



ECOLOGICAL IMPACT ASSESSMENT FOR THE RIDGE MIXED USE DEVELOPMENT, RICHARDS BAY, KWAZULU-NATAL.

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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.

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Executive summary

The proposed development is located in Meerensee, Richard's Bay. The development includes the construction of a mixed-use development consisting of a shopping centre, accommodation with residential, and an office. In addition, the developers wish to utilise the area of forest to the south west of the development as a conservation area that can be used by the residents of The Ridge development. Currently, the area that will be used for the development comprises a park with scattered planted trees, which will need to be removed to allow for the development. The forest area will not be touched except for the building of raised paths to allow access for birdwatching and walks.

Vegetation of the study site is described by Mucina and Rutherford (2006) Vegetation map as Subtropical Freshwater Wetlands and Maputaland Coastal Belt. As the forest area (mapped as wetlands) is clearly not a wetland, the description for the nearest forest type is Northern Coastal Forest. The Richard's Bay Game Reserve is the closest protected area to the site at less than 10kms away. In addition, the site falls within a Critical Biodiversity Area, which, after a site visit, applies only to the forest section of the site. The forest section will thus have to remain intact. The forest, comprises indigenous forest with some naturalised invasive elements occurring on stabilised dunes. The forest is slightly disturbed as it is used as a thoroughfare, as well as used as a toilet and an area for prostitution, and makeshift shelters. Invasion levels are low, but there are a number of species present, all of which will result in greater levels of invasion as the disturbance levels increase.

Overall, impacts are medium to low without mitigation, and can be reduced to low negative or negligible with mitigation measures (Table 6.1).

Table 1.1: Summary of impacts associated with The Ridge project

Impact	Without Mitigation	With mitigation
Issue 1: Loss of vegetation communities		
2: Loss of forest	Medium -	Low -
Issue 3: Loss of ecosystem function and process		
7: Fragmentation and edge effects	Low -	Negligible
8: Invasion of alien species	High -	Low -

Recommended mitigation measures include the following:

- Keep the loss of forest vegetation as close as possible to the footprint of the development, restrict dumping of soil and trampling to outside of an established buffer zone surrounding the forest;
- No forest plants should be removed or cut down unless these are alien invasive species;
- A rehabilitation plan must be developed;
- Monitoring of vegetation growth should be employed to reduce alien invasion and increase the presence of natural dispersed indigenous species;
- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species;
- No additional development must take place within the forest;
- Ideally a buffer zone allowed to develop as a natural ecotone should be set aside between the side of the forest adjacent to the development and the development itself;
- Rehabilitation should take place as soon as possible after construction is completed.

In order to proceed with this development, the following is recommended:

1. A buffer zone between the edge of the forest adjacent to the development and the development itself should be defined and adhered to;
2. An alien vegetation management plan should be developed; and
3. A rehabilitation plan should be developed.

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1 Introduction

1.1 Locality

The proposed development is located in Meerensee, Richard's Bay. The development includes the construction of a mixed-use development consisting of a shopping centre, accommodation with residential, and an office. The location of the proposed development can be seen in Figure 1.1. In addition, the developers wish to utilise the area of forest to the south west of the development as a conservation area that can be used by the residents of The Ridge development. Currently, the area that will be used for the development comprises a park with scattered planted trees, which will need to be removed to allow for the development. The forest area will not be touched except for the building of raised paths to allow access for birdwatching and walks.

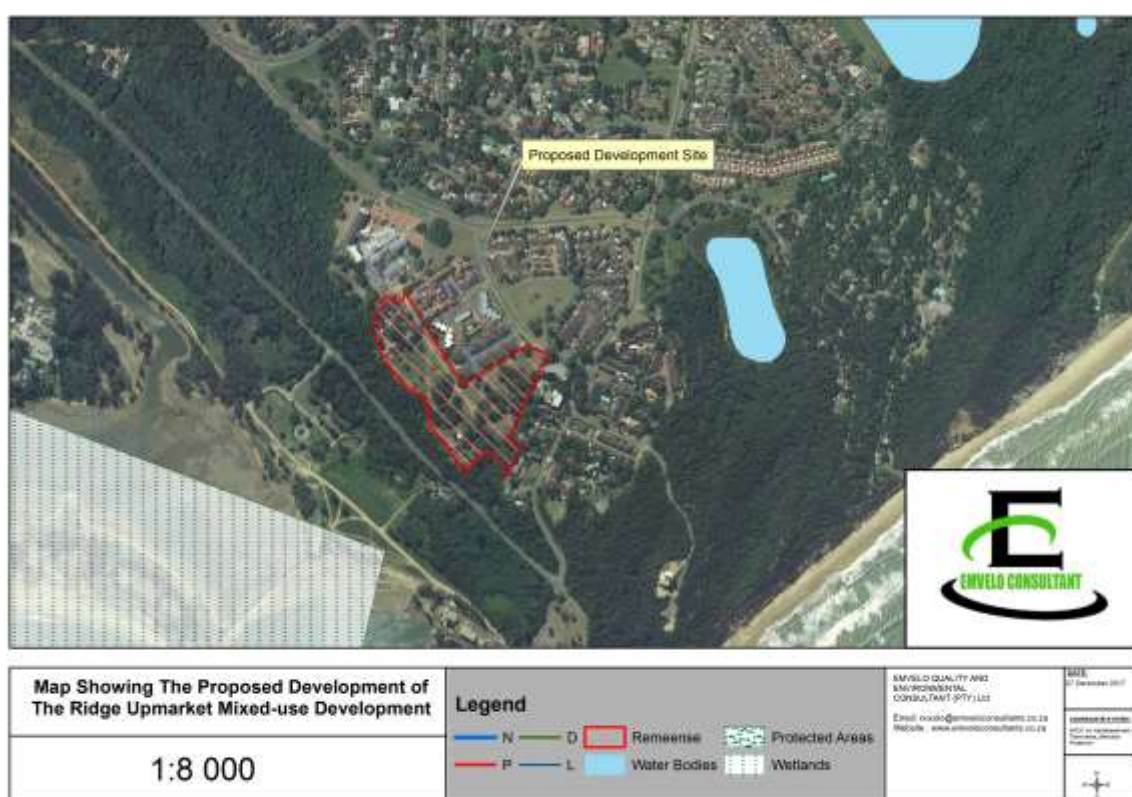


Figure 1.1: Location of The Ridge Project site.

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.

1.3 Terms of reference for the impact assessment

The Terms of Reference (ToR) for the study are as follows:

- Identify and map the main vegetation types and plant communities;
- Identify and record the main plant species that occur within the project area;
- Where possible identify any flora species of conservation concern (SCC);

- In the absence of specific information on SCC species, adopt a habitat approach by identifying areas likely to contain SCC species;
- Assess the extent of alien plant species over the site, and associated risks of alien invasion as a result of the proposed project;
- Identify any significant landscape features or rare or important vegetation/faunal associations such as wetlands or rocky areas that might support rare or important vegetation/faunal associations;
- Assess the condition of the site in terms of current or previous land uses;
- Provide a general overview of the project area in terms of connectivity, corridors, rivers and streams and ecological viability in relation to the surrounding region;
- Place the project area within the biodiversity context of the wider area (i.e. provide the “bigger picture”);
- Identify (as far as is possible from the data collected) the principal ecological processes evident within the project site and its relative importance in determining the biodiversity characteristics present;
- Assess the potential direct and indirect impacts resulting from the proposed development and associated infrastructure, both on the footprint and the immediate surrounding area during construction and operation; and
- Provide a detailed description of appropriate mitigation measures that can be adopted to reduce negative impacts of the project, where required.

1.4 Assumptions and limitations

- As full layout details were not available at the writing of this report, it is assumed that the full area of the park will be lost due to the construction of the development.
- A shapefile or kml file of the site boundary was not provided, this was drawn from available maps and may not be 100% accurate.
- It is assumed that the full forest area will be left intact, except to be fenced off and raised wooden pathways constructed for access for walks and bird watching.
- Field work was conducted over two days, the first site visit looked at the park on the 8th June 2018 , the second site visit was conducted on the 24th of July 2018.

2 Methodology

2.1 Desktop assessment

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 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 Systematic Conservation Plan (KZNSCP) and Biodiversity Sector Plans were checked and mapped for the study site to provide context.
- Bird lists were accessed including the South African Bird Atlas Project Lists for the site and surrounding areas to determine the likely bird species occurring in the region.
- Mammal lists were accessed including those of the Animal Demography Unit to determine the mammal species likely to be occurring on site, with particular attention paid to mammal species of Conservation Concern.
- Reptile and amphibian lists were accessed including those of the Animal Demography Unit to determine the herpatofaunal species likely to be occurring on site, with particular attention paid to Species of Conservation Concern.
- 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 (KwaZulu-Natal Environmental, Biodiversity and Protected Areas Management Bill, 2014));
 - National Protected Species List or TOPS (R 1187 of 2007);
 - The National Red List for Plants (redlist.sanbi.org); and
 - Various faunal National Red Lists.

2.2 Field assessment

Botanical

The study area was explored on foot within the footprint, and dominant, invasive or SCC species of plants found were identified and recorded. Photographs were taken for each species. Particular care was taken to identify any Species of Conservation Concern (SCC). SCC include those species that are listed on any database as rare, threatened or endangered and include international lists such as IUCN as well as national and provincial lists. Care was taken to identify any alien invasive species in the area. The results include the following:

- A site-specific vegetation map;
- A species list for the site;
- A list of Confirmed Species of Conservation Concern for the site.

Fauna

At this stage, faunal lists for the site were assessed at a desktop level only. The vegetation mapping and wetland delineation allows for the description of faunal habitats for the site, in which certain groups of species are likely to be found.

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 2.1 below. Where Duration, Extent and Magnitude are assessed first, followed by Likelihood.

Table 2.1: Table of Evaluation criteria ranking

Score	Label	Criteria
Duration		
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
Extent		
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
Magnitude		
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
Probability		
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 2.2, with the layout of all possible scores and their overall significance presented in Table 2.3.

Table 2.2: 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 2.3: 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 2.4 Provides an example of an impact table.

Table 2.4: 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 project area

3.1 Desktop data

3.1.1 Vegetation

Vegetation of the study site is described by the Mucina and Rutherford (2006) (Figure 3.1) vegetation map as Subtropical Freshwater Wetlands and Maputaland Coastal Belt. As the forest area (mapped as wetlands) is clearly not a wetland, the description for the nearest forest type is provided here and is Northern Coastal Forest. The description of these vegetation types by Mucina and Rutherford (2006) are as follows:

Subtropical Freshwater Wetlands (AZf6)

This vegetation type occurs in flat areas and supports low beds dominated by reeds, sedges and rushes, waterlogged meadows dominated by grasses (Mucina & Rutherford, 2006). The vegetation type is found along the edges of seasonal pools in aeolian depressions as well as edging alluvial pans or artificial dams. They occur in KwaZulu-Natal, Mpumalanga, Gauteng, North-West, Limpopo and Eastern Cape. Endemic taxa include the graminoid: *Cyperus sensilis* (embedded within Indian Ocean Coastal Belt of KwaZulu-Natal), geophytic herbs: *Crinum campanulatum* (Albany region) and aquatic herbs: *Isoetes wormaldii* (Albany region), *Wolffiella denticulata* (Maputaland). This vegetation type is Least Threatened, with a conservation target of 24% and up to 50% statutorily conserved in various reserves including the Richard's Bay Nature Reserve (Mucina & Rutherford 2006).

Maputaland Coastal Belt (CB1)

The Maputaland Coastal Belt occurs within the KwaZulu-Natal province and extends into southern Mozambique (Mucina & Rutherford 2006). This vegetation type occurs on flat coastal plains likely to have been densely forested in the past in places with a wide range of interspersed nonforest plant communities including dry grasslands, hygrophilous grasslands and thicket groups. Currently the vegetation type comprises pockets of various forest types, thickets, primary and secondary grasslands, timber plantations and cane fields. Endemic taxa include the herbs: *Helichrysum adenocarpum* subsp. *ammophilum*, and *Vahlia capensis* subsp. *vulgaris* var. *longifolia*, geophytic herbs: *Asclepias gordon-grayae*, *Kniphofia leucocephala*, and *Raphionacme lucens* and the graminoid: *Restio zuluensis*. This vegetation type is Vulnerable, with a conservation target of 25%, and 15% statutorily conserved (Mucina & Rutherford 2006).

Northern Coastal Forest (FOz7)

This vegetation type occurs in KwaZulu-Natal and extends slightly into the Eastern Cape (Mucina & Rutherford, 2006). This forest type is species rich, and forms a medium to tall subtropical forest on coastal plains and stabilised dunes. On dunes, these forests have herb, shrub and tree layers that are well-defined and include *Mimusops caffra*, *Sideroxylon inerme*, *Dovyalis longispina* among others. One endemic taxon occurs within this forest type: *Acacia kosiensis*. This vegetation type is Least Threatened in general but under increasing threat due to mining on coastal dunes. 68% is statutorily conserved (Mucina & Rutherford, 2006).

