1
25	*Philenoptera violacea*	25˚ 31' 44.4"	31˚ 22' 09.4"	311	1
26	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 40.6"	31˚ 22' 09.4"	311	2
27	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 42.0"	31˚ 21' 08.8"	311	2
28	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 45.5"	31˚ 22' 03.4"	312	1
29	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 37.5"	31˚ 21' 57.9"	97	1
30	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 35.1"	31˚ 22' 06.3"	97	1
31	*Philenoptera violacea*	25˚ 31' 33.8"	31˚ 22' 04.0"	97	1
32	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 32.2"	31˚ 22' 04.5"	97	2
33	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 39.8"	31˚ 21' 56.5"	97	2
34	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 38.6"	31˚ 21' 54.6"	302	1
35	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 41.5"	31˚ 21' 48.9"	302	2

Label no.	Species	Coordinates		Erf no.	No. of specimens
		longitude (S)	Latitude (E)		
36	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 42.7"	31˚ 21' 50.3"	302	2
37	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 42.7"	31˚ 21' 52.8"	302	1
38	*Philenoptera violacea*	25˚ 31' 40.3"	31˚ 21' 51.4"	302	1
39	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 43.8"	31˚ 21' 52.4"	302	1
40	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 44.2"	31˚ 21' 48.7"	302	1
41	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 44.7"	31˚ 21' 49.8"	312	1
42	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 45.6"	31˚ 21' 54.2"	312	1
43	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 45.8"	31˚ 21' 53.3"	312	1
44	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 46.5"	31˚ 21' 52.8"	312	1
45	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 49.8"	31˚ 21' 53.3"	312	1
46	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 48.3"	31˚ 21' 58.1"	312	1
47	*Sclerocarya birrea* subsp. *caffra*	25˚ 31' 47.7"	31˚ 22' 02.2"	312	1
48	*Philenoptera violacea*	25˚ 31' 48.8"	31˚ 22' 01.9"	312	2
Total specimens of *Philenoptera violacea* (Apple-leaf):					**16**
Total specimens of *Combretum imberbe* (Lead wood):					**1**
Total specimens of *Sclerocarya birrea* subsp. *caffra* (Marula):					**53**
Total specimens recorded:					**70**

Note: Figure 13 visually presents data from Table 26.

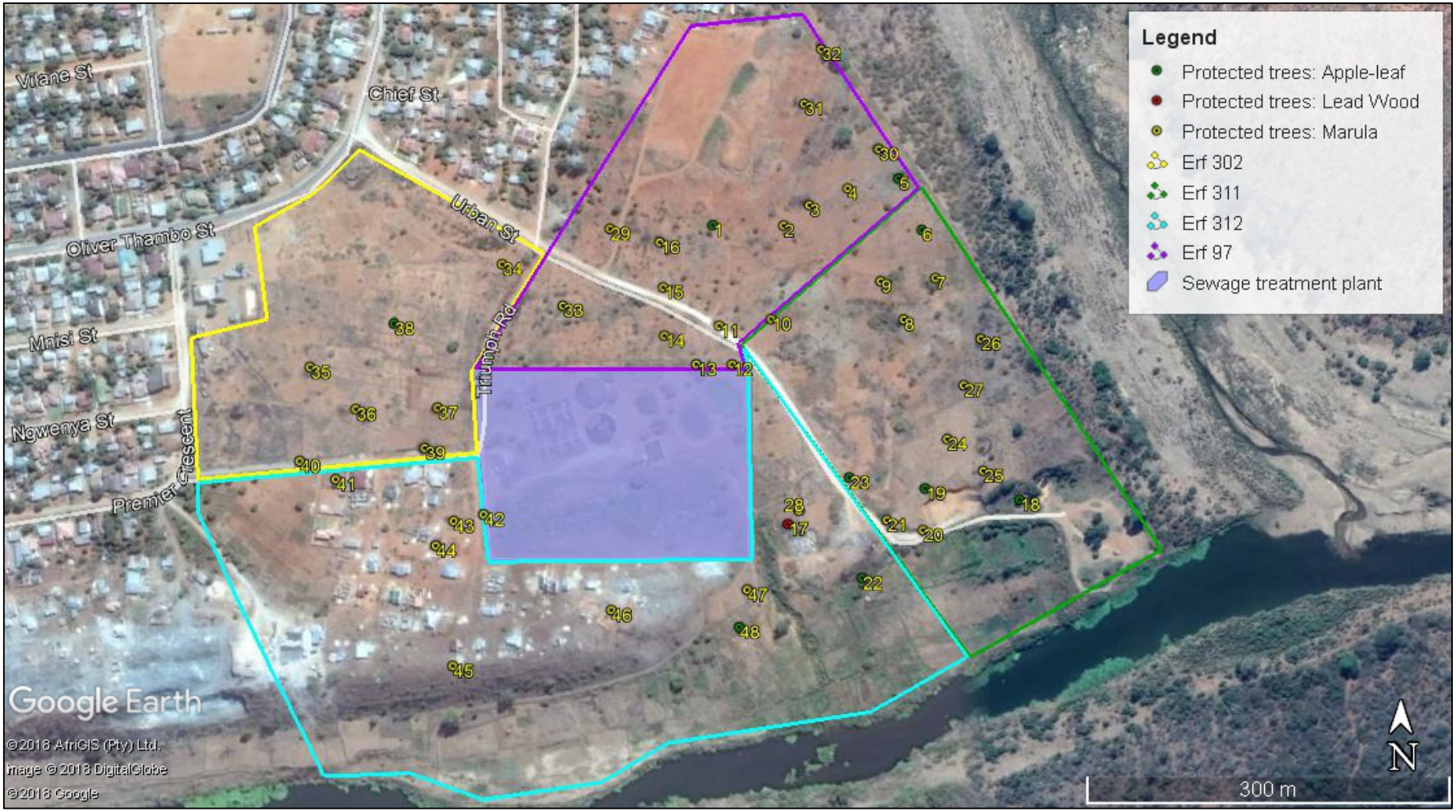

Figure 13: positions of protected tree species relevant to Erf numbers in the study area (label numbers coincide with the label numbers presented in Table 26).