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## DESKTOP ECOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED MSIMBAZI ECOESTATE DEVELOPMENT, KZN, SOUTH AFRICA.



**APRIL 2020**

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## Declaration

I, **Leigh-Ann de Wet**, declare that -

- I act as the independent specialist in this matter;
- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the National Environmental Management Act (Act 107 of 1998) (NEMA), regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the NEMA Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; all the particulars furnished by me in this report are true and correct.

**Signature of the specialist:**



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## List of Acronyms and Abbreviations

<b>ADU</b>	Animal Demography Unit
<b>CARA</b>	Conservation of Agricultural Resources Act
<b>CBA</b>	Critical Biodiversity Area
<b>C-Plan</b>	Conservation Plan
<b>D'MOSS</b>	Durban Metropolitan Open Space System
<b>EIA</b>	Environmental Impact Assessment
<b>EKZNW</b>	Ezemvelo KZN Wildlife
<b>ESA</b>	Ecological Support Area
<b>IUCN</b>	International Union for the Conservation of Nature
<b>NEM:BA</b>	National Environmental Management: Biodiversity Act
<b>NFEPA</b>	National Freshwater Ecosystems Priority Areas
<b>NPAES</b>	National Protected Areas Expansion Strategy
<b>POSA</b>	Plants of South Africa
<b>QDS</b>	Quarter Degree Square
<b>SANBI</b>	South African National Biodiversity Institute
<b>SCC</b>	Species of Conservation Concern
<b>TOPs</b>	National list of Threatened Or Protected species
<b>ToR</b>	Terms of Reference
<b>Vegmap</b>	Vegetation map

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## **INDEMNITY**

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## 1 Introduction

### 1.1 Locality

The proposed Msimbazi Eco Estate development is located south of Illovo Beach on the South Coast within the eThekweni Municipality (Figure 1). The initial plans indicate that several houses will be built with allowances for open space encompassing forest as well as the borders of the Msimbazi estuary (Figure 2). The site is covered in a mix of previously disturbed areas currently accommodating several alien invasive species and prolific stands of the indigenous *Osteospermum moniliferum* as well as areas of indigenous forest.



**Figure 1: Location of the Msimbazi Development Site.**





Figure 2: Plan of the proposed Msimbazi Development Site.

## 1.2 Aim of impact assessment

An ecological impact assessment serves to determine the current ecological state of a site, including vegetation and habitats, and then determines the likely impacts of the proposed development on that ecology. In addition, mitigation measures are recommended to reduce negative, and enhance positive impacts. For the purposes of this study, a desktop assessment has been done, which identifies potentially sensitive areas as well as any potential red flags that would halt any development.

## 1.3 Terms of reference for the assessment

Desktop assessments are based on available information for the area, and several databases and datasets are checked. These include the following:

- Google Earth imagery will be used to assess the current vegetation cover of the site, as well as determining past land use through historical imagery.
- Review of terrestrial ecological assessment reports completed for other environmental impact assessment processes undertaken in the general vicinity of the site.
- Mucina and Rutherford Vegetation Map and associated plant species lists. This map is the accepted vegmap for South Africa and will be used to place the study site in context, the newest version (2018) will be consulted. Species lists for each of the vegetation types on the site will also be used to determine expected plant species and plant Species of Conservation Concern for the site.
- Plants of South Africa (POSA) database will also be checked for expected species and Species of Special Concern.

- Conservation Planning Tools such as the list of Threatened Ecosystems in Need of Protection, Wetland datasets (NFEPA), and others will be checked and mapped for the study site to provide context.
- A list of Possible Species of Conservation Concern will be constructed based on the expected lists for the study site and assessed against the following:
  - National Protected Tree List (Government Gazette Vol. 593, 21 November 2014, No. 38215);
  - Provincial Protected Species Lists;
  - National Protected Species List or TOPS (R 1187 of 2007); and
  - The National Red List (redlist.sanbi.org).
  - The National Red Data List for Mammals<sup>1</sup>
  - The National Red Data List for Reptiles<sup>2</sup>
  - The National Red Data List for Amphibians<sup>3</sup>
- Mapping of high-risk areas on site, and in the general vicinity;
- Determination of likely impacts associated with the proposed development of the site;
- Determination of the necessity for a more comprehensive fieldwork based ecological assessment process;
- The information will be gathered, and synthesised into a report, and recommendations will be made for the consideration of the Client and EAP.

#### 1.4 Assumptions and limitations

- A site visit was conducted on the 3rd of March 2021 and another on the 14<sup>th</sup> of April 2021, which constitutes a summer season site survey as recommended by Ezemvelo KZN Wildlife.
- Conclusions are based on current versions of the layouts and site boundaries and are subject to change with changing plans or site boundaries.
- A site visit at this time is sufficient to record trees, forests and associated species assemblages, as well as flowering grasses, but may miss some winter flowering plants.
- Some areas of the site were inaccessible due to impenetrable vegetation and difficult terrain. In these cases, a sample of the vegetation of the area was taken from where it was accessible.
- The timing and risks (mainly of theft and anthropogenic disturbance to traps) of the surveys precluded complex trapping (camera, drift-net arrays and Sherman trapping) for fauna. Faunal surveys were based on opportunistic sightings in addition to tracks and signs.

<sup>1</sup> Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. 2016. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

<sup>2</sup> Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. 2014. Edited by Michael F. Bates, William R. Branch, Aaron M. Bauer, Marius Burger, Johan Marais, Graham J. Alexander & Marianne S. de Villiers. SANBI, Pretoria.

<sup>3</sup> Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.

## 2 Methodology

In order to correctly classify the site, a desktop assessment was undertaken. Desktop assessments are based on available information for the area, and several databases and datasets were checked. These included the following:

- Google Earth imagery was used to assess the current vegetation cover of the site.
- Mucina and Rutherford Vegetation Map and associated plant species lists. This map is the accepted vegmap (vegetation map) for South Africa and was used to place the study site in context.
- Plants of South Africa (POSA) database was checked for expected species and Species of Conservation Concern.
- Conservation Planning Tools such as the list of Threatened Ecosystems in Need of Protection, Wetland datasets (NFEPA), and the KwaZulu-Natal Biodiversity Plan and Durban Metropolitan Open Space System (D'MOSS) were checked and mapped for the study site to provide context.
- A list of Possible Species of Conservation Concern will be constructed based on the expected lists for the study site and assessed against the following:
  - National Protected Tree List (Government Gazette Vol. 593, 21 November 2014, No. 38215);
  - Provincial Protected Species List (Nature Conservation Ordinance No. 15 of 1974);
  - National List of Threatened and Protected Species or TOPS (R 1187 of 2007);
  - The National Red List for Plants ([redlist.sanbi.org](http://redlist.sanbi.org)); and
  - Various faunal National Red Lists.
  - The National Red List ([redlist.sanbi.org](http://redlist.sanbi.org)).
  - The National Red Data List for Mammals<sup>4</sup>
  - The National Red Data List for Reptiles<sup>5</sup>
  - The National Red Data List for Amphibians<sup>6</sup>

### 2.1 Field assessment

The site was surveyed based on Google Earth imagery. The site was divided into areas of specific vegetation communities as per stratified random sampling methodology. Each of these vegetation communities were then surveyed in the field, with adaptive field techniques applied where in-field conditions required. For sampling of both fauna and flora, timed meanders were used. Where possible, these were centred around the transmission route options and associated infrastructure. Where this was not possible, the meanders were performed in vegetation similar, and adjacent to the proposed transmission line routes.

#### 2.1.1 Vegetation and Flora

The study area was explored on foot, and different habitats identified using on-the-ground views in addition to google earth imagery. Habitats included areas such as mangroves, swamp forests, disturbed areas, and bushveld areas. All dominant, invasive and conservation important species for each of the habitats were noted and photographed. Where possible, the transmission line route itself was walked. Timed meanders were employed as a vegetation classification and species listing technique as per standard best practice. A timed meander comprised of a 30 minute walk in one particular habitat where all species are recorded as they are encountered. If, after 30 minutes, species are still being added to the list at a rate of >1 per 1 minute, the meander is extended for 5 minutes.

Once no new species have been recorded for the meander after 5 minutes, the sample is considered complete. In areas where few species were noted, timed meanders were cut short after no new species are recorded for 5 minutes.

Where species cannot be identified in field, these were photographed to be identified later using field guides and botanical texts or requested from experts where necessary.

### 2.1.2 Fauna

In order to save time in the field and reduce the amount of time-consuming faunal assessments, the focus of this study is on vegetation. Results of the vegetation analysis and hence, faunal habitat, in conjunction with a survey of the existing anthropogenic impacts may be used to infer the presence of faunal species and populations. Anthropogenic impacts may include activities such as:

- encroachment of development (in this case Port/ Harbour zone infrastructure) into natural areas,
- the influx of alien invasive plant species,
- hunting,
- collection of plants for trade and traditional medicine, and
- the influx of non-natural animals such as cattle, goats, domestic dogs and domestic cats, all of which have moderate to severe impacts on both flora and fauna of the surrounding area.

Traditional methodology for assessments of faunal taxa include timed meanders, walking transects and the use of traps (camera traps, drift net arrays and Sherman traps). In sites such as Richards Bay, the use of such traps is not practical for several reasons, primarily among them the presence of a large human population making use of the areas that require assessment. This human presence makes the risks for trap setting too high to make use of such methods. Risks include the removal of traps by humans, stealing of equipment (especially camera traps), the skewing of data associated with the vandalism of traps, removal of traps or release of trapped animals by humans within the site. As such, opportunistic sightings are best used in these scenarios. In addition, experience in the area, as well as reports of fauna occurring in the region and literature allows for a fairly accurate picture of the fauna that will be present on site.

For the purposes of this study, any opportunistic sightings of faunal species as well as tracks and signs were recorded and photographed wherever possible. Further, the presence of any habitat available for each of the possible species in the region was recorded.

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<sup>4</sup> Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. 2016. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

<sup>5</sup> Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. 2014. Edited by Michael F. Bates, William R. Branch, Aaron M. Bauer, Marius Burger, Johan Marais, Graham J. Alexander & Marienne S. de Villiers. SANBI, Pretoria.

<sup>6</sup> Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.

## 2.2 Sensitivity Assessment

A list of sensitivity criteria was assessed, and the value of each of these criteria assigned a weighted score. The resultant matrix is then used to produce an overall sensitivity. This assessment determines the overall sensitivity of the site and aids in the making of recommendations with regards to proposed development within the site.

Sensitivity criteria include the following:

- Species of Conservation Concern (Any red listed or protected species)
- Presence of sensitive habitats (such as wetlands, rocky outcrops)
- Presence of Critical Biodiversity Areas
- Level of degradation of the site (erosion, grazing)
- Presence of indigenous vegetation
- Proximity to watercourses
- Proximity to wetlands
- Proximity to National Parks
- Proximity to other protected areas
- Proximity to National Protected Areas Expansion Strategy (NPAES) Focus Areas
- Proximity to Important Bird Areas (IBAs)
- Proximity to Ramsar sites
- Proximity to World Heritage Sites; and
- Proximity to Threatened Ecosystems as gazetted.

## 2.3 Impact assessment

The significance (quantification) of potential environmental impacts identified during the Ecological Assessment has been assessed in terms of the following criteria (Guideline Documentation on EIA Regulation, Department of Environmental Affairs and Tourism, 2014). This is the rating scale developed by Afzelia for use in our reports. To determine the significance of impacts identified for a project, there are several parameters that need to be assessed. These include four factors, which, when plugged into a formula, will give a significance score. The following four parameters were assessed:

1. **Duration**, which is the relationship of the impact to temporal scale. This parameter determines the timespan of the impact and can range from very short term (less than a year) to permanent.
2. **Extent**, which is the relationship of the impact to spatial scales. Each impact can be defined as occurring in minor extent (limited to the footprint of very small projects) to International, where an impact has global repercussions (an example could be the destruction of habitat for an IUCN CR listed species).
3. **Magnitude**, which is used to rate the severity of impacts. This is done with and without mitigation, so that the residual impact (with mitigation) can be rated. The Magnitude, although usually rated as negative, can also be positive.
4. **Probability**; which is the likelihood of impacts taking place. These include unlikely impacts (such as the rate of roadkill of frogs, for example) or definite (such as the loss of vegetation within the direct construction footprint of a development).

Each of these aspects is rated according to Table 1 below. Where Duration, Extent and Magnitude are assessed first, followed by Likelihood.



**Table 1: Table of Evaluation criteria ranking**

Score	Label	Criteria
<b>Duration</b>		
1	Very short term	0 -1 years
2	Short term	2 – 5 years
3	Medium term	5 – 15 years
4	Long term	>15 years
5	Permanent	Permanent
<b>Extent</b>		
1	Minor	Limited to the immediate site of the development
2	Local	Within the general area of the town, or study area, or a defined Area of Impact
3	Regional	Affecting the region, municipality, or province
4	National	Country level
5	International	International level
<b>Magnitude</b>		
0	Negligible	Very small to no effect on the environment
2	Minor	Slight impact on the environment
4	Low	Small impact on the environment
6	Moderate	A moderate impact on the environment
8	High	The impacts on the environment are large
10	Very high	The impacts are extremely high and could constitute a fatal flaw
<b>Probability</b>		
1	Very improbable	Probably will not happen
2	Improbable	Some possibility, but low likelihood
3	Probable	Distinct possibility
4	Highly probable	Most likely
5	Definite	The impact will occur

Once each of these aspects is rated, the overall significance can be scored (based on the score for Effect). The significance is calculated by combining the criteria in the following formula:

$$S = (D+E+M) P$$

- S = Significance weighting
- D = Duration
- E = Extent
- M = Magnitude
- P = Probability

The explanation for each of the overall significance ratings are presented in Table 2, with the layout of all possible scores and their overall significance presented in Table 3.

**Table 2: Significance weighting**

Score	Label	Motivation
<10	Negligible	The impact is very small to absent
10-20	Low	where this impact would not have a direct influence on the decision to develop in the area
20-50	Medium	where the impact could influence the decision to develop in the area unless it is effectively mitigated
50 -70	- High	where the impact must have an influence on the decision process to develop in the area
>70	Very high	Where the impact may constitute a fatal flaw for the project



**Table 3: Possible significance scores based on Effect x Likelihood.**

Likelihood	Effect																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Very improbable (1)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Improbable (2)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Probable (3)	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
Highly probable (4)	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
Definite (5)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Each impact was assessed based on the methodology above, and a table produced, indicating the scores and the overall significance rating both without and with mitigation. Where relevant, mitigation measures are recommended. Table 4 Provides an example of an impact table.

**Table 4: Example of an impact table.**

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Short term	2	Moderate	6	Highly probable	4	44	Medium
With mitigation	Local	2	Short term	2	Low	4	Probable	3	24	Low

### 3 Description of the study site

#### 3.1 Desktop data

##### 3.1.1 Vegetation

According to Mucina and Rutherford (2006), there are three vegetation types (KwaZulu Natal Coastal Belt Grassland, Scarp Forest and Subtropical Estuarine Salt Marshes) within the Msimbazi site. These vegetation types are mapped in the National Vegetation Map Beta of 2018, with descriptions from (Mucina & Rutherford, 2011).

##### **KwaZulu-Natal Coastal Belt Grassland (CB3)**

This vegetation type is located within KwaZulu-Natal, in a broad coastal strip (Mucina & Rutherford 2011). It is found on highly dissected undulating coastal plains and is thought to be present where coastal forest existed in the past. Some primary grassland occurs in the area however the majority is secondary grasslands dominated by *Aristida* species and occurring as part of a mosaic of thickets and coastal thornveld, plantations, sugarcane fields and developments. There are three endemic plants including the herb *Vernonia Africana*, the geophyte *Kniphofia paunciflora* and the shrub *Barleria natalensis* which is now extinct. This vegetation type is endangered, with a conservation target of 25% with very little statutorily conserved and over 50% transformed for cultivation and urban development (Mucina & Rutherford 2011).

##### **Scarp Forest**

Scarp forest occurs in the Eastern Cape, KwaZulu-Natal and Mpumalanga Provinces in addition to occurring in Swaziland (Mucina & Rutherford 2011). It occurs as islands of scattered patches at altitudes between 50 and 600m. It comprises tall, species rich and structurally diverse, multi-layered forests with a well-developed canopy and understory tree layers, but a poorly developed herb layer. Common trees include *Buxus macowanii*, *Buxus natalensis*, *Drypetes gerrardii*, *Englerophytum natalense*, *Harpophyllum caffrum*, *Heywoodia lucens*, *Memecylon natalense*, *Millettia grandis*, *Orcia bachmannii*, *Philenoptera sutherlandii*, *Rinorea angustifolia*, *Rothmannia globosa* and *Umtiza listeriana*. Several endemic species are present within this vegetation type. It is considered Least Threatened within protected areas but is exposed to impacts elsewhere. The conservation target is 40% with over 20% statutorily conserved. It is prone to transformation for cultivation, especially plantations as well as to alien invasion. Biogeographically this is one of the most valuable forest in South Africa as it has many endemic species, six endemic genera and one endemic family of trees as well as relict cycad populations, suggesting that this vegetation type is biogeographically ancient (Mucina & Rutherford 2011).

##### **Subtropical Estuarine Salt Marshes**

These salt marshes are found in the Eastern Cape and KwaZulu-Natal Provinces north of Kei Mouth eastwards towards Mozambique (Mucina & Rutherford 2011). The marshes comprise estuaries and salt marsh plains with complexes of low herblands dominated by succulent chenopods and other flood tolerant halophytes. Salt marsh

meadows are also dominated by rushes and sedges, *Spartina*-flooded swards and submerged *Zostera* sea meadows. Important taxa include *Spartina maritima*, *Zostera capensis*, *Sarcocornia natalensis*, *Salicornia pachytachya*, *Cyperus laevigatus* and *Sarcocornia pillansii* among others. This vegetation type is Least Threatened, with a conservation target of 24% and an unknown percentage statutorily conserved. Threats include dune mining, development (especially in KZN) and impacts associated with sugar cane farming (Mucina & Rutherford 2011). Where the site overlaps with the 1 in 100 year floodline the saltmarshes are present.