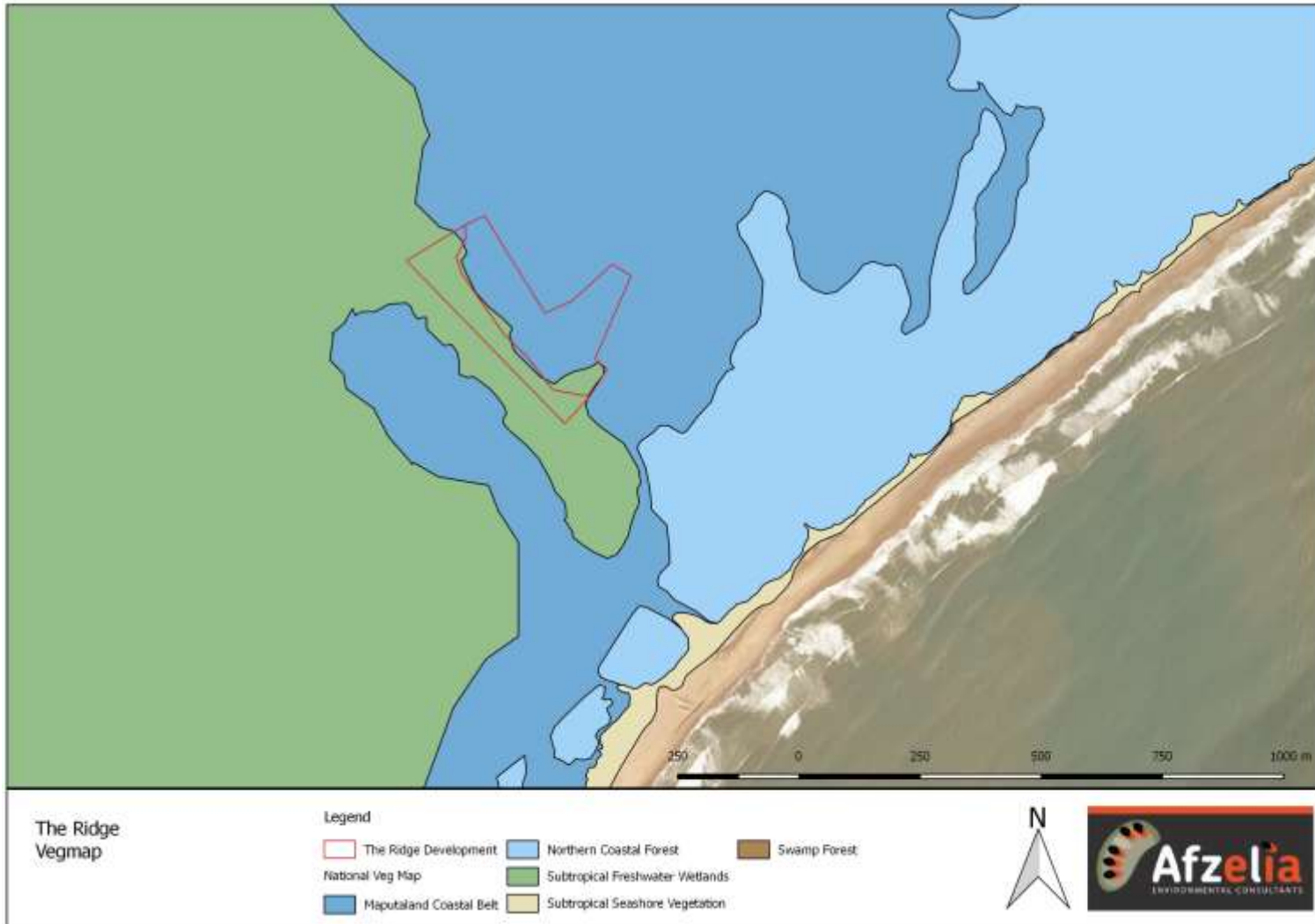


Figure 3.1: Mucina and Rutherford (2012 Beta) Vegetation map of The Ridge Project site.

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. Additional expected species were added from the Mucina & Rutherford (2006) species lists for each of the vegetation types for the study site and surrounds. This list included 473 species of plants (Appendix A). The most common plant families on this expected plant species list are as follows:

- Poaceae (Grass family) with 70 species;
- Cyperaceae (Sedge family) with 59 species;
- Asteraceae (Daisy family) with 37 species;
- Fabaceae (Pea family) with 33 species, and the
- Apocynaceae (Dogbane family) with 13 species.

Invasive species

There are also a number of alien invasive and non-indigenous species expected for the site and include those listed in Table 3.1. 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 CARA or NEM:BA lists that the landowner is mandated to control depending on their status. Both the Conservation of Agricultural Resources Act (CARA) and the National Environmental Management: Biodiversity Act (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 3.1: Expected invasive and non-indigenous species for The Ridge Site

Family	Taxon	Common name	Not indigenous	Invasive	CARA	NEMA
Amaranthaceae	<i>Alternanthera sessilis</i>		x	x		
	<i>Amaranthus viridis</i>		x			
Anacardiaceae	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	x	x	1	1b
Apocynaceae	<i>Cascabela thevetia</i>		x	x		
	<i>Nerium oleander</i>	Oleander	x	x	1	1b
Asteraceae	<i>Acanthospermum australe</i>		x	x		
	<i>Acmella caulirhiza</i>		x	x		
	<i>Ageratum houstonianum</i>	Mexican ageratum	x	x	1	1b
	<i>Ambrosia artemisiifolia</i>		x			
	<i>Conyza canadensis</i>		x			
	<i>Conyza sumatrensis</i> var. <i>sumatrensis</i>		x			
	<i>Ethulia conyzoides</i> subsp. <i>conyzoides</i>		x			
	<i>Hypochaeris brasiliensis</i>		x			
	<i>Hypochaeris microcephala</i> var. <i>albiflora</i>		x			
Brassicaceae	<i>Hypochaeris radicata</i>		x	x		
	<i>Coronopus didymus</i>		x			
	<i>Lepidium bonariense</i>	Pepper	x		1	
	<i>Lepidium virginicum</i>	Pepper	x		1	
Euphorbiaceae	<i>Euphorbia hirta</i>		x			
	<i>Euphorbia hypericifolia</i>		x			
	<i>Ricinus communis</i> var. <i>communis</i>	Castor-oil plant	x	x	2	2
Fabaceae	<i>Medicago polymorpha</i>		x	x		
	<i>Melilotus albus</i>		x			
	<i>Melilotus indicus</i>		x	x		
Lauraceae	<i>Cassytha filiformis</i>		x			
	<i>Litsea glutinosa</i>	Indian laurel	x	x	1	1b
	<i>Litsea sebifera</i>		x			
Malvaceae	<i>Corchorus trilocularis</i>		x			

Family	Taxon	Common name	Not indigenous	Invasive	CARA	NEMA
	<i>Malvastrum coromandelianum</i>	Prickly mavastrum	x	x		1b
Nyctaginaceae	<i>Boerhavia diffusa</i> var. <i>diffusa</i>		x			
Onagraceae	<i>Oenothera affinis</i>		x	x		
	<i>Oenothera indecora</i>		x	x		
Passifloraceae	<i>Passiflora edulis</i>	Purple granadilla	x	x		2
Phytolaccaceae	<i>Rivina humilis</i>	Bloodberry	x	x	1	1b
Plantaginaceae	<i>Scoparia dulcis</i>		x			
Poaceae	<i>Arundo donax</i>	Spanish reed	x	x	1	1b
	<i>Cenchrus brownii</i>		x			
	<i>Paspalum dilatatum</i>		x	x		
Rubiaceae	<i>Richardia scabra</i>		x			
Sapindaceae	<i>Cardiospermum grandiflorum</i>	Balloon vine	x	x	1	1b
Solanaceae	<i>Physalis angulata</i>		x	x		
	<i>Physalis viscosa</i>		x			
	<i>Solanum lycopersicum</i>		x	x		
	<i>Solanum nigrum</i>		x			
Verbenaceae	<i>Lantana camara</i>	Lantana	x	x	1	1b
	<i>Phyla nodiflora</i> var. <i>nodiflora</i>		x			
	<i>Verbena aristigera</i>		x			
	<i>Verbena bonariensis</i>	Wild verbena	x	x		1b
	<i>Verbena brasiliensis</i>	Brazilian verbena	x	x		1b

Species of Conservation Concern (SCC)

Species of Conservation Concern (SCC) are important, as they are endemic, or listed on the RedList, Provincially or Nationally Protected. The full plant species list can be found in Appendix A, 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 list), but they have been added here in Table 3.2 below for ease of reference..

Twenty-four SCC have been recorded from the area and surrounds. These include species that are listed on various lists. Of these species:

- 1 species (*Kniphofia leucocephala*) listed as Critically Endangered through the South African Red List;
- 1 species (*Nidorella tongensis*) listed as Endangered on the South African Red List;
- 2 species (*Aspalathus gerrardii* and *Freesia laxa* subsp. *azurea*) listed as Vulnerable on the South African Red List;
- 15 species are endemic;
- 8 species are listed on Schedule 12 of the KZN Nature Conservation Ordinance;
- 1 species (*Mimusops caffra*) is on the list of Nationally Protected Trees;
- No species previously recorded from the study area and surrounds are on the TOPs list.

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.

Table 3.2: Possible Species of Conservation Concern for The Ridge Site

Family	Taxon	IUCN ¹	Endemic ²	KZN ³	TOPS ⁴	Protected Trees ⁵
Apocynaceae	<i>Sisyranthus franksiae</i>	DD	x			
Asphodelaceae	<i>Kniphofia leucocephala</i>	CR	x			
Asteraceae	<i>Berkheya bergiana</i>	LC	x			
	<i>Nidorella linifolia</i>	LC	x			
	<i>Nidorella tongensis</i>	EN	x			
Brassicaceae	<i>Heliophila subulata</i>	LC	x			
Colchicaceae	<i>Gloriosa superba</i>			Sch12		
Cyperaceae	<i>Ficinia laciniata</i>	LC	x			
Fabaceae	<i>Aspalathus gerrardii</i>	VU	x			
Iridaceae	<i>Aristea compressa</i>	LC		Sch12		
	<i>Aristea torulosa</i>	LC		Sch12		
	<i>Freesia laxa</i> subsp. <i>azurea</i>	VU		Sch12		
Lemnaceae	<i>Wolffiella denticulata</i>		x			
Lobeliaceae	<i>Lobelia anceps</i>	LC	x			
Lythraceae	<i>Nesaea tolypobotrys</i>		x			
Oleaceae	<i>Chionanthus peglerae</i>	LC	x			
Orchidaceae	<i>Eulophia angolensis</i>			Sch12		
	<i>Eulophia speciosa</i>	LC		Sch12		
	<i>Oeceoclades lonchophylla</i>	LC		Sch12		
Poaceae	<i>Stipagrostis zeyheri</i> subsp. <i>barbata</i>	LC	x			
Proteaceae	<i>Spatalla mollis</i>	LC	x			
Sapotaceae	<i>Mimusops caffra</i>					x

¹ As listed by the POSA list downloaded on the 3rd of August 2018

² As listed by the POSA list downloaded on the 3rd of August 2018

³ Nature Conservation Ordinance 15 of 1974

⁴ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

⁵ Notice of the List of Protected Tree Species under the National Forests Act, 998 (Act no. 84 of 1998). 21 November 2014. Government Gazette Vol. 593 No. 38215.

Family	Taxon	IUCN ¹	Endemic ²	KZN ³	TOPS ⁴	Protected Trees ⁵
Vitaceae	<i>Rhoicissus sessilifolia</i>		x			
Zamiaceae	<i>Encephalartos ferox</i>			Sch12		

3.1.3 Fauna

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

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 3.3, mammals in Table 3.4, and herpetofauna in Table 3.5. There are 30 bird SCC previously recorded from the study area and surrounds including four Endangered species on the South African Red List. These birds may make use of the study area, but it does not form important habitat or breeding zones for these species. Two mammal SCC have been recorded from the area and surrounds and include the leopard, which though often recorded in habitat with a large degree of anthropogenic disturbance, is unlikely to make use of the small patch of forest on the site. The other mammal SCC is the African Clawless Otter, which cannot occur on site as there are no streams or rivers. The single amphibian SCC is the Natal Leaf Folding Frog, which may well occur on site, though it was not recorded during the site visit.