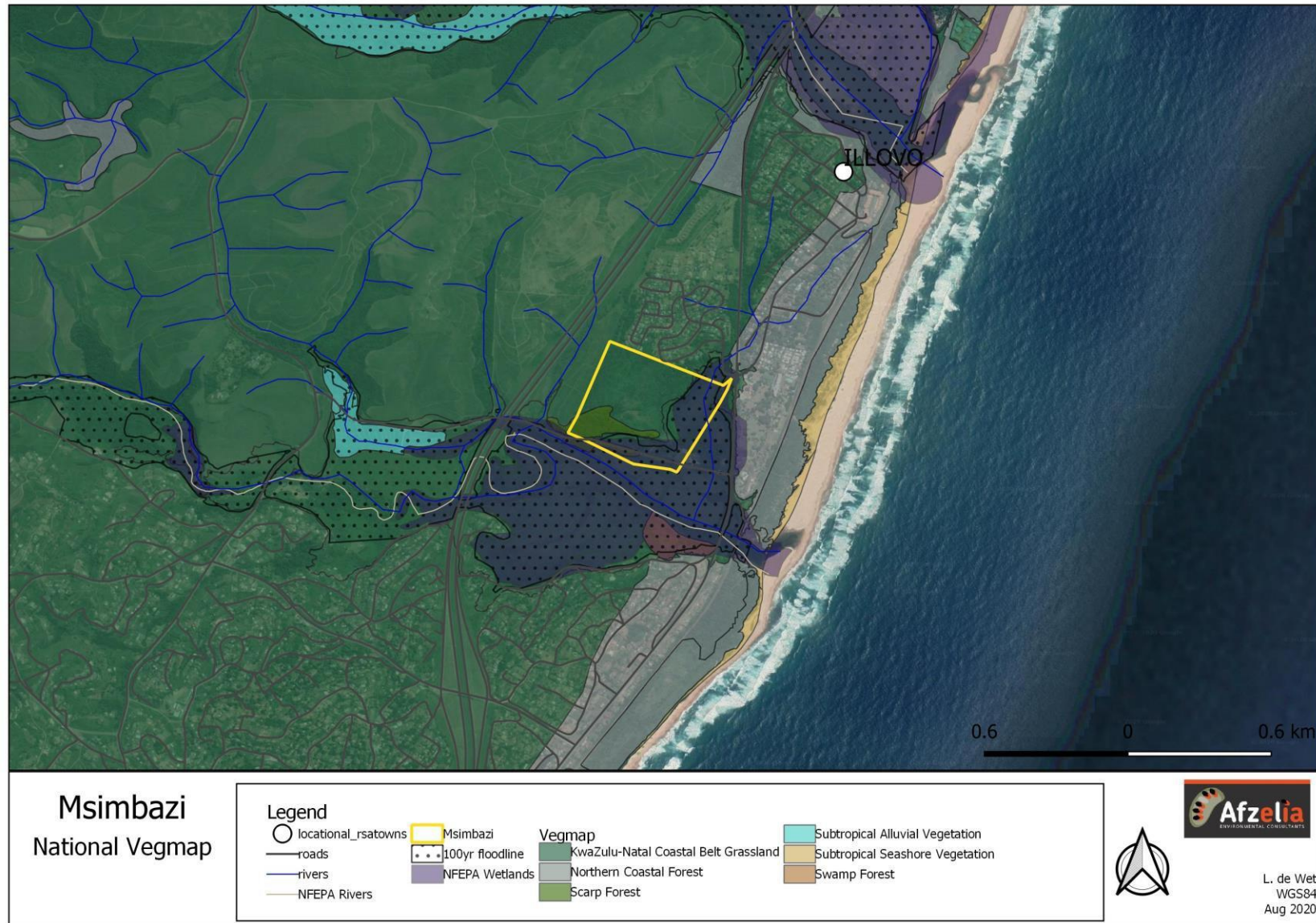


Figure 3: Mucina and Rutherford (2018 Beta) Vegetation map of the Project site

### 3.1.2 Flora

#### Plant species

An overall species list for the project site and surrounds was generated on Plants of South Africa (POSA), a South African National Biodiversity Institute (SANBI) database of all plants collected and recorded from specific locations. In addition, the list of plants associated with the National Vegetation Map vegetation type was also added (Mucina & Rutherford 2006). This combined overall expected plant list included 825 species of plants (Appendix B). The most common plant families on this expected plant species list are as follows:

- Asteraceae (Daisy family) with 100 species;
- Fabaceae (Pea family) with 78 species;
- Poaceae (Grass family) with 70 species;
- Rubiaceae (Coffee family) with 33 species; and
- Cyperaceae (Sedge family) with 31 species.

#### Invasive species

There are also a number of alien invasive and non-indigenous species expected for the site and include those alien invasive species listed in Table 5. Not all non-indigenous species are problematic, and only some are alien invasive species according to legislation. It is the plants listed on either the Conservation of Agricultural Resources Act (CARA) or National Environmental Management: Biodiversity Act (NEM:BA) lists that the landowner is mandated to control depending on their status. Both the CARA and the NEMBA have lists of invasive species and regulations with regards to their control.

NEM:BA specific restrictions applicable to the site include the following:

Restricted activities as defined in the Act	Category 1b	Category 2	Category 3
b. Having in possession or exercising physical control over any specimen of a listed invasive species	Exempted	Permit required	Exempted
f. Spreading or allowing the spread of any specimen of a listed invasive species	Prohibited	Permit required	Prohibited

CARA legislation states the following:

Category 1: Invader plants must be removed & destroyed immediately. No trade in these plants.

Category 2: Invader plants may be grown under controlled conditions in permitted zones. No trade in these plants.

Category 3: Invader plants may no longer be propagated or sold. Existing plants do not need to be removed.

**Table 5: Expected invasive and non-indigenous species for the Msimanzi Development site.**

Family	Species	Common name	CARA	NEMA
Anacardiaceae	<i>Schinus terebinthifolius</i>	Brazilian pepper	1	1b
Asteraceae	<i>Ageratum conyzoides</i>	Invading ageratum	1	1b
	<i>Chromolaena odorata</i>	Siam weed	1	1b
	<i>Coreopsis lanceolata</i>	Lance-leaved coreopsis		1a
	<i>Montanoa hibiscifolia</i>	Tree daisy	1	1b



	<i>Tithonia diversifolia</i>	Mexican sunflower	1	1b
Basellaceae	<i>Anredera cordifolia</i>	Madeira vine	1	1b
Cactaceae	<i>Pereskia aculeata</i>	Barbados gooseberry	1	1b
Convolvulaceae	<i>Ipomoea alba</i>	White morning glory	1	
	<i>Ipomoea indica</i>	Blue dawn flower	1	
Fabaceae	<i>Senna bicapsularis</i>	Rambling cassia	1	1b
	<i>Senna hirsuta</i>	Hairy senna		1b
	<i>Senna occidentalis</i>	Coffee senna		1b
	<i>Senna septemtrionalis</i>	Arsenic bush		1b
Meliaceae	<i>Melia azedarach</i>	Syringa	3	1b
Myrtaceae	<i>Eucalyptus grandis</i>	Saligna gum	2	1b
	<i>Psidium guajava</i>	Guava	2	3
Papaveraceae	<i>Argemone mexicana</i>	Mexican poppy	1	1b
Petiveriaceae	<i>Rivina humilis</i>	Blood berry		1b
Phytolaccaceae	<i>Phytolacca octandra</i>	Forest inkberry		1b
Poaceae	<i>Pennisetum villosum</i>	Feathertop		1b
	<i>Sorghum halepense</i>	Johnson grass	2	2
Polygonaceae	<i>Triplaris americana</i>	Ant tree	1	1a
Pontederiaceae	<i>Eichhornia crassipes</i>	Water hyacinth	1	1b
Sapindaceae	<i>Cardiospermum grandiflorum</i>	Balloon vine	1	1b
Solanaceae	<i>Cestrum laevigatum</i>	Ink berry	1	1b
	<i>Datura stramonium</i>	Jimsonweed	1	1b
	<i>Solanum mauritianum</i>	Bugweed	1	1b
	<i>Solanum sisymbriifolium</i>	Dense-thorned bitter apple	2	1b
Verbenaceae	<i>Lantana camara</i>	Lantana	1	1b

### Species of Conservation Concern (SCC)

Species of Conservation Concern are important, as they are endemic, or listed on the RedList, Provincially (Nature Conservation Ordinance No. 15 of 1974) or Nationally Protected. The full plant species list can be found in Appendix B, all the SCC that have been recorded from the area (Quarter degree square within which the study area falls) can be found on this list (extracted from the POSA and Mucina & Rutherford lists), in the appendices. The list of possible SCC (147 species) is too large to reproduce here and can be found in the full list in the appendices.

SCC have been previously recorded from the area and surrounds, according to the POSA list. These include species that are listed on various lists. Of these species:

- Five are listed as expected on the list of nationally Protected Trees;
- None are listed on the National TOPs list;
- 114 species are recorded as endemic by POSA;
- 39 species are listed on the provincial conservation ordinance under Schedule 12;
- 2 species are listed as Critically Endangered on the Red Data List: *Hyobanche fulleri* and *Kniphofia pauciflora*;
- 2 species are listed as Endangered on the Red Data List: *Satyrium rhodanthum* and *Zeuxine africana*;
- 2 species are listed as Near Threatened on the Red Data List: *Aloe thraxsii* and *Cyphostemma flaviflorum*; and
- 3 species are listed as Vulnerable on the Red Data List: *Brachystelma sanderdonii*, *Cineraria gandulosa* and *Delosperma subpetiolatum*.



It is not possible that all of these species will be found on site; however, it is likely that several SCC will be located on site. Depending on which list these species are on, permits will be required if any are to be destroyed during the construction and/or operation of the proposed development.

### 3.1.3 Fauna

To determine the fauna likely to occur on site, the lists for the Quarter Degree Square within which the Development Site is contained were obtained from the Animal Demography Unit's virtual museum. These lists include all fauna previously recorded from the area. Although it's unlikely that all of these species will be found on site, primarily due to the influx of people and other anthropogenic disturbance, there are large areas of the site which form suitable habitat for faunal species and where they are highly likely to occur. List of expected species can be found in the Appendices (Appendix C to F).

#### Species of Conservation Concern

SCC that are likely to be recorded from the site include birds, mammals and herpetofauna (reptiles and amphibians). Lists of bird SCC can be found in Table 6, mammals in Table 7, reptiles in Table 8 and amphibians in Table 9.

**Table 6: Mammal Species of Conservation Concern recorded from the Development Site and surrounding area.**

Family	Scientific name	Common name	Red List	TOPs	KZN
Bovidae	<i>Philantomba monticola</i>	Blue Duiker	VU	VU	Sch2
	<i>Redunca arundinum</i>	Southern Reedbuck	LC	PR	
	<i>Tragelaphus scriptus</i>	Bushbuck (female)	LC		Sch2
Vespertilionidae	<i>Hypsugo anchietae</i>	Anchieta's Pipistrelle	NT		
	<i>Kerivoula argentata</i>	Damara Woolly Bat	NT		
	<i>Miniopterus schreibersii</i>	Schreibers's Long-fingered Bat	NT		

**Table 7: Bird Species of Conservation Concern recorded from the Development Site and surrounding area.**

Family	Scientific name	Common name	IUCN	TOPs	KZN
Accipitridae	<i>Circus ranivorus</i>	African Marsh-harrier	EN	PR	
	<i>Stephanoaetus coronatus</i>	African Crowned Eagle	VU		
Anatidae	<i>Anas sparsa</i>	African Black Duck			Sch2
Falconidae	<i>Falco biarmicus</i>	Lanner Falcon	VU		
	<i>Falco peregrinus</i>	Peregrine Falcon		VU	Sch9
Gruidae	<i>Balearica regulorum</i>	Grey Crowned Crane	EN	EN	Sch9
Haematopodidae	<i>Haematopus moquini</i>	African Black Oystercatcher	LC		
Heliornithidae	<i>Podica senegalensis</i>	African Finfoot	VU		
Laridae	<i>Sterna caspia</i>	Caspian Tern	VU		
Pandionidae	<i>Pandion haliaetus</i>	Osprey			Sch9
Pelecanidae	<i>Pelecanus rufescens</i>	Pink-backed Pelican	VU	EN	Sch9
Phalacrocoracidae	<i>Phalacrocorax capensis</i>	Cape Cormorant	EN		
Stercorariidae	<i>Catharacta antarctica</i>	Subantarctic Skua	EN		
Sulidae	<i>Morus capensis</i>	Cape Gannet	VU		

**Table 8: Reptile Species of Conservation Concern Recorded from the Development Site and surrounding area.**

Family	Scientific name	Common name	Red list	TOPs	KZN
Chamaeleonidae	<i>Bradypodion melanocephalum</i>	KwaZulu Dwarf Chameleon	VU		
Cordylidae	<i>Chamaesaura macrolepis</i>	Large-scaled Grass Lizard	NT		
Elapidae	<i>Dendroaspis angusticeps</i>	Green Mamba	VU		
Lamprophiidae	<i>Macrelaps microlepidotus</i>	Natal Black Snake	NT		
Pythonidae	<i>Python natalensis</i>	Southern African Python	LC	PR	Sch 7
Scincidae	<i>Scelotes inornatus</i>	Durban Dwarf Burrowing Skink	CR		

**Table 9: Amphibian Species of Conservation Concern recorded from the Development Site and surrounding area.**

Family	Scientific name	Common name	IUCN	TOPs	KZN
Hyperoliidae	<i>Hyperolius pickersgilli</i>	Pickersgill's Reed Frog	EN		
Pyxicephalidae	<i>Natalobatrachus bonebergi</i>	Kloof Frog	EN		

### 3.1.4 Protected areas

#### Protected areas

Protected areas are defined by the Protected Areas Expansion Strategy as: areas of land or sea that are protected by law and managed mainly for biodiversity conservation” (Government of South Africa, 2008). Formal protected areas include those that are recognised in the National Environmental Management: Protected Areas Act (Act 57 of 2003). Several categories of Protected Area exist and include special nature reserves, national parks, nature reserves and protected environments.

The function of protected areas is to ensure ecological sustainability and adaptation to climate change (Government of South Africa, 2008). They ensure the continued provision of ecosystem services such as the provision of clean water, flood attenuation, erosion prevention, carbon sequestration and aesthetic and spiritual value.

Proximity to protected areas is important as close proximity may indicate that the area is important for biodiversity. There is one reserve, the Aliwal Shoal Marine Protected Area within 10km, to the south coast of the proposed development site (Figure 3.2).

#### National Protected Areas Expansion Strategy (NPAES)

Overall, South Africa has insufficient protected areas to ensure the conservation of different vegetation, marine and habitats. As a result, the National Protected Areas Expansion Strategy (NPAES) was developed. Overall, targets are established for protected areas that indicate how much of an ecosystem should be included in protected area and help to focus protected area expansion on the least protected ecosystems (Government of South Africa, 2008).

The NPAES utilises biodiversity thresholds that are specific to ecosystems ensuring that the targets and areas earmarked for protected area expansion are based on science (Government of South Africa, 2008). Two factors, importance and urgency are used to determine which areas should be prioritised as protected areas. There are 42 focus areas for land-based protected area expansion. These areas are “large intact and unfragmented areas suitable for the creation or expansion of large protected areas” (Government of South Africa, 2008).

Protected areas are important to look at in relation to the study site. If there are protected areas within 10km of the study site, or PAES focus areas within 10km of the study site, this indicates that the study area may be important from a biodiversity perspective. Proximity to protected areas and expansion areas is thus important for looking at biodiversity value of a site. There is one focus area within 10km of the study site (Figure 4)

#### Important Bird Areas

Important Bird Areas are areas internationally recognised for the bird species that occur there and are internationally important for bird conservation, there are no IBAs within 10kms of the study site (BirdLife SA 2018).

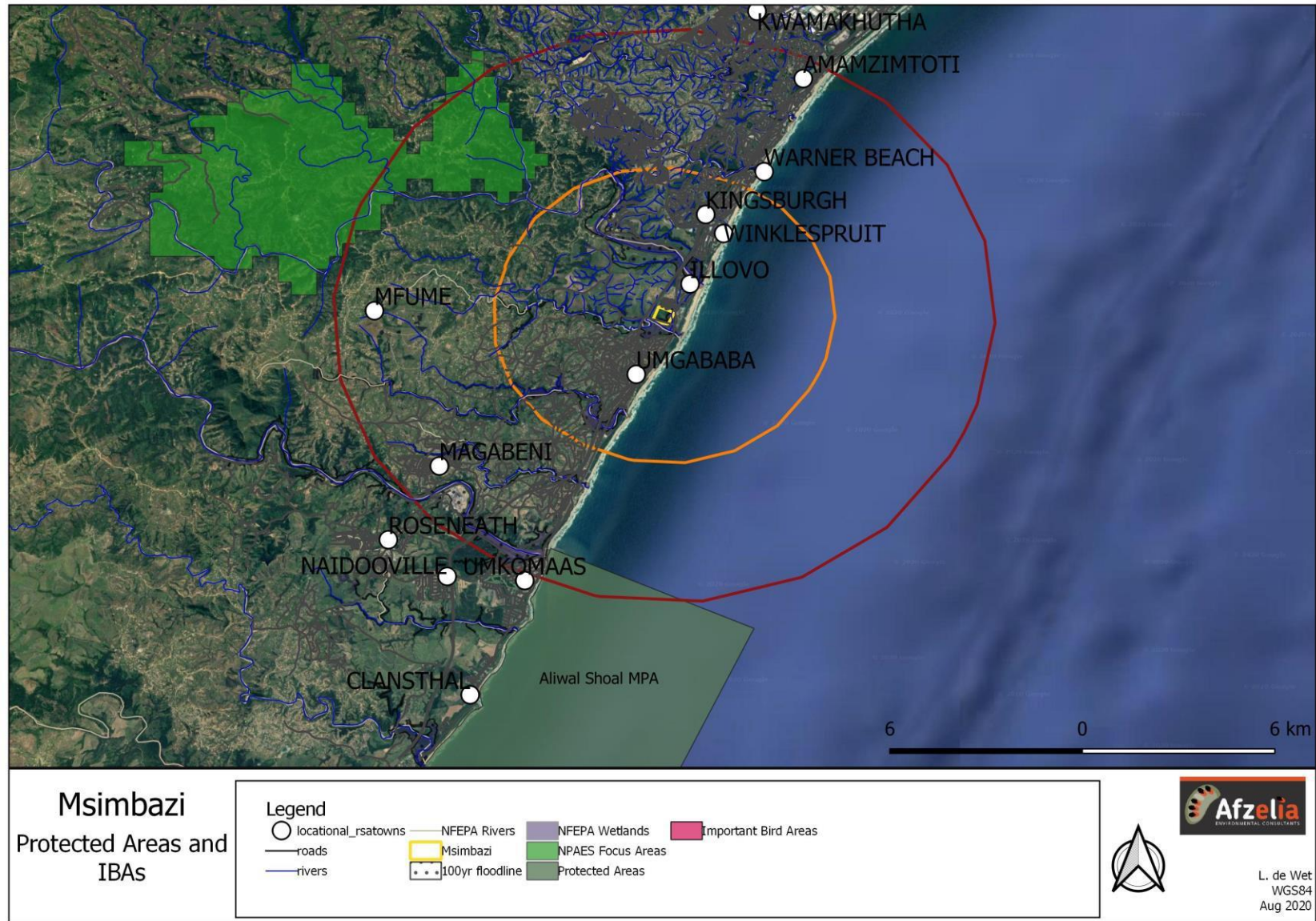


Figure 4: Protected areas and NPAES areas in relation to the study site.