Table 3.3: Bird Species of Conservation Concern recorded from The Ridge Site area

Family	Scientific name	Common name	SA Red List ⁶	Global Red List	KZN ⁷	TOPS ⁸
Accipitridae	<i>Aquila rapax</i>	Eagle, Tawny				VU
	<i>Gypohierax angolensis</i>	Vulture, Palm-nut			Sch9	
	<i>Stephanoaetus coronatus</i>	Eagle, African Crowned	VU	NT		
Alcedinidae	<i>Alcedo semitorquata</i>	Kingfisher, Half-collared	NT	LC		
	<i>Halcyon senegaloides</i>	Kingfisher, Mangrove	EN	LC		
Anatidae	<i>Anas smithii</i>	Shoveler, Cape			Sch2	
	<i>Nettapus auritus</i>	Pygmy-Goose, African			Sch2	
	<i>Thalassornis leuconotus</i>	Duck, White-backed			Sc2	
Ciconiidae	<i>Ciconia ciconia</i>	Stork, White			Sch9	
	<i>Ephippiorhynchus senegalensis</i>	Stork, Saddle-billed	EN	LC		EN
	<i>Mycteria ibis</i>	Stork, Yellow-billed			Sch9	
Coraciidae	<i>Coracias garrulus</i>	Roller, European	NT	NT		
Estrildidae	<i>Mandingoa nitidula</i>	Twinspot, Green			Sch9	
Falconidae	<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC		
	<i>Falco peregrinus</i>	Falcon, Peregrine			Sch9	VU
Gruidae	<i>Balearica regulorum</i>	Crane, Grey Crowned	EN	EN	Sch9	EN
Heliornithidae	<i>Podica senegalensis</i>	Finfoot, African	VU	LC		
Jacanidae	<i>Microparra capensis</i>	Jacana, Lesser	NT	LC		
Laridae	<i>Sterna caspia</i>	Tern, Caspian	VU	LC		
Numididae	<i>Guttera edouardi</i>	Guineafowl, Crested			Sch2	
Otididae	<i>Lissotis melanogaster</i>	Bustard, Black-bellied	NT	LC		
	<i>Neotis denhami</i>	Bustard, Denham's	VU	NT		Protected
Pelecanidae	<i>Pelecanus onocrotalus</i>	Pelican, Great White	VU	LC		

⁶ The 2014 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland.

⁷ Nature Conservation Ordinance 15 of 1974

⁸ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

Family	Scientific name	Common name	SA Red List ⁶	Global Red List	KZN ⁷	TOPS ⁸
	<i>Pelecanus rufescens</i>	Pelican, Pink-backed	VU	LC	Sch9	EN
Phalacrocoracidae	<i>Phalacrocorax capensis</i>	Cormorant, Cape	EN	EN		
Phoenicopteridae	<i>Phoenicopterus minor</i>	Flamingo, Lesser	NT	NT	Sch9	
	<i>Phoenicopterus ruber</i>	Flamingo, Greater	NT	LC	Sch9	
Rostratulidae	<i>Rostratula benghalensis</i>	Painted-snipe, Greater	VU	LC		
Scolopacidae	<i>Numenius arquata</i>	Curlew, Eurasian	NT	NT		
Sulidae	<i>Morus capensis</i>	Gannet, Cape	VU	VU		

Table 3.4: Mammal Species of Conservation Concern recorded from The Ridge Site area

Family	Scientific name	Common Name	SA Red List ⁹	KZN ¹⁰	TOPS ¹¹
Felidae	<i>Panthera pardus</i>	Leopard	VU	Sch3	VU
Mustelidae	<i>Aonyx capensis</i>	African Clawless Otter	NT		

Table 3.5: Herpetofauna Species of Conservation Concern recorded from The Ridge Site area

Family	Scientific name	Common name	SA Redlist ¹²	KZN ¹³	TOPS ¹⁴
Hyperoliidae	<i>Afrixalus spinifrons</i>	Natal Leaf-folding Frog	VU		

⁹ 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.

¹⁰ Nature Conservation Ordinance 15 of 1974

¹¹ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

¹² 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.

¹³ Nature Conservation Ordinance 15 of 1974

¹⁴ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

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. The Ridge has one reserve within 10km, this is the Richard's Bay Game Reserve (Figure 3.2).

National Protected Areas Expansion Strategy

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 are no focus areas within 10km of the site.

Important Bird Areas

Important Bird Areas are areas internationally recognised for the bird species that occur there and are internationally important for bird conservation (BirdLife SA 2018). The IBA closest to the site is the Richard's Bay Game Reserve (Figure 3.2)



Figure 3.2: Protected areas in the region in relation to The Ridge.

3.1.5 Conservation guidelines

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 3.6. The plan then defines land-use objectives for each type of land, these are outlined in Table 3.7 (Ezemvelo KZN Wildlife 2016).

The site is located within a CBA (Figure 3.3), this indicates that no natural vegetation should be lost as this area is critical for conservation. However, the field assessment determine that the park is not natural vegetation, so it can be assumed that the forest alone is part of the CBA and thus must not be touched. An Ecological Support Area also is present along the coast close to the site.

Table 3.6: Subcategories of CBA and ESAs*.

Critical Biodiversity Areas (CBAs) – 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).
Ecological Support Areas (ESAs) – 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 3.7: 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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*.

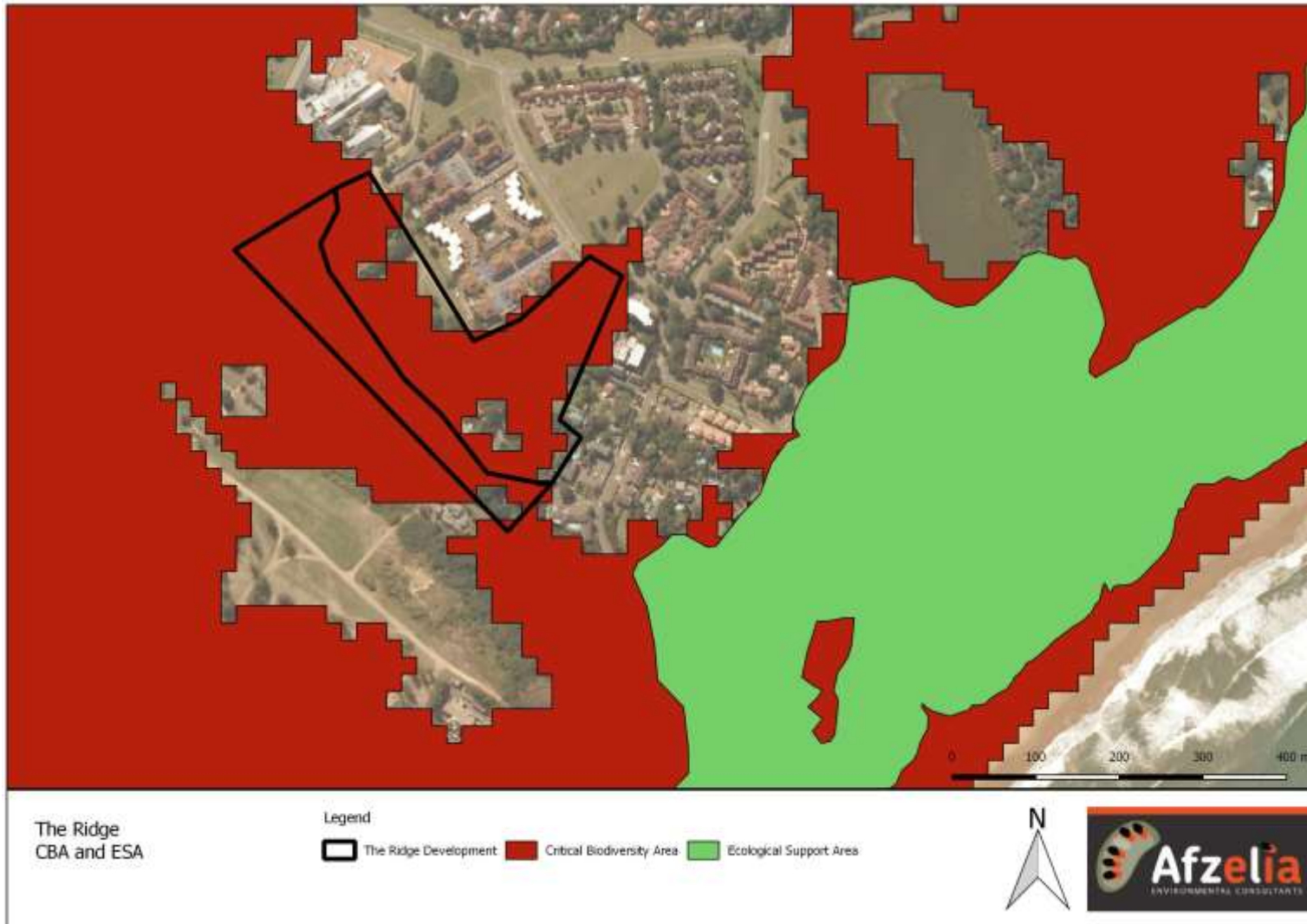


Figure 3.3: Ezemvelo KZN Wildlife Critical Biodiversity Areas and Ecological Support Areas.

3.2 Field assessment

A site visit was undertaken to determine the status and composition of the site in situ. Site visits are essential to confirm desktop information as it may not be accurate. Most conservation planning and mapping tools utilize remote sensing and not all sites are groundtruthed, the mapping may also be out-dated. As a result, a site visit is necessary to determine the vegetation composition and conservation value of the site.

3.2.1 Vegetation

The site comprises two easily discernible sections, the park, which will be destroyed during construction of the proposed development, and the forest, which is planned to be used a conservation area for walks and birdwatching.

The Park

The park comprises a mowed lawn with scattered trees. The trees range from indigenous to alien species, all of which will be removed to make space for the development. No formally Protected Trees or Species of Conservation Concern are located within the park, nor is it a natural habitat, no impacts are associated with this part of the development. The park can be seen in Figure 3.4. Trees planted in the park include the indigenous *Ficus natalensis*, *Syzygium cordatum*, *Strelitzia Nicolai* and *Phoenix reclinata* along with the invasive *Thevetia peruviana* and *Schinus terebinthifolius*. The invasive species are required by law to be controlled but as these will be cut down with the construction of the development, the construction phase will result in their control by default.



Figure 3.4: The Ridge park.

The Forest

The other section of the site: forest, comprises indigenous forest with some naturalised invasive elements occurring on stabilised dunes (Figure 3.5). This forest does not fit into the definitions of forest as described by Mucina and Rutherford (2006) in section 3.1.1. However, it is dune forest with coastal forest elements. The forest is slightly disturbed as it is used as a thoroughfare, as well as used as a toilet and an area for prostitution, and makeshift shelters (Figure 3.6). Invasion levels are low, but there are a number of species present, all of which will result in greater levels of invasion as the disturbance levels increase. Invasive species include *Mirabilis jalapa*, *Canna indica*, *Ipomoea indica*, *Neohrolepis exaltata*, *Syngonium podophyllum* and others (Figure 3.7). The forest tree stratum is dominated by *Strelitzia nicolai*, *Phoenix reclinata*, *Rauvolfia caffra*, *Vodcanga thouarsii*, *Macaranga capensis* and *Ficus natalensis* with various other species present (Figure 3.8). The herbaceous layer comprised largely the two invasive species *Syngonium podophyllum* and *Rivinia humilis* among others with the shrub layer comprising *Grewia lasiocarpa*, *Plectranthus ecklonii*, *Senecio tamoides* and *Psychotria capensis* among others (Figure 3.9).



Figure 3.5: Forest below The Ridge.



Figure 3.6: Disturbance within the forest below The Ridge.



Figure 3.7: Some alien invasive species recorded from the site including (form left to right, top to bottom), *Canna indica* (Indian shot), *Rivinia humilis* (Bloodberry) and *Mirabilis jalapa* (Four-ó Clocks).



Figure 3.8: Some indigenous tree species found at The Ridge including (right to left, top then bottom): *Ficus natalensis* (Coastal strangler fig), *Rauvolfia caffra* (Quinine tree), *Macaranga capensis* (River macaranga) and *Syzygium cordatum* (Waterberry).



Figure 3.9: Some indigenous understory species found in the forests of The Ridge (right to left, top then bottom). *Psychotria capensis*, *Coleotrype natalensis* (Forest commelina), *Asystasia gangetica* (Asystasia), *Mikania natalensis* (Mikania), *Hypoestes aristata* (Ribbon bush), and *Senecio tamoides* (canary creeper).

All vegetation types and features of interest are shown in the vegetation map for the site (Figure 3.10), A full species list can be found in the Appendices.

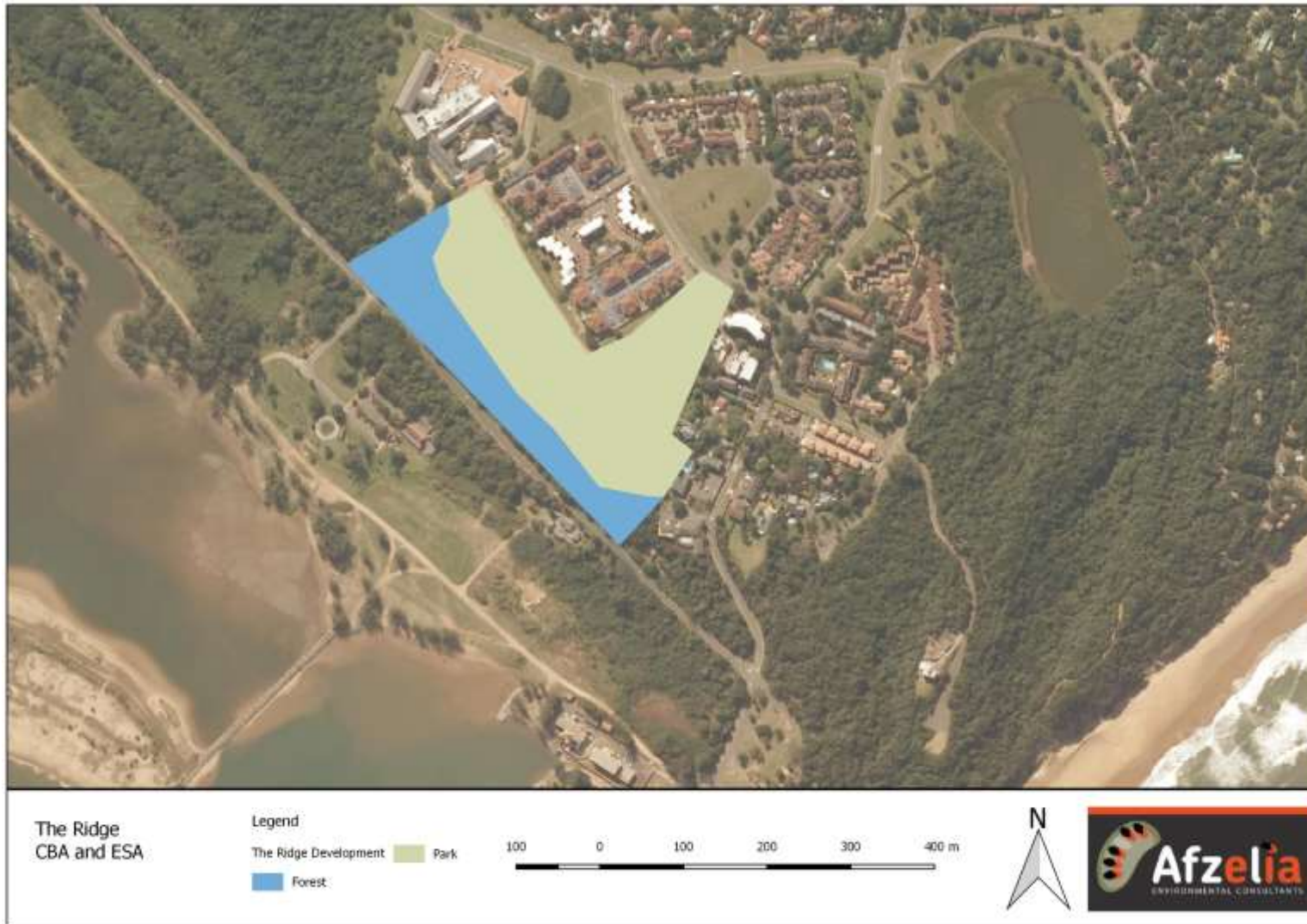


Figure 3.10: Vegetation map of The Ridge Site.

4 Sensitivity

Although the site for the development itself comprises a park, which cannot be considered to be natural habitat and is thus transformed, the presence of forest, results in a sensitivity assessment. To maintain ecosystem services, forests should be kept as intact as possible, and buffers should be applied. Alien plants occurring on the site should be removed, as is required by law. This includes those trees within the forest as well as in the ecotone of the forest to the park (or development). The development of the park has eliminated the ecotone required for adequate ecosystem function and process by mowing the lawn directly on the border of the forest. This has negative impacts on both the forest ecosystem and the plants and animals that live in it. It is recommended that a natural ecotone, forming a buffer between the forest and development, be allowed to develop.

A sensitivity map can be drawn up based on the presence and state of the forest. As forest ecosystems are inherently sensitive, the state of the forest plays a role only in buffer determination rather than sensitivity per se. Ostensibly, this map provides the no-go areas for the proposed development.

During the screening assessment and thorough GPS and satellite imagery after the site visit, the location and extent of forests were mapped. The Guidelines for Biodiversity Impact Assessment in KwaZulu Natal were then consulted to determine buffers for these areas (KZN Wildlife, 2013). Buffer requirements are clearly laid out for forests in the guidelines, these tables are reproduced below. Table 4.1 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.

Table 4.1: Forest sensitivity mapping (highlighting denotes applicable criteria).

Buffer scaling	Minimum distance from ecotone
<p>Forest is uniformly secondary or uniformly represents recent succession from grassland, woodland or scrub.</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>Critically Endangered, Endangered or Vulnerable forest types</p> <p>Old Growth Forest (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).</p> <p>Old growth forest more than 5 hectares in extent or part of a mosaic of more than 5 hectares.</p>	100 metres
<p>Ecotone criterion</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>Shading No unnatural shading into ecotone or natural forest.</p>	Calculation on a case by case basis.

Buffer scaling	Minimum distance from ecotone
<p>Activities creating ecological risk by storing or discharging pollutants or contaminants, or possibly accidentally discharging the same. 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>Activities likely to cause long term permanent or irreversible severe impacts 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>Erosion (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.
<p>Hydrological Impacts This criterion is most critical for wetland forest types.</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>High intensity edge effects/disturbance along the forest edge Categories include the following: -</p>	Buffers should be set at a minimum of 100 meters
1. High noise Some public, infrastructural (roads, dams, airstrips), commercial and industrial developments.	
2. Frequent activity, including traffic Most public, infrastructural (roads, airstrips), commercial and industrial developments.	
3. Transfer of dust from dirt roads to surrounding vegetation Wherever dirt roads are established	
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).	
5. Activities which have high potential to spread alien species into forests and the ecotone.	

Buffer scaling	Minimum distance from ecotone
6. Activities which may result in trampling or grazing in the forest and ecotone i.e. Livestock farming	
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.	100 metres, but with increase if these impacts cannot be adequately reduced at this distance.
<p>Activities adjacent to forest which will likely generate some ongoing moderate <i>ah hoc</i> negative impacts</p> <p>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>	60 metres but with an increase if these impacts cannot be adequately reduced at this distance.

Using the criteria associated with the establishment of the activities on The Ridge the buffer zone for the forests of the site should be at least 60m from the edge of the ecotone. As the ecotone does not exist due to current mowing activities, this buffer should be increased to accommodate the development of an ecotone of secondary vegetation and as such, the buffer should be increased to 100m. As the forest will be actively conserved as part of the proposed development – the overall impact of its conservation may outweigh the negative impacts it is currently experiencing. However, every effort should be made to maintain a buffer zone between the edge of the forest adjacent to the development, and the development itself. Access should also be restricted.

5 Impact Assessment

The impacts on the terrestrial biodiversity have been rated according to the methodology in Section 2.3. They span two issues and three impacts, which are outlined in sections 5.1 through 5.2. Mitigation measures are also provided for each of the expected impacts. Overall, loss of the park vegetation is negligible from an ecological context as it does not comprise natural habitat but is classified as transformed. However, the development of pathways within the forest will cause impacts to that vegetation. It is anticipated that these will be primarily positive as a result of access restriction and controlled use of the forest paths, along with the control of existing and potential alien invasive species.

5.1 Issue 1: Loss of Vegetation Communities

Vegetation will be lost as a direct result of the construction phase of the project. Overall, the impacts on mowed lawn (the park) will be negligible. The impacts of path construction within the forest are rated here.

Recommended mitigation measures include:

- Keep the loss of forest vegetation as close as possible to the footprint of the development, restrict dumping of soil and trampling to outside of an established buffer zone surrounding the forest;
- No forest plants should be removed or cut down unless these are alien invasive species;
- a rehabilitation plan must be developed; and
- Monitoring of vegetation growth should be employed to reduce alien invasion and increase the survival of the planted seeds.

5.1.1 Impact 1: Loss of Forest

Impact on this vegetation type without mitigation is expected to be minor in extent and magnitude is permanent and definite, with an overall significance of medium negative. Application of the mitigation measures will reduce the impact to low negative. It should be noted that the restriction of use of the forest will result in the current impacts on the forest to decrease dramatically, resulting in an overall positive impact.

Impact	Effect					Probability	Total Score	Significance		
	Extent		Duration		Magnitude					
Without mitigation	Minor	1	Permanent	5	Minor	2	Definite	5	40	Medium -
With mitigation	Minor	1	Long term	4	Negligible	0	Definite	5	20	Low -

5.2 Issue 2: 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. Alien invasives are already problematic and will become more so with disturbance. The site exists in an already fragmented landscape and should avoid increasing fragmentation. It is anticipated that the active conservation of the forest patch will have positive impacts provided alien invasive species are carefully controlled.

Recommended mitigation measures include:

- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species;
- Current alien species must be controlled;
- No additional development must take place within the forest;

- Ideally a buffer zone allowed to develop as a natural ecotone should be set aside between the side of the forest adjacent to the development and the development itself;
- Keeping the disturbance footprint as small as possible, with no construction debris and earth moving spilling past the defined paths within the forest; and
- Rehabilitation should take place as soon as possible after construction is completed.

5.2.1 Impact 2: Fragmentation and edge effects

Due to the already fragmented nature of the site, impacts will be low. This impact, without mitigation is estimated to be minor in extent and magnitude over the short term and is probable. Overall significance is a low negative and can be reduced to negligible with mitigation.

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Minor	1	Short term	2	Minor	2	Probable	3	15	Low -
With mitigation	Minor	1	Very short term	1	Negligible	0	Very improbable	1	2	Negligible

5.2.2 Impact 3: Invasion of alien species

The site is already invaded. There is a high risk of these invasive species spreading as the activity 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. Control of the existing alien invasive species, especially within the riparian area will result in an overall positive impact.

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

Overall, the site comprised two sections (park and forest). The park forms transformed land, and thus no significant impacts in the natural environment will occur with its development. Development of the forest by:

- Restricting access
- Construction of raised wooden walkways
- Construction of bird hides

Will result in the decrease of current impacts to the forest caused by influx of people, dumping and introduction and spread of alien invasive species will be reduced. Thus, an overall positive impact is expected should this forest patch be fenced off and conserved as part of The Ridge development.

Overall, impacts are medium to low without mitigation, and can be reduced to low negative or negligible with mitigation measures (Table 6.1).

Table 6.1: Summary of impacts associated with The Ridge project

Impact	Without Mitigation	With mitigation
Issue 1: Loss of vegetation communities		
2: Loss of forest	Medium -	Low -
Issue 3: Loss of ecosystem function and process		
7: Fragmentation and edge effects	Low -	Negligible
8: Invasion of alien species	High -	Low -

Recommended mitigation measures include the following:

- Keep the loss of forest vegetation as close as possible to the footprint of the development, restrict dumping of soil and trampling to outside of an established buffer zone surrounding the forest;
- No forest plants should be removed or cut down unless these are alien invasive species;
- A rehabilitation plan must be developed;
- Monitoring of vegetation growth should be employed to reduce alien invasion and increase the presence of natural dispersed indigenous species;
- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species;
- No additional development must take place within the forest;
- Ideally a buffer zone allowed to develop as a natural ecotone should be set aside between the side of the forest adjacent to the development and the development itself;
- Rehabilitation should take place as soon as possible after construction is completed.

In order to proceed with this development, the following is recommended:

4. A buffer zone between the edge of the forest adjacent to the development and the development itself should be defined and adhered to;
5. An alien vegetation management plan should be developed; and
6. A rehabilitation plan should be developed.