### 3.1.5 Conservation guidelines

#### Threatened Ecosystems

According to the National List of Threatened Ecosystems in Need of Protection, the study area falls within the Critically Endangered Southern Coastal Grasslands (Figure 5). The list of Threatened Ecosystems has been gazetted (National Environmental Management: Biodiversity Act: National List of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002, 9 December 2011). Critically Endangered Ecosystems should be kept natural as far as possible to maintain ecosystem services as well as conservation of threatened ecosystems and associated biodiversity values themselves.

#### KwaZulu-Natal Biodiversity Plan

The KwaZulu-Natal Biodiversity Plan defines the areas of land in the form of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) required to ensure the persistence and conservation of biodiversity within the province (Ezemvelo KZN Wildlife, 2016). The spatial plan then provides a tool to guide conservation and protected area expansion as well as informing economic sectors involved in alien plant control, conservation officer priorities and guiding the nature of development (Ezemvelo Wildlife 2016).

The spatial guidelines provided by the plan outline two main categories of areas that are required to meet conservation targets for the province (Ezemvelo KZN Wildlife 2016). These two main categories include Critical Biodiversity Areas (CBAs) and Ecological Support Areas, including corridors (ESAs). These are further divided into smaller categories, which are outlined in Table 10 The plan then defines land-use objectives for each type of land, these are outlined in Table 11 (Ezemvelo KZN Wildlife 2016).

The site is located within an Irreplaceable CBA (Figure 6). Land use for such areas is to be maintained in a natural state and managed for conservation.

**Table 10: Subcategories of CBA and ESAs.**

<b>Critical Biodiversity Areas (CBAs) –</b> Crucial for supporting biodiversity features and ecosystem functioning and are required to meet biodiversity and/or process targets	
Critical Biodiversity Areas: Irreplaceable	Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.
Critical Biodiversity Areas: Optimal	Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process, but is informed by expert input).
<b>Ecological Support Areas (ESAs) –</b> Functional but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within Critical Biodiversity Areas.	
Ecological Support Areas	Functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to the maintenance of Ecosystem Services.



Ecological Support Areas: Species Specific	Terrestrial modified areas that provide a critical support function to a threatened or protected species, for example agricultural land or dams associated with nesting/roosting sites.
Ecological Support Areas: Buffers	Terrestrial areas identified as requiring land-use management guidance not necessarily due to biodiversity prioritisation, but in order to address other legislation/ agreements which the biodiversity sector is mandated to address, e.g. WHS Convention, Triggers Listing Notice criteria, etc.

\*Taken from Ezemvelo KZN Wildlife, 2016)

**Table 11: Land-use objectives for the Terrestrial Conservation Categories.**

Map Category	Guiding description of categories	Land-Use Management Objective
Protected Areas (PAs)	Protected areas as declaration under NEMPA	Maintain in a natural state with limited to no biodiversity loss
Critical Biodiversity Areas (CBAs)	Natural or near-natural landscapes that include terrestrial and aquatic areas that are considered critical for meeting biodiversity targets and thresholds, and which safeguard areas required to ensure the persistence of viable populations species, and the functionality of ecosystems and Ecological Infrastructure*.	Maintain in a natural state with limited to no biodiversity loss.
1. CBA: Irreplaceable	Areas which are required to meet biodiversity conservation targets, and where there are no alternative sites available. (Category driven by species and feature presence).	Maintain in a natural state with limited to no biodiversity loss.
2. CBA: Optimal	Areas that are the most optimal solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process).	Maintain in a natural state with limited to no biodiversity loss
ESA: Buffers	Areas identified as influencing land-use management that are not derived based on biodiversity priorities alone, but also address other legislation/ agreements which the biodiversity sector is mandated to address, e.g. WHS Convention, triggers Listing Notice, etc.	Maintain or improve ecological and tourism functionality of a PA or WHS.
3. ESA: Protected Area Buffer	Unless otherwise stated, the represents an area extending 5km from the PAs or where applicable PA delineated buffers.	Maintain or improve ecological and tourism functionality of a PA.
4. ESA: World Heritage site Buffer	Unless otherwise stated, this represents an area extending 10km from the WHS or where applicable area specifically defined for WHS.	Maintain or improve ecological and tourism functionality of WHS.
Terrestrial Ecological Support Areas (ESAs)	Functional but not necessarily entirely natural terrestrial land that is largely required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to Ecological Infrastructure.	Maintain ecosystem functionality and connectivity allowing for some loss of biodiversity.
Terrestrial Ecological Support Areas: Species specific	Modified but area is providing a support function to a threatened or protected species.	Maintain current land use or rehabilitate back to functional natural area.
Natural Biodiversity Areas	All natural areas not already included in the above categories	Maintain basic ecosystem functionality.
Modified	Areas with no significant natural vegetation remaining and therefore regarded as having a low biodiversity value (e.g. areas under cultivation).	Sustainable management.

\*Ecological Infrastructure refers to functioning ecosystems that deliver valuable services to people and the environment. These areas were previously referred to as *Ecosystem Goods and Service Areas*.



## D'MOSS

D'MOSS covers 94 000ha of interconnecting open spaces throughout the Durban Metro with the aim of conserving biodiversity and ecosystem services within the municipality (eThekweni municipality 2011). Included are nature reserves, public and private spaces. Overall, 2 400 ha of estuaries (including sand and mudbanks, mangroves and swamp forests), 14 000ha of forests, 7 500ha of wetlands, 13 000ha of grasslands and 40 000ha of valley thicket are included. If maintained as managed and protected areas, D'MOSS areas assist in maintaining the national biodiversity conservation targets. These areas are also responsible for the provision and maintenance of important ecosystem services such as soil production, erosion control, water supply and regulation, flood attenuation, climate control and cultural and recreational services among others. D'MOSS areas are defined in order to maintain:

- “as many functional ecosystems as possible;
- The widest range of open space types (e.g. grassland, forests, wetland)
- Physical links between open spaces to allow for the flow of genetic material, energy, water and nutrients
- Physical links to and between significant sources of biodiversity (e.g. Pondoland and Maputaland centres of plant diversity) to prevent local species extinctions in the eThekweni Municipal Area
- Physical links along the coast, connecting river catchments to marine sources of biodiversity.” (eThekweni Municipality 2011).

D'MOSS areas should be protected and managed for conservation. Any change to these areas should be made with discussions with the Municipality. The forest and salt marsh areas of the site fall into terrestrial D'MOSS and should be conserved as far as is possible (Figure 7). If any of these areas is to be used for the construction or operational phase of the development, the municipality must be contacted and discussions with regards to relaxing the D'MOSS must be had.

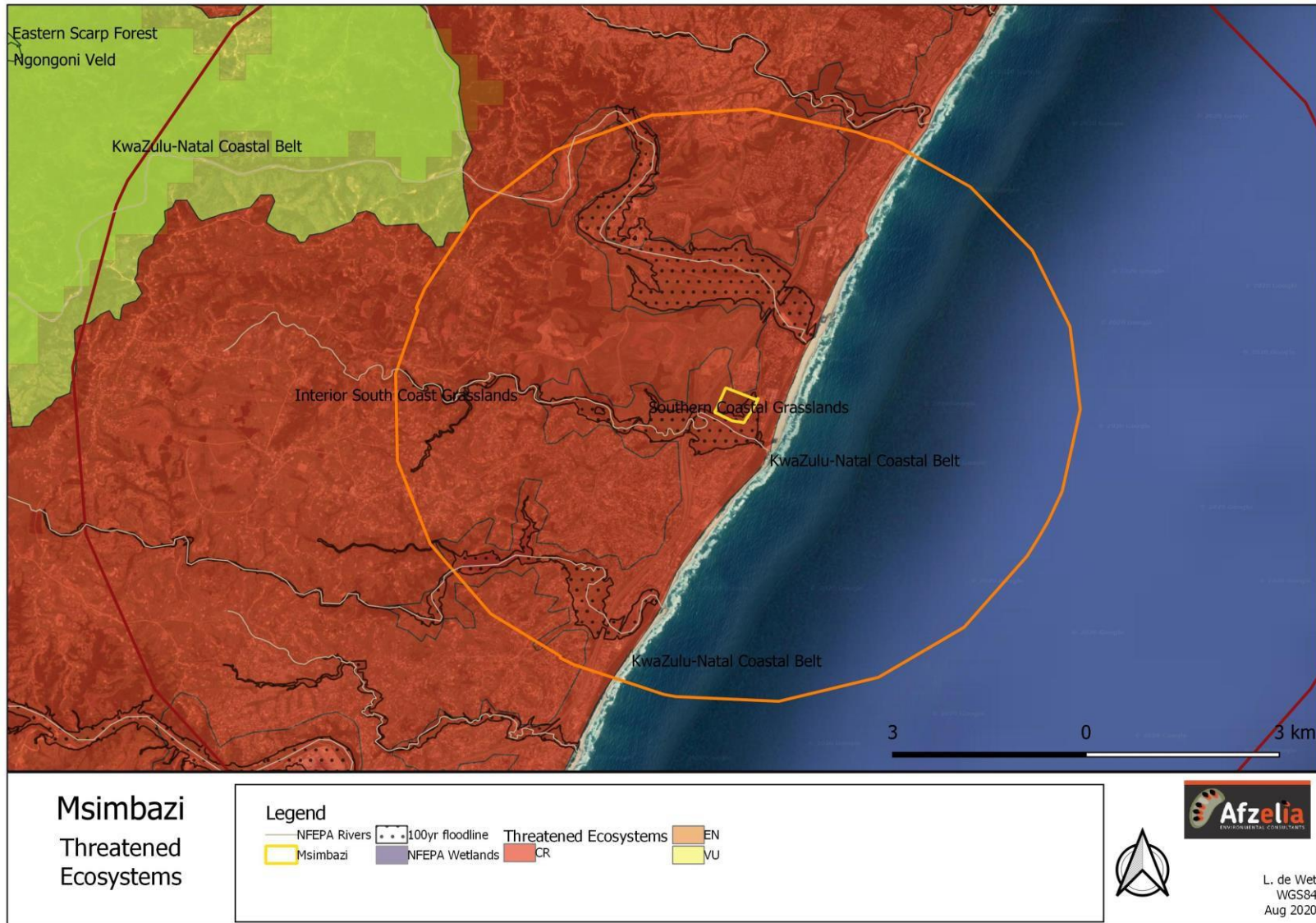


Figure 5: Threatened Ecosystems in relation to the study area.



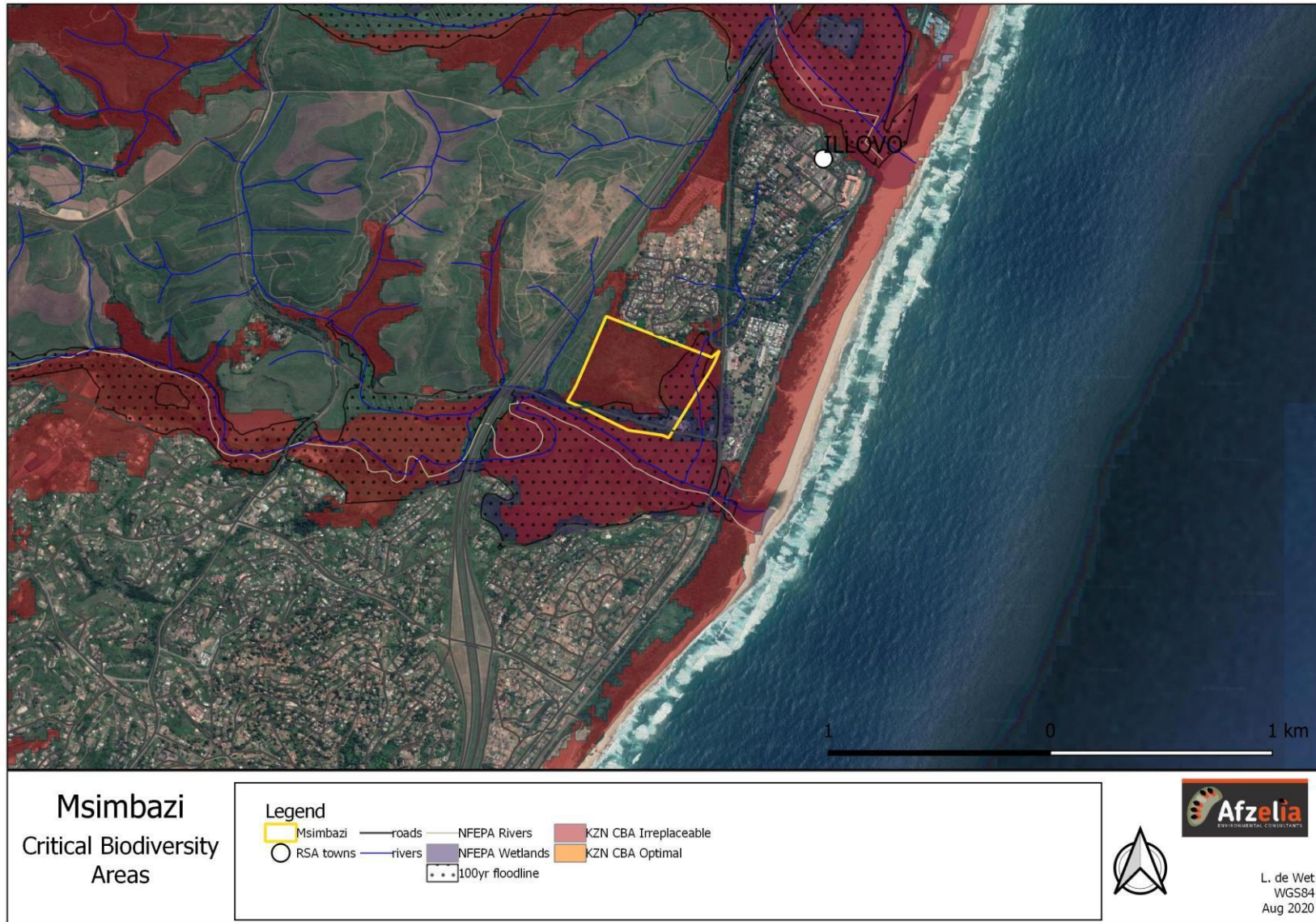


Figure 6: Critical Biodiversity Areas and Ecological Support Areas in relation to the study area





Figure 7: D'MOSS Areas in relation to the study area.



### 3.2 Historical land use

The site has been disturbed in the past with buildings and associated infrastructure in the southeast corner and along the road running between the site and the river. In addition, a large area of the site has been cleared and used as an agricultural area in the past. Although some of the site remains undisturbed in recent history (prior to 2003), much of the centre of the site along with the south and east has been disturbed and any current vegetation in these areas is secondary with alien invasive species dominant. The area to the south west which forms a steep slope leading to the riverbank saltmarsh area has not been disturbed and remains largely intact indigenous forest. In addition, an area to the north east of the site extending into the middle has remained largely tree-less for the last 20 years and comprises coastal scrub and associated grasses.

Images below indicate the history of the site with Figure 8 showing the presence of two sets of buildings and associated infrastructure on the south east corner, as well as a partially cleared area in the centre of the site. Figure 9 shows the large cleared area in the centre of the site as well as the absence of one of the buildings present in 2003. Finally, Figure 10 indicates the site in its current state with some of the vegetation having recovered and the continued presence of the indigenous forest.



**Figure 8: 2003 image of the site with buildings and associated infrastructure in the south east corner of the site and some disturbance in the centre of the site.**





**Figure 9: The site in 2014 showing clearly a large area of cleared vegetation for agriculture.**



**Figure 10: A current view of the site (2020) indicating the revegetation. Of much of the previously cleared areas.**



### 3.3 Field assessment

The site as a whole is largely disturbed with a residential development to the north, the continued use and degradation of the estuary to the south, a road to the east and south as well as sugar cane fields to the west. The internal areas of the site have been excavated in the past, resulting in the influx of several alien invasive species resulting in completely transformed vegetation in these areas. Some of these areas have recovered to comprise indigenous coastal scrub typical in its species composition but with several saplings of indigenous trees indicating that it may, in time, revert to forest. Narrow sections adjacent to the southern road, western sugarcane fields and northern housing development comprise indigenous forest, with the largest patch present on the highest point of the site along a very steep slope. A wetland is also present to the east of the site.

Images below indicate the vegetation variation in the site including:

- Indigenous forest on the highest point of the site surrounded by alien (and the yellow indigenous plant *Osteospermum moniliferum* which tends to grow profusely in disturbed areas) stands as well as small area of coastal scrub (Figure 11)
- The area adjacent to, and surrounding the existing buildings on the site have also been degraded and cleared in the past resulting in a succession of mainly alien invasive plants (Figure 12)
- A wetland is present on the east of the site with surrounding forest (Figure 13).



**Figure 11: Indigenous Forest, alien stands and coastal scrub.**





*Figure 12: Houses and associated anthropogenic disturbance, alien stands.*



*Figure 13: Wetland at the bottom east of the site with surrounding forest.*

### 3.3.1 Vegetation and flora

The vegetation of the site comprises several different vegetation communities as described below:

#### Wetland

There is a wetland at the lowest point of the site which is fairly large in size and comprises primarily reed beds. Details of the wetland and wetland associated vegetation and soils is given in the separate wetland assessment and is not dealt with in the terrestrial ecological assessment.

#### Alien stands

Much of the site is comprised of dense stands of alien invasive plant species interspersed with limited indigenous individuals but co-occurring with the abundant indigenous shrub *Osteospermum moniliferum* (Figure 14). These species indicate the past disturbance over much of the centre of the site. The mass of often impenetrable vegetation includes the dominant species *Schinus terebinthifolius*, *Lantana camara* and *Chromolaena odorata* however, a staggering number of alien invasive species were recorded from the site. This is not considered a vegetation community type per se however, the area acts as a corridor for faunal movement and may supply food and forage for mammals and avifauna throughout the site, as well as providing safe passage from one side of the site to another. It is assessed here as a loss of a corridor more so than the direct loss of biodiversity as the control of alien invasive plants, especially those encroaching into the forest of this site is essential.

#### Forest

The forest of the site is largely intact indigenous forest comprising typical forest species such as *Albizia adianthifolia*, *Syzygium cordatum*, *Apodytes dimidiata*, *Antidesma* sp. and others (Figure 16). Understorey species include *Psychotria capensis* as a dominant species along with *Oplismenus* and the forest sedge. Also occurring are the megaherb *Strelitzia Nicolai* and the palm *Phoenix reclinata*. These indigenous forest patches are under pressure from anthropogenic influences including influx of people using the area for hiking, as well as the influx of domestic dogs and cats (at least two dogs were caught on camera traps within the indigenous forest). Additionally, several alien invasive species have permeated the forest and should be removed prior to further forest degradation. Alien species found within the forest include *Solanum mauritianum* and *Schinus terebinthifolius*. In clearings created by natural tree fall, aliens are dominated by *Lantana camara* and *Chromolaena odorata* which should not be allowed to continue to grow within the forest areas. Adjacent to the sugar cane fields the forest is bordered by a thick stand of alien plants as well.

#### Flora

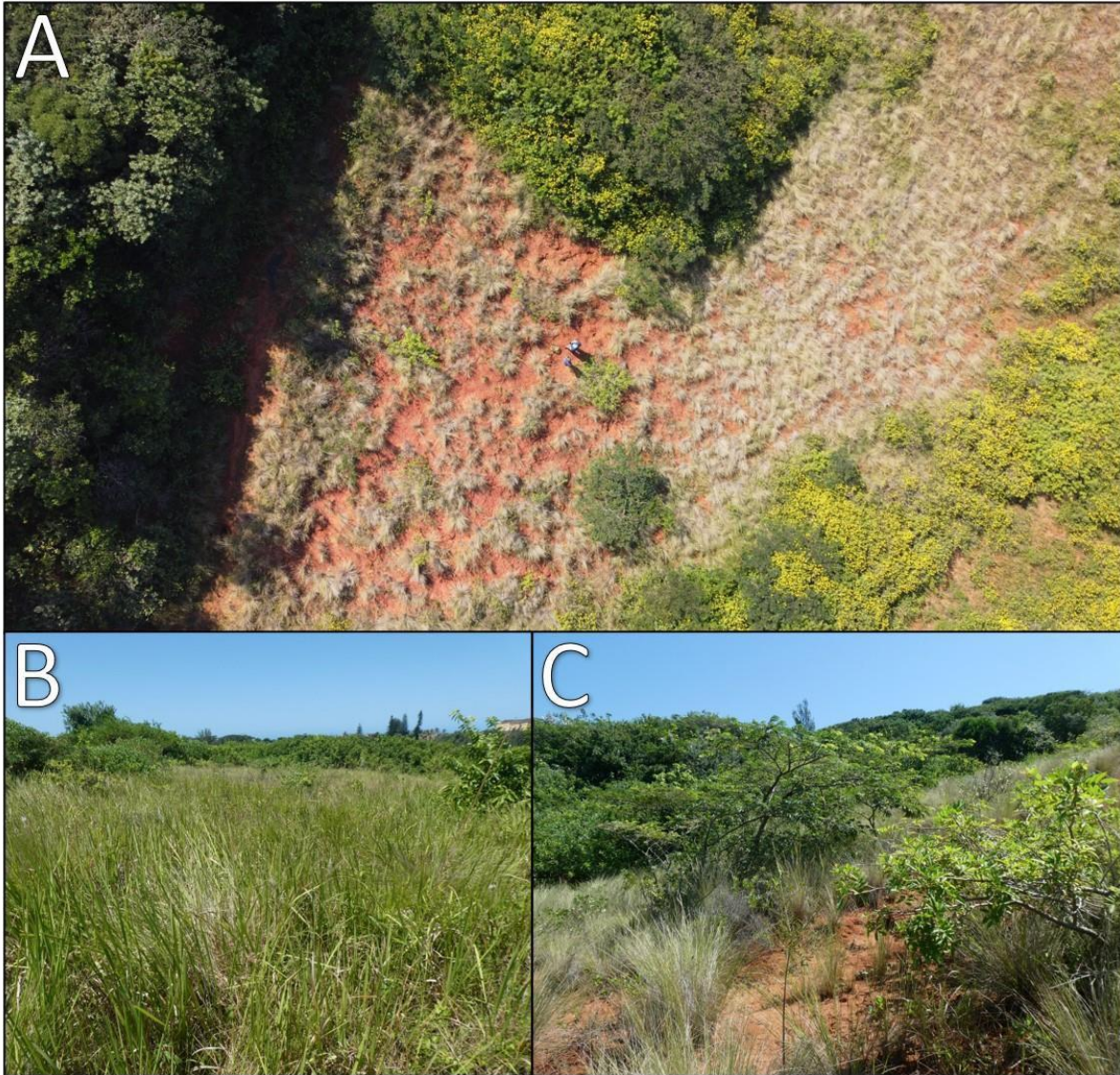
Some of the indigenous flora of the site can be seen in Figure 17 and the full species list can be found in Appendix B. No Species of Conservation Concern were found on site though it is likely that some occur within the forest areas. None are expected within the alien stands due to the allelopathic nature of *Schinus terebinthifolius*.





**Figure 14: Alien stands including A: impenetrable alien stands occur throughout previously disturbed areas of the site with few indigenous species. B: *Schinus terebinthifolius* and C: *Arundo donax***





**Figure 15: A: Coastal scrub occurring in the centre of the site including the dominant grass species *Aristida junciformis* and asteraceous shrub *Helichrysum krausii*. B: Some areas comprise the wetness and disturbance indicator grass *Imperata cylindrica* and C: in some areas forest tree saplings have established including *Albizia adianthifolia*.**





*Figure 16: Forest of the site occurring on steep slopes.*



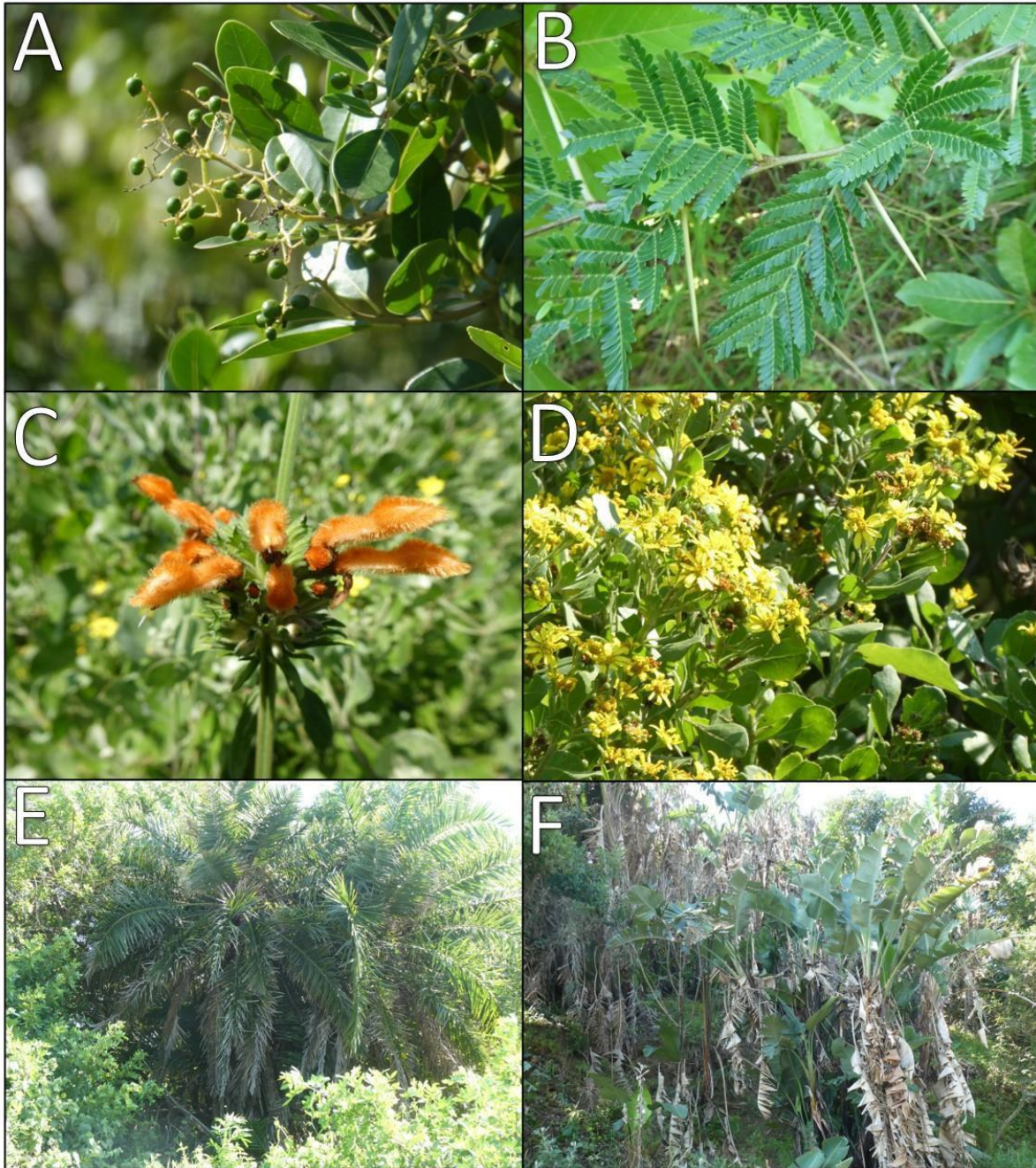


Figure 17: Indigenous flora of the study site. A: *Apodytes dimidiata*, B: *Albizia adianthifolia*, C: *Leonotis* sp. D: *Osteospermum moniliferum*, E: *Phoenix reclinata* and F: *Strelitzia Nicolai*.



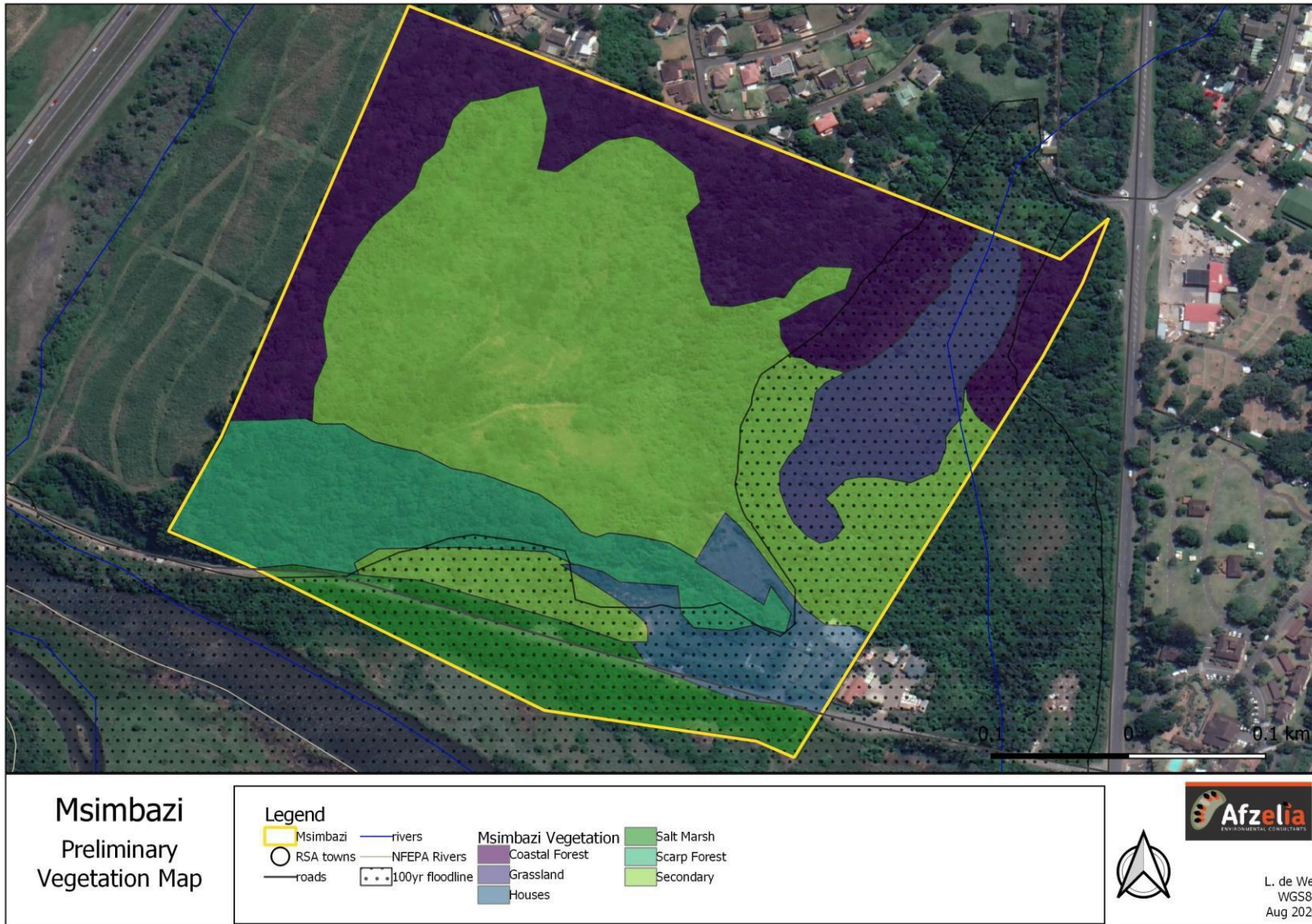
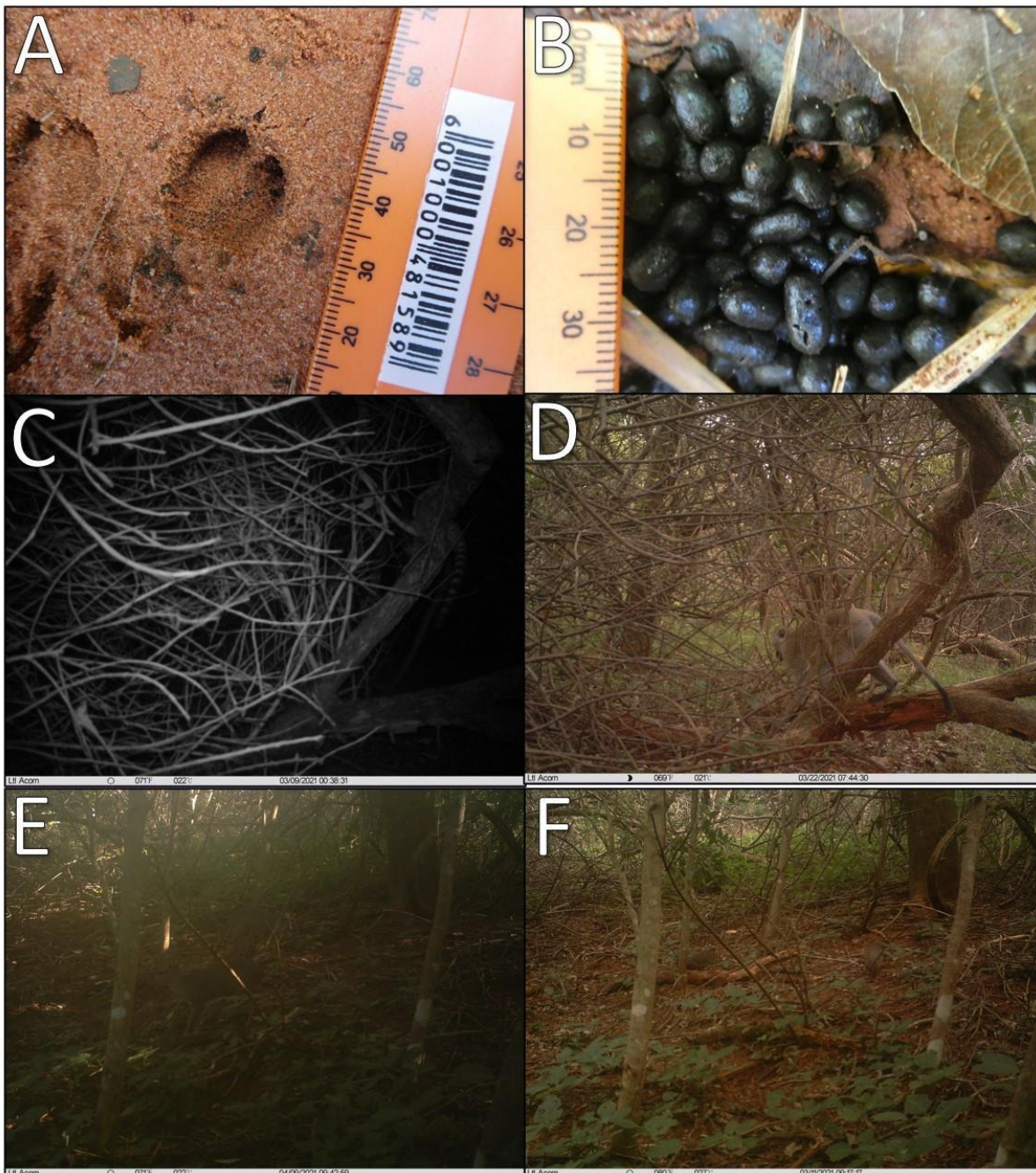


Figure 18: Indigenous flora of the study site. A: *Apodytes dimidiata*, B: *Albizia adianthifolia*, C: *Leonotis* sp. D: *Osteospermum moniliferum*, E: *Phoenix reclinata* and F: *Strelitzia Nicolai*.



### 3.3.2 Fauna

Numerous faunal species were found on site, some of which can be seen in Figure 19. These fauna (particularly mammals) were recorded from the indigenous forest on steep slopes. As the Blue Duiker is protected, the habitat in which it occurs must be maintained. Details of faunal species recorded can be found in the appendices.



**Figure 19: Fauna recorded from site, A: Blue duiker spoor, B: Blue duiker dung, C: Large spotted genet, D: vervet monkey, E: a pair of blue duiker and F: Banded mongooses.**



## 4 Sensitivity

### 4.1 General sensitivity

Characteristics of the site contributing to sensitivity and biodiversity value were assessed and ranked, and the resulting matrix used to calculate a sensitivity score, which could be applied to each of the vegetation communities and habitats. Forests and rocky outcrops, as these are essential for the function of ecosystems and form niche habitats, are assigned a high sensitivity automatically. Characteristics included the following:

- Species of Conservation Concern (Any red listed or protected species);
- Presence of sensitive habitats (such as wetlands, rocky outcrops);
- Presence of Critical Biodiversity Areas;
- Level of degradation of the site (erosion, grazing);
- Presence of indigenous vegetation;
- Proximity to watercourses;
- Proximity to wetlands;
- Proximity to National Parks;
- Proximity to other protected areas;
- Proximity to National Protected Areas Expansion Strategy (NPAES) Focus Areas;
- Proximity to Important Bird Areas (IBAs);
- Proximity to Ramsar sites;
- Proximity to World Heritage Sites; and
- Proximity to Threatened Ecosystems as gazetted.

### 4.2 Forests and forest buffers

Forests, including coastal forests, provide vital ecosystem goods and services and should be kept as intact as possible. In order to do so, buffers surrounding forests are recommended to reduce the anthropogenic impacts on forests.

Previous land uses of the site, have resulted in the reduction of the size of the forest as well as the elimination of any natural ecotone, making the forest edge abrupt. A buffer will allow the ecotone to develop in addition to adding a buffer zone to reduce the impact of anthropogenic activities as well as alien invasion.