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8 Appendix A: Expected Plant Species

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
Acanthaceae	<i>Asystasia gangetica</i>							X
	<i>Hypoestes aristata</i> var. <i>aristata</i>			X			X	
	<i>Isoglossa woodii</i>							X
	<i>Pseuderanthemum subviscosum</i>			X			X	
Achariaceae	<i>Xylothea kraussiana</i>							X
Agavaceae	<i>Chlorophytum comosum</i>			X			X	
Amaranthaceae	<i>Achyranthes aspera</i>							X
	<i>Alternanthera sessilis</i>				X	X	X	
	<i>Amaranthus viridis</i>				X		X	
	<i>Hermbstaedtia odorata</i> var. <i>aurantiaca</i>							X
	<i>Salicornia pachystachya</i>	LC		X			X	X
	<i>Salicornia perrieri</i>	LC		X			X	
	<i>Sarcocornia natalensis</i> var. <i>affinis</i>	LC		X			X	
	<i>Sarcocornia natalensis</i> var. <i>natalensis</i>	LC		X			X	
Amaryllidaceae	<i>Crinum campanulatum</i>							X
	<i>Crinum paludosum</i>							X
Anacardiaceae	<i>Ozoroa obovata</i>							X
	<i>Rhus kwazuluana</i>							X
	<i>Rhus natalensis</i>							X
	<i>Rhus nebulosa</i>							X
	<i>Schinus terebinthifolius</i>	NE			X	X	X	
	<i>Searsia natalensis</i>			X			X	
	<i>Searsia nebulosa</i> forma <i>nebulosa</i>			X			X	
Annonaceae	<i>Annona senegalensis</i>							X
	<i>Artabotrys monteiroae</i>							X
	<i>Monanthes affinis</i>							X
	<i>Uvaria caffra</i>							X
Apiaceae	<i>Centella asiatica</i>							X
	<i>Centella coriacea</i>							X
	<i>Sium repandum</i>							X

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
Apocynaceae	<i>Acokanthera oblongifolia</i>							X
	<i>Asclepias gordon-grayae</i>							X
	<i>Callichilia orientalis</i>							X
	<i>Carissa bispinosa</i>							X
	<i>Cascabela thevetia</i>				X	X	X	
	<i>Landolphia kirkii</i>							X
	<i>Nerium oleander</i>	NE				X	X	X
	<i>Orbea longidens</i>							X
	<i>Raphionacme lucens</i>							X
	<i>Secamone filiformis</i>	LC		X				X
	<i>Sisyranthus franksiae</i>	DD	X	X				X
	<i>Tabernaemontana elegans</i>	LC		X				X
	<i>Tacazzea apiculata</i>	LC		X				X
Aponogetonaceae	<i>Aponogeton desertorum</i>							X
	<i>Aponogeton natalensis</i>							X
	<i>Aponogeton rehmannii</i>							X
Araceae	<i>Pistia stratiotes</i>							X
Araliaceae	<i>Hydrocotyle bonariensis</i>	LC		X			X	
	<i>Hydrocotyle ranunculoides</i>							X
Arecaceae	<i>Hyphaene coriacea</i>							X
	<i>Phoenix reclinata</i>							X
Asphodelaceae	<i>Kniphofia leucocephala</i>	CR	X	X			X	X
Aspleniaceae	<i>Asplenium prionitis</i>	LC		X			X	
Asteraceae	<i>Acanthospermum australe</i>				X	X	X	
	<i>Acmella caulirhiza</i>				X	X	X	
	<i>Ageratum houstonianum</i>				X	X	X	
	<i>Ambrosia artemisiifolia</i>				X		X	
	<i>Berkheya bergiana</i>	LC	X	X			X	
	<i>Brachylaena discolor</i> subsp. <i>discolor</i>							X
	<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>							X
	<i>Conyza canadensis</i>				X		X	
	<i>Conyza sumatrensis</i> var. <i>sumatrensis</i>				X		X	

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Conyza ulmifolia</i>			x			x	
	<i>Doellia cafra</i>	LC		x			x	
	<i>Eclipta prostrata</i>							x
	<i>Epaltes gariepina</i>							x
	<i>Ethulia conyzoides</i> subsp. <i>conyzoides</i>				x		x	x
	<i>Helichrysopsis septentrionalis</i>							x
	<i>Helichrysium adenocarpum</i> subsp. <i>ammophilum</i>							x
	<i>Helichrysium argyrosphaerum</i>	LC		x			x	
	<i>Helichrysium asperum</i> var. <i>albidulum</i>	LC		x			x	
	<i>Helichrysium candolleianum</i>	LC		x			x	
	<i>Helichrysium cymosum</i> subsp. <i>cymosum</i>							x
	<i>Helichrysium decorum</i>	LC		x			x	
	<i>Helichrysium kraussii</i>							x
	<i>Helichrysium tongense</i>							x
	<i>Hypochaeris brasiliensis</i>				x		x	
	<i>Hypochaeris microcephala</i> var. <i>albiflora</i>				x		x	
	<i>Hypochaeris radicata</i>				x	x	x	
	<i>Launaea sarmentosa</i>	LC		x			x	
	<i>Nidorella auriculata</i>	LC		x			x	
	<i>Nidorella linifolia</i>	LC	x	x			x	
	<i>Nidorella tongensis</i>	EN	x	x			x	x
	<i>Pulicaria scabra</i>	LC		x			x	
	<i>Senecio bryoniifolius</i>	LC		x			x	
	<i>Senecio madagascariensis</i>	LC		x			x	
	<i>Senecio ngoyanus</i>							x
	<i>Senecio polyanthemoides</i>	LC		x			x	
	<i>Vernonia centaureoides</i>							x
	<i>Vernonia natalensis</i>							x
	<i>Vernonia oligocephala</i>							x
Azollaceae	<i>Azolla pinnata</i> var. <i>africana</i>							x
Brachytheciaceae	<i>Rhynchostegium brachypterum</i>			x			x	
Brassicaceae	<i>Coronopus didymus</i>				x		x	

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Heliophila subulata</i>	LC	x	x			x	
	<i>Lepidium africanum</i> subsp. <i>africanum</i>	LC		x			x	
	<i>Lepidium bonariense</i>				x		x	
	<i>Lepidium suluense</i>	LC		x			x	
	<i>Lepidium virginicum</i>				x		x	
	<i>Rorippa madagascariensis</i>							x
Burmanniaceae	<i>Burmannia madagascariensis</i>							x
Buxaceae	<i>Buxus natalensis</i>							x
Cabombaceae	<i>Brasenia schreberi</i>							x
Campanulaceae	<i>Wahlenbergia abyssinica</i> subsp. <i>abyssinica</i>	LC		x			x	
	<i>Wahlenbergia undulata</i>	LC		x			x	
Capparaceae	<i>Capparis brassii</i>	LC		x			x	
Caryophyllaceae	<i>Silene burchellii</i> subsp. <i>multiflora</i>			x			x	
Celastraceae	<i>Gymnosporia nemorosa</i>							x
	<i>Mystroxyton aethiopicum</i> subsp. <i>schlechteri</i>	LC		x			x	
	<i>Putterlickia verrucosa</i>							x
	<i>Salacia kraussii</i>	LC		x			x	
Celtidaceae	<i>Celtis gomphophylla</i>							x
Ceratophyllaceae	<i>Ceratophyllum demersum</i>							x
	<i>Ceratophyllum muricatum</i>							x
Chrysobalanaceae	<i>Parinari capensis</i> subsp. <i>capensis</i>	LC		x			x	
Clusiaceae	<i>Garcinia livingstonei</i>	LC		x			x	
Colchicaceae	<i>Gloriosa superba</i>							x
Commelinaceae	<i>Coleotrype natalensis</i>	LC		x			x	
	<i>Commelina diffusa</i>							x
	<i>Floscopa glomerata</i>	LC		x			x	x
Convolvulaceae	<i>Convolvulus mauritanicus</i>							x
	<i>Hewittia malabarica</i>	LC		x			x	
	<i>Ipomoea aquatica</i>							x
	<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>	LC		x			x	
Cucurbitaceae	<i>Citrullus lanatus</i>	LC		x			x	
	<i>Coccinia mackenii</i>	LC		x			x	

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R	
	<i>Cucumis maderaspatanus</i>	LC		x			x		
	<i>Kedrostis foetidissima</i>	LC		x			x		
Cymodoceaceae	<i>Thalassodendron ciliatum</i>	LC		x			x		
Cyperaceae	<i>Bolboschoenus glaucus</i>							x	
	<i>Bulbostylis contexta</i>	LC		x			x		
	<i>Bulbostylis hispidula</i> subsp. <i>pyriformis</i>	LC		x			x		
	<i>Cladium mariscus</i> subsp. <i>jamaicense</i>	LC		x			x	x	
	<i>Courtoisia cyperoides</i>							x	
	<i>Cyperus albostriatus</i>	LC		x			x	x	
	<i>Cyperus alopecuroides</i>							x	
	<i>Cyperus articulatus</i>	LC		x			x	x	
	<i>Cyperus brevis</i>	LC		x			x		
	<i>Cyperus congestus</i>	LC		x			x		
	<i>Cyperus difformis</i>							x	
	<i>Cyperus digitatus</i>							x	
	<i>Cyperus dives</i>							x	
	<i>Cyperus dubius</i>				x			x	
	<i>Cyperus dubius</i> var. <i>dubius</i>				x			x	
	<i>Cyperus fastigiatus</i>							x	
	<i>Cyperus involucratus</i>	LC			x			x	
	<i>Cyperus laevigatus</i>	LC			x			x	
	<i>Cyperus latifolius</i>							x	
	<i>Cyperus macrocarpus</i>	LC			x			x	
	<i>Cyperus natalensis</i>	LC			x			x	
	<i>Cyperus papyrus</i>							x	
	<i>Cyperus pectinatus</i>							x	
	<i>Cyperus procerus</i>							x	
	<i>Cyperus prolifer</i>	LC			x			x	x
	<i>Cyperus rotundus</i> subsp. <i>rotundus</i>	LC			x			x	
<i>Cyperus rotundus</i> subsp. <i>tuberosus</i>	LC			x			x		
<i>Cyperus rubicundus</i>	LC			x			x		
<i>Cyperus sensilis</i>								x	

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Cyperus sexangularis</i>							x
	<i>Cyperus solidus</i>	LC		x			x	
	<i>Cyperus sphaerospermus</i>	LC		x			x	
	<i>Eleocharis dulcis</i>							x
	<i>Eleocharis limosa</i>	LC		x			x	
	<i>Ficinia laciniata</i>	LC	x	x			x	
	<i>Fimbristylis bisumbellata</i>							x
	<i>Fimbristylis complanata</i>	LC		x			x	
	<i>Fimbristylis dichotoma</i>			x			x	
	<i>Fimbristylis dichotoma</i> subsp. <i>dichotoma</i>	LC		x			x	
	<i>Fimbristylis ferruginea</i>	LC		x			x	
	<i>Fimbristylis obtusifolia</i>							x
	<i>Fuirena ciliaris</i>							x
	<i>Fuirena ecklonii</i>							x
	<i>Fuirena hirsuta</i>	LC		x			x	
	<i>Fuirena obcordata</i>	LC		x			x	
	<i>Isolepis prolifera</i>	LC		x			x	
	<i>Oxycaryum cubense</i>							x
	<i>Pycnus mundii</i>	LC		x			x	x
	<i>Pycnus nitidus</i>	LC		x			x	
	<i>Pycnus pelophilus</i>							x
	<i>Pycnus polystachyos</i>							x
	<i>Pycnus rehmannianus</i>	LC		x			x	
	<i>Pycnus unioloides</i>	LC		x			x	
	<i>Rhynchospora brownii</i>	LC		x			x	
	<i>Rhynchospora perrieri</i>	LC		x			x	
	<i>Schoenoplectus corymbosus</i>							x
	<i>Schoenoplectus scirpoides</i>							x
	<i>Scleria achtenii</i>	LC		x			x	
	<i>Scleria poiformis</i>							x
Davalliaceae	<i>Davallia denticulata</i> var. <i>denticulata</i>	LC		x			x	
Dichapetalaceae	<i>Tapura fischeri</i>							x

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
Dracaenaceae	<i>Dracaena alectriformis</i>							X
Ebenaceae	<i>Diospyros galpinii</i>							X
	<i>Diospyros inhacaensis</i>							X
	<i>Euclea natalensis</i>							X
	<i>Euclea natalensis</i> subsp. <i>natalensis</i>							X
	<i>Euclea racemosa</i>							X
Elatinaceae	<i>Bergia salaria</i>							X
Eriocaulaceae	<i>Eriocaulon abyssinicum</i>							X
Erythroxylaceae	<i>Erythroxylum emarginatum</i>							X
Euphorbiaceae	<i>Cavacoa aurea</i>							X
	<i>Dalechampia scandens</i> var. <i>natalensis</i>	LC		X			X	
	<i>Erythrococca berberidea</i>							X
	<i>Euphorbia hirta</i>	NE			X		X	
	<i>Euphorbia hypericifolia</i>				X		X	
	<i>Ricinus communis</i> var. <i>communis</i>	NE			X	X	X	
Fabaceae	<i>Abrus precatorius</i> subsp. <i>africanus</i>							X
	<i>Acacia kosiensis</i>							X
	<i>Acacia kraussiana</i>							X
	<i>Acacia natalitia</i>							X
	<i>Albizia adianthifolia</i>							X
	<i>Aspalathus gerrardii</i>	VU	X	X			X	
	<i>Chamaecrista mimosoides</i>	LC		X			X	
	<i>Chamaecrista plumosa</i> var. <i>plumosa</i>	LC		X			X	X
	<i>Crotalaria pallida</i> var. <i>pallida</i>	LC		X			X	
	<i>Crotalaria virgulata</i> subsp. <i>grantiana</i>	LC		X			X	
	<i>Dalbergia armata</i>							X
	<i>Dalbergia obovata</i>							X
	<i>Desmodium dregeanum</i>	LC		X			X	X
	<i>Eriosema psoraleoides</i>	LC		X			X	
	<i>Guilandina bonduc</i>			X			X	
	<i>Indigofera charlieriana</i> subsp. <i>sessilis</i> var. <i>scaberrima</i>			X			X	
<i>Indigofera charlieriana</i> var. <i>charlieriana</i>	LC		X			X		

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Indigofera neglecta</i>	NE		x			x	
	<i>Indigofera williamsonii</i>							x
	<i>Macrotyloma axillare</i> var. <i>axillare</i>	LC		x			x	
	<i>Medicago polymorpha</i>	NE			x	x	x	
	<i>Melilotus albus</i>	NE			x		x	
	<i>Melilotus indicus</i>	NE			x	x	x	
	<i>Neptunia oleracea</i>							x
	<i>Stylosanthes fruticosa</i>							x
	<i>Tephrosia kraussiana</i>	LC		x			x	
	<i>Tephrosia longipes</i>							x
	<i>Tephrosia polystachya</i> var. <i>hirta</i>	LC		x			x	
	<i>Tephrosia polystachya</i> var. <i>polystachya</i>	LC		x			x	
	<i>Tephrosia shilwanensis</i>	LC		x			x	
	<i>Vachellia karroo</i>	LC		x			x	
	<i>Vachellia nilotica</i> subsp. <i>kraussiana</i>	LC		x			x	
	<i>Zornia capensis</i> subsp. <i>capensis</i>	LC		x			x	
Geraniaceae	<i>Pelargonium grossularioides</i>	LC		x			x	
Hydrocharitaceae	<i>Lagarosiphon crispus</i>							x
	<i>Najas marina</i> subsp. <i>armata</i>	LC		x			x	
	<i>Ottelia exserta</i>							x
Icacinaceae	<i>Apodytes dimidiata</i> subsp. <i>dimidiata</i>	LC		x			x	x
Iridaceae	<i>Aristea compressa</i>	LC		x			x	
	<i>Aristea torulosa</i>	LC		x			x	
	<i>Freesia laxa</i> subsp. <i>azurea</i>	VU		x			x	
Isoetaceae	<i>Isoetes wormaldii</i>							x
Juncaceae	<i>Juncus kraussii</i> subsp. <i>kraussii</i>	LC		x			x	
Lamiaceae	<i>Plectranthus verticillatus</i>	LC		x			x	
Lauraceae	<i>Cassytha filiformis</i>	NE			x		x	
	<i>Litsea glutinosa</i>				x	x	x	
	<i>Litsea sebifera</i>	NE			x		x	
Lemnaceae	<i>Lemna minor</i>							x
	<i>Spirodela polyrhiza</i>							x

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Spirodela punctata</i>							X
	<i>Wolffia arrhiza</i>							X
	<i>Wolffia globosa</i>							X
	<i>Wolffiella denticulata</i>		X	X			X	X
	<i>Wolffiella welwitschii</i>							X
Lentibulariaceae	<i>Utricularia australis</i>	LC		X			X	
	<i>Utricularia foliosa</i>	LC		X			X	
	<i>Utricularia gibba</i> subsp. <i>exoleta</i>							X
	<i>Utricularia inflexa</i>							X
	<i>Utricularia subulata</i>							X
Lobeliaceae	<i>Lobelia anceps</i>	LC	X	X			X	
Lomariopsiaceae	<i>Bolbitis heudelotii</i>							X
Lythraceae	<i>Nesaea tolypobotrys</i>		X	X			X	
Malvaceae	<i>Cola natalensis</i>							X
	<i>Corchorus trilocularis</i>	NE			X		X	
	<i>Malvastrum coromandelianum</i>				X	X	X	
	<i>Sida cordifolia</i>			X			X	
	<i>Sida rhombifolia</i> subsp. <i>rhombifolia</i>	LC		X			X	
	<i>Triumfetta rhomboidea</i> var. <i>rhomboidea</i>	LC		X			X	
	<i>Waltheria indica</i>	LC		X			X	
Marsileaceae	<i>Marsilea apposita</i>							X
	<i>Marsilea coromandelina</i>							X
	<i>Marsilea macrocarpa</i>							X
	<i>Marsilea minuta</i>							X
	<i>Marsilea villifolia</i>							X
Meliaceae	<i>Ekebergia capensis</i>	LC		X			X	
	<i>Trichilia dregeana</i>	LC		X			X	
	<i>Trichilia emetica</i>							X
	<i>Turraea floribunda</i>							X
Melanthaceae	<i>Bersama tysoniana</i>	LC		X			X	
Menyanthaceae	<i>Nymphoides indica</i> subsp. <i>occidentalis</i>							X
	<i>Nymphoides rautanenii</i>							X

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
Molluginaceae	<i>Glinus lotoides</i>							X
Moraceae	<i>Ficus burtt-davyi</i>							X
	<i>Ficus natalensis</i> subsp. <i>natalensis</i>	LC		X			X	
Myrtaceae	<i>Eugenia capensis</i> subsp. <i>capensis</i>	LC		X			X	X
	<i>Syzygium cordatum</i>			X			X	X
Najadaceae	<i>Najas marina</i> subsp. <i>dellei</i>							X
	<i>Najas pectinata</i>							X
Nephrolepidaceae	<i>Nephrolepis biserrata</i>	LC		X			X	
Nyctaginaceae	<i>Boerhavia coccinea</i> var. <i>coccinea</i>	LC		X			X	
	<i>Boerhavia diffusa</i> var. <i>diffusa</i>				X		X	
	<i>Commicarpus chinensis</i> subsp. <i>natalensis</i>	LC		X			X	
Nymphaeaceae	<i>Nymphaea nouchali</i> var. <i>caerulea</i>							X
Oleaceae	<i>Chionanthus peglerae</i>	LC	X	X			X	
	<i>Olea woodiana</i>			X			X	
Onagraceae	<i>Ludwigia adscendens</i> subsp. <i>diffusa</i>							X
	<i>Ludwigia leptocarpa</i>							X
	<i>Ludwigia octovalvis</i>							X
	<i>Ludwigia palustris</i>							X
	<i>Oenothera affinis</i>				X	X	X	
	<i>Oenothera indecora</i>				X	X	X	
Orchidaceae	<i>Cheirostylis nuda</i>	LC		X			X	
	<i>Eulophia angolensis</i>							X
	<i>Eulophia speciosa</i>	LC		X			X	
	<i>Oeceoclades lonchophylla</i>	LC		X			X	
Orobanchaceae	<i>Buchnera longespicata</i>							X
	<i>Cycnium tubulosum</i> subsp. <i>tubulosum</i>	LC		X			X	
	<i>Striga bilabiata</i> subsp. <i>bilabiata</i>	LC		X			X	
	<i>Striga gesnerioides</i>	LC		X			X	
	<i>Striga junodii</i>							X
	<i>Zeuxine africana</i>							X
Parkeriaceae	<i>Ceratopteris cornuta</i>							X
Passifloraceae	<i>Passiflora edulis</i>				X	X	X	

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
Phyllanthaceae	<i>Bridelia cathartica</i> subsp. <i>cathartica</i>	LC		x			x	x
Phytolaccaceae	<i>Rivina humilis</i>				x	x	x	
Piperaceae	<i>Peperomia blanda</i>			x			x	
Plantaginaceae	<i>Scoparia dulcis</i>	NE			x		x	
Poaceae	<i>Acroceras macrum</i>	LC		x			x	
	<i>Andropogon eucomus</i>	LC		x			x	
	<i>Andropogon huillensis</i>	LC		x			x	
	<i>Aristida bipartita</i>	LC		x			x	
	<i>Aristida junciformis</i> subsp. <i>junciformis</i>	LC		x			x	
	<i>Aristida stipitata</i> subsp. <i>graciliflora</i>							x
	<i>Arundo donax</i>	NE			x	x	x	
	<i>Brachiaria humidicola</i>	LC		x			x	
	<i>Cenchrus brownii</i>	NE			x		x	
	<i>Chloris virgata</i>							x
	<i>Cymbopogon nardus</i>	LC		x			x	
	<i>Cymbopogon pospischilii</i>							x
	<i>Cynodon dactylon</i>	LC		x			x	x
	<i>Dactyloctenium aegyptium</i>							x
	<i>Dactyloctenium australe</i>	LC		x			x	
	<i>Dactyloctenium giganteum</i>	LC		x			x	
	<i>Digitaria longiflora</i>	LC		x			x	
	<i>Digitaria natalensis</i>							x
	<i>Digitaria scalarum</i>	LC		x			x	
	<i>Diheteropogon amplexans</i>							x
	<i>Diplachne fusca</i>							x
	<i>Echinochloa colona</i>	LC		x			x	
	<i>Echinochloa crus-galli</i>	LC		x			x	
	<i>Echinochloa pyramidalis</i>	LC		x			x	x
	<i>Echinochloa stagnina</i>							x
	<i>Eleusine coracana</i> subsp. <i>africana</i>	LC		x			x	
	<i>Elionurus muticus</i>							x
<i>Eragrostis chapelieri</i>							x	

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Eragrostis inamoena</i>	LC		x			x	x
	<i>Eragrostis lappula</i>							x
	<i>Eragrostis sclerantha</i>							x
	<i>Eragrostis tenuifolia</i>	LC		x			x	
	<i>Eriochloa meyeriana</i>							x
	<i>Hemarthria altissima</i>							x
	<i>Hyparrhenia cymbaria</i>	LC		x			x	
	<i>Hyparrhenia filipendula</i> var. <i>filipendula</i>	LC		x			x	
	<i>Hyparrhenia hirta</i>	LC		x			x	
	<i>Imperata cylindrica</i>							x
	<i>Ischaemum arcuatum</i>							x
	<i>Ischaemum fasciculatum</i>							x
	<i>Leersia hexandra</i>							x
	<i>Megastachya mucronata</i>	LC		x			x	
	<i>Monocymbium ceresiiforme</i>							x
	<i>Oplismenus hirtellus</i>							x
	<i>Panicum dregeanum</i>	LC		x			x	
	<i>Panicum genuflexum</i>	LC		x			x	
	<i>Paspalidium obtusifolium</i>							x
	<i>Paspalum commersonii</i>							x
	<i>Paspalum dilatatum</i>	NE			x	x	x	
	<i>Paspalum scrobiculatum</i>	LC		x			x	
	<i>Paspalum vaginatum</i>	LC		x			x	
	<i>Phragmites australis</i>							x
	<i>Phragmites mauritanus</i>							x
	<i>Sacciolepis curvata</i>	LC		x			x	
	<i>Sorghum bicolor</i> subsp. <i>arundinaceum</i>	LC		x			x	
	<i>Sporobolus consimilis</i>							x
	<i>Sporobolus natalensis</i>	LC		x			x	
	<i>Sporobolus nitens</i>							x
	<i>Sporobolus pyramidalis</i>	LC		x			x	
	<i>Sporobolus smutsii</i>							x

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Sporobolus subulatus</i>							x
	<i>Sporobolus virginicus</i>	LC		x			x	
	<i>Stenotaphrum secundatum</i>	LC		x			x	
	<i>Stipagrostis zeyheri</i> subsp. <i>barbata</i>	LC	x	x			x	
	<i>Themeda triandra</i>							x
	<i>Trachypogon spicatus</i>							x
	<i>Trichoneura grandiglumis</i>							x
	<i>Tristachya leucothrix</i>							x
	<i>Urelytrum agropyroides</i>							x
	<i>Urochloa stolonifera</i>							x
Polygonaceae	<i>Persicaria attenuata</i> subsp. <i>africana</i>							x
	<i>Persicaria hystriola</i>							x
	<i>Persicaria madagascariensis</i>			x			x	
	<i>Persicaria senegalensis</i>							x
Polypodiaceae	<i>Microsorium scolopendria</i>	LC		x			x	x
Potamogetonaceae	<i>Potamogeton crispus</i>							x
	<i>Potamogeton pectinatus</i>	LC		x			x	
	<i>Potamogeton pectinatus</i>							x
	<i>Potamogeton schweinfurthii</i>	LC		x			x	x
Proteaceae	<i>Spatalla mollis</i>	LC	x	x			x	
Pteridaceae	<i>Pteris vittata</i>	LC		x			x	
Putranjivaceae	<i>Drypetes natalensis</i>							x
	<i>Drypetes reticulata</i>							x
Restionaceae	<i>Restio zuluensis</i>							x
Rhamnaceae	<i>Scutia myrtina</i>	LC		x			x	x
Rubiaceae	<i>Agathisanthemum bojeri</i>							x
	<i>Canthium inerme</i>							x
	<i>Coffea racemosa</i>							x
	<i>Hyperacanthus amoenus</i>							x
	<i>Kraussia floribunda</i>							x
	<i>Oldenlandia cephalotes</i>	LC		x			x	
	<i>Pentodon pentandrus</i>							x