The Guidelines for Biodiversity Impact Assessment in KwaZulu Natal were consulted to determine buffers for the forest (KZN Wildlife, 2013). Buffer requirements are clearly laid out for forests in the guidelines, these tables are reproduced below. indicates the criteria for forest sensitivity mapping (for which all indigenous forest must be mapped as sensitive regardless of condition as per the guidelines). Line items that are applicable to this context and were used to determine buffers are highlighted.

According to the guidelines, the buffer for the forest should be measured at 100m from the forest edge.

**Table 12: Forest sensitivity mapping (highlighting denotes applicable criteria)**

<b>Buffer scaling</b>	<b>Minimum distance from ecotone</b>
<p><b>Forest is uniformly secondary or uniformly represents recent succession from grassland, woodland or scrub.</b></p> <p>Forest of the type will comprise younger trees, with pioneer and common species conspicuous. Species diversity will be low and rare or unusual species will be absent.</p>	20 metres
<p><b>Critically Endangered, Endangered or Vulnerable forest types</b></p>	100 metres
<p><b>Old Growth Forest</b> (Mature forest, not recently having succeeded from grassland, woodland or scrub. Has a diverse species composition, pioneer species will not be conspicuous, and rare or unusual species may additionally be present).  Old growth forest more than 5 hectares in extent or part of a mosaic of more than 5 hectares.</p>	100 metres
<p><b>Ecotone criterion</b></p> <p>Ecotones add considerably to the overall diversity of a forest, including its ability to maintain fauna. When compared to those in the forest interior, not only may different species occur, but these are often shorter-lived or more successional species.</p>	Buffer should at least equal the depth of ecotone and must allow for management options necessary to maintain the ecotone, including controlled burning.
<p><b>Shading</b> No unnatural shading into ecotone or natural forest.</p>	Calculation on a case by case basis.
<p><b>Activities creating ecological risk by storing or discharging pollutants or contaminants, or possibly accidentally discharging the same.</b> Use of herbicides, pesticides, fertilizers, bulk storage of fuels and hazardous chemicals; discharge into atmosphere of pollutants including particulate matter which attaches to surrounding vegetation.</p>	200 metres, but with increase if these impacts cannot be adequately mitigated at this distance.
<p><b>Activities likely to cause long term permanent or irreversible severe impacts</b> Some activities may so degrade land that they may cause persistent, permanent or irreversible impacts, such as where the site of the activity will remain a long-term centre of alien plant infestation and spread, or pollution.</p>	200 metres, but with increase if these impacts cannot be adequately reduced at this distance.
<p><b>Erosion</b> (Forests are particularly vulnerable to erosion due to sparse ground cover caused by high shade conditions. Buffers should be large enough to prevent increased overland flows into forest and its ecotone, due to surrounding land transformation).  Activities captured by this criterion will tend to extensively harden surfaces proximate to forest, such but not limited to some residential developments.</p>	Increased runoff to percolate to groundwater outside buffer. Engineering storm water solutions to remain outside buffer. Slopes and less permeable soils will tend to increase buffer.

Buffer scaling	Minimum distance from ecotone
<p><b>Hydrological Impacts</b> This criterion is most critical for wetland forest types.</p>	<p>Sized of buffer, and areas to be excluded from transforming activity with potential to change hydrology, should be assessed by a hydrologist. Buffering subcatchments must also be considered where necessary, such as establishing plantations around forests.</p>
<p><b>High intensity edge effects/disturbance along the forest edge</b> Categories include the following: -</p>	<p>Buffers should be set at a minimum of 100 meters</p>
<p>1. High noise Some public, infrastructural (roads, dams, airstrips), commercial and industrial developments.</p>	
<p>2. Frequent activity, including traffic Most public, infrastructural (roads, airstrips), commercial and industrial developments.</p>	
<p>3. Transfer of dust from dirt roads to surrounding vegetation Wherever dirt roads are established</p>	
<p>4. Periodic or recurrent physical disturbance to the ground and surrounding vegetation, including burning of adjacent transformed area outside of natural frequencies Cultivation involving ploughing, sugar cane farming, harvesting or planting of trees (plantations), mining, linear activities which will require periodic disturbance of ground or clearing of vegetation (pipelines and transmission lines).</p>	
<p>5. Activities which have high potential to spread alien species into forests and the ecotone.</p>	
<p>6. Activities which may result in trampling or grazing in the forest and ecotone i.e. Livestock farming</p>	
<p>7. Activities which establish large populations adjacent to forest which will likely result in heavy impacts from opening up of paths, illegal harvesting of timber and medicinal products, frequent burning, hunting, infiltration of forest by domestic animals especially dogs, which cannot be controlled by collective arrangements such as Homeowners Association or Body Corporate rules.</p>	<p>100 metres, but with increase if these impacts cannot be adequately reduced at this distance.</p>
<p><b>Activities adjacent to forest which will likely generate some ongoing moderate <i>ah hoc</i> negative impacts</b> For example, dumping of refuse; establishment or escape of alien plants including invasive garden ornamentals, or clearing beyond original footprint areas, where this cannot be controlled by an institution of collective arrangements such as Homeowners Association or Body Corporate rules.</p>	<p>60 metres but with an increase if these impacts cannot be adequately reduced at this distance.</p>

There is room for the Msimbazi development to have an overall positive impact on the forest, provided these areas are managed effectively for conservation. In this case, the forest areas have been identified as D'MOSS areas as well as irreplaceable CBA areas, and thus should be maintained as conservation areas. This would allow regeneration to occur where aliens are controlled.

Overall, the forest areas within the site are impacted at the edges through disturbance either through invasion of

alien plant species. If the forest were to be left as is, with no management measures put into place, the conservation and biodiversity value would continue to degrade, despite the recommended 100m buffer.

In order to ensure the continued health of the forest ecosystem on site, and only if the proponent is willing to manage the forest areas of the site for conservation throughout the life of the development, it is considered that a reduction in the buffer of 100m to 40m would be acceptable provided certain management criteria are met. The following recommendations are essential, should the buffer be reduced:

- Development and implementation of an alien invasive plant species management plan, which would remove and control the alien vegetation within and bordering forest areas throughout the life of the development;
- Development and implementation of a Conservation Management Plan
- Should activities other than alien plant management are to occur within the forest areas, these should be in line with conservation goals and include, but not be limited to:
  - Paths created for hiking and viewpoints
  - Benches placed in strategic areas for viewpoints and bird watching
  - Placement of bins to ensure proper disposal of litter
  - Placement of information boards to allow visitors to learn about the forests and associated fauna and flora
- Access control to the forest.



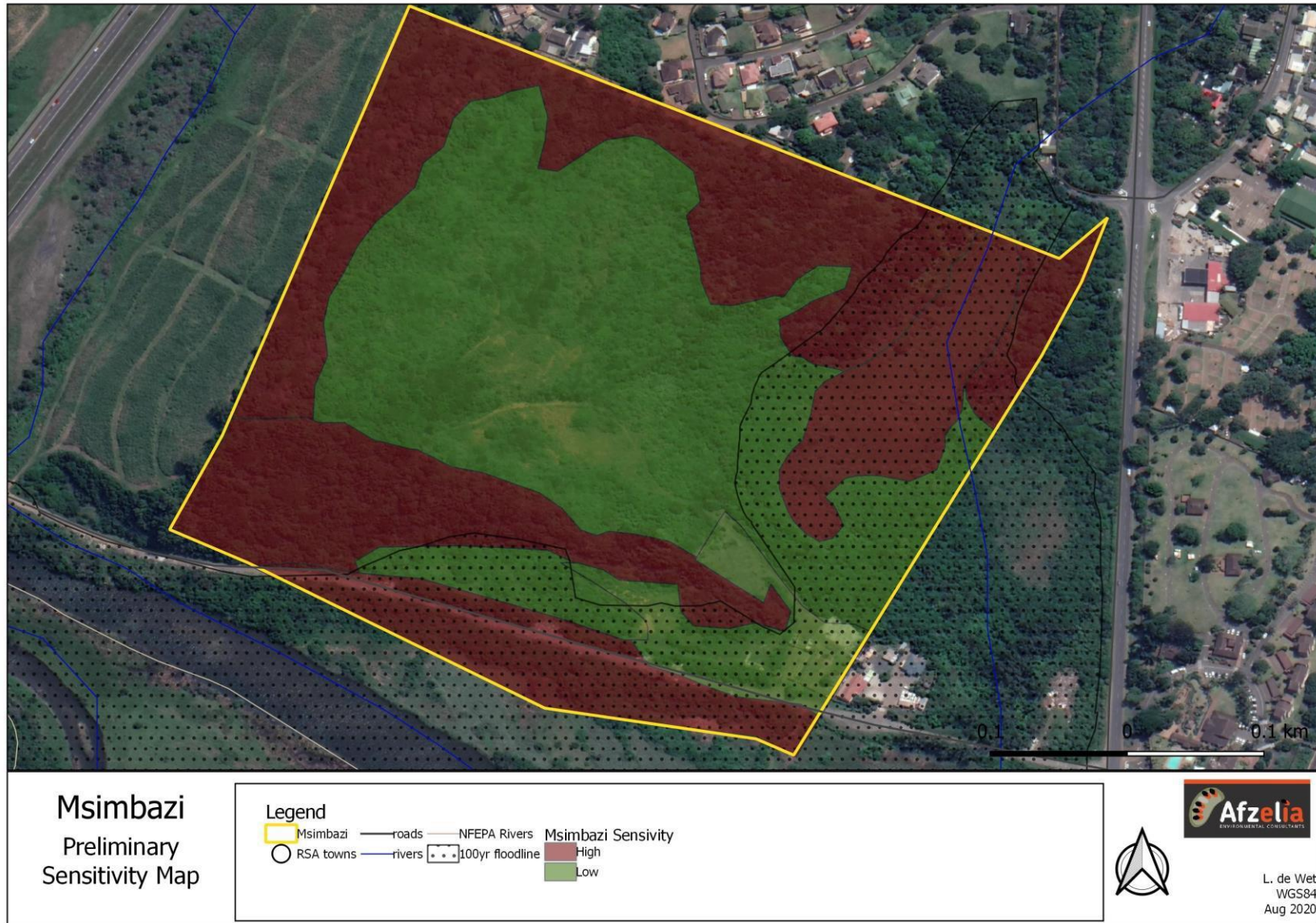


Figure 20: Sensitivity map of the Project Site.



## 5 Impact Assessment

The impacts on the terrestrial biodiversity have been rated according to the methodology in Section 2.3. They span three issues and five impacts, which are outlined in sections 5.1 through 5.3. Mitigation measures are also provided for each of the expected impacts. Impacts associated with the planned development are based on the picture/artistic representation of the plan provided.

Important to note are the current anthropogenic pressures on the site including continued use as a dumping ground and toilet, influx of people and influx of alien invasive plants. These pressures, coupled with the edge effects associated with a patch of isolated forest results in a relatively high negative long-term impact associated with leaving the site as is. Ultimately, this site will become heavily invaded as well as forming a dumping area which will result in the loss of ecosystem function, species richness and diversity, as well as habitat and continuity with similar vegetation communities.

### 5.1 Issue 1: Loss of Vegetation Communities

Vegetation will be lost permanently as a direct result of the construction phase of the project. The location of the proposed housing development is within the alien vegetation of the site, and does not pose a large threat to the forest unless no management measures are undertaken.

Possible mitigation measures include:

- The construction and operational footprint of the development must not extend past the site footprint and laydown areas should be placed outside of the forest in disturbed areas;
- Forest should be kept intact,
- Felling of large trees should be avoided as much as possible;
- Fencing the site and controlling access for people but allowing full access for fauna for the remaining forest area;
- Management and control of alien invasive species within and surrounding the proposed development including the remaining forest area.

#### 5.1.1 Impact 1: Loss of Coastal Scrub

Impact on this community type without mitigation is expected to be local in extent and moderate in magnitude over the long term and is highly probable, with an overall significance of medium negative. Application of the mitigation measures will ensure the impact is a low negative.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Local	2	Long term	4	Moderate	6	Highly probable	4	48	Medium -
With mitigation	Local	2	Short-term	2	Low	4	Improbable	2	16	Low -

### 5.1.2 Impact 2: Loss of Invaded areas

Impact on this community type without mitigation is expected to be local in extent and minor in magnitude permanently and is definite, with an overall significance of medium negative. Application of the mitigation measures will ensure the impact is a low negative.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Local	2	Permanent	5	Minor	2	Definite	5	45	Medium -
With mitigation	Minor	1	Permanent	5	Negligible	0	Definite	5	30	Low -

### 5.1.3 Impact 3: Loss of forest

According to the available plans, the forest will not be affected. However, it is recommended that the plans be adjusted if necessary, to ensure that all forest and associated buffers are excluded from the development footprint.

## 5.2 Issue 2: Loss of Species of Conservation Concern and Biodiversity

Loss of SCC and biodiversity is species specific and measures the impact of the proposed development on SCC and biodiversity.

Mitigation measures include:

- Application for permits for the removal of listed plant SCC;
- Removal and replanting/ relocation to a nursery of existing SCC;

### 5.1.4 Impact 4: Loss of flora SCC

Loss of the SCC without mitigation will be regional in extent, and moderate over the long term as well as highly probable. Overall significance is high negative but with application of the mitigation measures, the impact can be reduced to low negative.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Long term	4	Moderate	6	Highly probable	4	52	High -
With mitigation	Minor	1	Very short term	1	Minor	2	Probable	3	12	Low -

### 5.2.1 Impact 4: Loss of fauna SCC

Loss of the SCC without mitigation will be regional in extent, and moderate over the long term as well as highly probable. Overall significance is high negative but with application of the mitigation measures, the impact can be

reduced to low negative.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Long term	4	Moderate	6	Highly probable	4	52	High -
With mitigation	Minor	1	Very short term	1	Minor	2	Probable	3	12	Low -

### 5.3 Issue 3: Loss of Ecosystem Function and Process

Ecosystem function and process are important for terrestrial biodiversity. Invasion by alien flora species can result in the change of vegetation and the loss of function, especially when a grassland is converted to woodland, resulting in the reduction of available water and the drying up of wetlands and streams. The proposed development will further fragment an already fragmented ecosystem, even if managed for conservation.

Recommended mitigation measures include:

- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species over the full site for both the construction and operational phases of the proposed development;
- Keeping the disturbance footprint as small as possible; and
- Rehabilitation should take place as soon as possible after construction is completed.

#### 5.1.5 Impact 5: Fragmentation and edge effects

Overall, fragmentation of the ecosystem is high, with, the presence of high numbers of alien species adding to the fragmentation in terms of barriers to pollination, seed dispersal and animal movement. The site should be managed to reduce fragmentation where possible and corridors for ecological processes should be maintained.

Mitigation measures include:

- Providing for corridors of natural vegetation throughout the development;
- Management and control of alien invasive species within and surrounding the proposed development.

Fragmentation and edge effects without mitigation will be regional in extent, and moderate over the long term as well as highly probable. Overall significance is high negative but with application of the mitigation measures, the impact can be reduced to low negative.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Long term	4	Moderate	6	Highly probable	4	52	High -
With mitigation	Local	2	Long term	4	Low	4	Improbable	2	20	Low -



### 5.1.6 Impact 6: Invasion of alien species

There are already alien invasive species on site. There is a high risk of these invasive species spreading as the facility is constructed in addition to new species being introduced through seed dispersal, and on vehicles and personnel. This impact will be local in extent, permanent and moderate in magnitude. The impact is definite with an overall significance of high negative. With the application of mitigation measures, this impact can be reduced to low negative.

Mitigation measures include:

- Development and maintenance of corridors of indigenous vegetation on site;
- Management and control of alien invasive species within and surrounding the proposed development;
- Development and application of an alien invasive management plan; and
- Development and application of a rehabilitation plan for remaining natural areas.

Impact of alien invasive species without mitigation will be local in extent, and moderate and permanent as well as definite. Overall significance is high negative but with application of the mitigation measures, the impact can be reduced to low negative.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Local	2	Permanent	5	Moderate	6	Definite	5	65	High -
With mitigation	Minor	1	Short term	2	Minor	2	Probable	3	15	Low -

## 6 Conclusions and recommendations

The site comprises a large area of secondary vegetation, that has been disturbed in the past (long-term fallow agricultural lands) but is located within a critical CBA and D'MOSS in addition to being located alongside a river with associated estuarine salt marshes. Thus the conservation value of existing indigenous vegetation on site is high. The existing plan, however, located almost all of the infrastructure within previously disturbed areas, so the possibility that the conservation outcomes may be an overall positive should the development go ahead with an active conservation management plan and no plan to develop the remainder of the site.

It is considered highly likely that the development will result in overall positive impacts for the site should the following conditions be met:

- 1) The site plan may vary only within the bounds of low sensitivity areas
- 2) An Alien Invasive Plant Management Plan must be drawn up and implemented
- 3) A Conservation Management Plan must be drawn up and implemented for the remainder of the site that does not fall under the housing development
- 4) The high sensitivity areas of the site must be actively conserved throughout both the construction and operational phase of the development
- 5) Infrastructure placed in conservation areas should be conservation compatible and include hiking trails, view points with benches and information boards
- 6) No cats should be allowed to be kept by residents within the development

## 7 References

Government of South Africa (2008). National Protected Area Expansion Strategy for South Africa 2008: Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. Government of South Africa, Pretoria. 2010. ISBN 978-1-919976-55-6.

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

Mucina, L. and Rutherford, MC. (Eds). (Reprint 2011). The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.



## 8 Appendix A: Species of Conservation Concern, list and category details

### 8.1 IUCN

These categories are the same for both global and national IUCN red data lists, the same criteria are used to determine the IUCN rating for these species.

**Table 1: IUCN Categories**

Category	Abbreviation	Explanation
Extinct	EX	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild	EW	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form
Critically Endangered	CR	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered	EN	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable	VU	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened	NT	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern	LC	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient	DD	taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
Not Evaluated	NE	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

## 8.2 TOPS

The TOPS list used in this report is from: National Environmental Management; Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species (GN 30568, 14 Dec 2007).

**Table 1: TOPS list summary of Schedules and Categories**

Category	Abbreviation	Explanation
Critically Endangered Species	CR	Indigenous species facing an extremely high risk of extinction in the wild in the immediate future
Endangered Species	EN	Indigenous species facing a high risk of extinction on the wild in the near future, although they are not a critically endangered species
Vulnerable Species	VU	Indigenous species facing a high risk of extinction in the wild in the medium-term future, although they are not a critically endangered species or an endangered species
Protected Species	P	Indigenous species of high conservation value or national importance that require national protection

## 8.3 KZN Conservation Ordinance

The provincial list is obtained from the Nature Conservation Ordinance (No. 15 of 1974) for the province, and the associated species listed in the Schedules, which need permits to remove or kill according to the associated legislation. This list is shortened to “KZN” for reporting. Pertinent lists are as follows:

- Schedule 2: Protected game;
- Schedule 3: Specially Protected Game;
- Schedule 6: Endangered Mammals;
- Schedule 7: Protected Amphibians, Invertebrates and Reptiles;
- Schedule 9: Specially Protected Birds;
- Schedule 11: Protected Indigenous Plants; and
- Schedule 12: Specially Protected Indigenous Plants.

## 9 Appendix B: List of Expected Plant Species

Family	Species <sup>7</sup>	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
Acanthaceae	<i>Asystasia gangetica</i>			LC					
	<i>Avicennia marina</i>	x		LC					
	<i>Barleria natalensis</i>		x	EX					
	<i>Blepharis integrifolia</i>	x		LC					
	<i>Crabbea nana</i>	x		LC					
	<i>Dicliptera cernua</i>	x		LC					
	<i>Dicliptera heterostegia</i>	x		LC					
	<i>Hypoestes aristata</i>	x		LC					
	<i>Hypoestes forskalii</i>	x		LC					
	<i>Isoglossa ciliata</i>	x		LC					
	<i>Isoglossa hypoestiflora</i>	x		LC					
	<i>Isoglossa woodii</i>	x		LC	x				
	<i>Justicia betonica</i>	x		LC					
	<i>Justicia campylostemon</i>	x		LC					
	<i>Phaulopsis imbricata</i>	x		LC					
	<i>Rhinacanthus gracilis</i>	x		LC					
	<i>Thunbergia dregeana</i>	x		LC					
<i>Thunbergia grandiflora</i>	x					x			
Achariaceae	<i>Xylothea kraussiana</i>	x		LC					
Agavaceae	<i>Behnia reticulata</i>	x		LC					
	<i>Chlorophytum modestum</i>	x		LC	x				
Aizoaceae	<i>Carpobrotus dimidiatus</i>	x		LC					
	<i>Delosperma subpetiolatum</i>	x		VU	x				
	<i>Mesembryanthemum cordifolia</i>	x		LC	x				
	<i>Tetragonia tetragonioides</i>	x		LC					
Alliaceae	<i>Nothoscordum gracile</i>	x				x			
Amaranthaceae	<i>Alternanthera sessilis</i>	x				x			

<sup>7</sup> <http://redlist.sanbi.org/index.php> (c) South African National Biodiversity Institute (SANT) 2010-12.



Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Amaranthus deflexus</i>	x				x			
	<i>Amaranthus dubius</i>	x				x			
	<i>Amaranthus spinosus</i>	x				x			
	<i>Amaranthus viridis</i>	x				x			
	<i>Celosia trigyna</i>	x		LC					
	<i>Chenopodium album</i>	x				x			
	<i>Chenopodium murale</i>	x				x			
	<i>Dysphania ambrosioides</i>	x				x			
	<i>Hermbstaedtia caffra</i>	x		LC	x				
	<i>Kyphocarpa trichinoides</i>	x		LC	x				
	<i>Pupalia lappacea</i>	x		LC					
	<i>Sarcocornia natalensis</i>	x		LC					
Amaryllidaceae	<i>Cyrtanthus breviflorus</i>	x		LC				Sch. 12	
	<i>Cyrtanthus mackenii</i>	x		LC	x			Sch. 12	
	<i>Haemanthus albiflos</i>	x		LC	x			Sch. 12	
	<i>Nerine appendiculata</i>	x		LC	x			Sch. 12	
	<i>Scadoxus membranaceus</i>	x		LC	x			Sch. 12	
	<i>Scadoxus puniceus</i>	x		LC				Sch. 12	
Anacardiaceae	<i>Protorhus longifolia</i>	x		LC					
	<i>Schinus terebinthifolius</i>					x			
	<i>Searsia chirindensis</i>	x		LC					
	<i>Searsia gueinzii</i>	x		LC					
	<i>Searsia natalensis</i>	x		LC					
	<i>Searsia nebulosa</i>	x		NE	x				
	<i>Searsia pyroides</i>	x		LC					
	<i>Searsia rehmanniana</i>	x		LC					
Anemiaceae	<i>Mohria caffrorum</i>	x		LC	x				
Annonaceae	<i>Monanthes caffra</i>	x		LC					
Apiaceae	<i>Afroscidium caffrum</i>	x		LC					
	<i>Alepidea acutidens</i>	x		LC	x				
	<i>Alepidea longifolia</i>		x	DDT					
	<i>Apium graveolens</i>	x				x			

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Centella asiatica</i>	x		LC					
	<i>Centella glabrata</i>		x	LC					
	<i>Coriandrum sativum</i>	x				x			
	<i>Cyclosporum leptophyllum</i>	x				x			
	<i>Heteromorpha arborescens</i>	x		LC					
	<i>Notobubon laevigatum</i>	x		LC					
Apocynaceae	<i>Acokanthera oblongifolia</i>	x		LC					
	<i>Acokanthera oppositifolia</i>	x		LC					
	<i>Ancylobotrys petersiana</i>		x	LC					
	<i>Brachystelma sandersonii</i>	x		VU	x			Sch. 12	
	<i>Carissa bispinosa</i>	x		LC					
	<i>Carissa macrocarpa</i>	x		LC					
	<i>Ceropegia linearis</i>	x		LC					
	<i>Cynanchum ellipticum</i>	x		LC					
	<i>Cynanchum natalitium</i>	x		LC	x				
	<i>Cynanchum obtusifolium</i>	x		LC					
	<i>Gomphocarpus physocarpus</i>	x		LC					
	<i>Pachycarpus asperifolius</i>		x	LC					
	<i>Pergularia daemia</i>	x		LC					
	<i>Rauwolfia caffra</i>	x		LC					
	<i>Schizoglossum atropurpureum</i>	x		LC					
	<i>Secamone alpini</i>	x		LC					
	<i>Secamone filiformis</i>	x		LC					
	<i>Sisyranthus imberbis</i>	x	x	LC					
	<i>Tabernaemontana ventricosa</i>	x		LC					
	<i>Voacanga thouarsii</i>	x		LC					
<i>Xysmalobium involucreatum</i>	x		LC						
<i>Xysmalobium orbiculare</i>	x		LC						
Araceae	<i>Lemna minor</i>	x		LC					
	<i>Spirodela punctata</i>	x		LC					
Araliaceae	<i>Cussonia nicholsonii</i>	x		LC	x				
	<i>Cussonia spicata</i>	x		LC					

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Cussonia zuluensis</i>	x		LC					
Areaceae	<i>Phoenix reclinata</i>		x	LC					
Asparagaceae	<i>Asparagus africanus</i>	x		LC					
	<i>Asparagus angusticladus</i>	x		LC					
	<i>Asparagus densiflorus</i>	x		LC					
	<i>Asparagus falcatus</i>	x		LC					
	<i>Asparagus plumosus</i>	x		LC					
	<i>Asparagus racemosus</i>		x	LC					
Asphodelaceae	<i>Aloe arborescens</i>	x		LC					
	<i>Aloe maculata</i>	x		LC					
	<i>Aloe thraskii</i>	x		NT	x				
	<i>Bulbine asphodeloides</i>		x	LC					
	<i>Kniphofia gracilis</i>	x	x	LC	x				
	<i>Kniphofia laxiflora</i>	x		LC	x				
	<i>Kniphofia littoralis</i>		x	NT					
	<i>Kniphofia pauciflora</i>		x	CR					
	<i>Kniphofia rooperi</i>		x	LC					
	<i>Kniphofia triangularis</i>	x		LC					
	<i>Kniphofia tysonii</i>	x		LC	x				
	<i>Trachyandra affinis</i>	x		LC	x				
<i>Trachyandra asperata</i>	x		LC	x					
Aspleniaceae	<i>Asplenium rutifolium</i>	x		LC					
	<i>Asplenium splendens</i>	x		LC					
Asteraceae	<i>Acmella caulirhiza</i>	x		LC		x			
	<i>Ageratum conyzoides</i>					x			
	<i>Ambrosia artemisiifolia</i>	x				x			
	<i>Arctotheca populifolia</i>	x		LC					
	<i>Aspilia natalensis</i>	x		LC					
	<i>Baccharoides adoensis</i>	x		LC					
	<i>Berkheya bergiana</i>	x		LC	x				
	<i>Berkheya bipinnatifida</i>	x		LC	x				
	<i>Berkheya debilis</i>	x		LC	x				



Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Berkheya erysithales</i>	x		LC					
	<i>Berkheya rhapontica</i>	x		LC					
	<i>Berkheya speciosa</i> subsp. <i>speciosa</i>		x	LC					
	<i>Bidens pilosa</i>	x				x			
	<i>Blumea dregeanoides</i>	x		LC					
	<i>Brachylaena discolor</i>	x		LC					
	<i>Brachylaena elliptica</i>	x		LC	x				
	<i>Brachylaena transvaalensis</i>	x		LC					
	<i>Brachylaena uniflora</i>	x		LC	x				
	<i>Chromolaena odorata</i>	x				x			
	<i>Cineraria glandulosa</i>	x		VU	x				
	<i>Conyza pinnata</i>	x		LC					
	<i>Conyza primulifolia</i>	x				x			
	<i>Conyza scabrida</i>	x		LC					
	<i>Conyza ulmifolia</i>	x		LC					
	<i>Coreopsis lanceolata</i>	x				x			
	<i>Crassocephalum picridifolium</i>	x							
	<i>Dicoma anomala</i>	x		LC					
	<i>Dimorphotheca fruticosa</i>	x		LC	x				
	<i>Distephanus angulifolius</i>	x		LC					
	<i>Eclipta prostrata</i>	x				x			
	<i>Ethulia conyzoides</i>	x				x			
	<i>Euryops laxus</i>	x		LC					
	<i>Gaillardia pulchella</i>	x				x			
	<i>Gamochoeta antillana</i>	x				x			
	<i>Gazania rigens</i>	x		LC					
	<i>Gerbera ambigua</i>	x	x	LC					
	<i>Gerbera piloselloides</i>	x		LC					
	<i>Gnaphalium austroafricanum</i>	x		LC					
	<i>Gymnanthemum corymbosum</i>	x		LC					
	<i>Helianthus argophyllus</i>	x				x			
	<i>Helichrysum adenocarpum</i>	x		LC					

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Helichrysum appendiculatum</i>	x		LC					
	<i>Helichrysum asperum</i>	x		LC	x				
	<i>Helichrysum auriceps</i>	x		LC	x				
	<i>Helichrysum cymosum</i>	x		LC	x				
	<i>Helichrysum cymosum</i> subsp. <i>cymosum</i>		x	LC					
	<i>Helichrysum decorum</i>	x		LC					
	<i>Helichrysum kraussii</i>	x	x	LC					
	<i>Helichrysum longifolium</i>		x	LC					
	<i>Helichrysum nudifolium</i>	x		LC					
	<i>Helichrysum pallidum</i>		x	LC					
	<i>Helichrysum panduratum</i>	x		LC	x				
	<i>Helichrysum stenopterum</i>	x		LC					
	<i>Helichrysum teretifolium</i>	x		LC	x				
	<i>Helichrysum umbraculigerum</i>	x		LC					
	<i>Hilliardiella capensis</i>	x		LC					
	<i>Hilliardiella elaeagnoides</i>	x		LC					
	<i>Hilliardiella hirsuta</i>	x		LC					
	<i>Hypochoeris glabra</i>	x				x			
	<i>Lactuca indica</i>	x				x			
	<i>Laggera crispata</i>	x		LC					
	<i>Launaea sarmentosa</i>	x		LC					
	<i>Melanthera scandens</i>	x				x			
	<i>Microglossa mespilifolia</i>	x		LC	x				
	<i>Mikania natalensis</i>	x		LC					
	<i>Montanoa hibiscifolia</i>	x				x			
	<i>Nidorella auriculata</i>	x		LC					
	<i>Nidorella linifolia</i>	x		LC	x				
	<i>Osteospermum herbaceum</i>	x		LC	x				
	<i>Osteospermum moniliferum</i>	x		LC					
	<i>Pseudognaphalium luteoalbum</i>	x		LC		x			
	<i>Pseudognaphalium oligandrum</i>	x		LC					
	<i>Senecio albanopsis</i>	x	x	LC	x				

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Senecio brachypodus</i>	x		LC					
	<i>Senecio bupleuroides</i>		x	LC					
	<i>Senecio chrysocoma</i>	x		LC	x				
	<i>Senecio coronatus</i>		x	LC					
	<i>Senecio deltoideus</i>	x		LC					
	<i>Senecio dregeanus</i>		x	VU					
	<i>Senecio glaberrimus</i>	x	x	LC					
	<i>Senecio inaequidens</i>	x		LC					
	<i>Senecio macroglossoides</i>	x		LC	x				
	<i>Senecio macroglossus</i>	x		LC					
	<i>Senecio madagascariensis</i>	x		LC					
	<i>Senecio oxyriifolius</i>	x		LC					
	<i>Senecio polyanthemoides</i>	x		LC					
	<i>Senecio pterophorus</i>	x		LC					
	<i>Senecio ryncholaenus</i>		x	LC					
	<i>Senecio skirrhodon</i>	x		LC					
	<i>Senecio tamoides</i>	x		LC					
	<i>Senecio variabilis</i>	x		LC	x				
	<i>Sigesbeckia orientalis</i>	x				x			
	<i>Soliva sessilis</i>	x				x			
	<i>Sonchus asper</i>	x				x			
	<i>Sonchus integrifolius</i>	x		LC					
	<i>Sonchus oleraceus</i>	x				x			
	<i>Tithonia diversifolia</i>	x				x			
	<i>Vernonia africana</i>		x	EX					
	<i>Vernonia galpinii</i>		x	LC					
	<i>Vernonia oligocephala</i>		x	LC					
Basellaceae	<i>Anredera cordifolia</i>	x		NE		x			
Begoniaceae	<i>Begonia sutherlandii</i>	x		LC					
Bignoniaceae	<i>Tecomaria capensis</i>	x		LC					
Blechnaceae	<i>Blechnum attenuatum</i>	x		LC					
	<i>Blechnum capense</i>	x		LC					



Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Blechnum punctulatum</i>	x		LC	x				
	<i>Stenochlaena tenuifolia</i>	x		LC					
Boraginaceae	<i>Cordia caffra</i>	x		LC					
	<i>Cynoglossum hispidum</i>	x		LC					
	<i>Ehretia rigida</i>	x		LC	x				
	<i>Brachythecium ruderale</i>	x							
Brassicaceae	<i>Coronopus didymus</i>	x				x			
	<i>Erucastrum austroafricanum</i>	x		LC					
	<i>Heliophila elongata</i>	x		LC	x				
	<i>Heliophila scandens</i>	x		LC	x				
	<i>Heliophila subulata</i>	x		LC	x				
	<i>Sisymbrium capense</i>	x		LC					
Bryaceae	<i>Bryum canariense</i>	x							
Burseraceae	<i>Commiphora harveyi</i>	x		LC					
Buxaceae	<i>Buxus natalensis</i>	x		LC	x				
Cactaceae	<i>Pereskia aculeata</i>	x		NE		x			
Campanulaceae	<i>Wahlenbergia grandiflora</i>	x		LC					
	<i>Wahlenbergia undulata</i>	x		LC					
Cannabaceae	<i>Celtis africana</i>	x		LC					
	<i>Celtis gomphophylla</i>	x		LC					
	<i>Celtis mildbraedii</i>	x		LC					
	<i>Chaetachme aristata</i>	x		LC					
	<i>Trema orientalis</i>	x		LC					
Capparaceae	<i>Cadaba natalensis</i>	x		LC					
	<i>Capparis fascicularis</i>	x		LC	x				
	<i>Capparis sepiaria</i>	x		LC					
	<i>Capparis tomentosa</i>	x		LC					
	<i>Maerua nervosa</i>	x		LC	x				
	<i>Maerua racemulosa</i>	x		LC					
Caryophyllaceae	<i>Cerastium arabis</i>	x		LC					
	<i>Corrigiola litoralis</i>	x		NE					
	<i>Dianthus crenatus</i>	x		LC	x				

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Krauseola mosambicina</i>	x		LC	x				
	<i>Stellaria media</i>	x				x			
Celastraceae	<i>Allocassine laurifolia</i>	x		LC					
	<i>Gymnosporia arenicola</i>	x		LC					
	<i>Gymnosporia heterophylla</i>	x		LC					
	<i>Gymnosporia nemorosa</i>	x		LC					
	<i>Gymnosporia rubra</i>	x		LC	x				
	<i>Maytenus acuminata</i>	x		LC					
	<i>Maytenus cordata</i>	x		LC	x				
	<i>Maytenus peduncularis</i>	x		LC					
	<i>Maytenus procumbens</i>	x		LC					
	<i>Mystroxydon aethiopicum</i>	x		LC	x				
	<i>Putterlickia verrucosa</i>	x		LC					
	<i>Salacia gerrardii</i>	x		LC	x				
	<i>Salacia kraussii</i>		x	LC					
Ceratophyllaceae	<i>Ceratophyllum demersum</i>	x		LC					
Cleomaceae	<i>Cleome monophylla</i>	x		LC					
Colchicaceae	<i>Colchicum longipes</i>	x		LC	x				
Combretaceae	<i>Combretum bracteosum</i>	x		LC	x				
	<i>Combretum erythrophyllum</i>	x		LC					
	<i>Combretum kraussii</i>	x		LC					
	<i>Combretum molle</i>	x		LC					
Commelinaceae	<i>Coleotrype natalensis</i>	x		LC					
	<i>Commelina africana</i>	x		LC					
	<i>Commelina benghalensis</i>	x		LC					
	<i>Commelina diffusa</i>	x		LC					
	<i>Commelina erecta</i>	x		LC					
	<i>Cyanotis speciosa</i>	x	x	LC					
Convolvulaceae	<i>Convolvulus farinosus</i>	x		LC					
	<i>Convolvulus natalensis</i>	x		LC					
	<i>Hewittia malabarica</i>	x		LC					
	<i>Ipomoea alba</i>	x				x			

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Ipomoea indica</i>	x				x			
	<i>Ipomoea plebeia</i>	x		LC					
	<i>Jacquemontia tamnifolia</i>	x		LC					
	<i>Xenostegia tridentata</i>	x		LC					
Crassulaceae	<i>Crassula flanaganii</i>	x		LC	x				
	<i>Crassula pellucida</i>	x		LC					
	<i>Kalanchoe rotundifolia</i>	x		LC					
Cucurbitaceae	<i>Coccinia mackenii</i>	x		LC					
	<i>Cucumis africanus</i>	x		LC					
	<i>Cucumis maderaspatanus</i>	x		LC					
	<i>Cucumis zeyheri</i>	x		LC					
	<i>Lagenaria sphaerica</i>	x		LC					
	<i>Momordica balsamina</i>	x		LC					
	<i>Zehneria scabra</i>	x		LC					
Cyperaceae	<i>Abildgaardia hygrophila</i>	x		LC					
	<i>Abildgaardia ovata</i>	x		LC					
	<i>Cyperus articulatus</i>	x		LC					
	<i>Cyperus compressus</i>	x		LC					
	<i>Cyperus dubius</i>	x							
	<i>Cyperus natalensis</i>	x	x	LC					
	<i>Cyperus obtusiflorus</i>	x		LC					
	<i>Cyperus prolifer</i>	x		LC					
	<i>Cyperus rotundus</i>	x		LC					
	<i>Cyperus solidus</i>	x		LC					
	<i>Cyperus tenax</i>	x		LC					
	<i>Cyperus textilis</i>	x		LC	x				
	<i>Eleocharis limosa</i>	x		LC					
	<i>Fimbristylis complanata</i>	x		LC					
	<i>Fimbristylis dichotoma</i>	x		LC					
	<i>Fimbristylis ferruginea</i>	x		LC					
	<i>Fuirena ecklonii</i>	x		LC	x				
<i>Fuirena obcordata</i>	x		LC						



Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Isolepis fluitans</i>	x		LC					
	<i>Isolepis sepulcralis</i>	x		LC					
	<i>Pycreus intactus</i>	x		LC					
	<i>Pycreus mundii</i>	x		LC					
	<i>Pycreus nitidus</i>	x		LC					
	<i>Pycreus polystachyos</i>	x		LC					
	<i>Pycreus rehmannianus</i>	x		LC					
	<i>Rhynchospora barrosiana</i>	x		LC					
	<i>Rhynchospora holoschoenoides</i>	x		LC					
	<i>Rhynchospora perrieri</i>	x		LC					
	<i>Rhynchospora spectabilis</i>	x		LC					
	<i>Scleria achtenii</i>	x		LC					
	<i>Scleria melanomphala</i>	x		LC					
Dioscoreaceae	<i>Dioscorea cotinifolia</i>	x		LC				Sch. 12	
	<i>Dioscorea quartiniana</i>	x		LC				Sch. 12	
Dipsacaceae	<i>Cephalaria oblongifolia</i>	x	x	LC					
	<i>Cephalaria pungens</i>	x		LC					
	<i>Scabiosa columbaria</i>	x		LC					
Ebenaceae	<i>Diospyros lycioides</i>	x		LC					
	<i>Euclea natalensis</i>	x		LC					
Ericaceae	<i>Erica caffra</i>	x		LC					
Erythroxylaceae	<i>Erythroxylum emarginatum</i>	x		LC					
	<i>Erythroxylum pictum</i>	x		LC	x				
Euphorbiaceae	<i>Clutia pulchella</i>	x	x	LC	x				
	<i>Croton sylvaticus</i>	x		LC					
	<i>Euphorbia heterophylla</i>	x		NE		x			
	<i>Euphorbia hirta</i>	x		NE		x			
	<i>Euphorbia ingens</i>	x		LC					
	<i>Euphorbia livida</i>	x		LC	x				
	<i>Euphorbia natalensis</i>	x		LC					
	<i>Euphorbia prostrata</i>	x		NE		x			
	<i>Euphorbia serpens</i>	x		NE		x			

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Euphorbia tetragona</i>	x		LC	x				
	<i>Euphorbia triangularis</i>	x		LC					
	<i>Sclerocroton integerrimus</i>	x		LC					
	<i>Suregada africana</i>	x		LC					
	<i>Tragia capensis</i>	x							
	<i>Tragia glabrata</i>	x		LC					
Fabaceae	<i>Abrus laevigatus</i>		x	LC					
	<i>Aeschynomene uniflora</i>	x		LC					
	<i>Albizia adianthifolia</i>		x	LC					
	<i>Argyrobium amplexicaule</i>	x		LC	x				
	<i>Argyrobium baptisioides</i>	x		LC	x				
	<i>Argyrobium marginatum</i>	x		LC					
	<i>Baphia racemosa</i>	x		LC	x				
	<i>Bauhinia tomentosa</i>	x		LC					
	<i>Calpurnia aurea</i>	x		LC					
	<i>Canavalia bonariensis</i>	x		LC					
	<i>Canavalia rosea</i>	x		LC					
	<i>Chamaecrista mimosoides</i>	x	x	LC					
	<i>Crotalaria globifera</i>	x		LC					
	<i>Crotalaria lanceolata</i>		x	LC					
	<i>Crotalaria natalitia</i>	x		LC					
	<i>Crotalaria virgulata</i>	x		LC					
	<i>Dalbergia armata</i>	x		LC					
	<i>Dalbergia obovata</i>			LC					
	<i>Derris trifoliata</i>	x		LC	x				
	<i>Desmodium dregeanum</i>	x	x	LC					
	<i>Desmodium setigerum</i>	x		LC					
	<i>Dichilus lebeckioides</i>	x		LC					
<i>Dichilus reflexus</i>	x		LC						
<i>Dichrostachys cinerea</i>	x		NE						
<i>Entada rheedei</i>	x		LC						
<i>Eriosema parviflorum</i>	x		LC						

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Eriosema preptum</i>	x		LC	x				
	<i>Eriosema salignum</i>	x		LC					
	<i>Eriosema squarrosum</i>		x	LC					
	<i>Erythrina lysistemon</i>	x		LC					
	<i>Flemingia grahamiana</i>	x		LC					
	<i>Indigofera grata</i>	x		LC	x				
	<i>Indigofera hendecaphylla</i>	x		LC					
	<i>Indigofera hilaris</i>		x	LC					
	<i>Indigofera inhambanensis</i>	x		LC					
	<i>Indigofera micrantha</i>	x		LC					
	<i>Indigofera spicata</i>	x		LC					
	<i>Indigofera tristis</i>	x		LC					
	<i>Indigofera zeyheri</i>	x		LC					
	<i>Leobordea eriantha</i>	x		LC					
	<i>Leobordea mucronata</i>	x							
	<i>Lotononis eriocarpa</i>	x		LC					
	<i>Lotononis viminea</i>	x		LC	x				
	<i>Lotononis virgata</i>	x		LC	x				
	<i>Lotus discolor</i>	x		LC					
	<i>Medicago polymorpha</i>	x		NE		x			
	<i>Millettia grandis</i>	x		LC	x			Sch. 12	
	<i>Mimosa pudica</i>	x		NE		x			
	<i>Neonotonia wightii</i>	x		LC					
	<i>Otholobium caffrum</i>	x		LC	x				
	<i>Psoralea glabra</i>	x		LC					
	<i>Rhynchosia caribaea</i>	x		LC					
	<i>Schotia brachypetala</i>	x		LC					
	<i>Senegalia kraussiana</i>	x		LC					
	<i>Senna bicapsularis</i>	x		NE		x			
	<i>Senna hirsuta</i>	x		NE		x			
	<i>Senna italica</i>	x		LC					
	<i>Senna occidentalis</i>	x		NE		x			

Family	Species <sup>7</sup>	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Senna septemtrionalis</i>	x		NE		x			
	<i>Smithia erubescens</i>	x		LC					
	<i>Sphenostylis angustifolia</i>		x	LC					
	<i>Tamarindus indica</i>	x		NE		x			
	<i>Tephrosia albissima</i>	x		LC	x				
	<i>Tephrosia grandiflora</i>	x		LC	x				
	<i>Tephrosia macropoda</i>	x		LC					
	<i>Tephrosia multijuga</i>	x		LC					
	<i>Tephrosia polystachya</i>	x	x	LC					
	<i>Tephrosia purpurea</i>	x		LC					
	<i>Tephrosia shiluanensis</i>	x		LC					
	<i>Trifolium africanum</i>	x		NE					
	<i>Vachellia karroo</i>	x		LC					
	<i>Vachellia natalitia</i>		x	LC					
	<i>Vachellia nilotica</i> subsp. <i>kraussiana</i>		x	LC					
	<i>Vachellia tortilis</i>	x		LC					
	<i>Vachellia xanthophloea</i>	x		LC					
	<i>Vicia sativa</i>	x		NE		x			
	<i>Vigna luteola</i>	x		LC					
	<i>Vigna unguiculata</i>	x		LC					
Fabroniaceae	<i>Fabronia pilifera</i>	x							
Fissidentaceae	<i>Fissidens wageri</i>	x			x				
Flagellariaceae	<i>Flagellaria guineensis</i>	x		LC					
Frullaniaceae	<i>Frullania obscurifolia</i>	x							
Fumariaceae	<i>Fumaria muralis</i>	x				x			
Gentianaceae	<i>Chironia baccifera</i>	x		LC	x				
	<i>Sebaea bojeri</i>	x		LC					
	<i>Sebaea sedoides</i>	x		LC					
Geraniaceae	<i>Geranium flanagani</i>	x		LC					
	<i>Pelargonium capitatum</i>	x		LC					
Gerrardinaceae	<i>Gerrardina foliosa</i>	x		LC					
Gigaspermaceae	<i>Oedipodiella australis</i>	x							



Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
Goodeniaceae	<i>Scaevola plumieri</i>	x		LC					
Hamamelidaceae	<i>Trichocladus ellipticus</i>	x		LC	x				
Hyacinthaceae	<i>Albuca bracteata</i>	x		LC	x				
	<i>Dipcadi viride</i>	x		LC					
	<i>Drimia calcarata</i>	x		LC					
	<i>Ledebouria cooperi</i>	x		LC					
	<i>Ledebouria floribunda</i>		x	LC					
	<i>Ledebouria petiolata</i>	x		LC					
	<i>Schizocarpus nervosus</i>		x	LC					
Hypericaceae	<i>Hypericum aethiopicum</i>	x		LC					
Hypoxidaceae	<i>Hypoxis acuminata</i>	x		LC					
	<i>Hypoxis angustifolia</i>	x		LC					
	<i>Hypoxis argentea</i>	x		LC					
	<i>Hypoxis filiformis</i>		x	LC					
Icacinaceae	<i>Apodytes dimidiata</i>	x		LC					
	<i>Pyrenacantha scandens</i>	x		LC					
Iridaceae	<i>Aristea compressa</i>	x		LC					
	<i>Dietes iridioides</i>	x		LC				Sch. 12	
	<i>Freesia laxa</i>	x		LC				Sch. 12	
	<i>Gladiolus dalenii</i>	x		LC				Sch. 12	
	<i>Gladiolus densiflorus</i>	x		LC				Sch. 12	
	<i>Gladiolus inandensis</i>	x		LC	x			Sch. 12	
	<i>Gladiolus oppositiflorus</i>	x		LC	x			Sch. 12	
	<i>Gladiolus papilio</i>	x		LC				Sch. 12	
	<i>Gladiolus sericeovillosus</i>	x		LC				Sch. 12	
	<i>Hesperantha lactea</i>	x		LC	x			Sch. 12	
	<i>Moraea elliotii</i>	x		LC				Sch. 12	
	<i>Tritonia disticha</i>		x	LC				Sch. 12	
<i>Watsonia densiflora</i>	x		LC	x			Sch. 12		
Juncaceae	<i>Juncus dregeanus</i>	x		LC					
	<i>Juncus kraussii</i>	x		LC					
	<i>Juncus lomatophyllus</i>	x		LC					

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Juncus oxycarpus</i>	x		LC					
	<i>Endostemon obtusifolius</i>	x		LC					
	<i>Leonotis leonurus</i>	x		LC					
	<i>Ocimum obovatum</i>	x		NE					
	<i>Plectranthus ciliatus</i>	x		LC					
	<i>Plectranthus strigosus</i>	x		LC					
	<i>Solenostemon latifolius</i>	x		LC					
Lamiaceae	<i>Stachys aethiopica</i>	x	x	LC					
	<i>Stachys natalensis</i>	x		LC					
	<i>Stachys nigricans</i>		x	LC					
	<i>Syncolostemon densiflorus</i>	x		LC					
	<i>Syncolostemon parviflorus</i>	x		LC	x				
	<i>Syncolostemon teucრიifolius</i>	x		LC					
	<i>Volkameria glabra</i>	x		LC					
Lauraceae	<i>Cryptocarya woodii</i>	x		LC					
Lentibulariaceae	<i>Utricularia gibba</i>	x		LC					
	<i>Utricularia livida</i>	x		LC					
Limeaceae	<i>Limeum viscosum</i>	x		NE					
Lobeliaceae	<i>Lobelia coronopifolia</i>	x		LC	x				
	<i>Lobelia erinus</i>	x		LC					
	<i>Lobelia tomentosa</i>	x		LC					
	<i>Monopsis stellarioides</i>	x		LC					
Loganiaceae	<i>Strychnos decussata</i>	x		LC					
	<i>Strychnos gerrardii</i>	x		LC					
	<i>Strychnos henningsii</i>	x		LC					
	<i>Strychnos madagascariensis</i>	x		LC					
	<i>Strychnos mitis</i>	x		LC					
	<i>Strychnos usambarensis</i>	x		LC					
Loranthaceae	<i>Erianthemum dregei</i>	x		LC					
Lythraceae	<i>Nesaea crassicaulis</i>	x		LC					
	<i>Nesaea radicans</i>	x		LC					
	<i>Nesaea tolypobotrys</i>	x		LC	x				

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
Malpighiaceae	<i>Acridocarpus natalitius</i>	x		NE					
Malvaceae	<i>Abutilon grantii</i>	x		LC					
	<i>Cola greenwayi</i>	x		LC					
	<i>Cola natalensis</i>	x		LC					
	<i>Corchorus trilocularis</i>	x		NE		x			
	<i>Dombeya cymosa</i>	x		LC					
	<i>Grewia caffra</i>	x		LC					
	<i>Grewia occidentalis</i>	x		LC					
	<i>Hermannia schlechteriana</i>	x		LC	x				
	<i>Hermannia velutina</i>	x		LC					
	<i>Hermannia woodii</i>	x		LC					
	<i>Hibiscus calyphyllus</i>	x		LC					
	<i>Hibiscus diversifolius</i>	x		LC					
	<i>Hibiscus fuscus</i>	x		LC					
	<i>Hibiscus pedunculatus</i>	x	x	LC					
	<i>Hibiscus physaloides</i>	x		LC					
	<i>Hibiscus surattensis</i>	x		LC					
	<i>Hibiscus tiliaceus</i>	x		LC					
	<i>Hibiscus trionum</i>	x					x		
	<i>Melhania didyma</i>	x		LC					
	<i>Pavonia burchellii</i>	x		LC					
<i>Pavonia dregei</i>	x		LC	x					
<i>Sida cordifolia</i>	x		LC						
<i>Sida pseudocordifolia</i>	x		LC						
<i>Sida rhombifolia</i>	x		LC						
<i>Triumfetta rhomboidea</i>	x		LC						
Melastomataceae	<i>Dissotis canescens</i>		x	LC					
Meliaceae	<i>Ekebergia capensis</i>	x		LC					
	<i>Melia azedarach</i>					x			
	<i>Trichilia dregeana</i>	x		LC					
	<i>Trichilia emetica</i>	x		LC					
	<i>Turraea floribunda</i>	x		LC					

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Turraea obtusifolia</i>	x		LC					
Melianthaceae	<i>Bersama lucens</i>	x		LC					
Menispermaceae	<i>Cissampelos torulosa</i>	x		LC					
	<i>Tinospora caffra</i>	x		LC					
Molluginaceae	<i>Glinus oppositifolius</i>	x		LC					
	<i>Pharnaceum thunbergii</i>	x		LC	x				
Moraceae	<i>Ficus burtt-davyi</i>	x		LC					
	<i>Ficus lutea</i>	x		LC					
	<i>Ficus natalensis</i>	x		LC					
	<i>Ficus polita</i>	x		LC					
	<i>Ficus thonningii</i>	x							
Myricaceae	<i>Morella serrata</i>	x		LC					
Myrsinaceae	<i>Embelia ruminata</i>	x		LC	x				
Myrtaceae	<i>Eucalyptus grandis</i>					x			
	<i>Eugenia albanensis</i>		x	LC					
	<i>Eugenia capensis</i>	x		LC					
	<i>Eugenia natalitia</i>	x		LC					
	<i>Psidium guajava</i>					x			
	<i>Syzygium cordatum</i>	x	x	LC					
Nyctaginaceae	<i>Boerhavia diffusa</i>	x				x			
	<i>Commicarpus chinensis</i>	x		LC					
	<i>Commicarpus pentandrus</i>	x		LC					
	<i>Pisonia aculeata</i>	x		LC					
Nymphaeaceae	<i>Nymphaea nouchali</i>	x		LC				Sch. 12	
Ochnaceae	<i>Ochna arborea</i>	x		NE					
	<i>Ochna barbosae</i>	x		LC					
	<i>Ochna natalitia</i>	x		LC					
Oleaceae	<i>Jasminum streptopus</i>	x		LC					
	<i>Olea woodiana</i>	x		LC					
	<i>Schrebera alata</i>	x		LC					
Onagraceae	<i>Ludwigia octovalvis</i>	x		LC					
	<i>Oenothera affinis</i>	x				x			



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	<i>Oenothera laciniata</i>	x				x			
Ophioglossaceae	<i>Ophioglossum polyphyllum</i>	x		LC					
	<i>Ophioglossum reticulatum</i>	x		LC					
	<i>Ophioglossum vulgatum</i>	x		NE					
	<i>Disa polygonoides</i>		x	LC				Sch. 12	
Orchidaceae	<i>Eulophia hians</i>	x		LC				Sch. 12	
	<i>Eulophia speciosa</i>	x		LC				Sch. 12	
	<i>Habenaria dives</i>	x		LC				Sch. 12	
	<i>Habenaria epipactidea</i>	x		LC				Sch. 12	
	<i>Habenaria falcicornis</i>	x		LC				Sch. 12	
	<i>Holothrix orthoceras</i>	x		LC				Sch. 12	
	<i>Huttonaea pulchra</i>	x		LC	x			Sch. 12	
	<i>Mystacidium pusillum</i>	x		LC	x			Sch. 12	
	<i>Mystacidium venosum</i>	x		LC				Sch. 12	
	<i>Orthochilus ensatus</i>	x		LC				Sch. 12	
	<i>Polystachya modesta</i>	x		LC				Sch. 12	
	<i>Satyrium rhodanthum</i>	x		EN	x			Sch. 12	
	<i>Zeuxine africana</i>		x	EN				Sch. 12	
	Orobanchaceae	<i>Cycnium tubulosum</i>	x		LC				
<i>Graderia scabra</i>		x		LC					
<i>Hyobanche fulleri</i>		x		CR	x				
<i>Hyobanche sanguinea</i>		x		LC					
<i>Striga asiatica</i>		x		LC					
Orthotrichaceae	<i>Macrocoma tenuis</i>	x							
Pallaviciniaceae	<i>Symphyogyna brasiliensis</i>	x							
Papaveraceae	<i>Argemone mexicana</i>	x				x			
Petiveriaceae	<i>Rivina humilis</i>	x				x			
Phyllanthaceae	<i>Antidesma venosum</i>	x	x	LC					
	<i>Bridelia micrantha</i>	x	x	LC					
	<i>Margaritaria discoidea</i>	x		NE					
	<i>Phyllanthus glaucophyllus</i>		x	LC					
	<i>Phyllanthus meyerianus</i>	x		LC					