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
	<i>Psydrax obovata</i> subsp. <i>obovata</i>	LC		x			x	x
	<i>Richardia scabra</i>	NE			x		x	
Ruppiaceae	<i>Ruppia cirrhosa</i>			x			x	
	<i>Ruppia maritima</i>			x			x	
Rutaceae	<i>Teclea gerrardii</i>							x
	<i>Vepris lanceolata</i>							x
Salicaceae	<i>Dovyalis longispina</i>							x
	<i>Dovyalis rhamnoides</i>							x
	<i>Scolopia mundii</i>	LC		x			x	
	<i>Scolopia zeyheri</i>	LC		x			x	
Salviniaceae	<i>Azolla pinnata</i> subsp. <i>africana</i>	LC		x			x	
Santalaceae	<i>Colpoon compressum</i>	LC		x			x	
Sapindaceae	<i>Cardiospermum grandiflorum</i>				x	x	x	
	<i>Deinbollia oblongifolia</i>			x			x	x
	<i>Haplocoelum foliolosum</i> subsp. <i>mombasense</i>							x
	<i>Pancovia golungensis</i>							x
Sapotaceae	<i>Chrysophyllum viridifolium</i>							x
	<i>Englerophytum natalense</i>							x
	<i>Inhambanella henriquesii</i>							x
	<i>Manilkara concolor</i>	LC		x			x	x
	<i>Manilkara discolor</i>	LC		x			x	
	<i>Mimusops caffra</i>							x
	<i>Mimusops obovata</i>	LC		x			x	
	<i>Sideroxylon inerme</i>							x
Scrophulariaceae	<i>Hebenstretia comosa</i>	LC		x			x	
	<i>Manulea parviflora</i> var. <i>parviflora</i>	LC		x			x	
Smilacaceae	<i>Smilax anceps</i>			x			x	x
Solanaceae	<i>Physalis angulata</i>				x	x	x	
	<i>Physalis viscosa</i>				x		x	
	<i>Solanum lycopersicum</i>				x	x	x	
	<i>Solanum nigrum</i>				x		x	
Strelitziaceae	<i>Strelitzia nicolai</i>							x

Family	Taxon	IUCN	Endemic	Indigenous	Not indigenous	Invasive	POSA	M&R
Strychnaceae	<i>Strychnos decussata</i>							X
	<i>Strychnos henningsii</i>							X
	<i>Strychnos spinosa</i>							X
Thelypteridaceae	<i>Ampelopteris prolifera</i>	LC		X			X	
	<i>Cyclosorus interruptus</i>	LC		X			X	
Thymelaeaceae	<i>Peddiea africana</i>							X
	<i>Synaptolepis kirkii</i>							X
Trapaceae	<i>Trapa natans</i> var. <i>bispinosa</i>							X
Typhaceae	<i>Typha capensis</i>							X
Ulmaceae	<i>Trema orientalis</i>						X	
Urticaceae	<i>Laportea peduncularis</i>							X
	<i>Pilea microphylla</i>						X	
	<i>Ureca trinervis</i>			X			X	
Vahliaceae	<i>Vahlia capensis</i>							X
	<i>Vahlia capensis</i> subsp. <i>vulgaris</i> var. <i>longifolia</i>							X
Verbenaceae	<i>Lantana camara</i>				X	X	X	
	<i>Phyla nodiflora</i> var. <i>nodiflora</i>				X		X	
	<i>Verbena aristigera</i>				X		X	
	<i>Verbena bonariensis</i>				X	X	X	
	<i>Verbena brasiliensis</i>				X	X	X	
Vitaceae	<i>Rhoicissus sessilifolia</i>		X	X			X	
	<i>Rhoicissus tomentosa</i>							X
Zamiaceae	<i>Encephalartos ferox</i>							X
Zosteraceae	<i>Zostera capensis</i>			X			X	

9 Appendix B: Expected Birds

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
Accipitridae	<i>Accipiter melanoleucus</i>	Sparrowhawk, Black				
	<i>Accipiter minullus</i>	Sparrowhawk, Little				
	<i>Accipiter tachiro</i>	Goshawk, African				
	<i>Aquila ayresii</i>	Hawk-eagle, Ayres's				
	<i>Aquila rapax</i>	Eagle, Tawny				VU
	<i>Aquila wahlbergi</i>	Eagle, Wahlberg's				
	<i>Aviceda cuculoides</i>	Hawk, African Cuckoo				
	<i>Buteo vulpinus</i>	Buzzard, Steppe				
	<i>Circaetus cinereus</i>	Snake-eagle, Brown				
	<i>Circaetus fasciolatus</i>	Snake-eagle, Southern Banded				
	<i>Circaetus pectoralis</i>	Snake-eagle, Black-chested				
	<i>Circus ranivorus</i>	Marsh-harrier, African				
	<i>Elanus caeruleus</i>	Kite, Black-shouldered				
	<i>Gypohierax angolensis</i>	Vulture, Palm-nut			Sch9	
	<i>Haliaeetus vocifer</i>	Fish-eagle, African				
	<i>Kaupifalco monogrammicus</i>	Buzzard, Lizard				
	<i>Lophaetus occipitalis</i>	Eagle, Long-crested				
	<i>Milvus aegyptius</i>	Kite, Yellow-billed				
	<i>Milvus migrans</i>	Kite, Black				
	<i>Pernis apivorus</i>	Honey-buzzard, European				
<i>Polyboroides typus</i>	Harrier-Hawk, African					
<i>Stephanoaetus coronatus</i>	Eagle, African Crowned	VU	NT			
Acrocephalidae	<i>Acrocephalus arundinaceus</i>	Reed-warbler, Great				
	<i>Acrocephalus baeticatus</i>	Reed-warbler, African				

¹⁵ The 2014 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland.

¹⁶ Nature Conservation Ordinance 15 of 1974

¹⁷ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Acrocephalus gracilirostris</i>	Swamp-warbler, Lesser				
	<i>Acrocephalus palustris</i>	Warbler, Marsh				
	<i>Chloropeta natalensis</i>	Warbler, Dark-capped Yellow				
Alaudidae	<i>Calendulauda sabota</i>	Lark, Sabota				
	<i>Mirafra africana</i>	Lark, Rufous-naped				
Alcedinidae	<i>Alcedo cristata</i>	Kingfisher, Malachite				
	<i>Alcedo semitorquata</i>	Kingfisher, Half-collared	NT	LC		
	<i>Ceryle rudis</i>	Kingfisher, Pied				
	<i>Halcyon albiventris</i>	Kingfisher, Brown-hooded				
	<i>Halcyon chelicuti</i>	Kingfisher, Striped				
	<i>Halcyon senegalensis</i>	Kingfisher, Woodland				
	<i>Halcyon senegaloides</i>	Kingfisher, Mangrove	EN	LC		
	<i>Ispidina picta</i>	Pygmy-Kingfisher, African				
Anatidae	<i>Megaceryle maximus</i>	Kingfisher, Giant				
	<i>Alopochen aegyptiacus</i>	Goose, Egyptian				
	<i>Anas capensis</i>	Teal, Cape				
	<i>Anas erythrorhyncha</i>	Teal, Red-billed				
	<i>Anas hottentota</i>	Teal, Hottentot				
	<i>Anas platyrhynchos</i>	Duck, Mallard				
	<i>Anas smithii</i>	Shoveler, Cape			Sch2	
	<i>Anas sparsa</i>	Duck, African Black				
	<i>Anas undulata</i>	Duck, Yellow-billed				
	<i>Dendrocygna bicolor</i>	Duck, Fulvous				
	<i>Dendrocygna viduata</i>	Duck, White-faced				
	<i>Nettapus auritus</i>	Pygmy-Goose, African			Sch2	
<i>Plectropterus gambensis</i>	Goose, Spur-winged					
<i>Thalassornis leuconotus</i>	Duck, White-backed			Sc2		
Anhingidae	<i>Anhinga rufa</i>	Darter, African				
Apodidae	<i>Apus affinis</i>	Swift, Little				
	<i>Apus barbatus</i>	Swift, African Black				
	<i>Apus caffer</i>	Swift, White-rumped				
	<i>Cypsiurus parvus</i>	Palm-swift, African				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
Ardeidae	<i>Tachymarptis melba</i>	Swift, Alpine				
	<i>Ardea cinerea</i>	Heron, Grey				
	<i>Ardea goliath</i>	Heron, Goliath				
	<i>Ardea melanocephala</i>	Heron, Black-headed				
	<i>Ardea purpurea</i>	Heron, Purple				
	<i>Ardeola ralloides</i>	Heron, Squacco				
	<i>Bubulcus ibis</i>	Egret, Cattle				
	<i>Butorides striata</i>	Heron, Green-backed				
	<i>Egretta alba</i>	Egret, Great				
	<i>Egretta ardesiaca</i>	Heron, Black				
	<i>Egretta garzetta</i>	Egret, Little				
	<i>Egretta intermedia</i>	Egret, Yellow-billed				
	<i>Ixobrychus minutus</i>	Bittern, Little				
Bucerotidae	<i>Nycticorax nycticorax</i>	Night-Heron, Black-crowned				
	<i>Bycanistes bucinator</i>	Hornbill, Trumpeter				
Burhinidae	<i>Tockus alboterminatus</i>	Hornbill, Crowned				
	<i>Burhinus capensis</i>	Thick-knee, Spotted				
Campephagidae	<i>Burhinus vermiculatus</i>	Thick-knee, Water				
	<i>Campephaga flava</i>	Cuckoo-shrike, Black				
Caprimulgidae	<i>Coracina caesia</i>	Cuckoo-shrike, Grey				
	<i>Caprimulgus europaeus</i>	Nightjar, European				
	<i>Caprimulgus fossii</i>	Nightjar, Square-tailed				
Charadriidae	<i>Caprimulgus pectoralis</i>	Nightjar, Fiery-necked				
	<i>Charadrius hiaticula</i>	Plover, Common Ringed				
	<i>Charadrius leschenaultii</i>	Plover, Greater Sand				
	<i>Charadrius marginatus</i>	Plover, White-fronted				
	<i>Charadrius mongolus</i>	Plover, Lesser Sand				
	<i>Charadrius pecuarius</i>	Plover, Kittlitz's				
	<i>Charadrius tricollaris</i>	Plover, Three-banded				
	<i>Pluvialis squatarola</i>	Plover, Grey				
	<i>Vanellus armatus</i>	Lapwing, Blacksmith				
<i>Vanellus coronatus</i>	Lapwing, Crowned					

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Vanellus melanopterus</i>	Lapwing, Black-winged				
	<i>Vanellus senegallus</i>	Lapwing, African Wattled				
Ciconiidae	<i>Anastomus lamelligerus</i>	Openbill, African				
	<i>Ciconia ciconia</i>	Stork, White			Sch9	
	<i>Ciconia episcopus</i>	Stork, Woolly-necked				
	<i>Ephippiorhynchus senegalensis</i>	Stork, Saddle-billed	EN	LC		EN
	<i>Mycteria ibis</i>	Stork, Yellow-billed			Sch9	
Cisticolidae	<i>Apalis flavida</i>	Apalis, Yellow-breasted				
	<i>Apalis ruddi</i>	Apalis, Rudd's				
	<i>Apalis thoracica</i>	Apalis, Bar-throated				
	<i>Camaroptera brachyura</i>	Camaroptera, Green-backed				
	<i>Cisticola aberrans</i>	Cisticola, Lazy				
	<i>Cisticola chiniana</i>	Cisticola, Rattling				
	<i>Cisticola erythrops</i>	Cisticola, Red-faced				
	<i>Cisticola fulvicapilla</i>	Neddicky, Neddicky				
	<i>Cisticola galactotes</i>	Cisticola, Rufous-winged				
	<i>Cisticola juncidis</i>	Cisticola, Zitting				
	<i>Cisticola natalensis</i>	Cisticola, Croaking				
	<i>Prinia subflava</i>	Prinia, Tawny-flanked				
Coliidae	<i>Colius striatus</i>	Mousebird, Speckled				
	<i>Urocolius indicus</i>	Mousebird, Red-faced				
Columbidae	<i>Aplopelia larvata</i>	Dove, Lemon				
	<i>Columba arquatrix</i>	Olive-pigeon, African				
	<i>Columba guinea</i>	Pigeon, Speckled				
	<i>Columba livia</i>	Dove, Rock				
	<i>Oena capensis</i>	Dove, Namaqua				
	<i>Streptopelia capicola</i>	Turtle-dove, Cape				
	<i>Streptopelia semitorquata</i>	Dove, Red-eyed				
	<i>Streptopelia senegalensis</i>	Dove, Laughing				
	<i>Treron calvus</i>	Green-pigeon, African				
	<i>Turtur chalcospilos</i>	Wood-dove, Emerald-spotted				
<i>Turtur tympanistria</i>	Dove, Tambourine					