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	<i>Phyllanthus myrtaceus</i>	x		LC					
	<i>Phyllanthus parvulus</i>	x		LC					
	<i>Phyllanthus reticulatus</i>	x		LC					
Phytolaccaceae	<i>Phytolacca dodecandra</i>	x		LC					
	<i>Phytolacca octandra</i>	x				x			
Pittosporaceae	<i>Pittosporum viridiflorum</i>	x		LC					x
Poaceae	<i>Acroceras macrum</i>	x		LC					
	<i>Agrostis lachnantha</i>	x		LC					
	<i>Alloteropsis semialata</i> subsp. <i>eckloniana</i>		x	LC					
	<i>Andropogon eucomus</i>	x		LC					
	<i>Aristida junciformis</i>	x		LC					
	<i>Aristida junciformis</i> subsp. <i>galpinii</i>		x	LC					
	<i>Avena sativa</i>	x		NE		x			
	<i>Axonopus fissifolius</i>	x				x			
	<i>Bothriochloa insculpta</i>	x		LC					
	<i>Brachiaria chusqueoides</i>	x		LC					
	<i>Cenchrus brownii</i>	x		NE		x			
	<i>Chloris gayana</i>	x		LC					
	<i>Coix lacryma-jobi</i>	x		NE		x			
	<i>Cymbopogon caesius</i>		x	LC					
	<i>Cymbopogon nardus</i>		x	LC					
	<i>Cynodon dactylon</i>	x		LC					
	<i>Cynodon nlemfuensis</i>	x		NE		x			
	<i>Dactyloctenium geminatum</i>	x		LC					
	<i>Digitaria ciliaris</i>	x		NE		x			
	<i>Digitaria debilis</i>	x		LC					
	<i>Digitaria didactyla</i>	x		NE		x			
	<i>Digitaria diversinervis</i>	x		LC	x				
	<i>Digitaria eriantha</i>		x	LC					
	<i>Digitaria longiflora</i>	x		LC					
<i>Digitaria natalensis</i>	x		LC						
<i>Digitaria nuda</i>	x		NE			x			

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	<i>Digitaria sanguinalis</i>	x		NE		x			
	<i>Digitaria scalarum</i>	x		LC					
	<i>Echinochloa colona</i>	x		LC					
	<i>Echinochloa haploclada</i>	x		LC					
	<i>Echinochloa holubii</i>	x		LC					
	<i>Echinochloa pyramidalis</i>	x		LC					
	<i>Eleusine coracana</i>	x		LC					
	<i>Eleusine indica</i>	x		LC					
	<i>Eragrostis ciliaris</i>	x		LC					
	<i>Eragrostis curvula</i>	x	x	LC					
	<i>Eragrostis lappula</i>		x	LC					
	<i>Eulalia villosa</i>		x	LC					
	<i>Hyparrhenia cymbaria</i>	x		LC					
	<i>Hyparrhenia filipendula</i>	x	x	LC					
	<i>Hyparrhenia hirta</i>	x		LC					
	<i>Leersia hexandra</i>	x		LC					
	<i>Melinis repens</i>	x	x	LC					
	<i>Melinis repens</i>			LC					
	<i>Oplismenus hirtellus</i>	x		LC					
	<i>Panicum deustum</i>	x		LC					
	<i>Panicum hymenochilum</i>	x		LC					
	<i>Panicum laticomum</i>	x		LC					
	<i>Panicum maximum</i>	x	x	LC					
	<i>Paspalum distichum</i>	x		LC					
	<i>Paspalum vaginatum</i>	x		LC					
	<i>Pennisetum natalense</i>	x		LC					
	<i>Pennisetum purpureum</i>	x		NE		x			
	<i>Pennisetum villosum</i>	x		NE		x			
	<i>Phragmites australis</i>	x		LC					
	<i>Phragmites mauritianus</i>	x		LC					
	<i>Pogonarthria squarrosa</i>	x		LC					
	<i>Polypogon monspeliensis</i>	x		NE		x			

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	<i>Prosphytochloa prehensilis</i>	x		LC					
	<i>Pseudechinolaena polystachya</i>	x		LC					
	<i>Setaria italica</i>	x		NE		x			
	<i>Setaria megaphylla</i>	x		LC					
	<i>Setaria sphacelata</i>	x		NE					
	<i>Sorghum bicolor</i>	x		LC					
	<i>Sorghum halepense</i>	x		NE		x			
	<i>Sporobolus africanus</i>	x		LC					
	<i>Sporobolus subulatus</i>	x		LC					
	<i>Sporobolus virginicus</i>	x		LC					
	<i>Themeda triandra</i>	x	x	LC					
	<i>Trichopteryx dregeana</i>	x		LC					
Podocarpaceae	<i>Podocarpus latifolius</i>	x		LC					x
Polygalaceae	<i>Polygala capillaris</i>	x		LC					
	<i>Polygala producta</i>	x		LC					
	<i>Polygala virgata</i>	x		LC					
Polygonaceae	<i>Emex australis</i>	x		LC					
	<i>Persicaria decipiens</i>	x		LC					
	<i>Persicaria hydropiper</i>	x				x			
	<i>Persicaria madagascariensis</i>	x							
	<i>Persicaria senegalensis</i>	x		NE					
	<i>Rumex acetosella</i>	x				x			
	<i>Rumex rhodesius</i>	x		LC					
	<i>Rumex sagittatus</i>	x		LC					
	<i>Triplaris americana</i>	x				x			
Polypodiaceae	<i>Microgramma mauritiana</i>	x		LC					
	<i>Microsorium punctatum</i>	x		LC					
	<i>Microsorium scolopendria</i>	x		LC					
Pontederiaceae	<i>Eichhornia crassipes</i>	x				x			
Potamogetonaceae	<i>Potamogeton pectinatus</i>	x		LC					
	<i>Potamogeton schweinfurthii</i>	x		LC					
Pottiaceae	<i>Didymodon tophaceus</i>	x							



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Proteaceae	<i>Faurea saligna</i>	x		LC					
	<i>Leucospermum reflexum</i>	x		NE	x				
	<i>Protea caffra</i>	x		LC					
	<i>Protea roupelliae</i>	x		LC				Sch. 12	
	<i>Protea welwitschii</i>	x		LC				Sch. 12	
Pteridaceae	<i>Acrostichum aureum</i>	x		LC					
	<i>Cheilanthes viridis</i>	x		LC					
	<i>Doryopteris concolor</i>	x		LC					
	<i>Pityrogramma calomelanos</i>	x				x			
	<i>Pteris vittata</i>	x		LC					
Putranjivaceae	<i>Vittaria isoetifolia</i>	x		LC					
	<i>Drypetes arguta</i>	x		LC					
	<i>Drypetes gerrardii</i>	x		LC					
	<i>Drypetes natalensis</i>	x		LC					
Racopilaceae	<i>Racopilum capense</i>	x							
Ranunculaceae	<i>Ranunculus multifidus</i>	x		LC					
Restionaceae	<i>Restio paniculatus</i>	x		LC	x				
Rhamnaceae	<i>Helinus integrifolius</i>	x		LC					
	<i>Scutia myrtina</i>	x		LC					
	<i>Ziziphus mucronata</i>	x		LC					
Rhizophoraceae	<i>Bruguiera gymnorrhiza</i>	x		LC					x
	<i>Cassipourea malosana</i>	x		LC					
Rosaceae	<i>Rubus rigidus</i>	x		LC					
Rubiaceae	<i>Agathisanthemum bojeri</i>		x	LC					
	<i>Anthospermum littoreum</i>	x		LC	x				
	<i>Canthium inerme</i>	x		LC					
	<i>Canthium spinosum</i>	x		LC					
	<i>Catunaregam obovata</i>	x		LC					
	<i>Conostomium natalense</i>		x	LC					
	<i>Cordylostigma virgatum</i>	x		LC					
	<i>Empogona lanceolata</i>	x							
	<i>Gardenia thunbergia</i>	x		LC					

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Hyperacanthus amoenus</i>	x		LC					
	<i>Kraussia floribunda</i>	x		LC					
	<i>Oldenlandia affinis</i>	x		LC					
	<i>Oldenlandia cephalotes</i>	x		LC					
	<i>Pachystigma latifolium</i>	x		LC					
	<i>Pachystigma venosum</i>		x	LC					
	<i>Pavetta bowkeri</i>	x		LC	x				
	<i>Pavetta lanceolata</i>	x		LC					
	<i>Pavetta revoluta</i>	x		LC					
	<i>Pentanisia prunelloides</i>	x		LC					
	<i>Pentanisia prunelloides</i> subsp. <i>latifolia</i>		x	LC					
	<i>Pentodon pentandrus</i>	x		LC					
	<i>Phylohydrax camosa</i>	x		LC					
	<i>Psychotria capensis</i>	x		NE					
	<i>Psydrax locuples</i>	x		LC					
	<i>Psydrax obovata</i>	x		LC					
	<i>Richardia brasiliensis</i>	x		NE		x			
	<i>Richardia scabra</i>	x		NE		x			
	<i>Rothmannia globosa</i>	x		LC					
	<i>Rubia cordifolia</i>	x		LC					
	<i>Tarenna pavettoides</i>	x		LC					
	<i>Vangueria lasiantha</i>	x		LC					
	<i>Vangueria randii</i>	x		LC					
Ruppiaceae	<i>Ruppia maritima</i>	x		LC					
	<i>Calodendrum capense</i>	x		LC					
Rutaceae	<i>Clausena anisata</i>	x		LC					
	<i>Vepris bachmannii</i>	x							
	<i>Vepris lanceolata</i>	x		LC					
	<i>Vepris trichocarpa</i>	x							
Salicaceae	<i>Dovyalis longispina</i>	x		LC					
	<i>Dovyalis rhamnoides</i>	x		LC					
	<i>Homalium dentatum</i>	x		LC					

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Homalium rufescens</i>	x		LC	x				
Santalaceae	<i>Osyridicarpos schimperianus</i>	x		LC					
Sapindaceae	<i>Allophylus africanus</i>	x		LC					
	<i>Allophylus natalensis</i>	x		LC					
	<i>Cardiospermum grandiflorum</i>	x				x			
	<i>Deinbollia oblongifolia</i>	x		LC					
	<i>Hippobromus pauciflorus</i>	x		LC					
Sapotaceae	<i>Chrysophyllum viridifolium</i>	x		LC					
	<i>Englerophytum natalense</i>	x		LC					
	<i>Manilkara concolor</i>	x		LC					
	<i>Manilkara discolor</i>	x		LC					
	<i>Mimusops caffra</i>	x		LC					x
	<i>Mimusops obovata</i>	x		LC					
	<i>Sideroxylon inerme</i>	x		LC					x
	<i>Vitellariopsis marginata</i>	x		LC					
Scrophulariaceae	<i>Anastrabe integerrima</i>		x	LC					
	<i>Diclis reptans</i>	x		LC					
	<i>Hebenstretia comosa</i>	x	x	LC					
	<i>Jamesbrittenia kraussiana</i>	x		LC	x				
	<i>Manulea parviflora</i>	x		LC					
	<i>Selago peduncularis</i>	x		LC	x				
	<i>Selago tarachodes</i>	x	x	LC	x				
	<i>Selago trinervia</i>	x		LC	x				
Smilacaceae	<i>Smilax anceps</i>	x	x	LC					
Solanaceae	<i>Cestrum laevigatum</i>	x				x			
	<i>Datura stramonium</i>	x				x			
	<i>Solanum africanum</i>	x		LC	x				
	<i>Solanum lichtensteinii</i>	x		LC					
	<i>Solanum mauritianum</i>					x			
	<i>Solanum nigrum</i>	x				x			
	<i>Solanum sisymbriifolium</i>	x				x			
	<i>Solanum umtuma</i>	x		LC	x				

Family	Species'	POSA	M&R	IUCN	Endemic	Invasive	Tops	KZN	Protected Trees
	<i>Withania somnifera</i>	x		LC					
Stilbaceae	<i>Anastrabe integerrima</i>	x		LC	x				
	<i>Halleria lucida</i>	x		LC					
Strelitziaceae	<i>Strelitzia nicolai</i>		x	LC					
Thelypteridaceae	<i>Christella dentata</i>	x		LC					
	<i>Christella gueinziana</i>	x		LC					
	<i>Cyclosorus interruptus</i>	x		LC					
	<i>Macrothelypteris torresiana</i>	x		NE		x			
Thymelaeaceae	<i>Englerodaphne ovalifolia</i>	x		LC					
	<i>Gnidia kraussiana</i>		x	LC					
	<i>Lasiosiphon anthylloides</i>	x		LC	x				
	<i>Lasiosiphon macropetalus</i>	x		DD	x				
	<i>Passerina rigida</i>	x		LC	x				
	<i>Peddiea africana</i>	x		LC					
Typhaceae	<i>Typha capensis</i>	x		LC					
Urticaceae	<i>Didymodoxa caffra</i>	x		LC					
	<i>Droguetia ambigua</i>	x		LC	x				
	<i>Laportea peduncularis</i>	x		LC					
	<i>Obetia tenax</i>	x		LC					
Verbenaceae	<i>Lantana camara</i>	x				x			
	<i>Phyla nodiflora</i>	x				x			
Violaceae	<i>Hybanthus capensis</i>		x	LC					
Vitaceae	<i>Cissus fragilis</i>	x		LC	x				
	<i>Cyphostemma cirrhosum</i>	x		LC					
	<i>Cyphostemma flaviflorum</i>	x		NT	x				
	<i>Cyphostemma hypoleucum</i>	x		LC					
	<i>Rhoicissus digitata</i>	x		LC					
	<i>Rhoicissus rhomboidea</i>	x		LC					
Xyridaceae	<i>Xyris anceps</i>	x		LC					
Zosteraceae	<i>Zostera capensis</i>	x		LC					



## 10 Appendix C: CV of the specialist

### 1. Personal Particulars

Name: **Leigh-Ann de Wet**  
 Date of birth: **1 September 1982**  
 Place of Birth: **Durban**  
 Place of Tertiary education: **Rhodes University**  
 Dates of tertiary education: **2001 - 2003 (BSc)**  
   **2004 (BSc Hons)**  
   **2005 - 2007 (MSc)**

### 2. Qualifications

2005 - 2007           **MSc** in Botany – Rhodes University  
 2005                   **BSc Honours** in Botany (with Distinction) – Rhodes University  
 2001 - 2004           **BSc** (Botany and Entomology) – Rhodes University

### 3. Courses

2013                   Wetland Management: Introduction to Law – University of the Free State  
 2013                   Wetland Management: Introduction and Delineation Short Course – University of the Free State  
 2011                   Land Degradation Short Course – Rhodes University  
 2009                   EIA Short Course – Rhodes University and Coastal and Environmental Services

### 4. Professional Membership

2012 – Present       Professional Natural Scientist with SACNASP: Ecological Science (No. 400233/12)  
 2004 – Present       South African Association of Botanists

### 5. Name of current employer and position in company

Afzelia Environmental Consulting  
 Ecological specialist

### 6. Overview of last 10 years experience

Year	Organisation	Position	Selected Projects
2017 - Current	Afzelia Environmental Consultants	Ecological Specialist	Elysium Desalination Plant Desktop Ecological Assessment, KZN - Review Hawaii Road Upgrade Desktop Ecological Assessment, KZN - Review Ecological Assessment for the proposed bulk eater infrastructure at Nomandlovo, KZN
2014 - 2017	LD Biodiversity Consulting	Biodiversity Specialist	Protected Species permitting for the Skuitdrift Solar Energy Facility, Northern Cape Ecological Assessment Rehabilitation Plan Plant Rescue and Protection Plan Open Space Management Plan Alien Vegetation Management Plan for the Roodeplaat Inyanda Wind Energy Facility, Eastern Cape

				Ecological Impact Assessment, Saldanha Bay Network Strengthening Project, Western Cape
				Conservation Value Assessment, Little Falls Nature Reserve, City of Johannesburg, Gauteng
				Conservation Value Assessment, Melville Koppies Nature Reserve, City of Johannesburg, Gauteng
				Conservation Value Assessment, Ruimsig Butterfly Reserve, City of Johannesburg, Gauteng
				Conservation Value Assessment, Rietfontein Nature Reserve, City of Johannesburg, Gauteng
				High Conservation Value Assessment Botanical Assessment Boteka Oil Palm Plantation, Feronia, DRC
				High Conservation Value Assessment Botanical Assessment Lokutu Oil Palm Plantation, Feronia, DRC
				High Conservation Value Assessment Botanical Assessment Yaligimba Oil Palm Plantation, Feronia, DRC
2012 - 2014	Digby Wells Environmental	Biophysical Unit Manager		Ecological Assessment Dalyshope Coal Mine, Limpopo
				Ecological Assessment Putu Iron Ore Mine, rail and port, Liberia
				Ecological Assessment New Liberty Gold Mine, Liberia
				Critical Habitat Assessment New Liberty Gold Mine, Liberia
				Ecological Assessment Rhodium Reefs, Limpopo
				Biodiversity Action Plans (various) Anglo Coal
2009 - 2012	Coastal and Environmental Services	Ecological Specialist		Ecological Assessment, Toliara sands, Madagascar
				Ecological Assessment. Richards Bay Wind Energy Facility, KZN
				Ecological Assessment, various Wind Energy Facilities, Eastern, Western and Northern Cape
				Ecological Assessment, Laguna Bay Development
				Ecological Assessment, Linas Monazite mine, Malawi
				High Conservation Value Assessment, various, Equatorial Palm Oil, Liberia
2007 - 2009	Rhodes University	Research Assistant - Botany		Effects of global climate change on grassland composition.

**7. Outline of selected recent assignments/ experience that have a bearing on the scope of work**

No	NAME OF PROJECT	CLIENT DETAILS	PROJECT TYPE	PROJECT VALUE	DURATION
1	Feronia High Conservation Value Assessment	Feronia Oil Palm	High Conservation Value Assessment and Botanical Assessment in three Oil Palm Plantations (6 projects) in the DRC	500 000	1 year (2015 - 2016)
2	Simandau Bankable Feasibility Study	Rio Tinto	Critical Habitat Assessment, Inselberg Ecological Assessment, Offset Design for a mine, rail and port facility in Guinea	200 000	6 months (2016)

3	Putu Iron Ore Ecological Assessment	Putu Iron Ore	Terrestrial Ecology Assessment of a mine, rail and port in Liberia.	500 000	1 year (2014)
4	Roodeplaat Inyanda Wind Energy Facility Terrestrial Ecology	Newcombe Wind	Terrestrial Ecology Assessment and associated management plans for a Wind Energy Facility in an environmentally sensitive area, Eastern Cape.	100 000	ongoing (since 2016)
5	Richards Bay Wind Energy facility Terrestrial Ecology		Wind Energy Facility planned for Richards Bay, Terrestrial Ecology Assessment	50 000	2011

### 11 Appendix D: Proposed Development Layout with Buffers and Ecological Corridor