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
Coraciidae	<i>Coracias garrulus</i>	Roller, European	NT	NT		
	<i>Eurystomus glaucurus</i>	Roller, Broad-billed				
Corvidae	<i>Corvus albus</i>	Crow, Pied				
	<i>Corvus capensis</i>	Crow, Cape				
	<i>Corvus splendens</i>	Crow, House				
Cuculidae	<i>Centropus burchellii</i>	Coucal, Burchell's				
	<i>Centropus superciliosus</i>	Coucal, White-browed				
	<i>Ceuthmochares australis</i>	Malkoha, Green				
	<i>Chrysococcyx caprius</i>	Cuckoo, Diderick				
	<i>Chrysococcyx cupreus</i>	Cuckoo, African Emerald				
	<i>Chrysococcyx klaas</i>	Cuckoo, Klaas's				
	<i>Clamator jacobinus</i>	Cuckoo, Jacobin				
	<i>Cuculus clamosus</i>	Cuckoo, Black				
Dicruridae	<i>Dicrurus adsimilis</i>	Drongo, Fork-tailed				
	<i>Dicrurus ludwigii</i>	Drongo, Square-tailed				
Dromadidae	<i>Dromas ardeola</i>	Plover, Crab				
Emberizidae	<i>Emberiza flaviventris</i>	Bunting, Golden-breasted				
	<i>Emberiza tahapisi</i>	Bunting, Cinnamon-breasted				
Estrildidae	<i>Amandava subflava</i>	Waxbill, Orange-breasted				
	<i>Estrilda astrild</i>	Waxbill, Common				
	<i>Estrilda perreini</i>	Waxbill, Grey				
	<i>Lagonosticta rubricata</i>	Firefinch, African				
	<i>Lagonosticta senegala</i>	Firefinch, Red-billed				
	<i>Mandingoa nitidula</i>	Twinspot, Green			Sch9	
	<i>Spermestes cucullatus</i>	Mannikin, Bronze				
	<i>Spermestes nigriceps</i>	Mannikin, Red-backed				
Falconidae	<i>Uraeginthus angolensis</i>	Waxbill, Blue				
	<i>Falco amurensis</i>	Falcon, Amur				
	<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC		
	<i>Falco peregrinus</i>	Falcon, Peregrine			Sch9	VU
	<i>Falco subbuteo</i>	Hobby, Eurasian				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
Fringillidae	<i>Crithagra mozambicus</i>	Canary, Yellow-fronted				
	<i>Crithagra sulphuratus</i>	Canary, Brimstone				
	<i>Serinus canicollis</i>	Canary, Cape				
Glareolidae	<i>Glareola pratincola</i>	Pratincole, Collared				
	<i>Rhinoptilus chalcopterus</i>	Courser, Bronze-winged				
Gruidae	<i>Balearica regulorum</i>	Crane, Grey Crowned	EN	EN	Sch9	EN
Heliornithidae	<i>Podica senegalensis</i>	Finfoot, African	VU	LC		
Hirundinidae	<i>Delichon urbicum</i>	House-martin, Common				
	<i>Hirundo abyssinica</i>	Swallow, Lesser Striped				
	<i>Hirundo albigularis</i>	Swallow, White-throated				
	<i>Hirundo cucullata</i>	Swallow, Greater Striped				
	<i>Hirundo fuligula</i>	Martin, Rock				
	<i>Hirundo rustica</i>	Swallow, Barn				
	<i>Hirundo semirufa</i>	Swallow, Red-breasted				
	<i>Hirundo smithii</i>	Swallow, Wire-tailed				
	<i>Psalidoprocne holomelaena</i>	Saw-wing, Black (Southern race)				
	<i>Pseudhirundo griseopyga</i>	Swallow, Grey-rumped				
	<i>Riparia cincta</i>	Martin, Banded				
	<i>Riparia paludicola</i>	Martin, Brown-throated				
	<i>Riparia riparia</i>	Martin, Sand				
Indicatoridae	<i>Indicator indicator</i>	Honeyguide, Greater				
	<i>Indicator minor</i>	Honeyguide, Lesser				
	<i>Indicator variegatus</i>	Honeyguide, Scaly-throated				
	<i>Prodotiscus regulus</i>	Honeybird, Brown-backed				
Jacanidae	<i>Actophilornis africanus</i>	Jacana, African				
	<i>Microparra capensis</i>	Jacana, Lesser	NT	LC		
Laniidae	<i>Lanius collaris</i>	Fiscal, Common (Southern)				
	<i>Lanius collurio</i>	Shrike, Red-backed				
Laridae	<i>Chlidonias hybrida</i>	Tern, Whiskered				
	<i>Chlidonias leucopterus</i>	Tern, White-winged				
	<i>Chlidonias niger</i>	Tern, Black				
	<i>Larus cirrocephalus</i>	Gull, Grey-headed				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Larus dominicanus</i>	Gull, Kelp				
	<i>Larus hartlaubii</i>	Gull, Hartlaub's				
	<i>Larus pipixcan</i>	Gull, Franklin's				
	<i>Sterna albifrons</i>	Tern, Little				
	<i>Sterna bengalensis</i>	Tern, Lesser Crested				
	<i>Sterna bergii</i>	Tern, Swift				
	<i>Sterna caspia</i>	Tern, Caspian	VU	LC		
	<i>Sterna hirundo</i>	Tern, Common				
	<i>Sterna sandvicensis</i>	Tern, Sandwich				
Locustellidae	<i>Bradypterus baboecala</i>	Rush-warbler, Little				
Lybiidae	<i>Lybius torquatus</i>	Barbet, Black-collared				
	<i>Pogoniulus bilineatus</i>	Tinkerbird, Yellow-rumped				
	<i>Pogoniulus pusillus</i>	Tinkerbird, Red-fronted				
	<i>Stactolaema leucotis</i>	Barbet, White-eared				
	<i>Trachyphonus vaillantii</i>	Barbet, Crested				
Macrosphenidae	<i>Sylvietta rufescens</i>	Crombec, Long-billed				
Malaconotidae	<i>Dryoscopus cubla</i>	Puffback, Black-backed				
	<i>Laniarius ferrugineus</i>	Boubou, Southern				
	<i>Malaconotus blanchoti</i>	Bush-shrike, Grey-headed				
	<i>Nilaus afer</i>	Brubru, Brubru				
	<i>Tchagra senegalus</i>	Tchagra, Black-crowned				
	<i>Telophorus olivaceus</i>	Bush-shrike, Olive				
	<i>Telophorus quadricolor</i>	Bush-shrike, Gorgeous				
	<i>Telophorus sulfureopectus</i>	Bush-shrike, Orange-breasted				
Meropidae	<i>Merops apiaster</i>	Bee-eater, European				
	<i>Merops bullockoides</i>	Bee-eater, White-fronted				
	<i>Merops persicus</i>	Bee-eater, Blue-cheeked				
	<i>Merops pusillus</i>	Bee-eater, Little				
Monarchidae	<i>Terpsiphone viridis</i>	Paradise-flycatcher, African				
	<i>Trochocercus cyanomelas</i>	Crested-flycatcher, Blue-mantled				
Motacillidae	<i>Anthus cinnamomeus</i>	Pipit, African				
	<i>Anthus lineiventris</i>	Pipit, Striped				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Macronyx capensis</i>	Longclaw, Cape				
	<i>Macronyx croceus</i>	Longclaw, Yellow-throated				
	<i>Motacilla aguimp</i>	Wagtail, African Pied				
	<i>Motacilla capensis</i>	Wagtail, Cape				
	<i>Motacilla clara</i>	Wagtail, Mountain				
	<i>Motacilla flava</i>	Wagtail, Yellow				
Muscicapidae	<i>Bradornis pallidus</i>	Flycatcher, Pale				
	<i>Cercomela familiaris</i>	Chat, Familiar				
	<i>Cercotrichas leucophrys</i>	Scrub-robin, White-browed				
	<i>Cercotrichas signata</i>	Scrub-robin, Brown				
	<i>Cossypha caffra</i>	Robin-chat, Cape				
	<i>Cossypha dichroa</i>	Robin-chat, Chorister				
	<i>Cossypha natalensis</i>	Robin-chat, Red-capped				
	<i>Melaenornis pammelaina</i>	Flycatcher, Southern Black				
	<i>Muscicapa adusta</i>	Flycatcher, African Dusky				
	<i>Muscicapa caerulescens</i>	Flycatcher, Ashy				
	<i>Muscicapa striata</i>	Flycatcher, Spotted				
	<i>Myioparus plumbeus</i>	Tit-flycatcher, Grey				
	<i>Saxicola torquatus</i>	Stonechat, African				
	<i>Sigelus silens</i>	Flycatcher, Fiscal				
<i>Turdus libonyanus</i>	Thrush, Kurrichane					
Musophagidae	<i>Gallirex porphyreolophus</i>	Turaco, Purple-crested				
	<i>Tauraco livingstonii</i>	Turaco, Livingstone's				
Nectariniidae	<i>Chalcomitra amethystina</i>	Sunbird, Amethyst				
	<i>Chalcomitra senegalensis</i>	Sunbird, Scarlet-chested				
	<i>Cinnyris bifasciatus</i>	Sunbird, Purple-banded				
	<i>Cinnyris talatala</i>	Sunbird, White-bellied				
	<i>Cyanomitra olivacea</i>	Sunbird, Olive				
	<i>Cyanomitra veroxii</i>	Sunbird, Grey				
	<i>Hedydipna collaris</i>	Sunbird, Collared				
Nicatoridae	<i>Nicator gularis</i>	Nicator, Eastern				
Numididae	<i>Guttera edouardi</i>	Guineafowl, Crested			Sch2	

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Numida meleagris</i>	Guinea fowl, Helmeted				
Oriolidae	<i>Oriolus larvatus</i>	Oriole, Black-headed				
	<i>Oriolus oriolus</i>	Oriole, Eurasian Golden				
Otididae	<i>Lissotis melanogaster</i>	Bustard, Black-bellied	NT	LC		
	<i>Neotis denhami</i>	Bustard, Denham's	VU	NT		Protected
Pandionidae	<i>Pandion haliaetus</i>	Osprey, Osprey				
Paridae	<i>Parus niger</i>	Tit, Southern Black				
Passeridae	<i>Passer diffusus</i>	Sparrow, Southern Grey-headed				
	<i>Passer domesticus</i>	Sparrow, House				
	<i>Petronia superciliaris</i>	Petronia, Yellow-throated				
Pelecanidae	<i>Pelecanus onocrotalus</i>	Pelican, Great White	VU	LC		
	<i>Pelecanus rufescens</i>	Pelican, Pink-backed	VU	LC	Sch9	EN
Phalacrocoracidae	<i>Phalacrocorax africanus</i>	Cormorant, Reed				
	<i>Phalacrocorax capensis</i>	Cormorant, Cape	EN	EN		
	<i>Phalacrocorax carbo</i>	Cormorant, White-breasted				
Phasianidae	<i>Coturnix coturnix</i>	Quail, Common				
	<i>Pternistis natalensis</i>	Spurfowl, Natal				
	<i>Pternistis swainsonii</i>	Spurfowl, Swainson's				
Phoenicopteridae	<i>Phoenicopterus minor</i>	Flamingo, Lesser	NT	NT	Sch9	
	<i>Phoenicopterus ruber</i>	Flamingo, Greater	NT	LC	Sch9	
Phoeniculidae	<i>Phoeniculus purpureus</i>	Wood-hoopoe, Green				
Phylloscopidae	<i>Phylloscopus trochilus</i>	Warbler, Willow				
Picidae	<i>Campethera abingoni</i>	Woodpecker, Golden-tailed				
	<i>Dendropicos fuscescens</i>	Woodpecker, Cardinal				
	<i>Dendropicos griseocephalus</i>	Woodpecker, Olive				
Platysteiridae	<i>Batis molitor</i>	Batis, Chinspot				
	<i>Platysteira peltata</i>	Wattle-eye, Black-throated				
Ploceidae	<i>Amblyospiza albifrons</i>	Weaver, Thick-billed				
	<i>Euplectes albonotatus</i>	Widowbird, White-winged				
	<i>Euplectes ardens</i>	Widowbird, Red-collared				
	<i>Euplectes axillaris</i>	Widowbird, Fan-tailed				
	<i>Euplectes orix</i>	Bishop, Southern Red				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Ploceus bicolor</i>	Weaver, Dark-backed				
	<i>Ploceus capensis</i>	Weaver, Cape				
	<i>Ploceus cucullatus</i>	Weaver, Village				
	<i>Ploceus intermedius</i>	Masked-weaver, Lesser				
	<i>Ploceus ocularis</i>	Weaver, Spectacled				
	<i>Ploceus subaureus</i>	Weaver, Yellow				
	<i>Ploceus velatus</i>	Masked-weaver, Southern				
	<i>Ploceus xanthops</i>	Weaver, Golden				
	<i>Ploceus xanthopterus</i>	Weaver, Southern Brown-throated				
	<i>Quelea erythroptus</i>	Quelea, Red-headed				
	<i>Quelea quelea</i>	Quelea, Red-billed				
Podicipedidae	<i>Tachybaptus ruficollis</i>	Grebe, Little				
Pycnonotidae	<i>Andropadus importunus</i>	Greenbul, Sombre				
	<i>Chlorocichla flaviventris</i>	Greenbul, Yellow-bellied				
	<i>Phyllastrephus terrestris</i>	Brownbul, Terrestrial				
	<i>Pycnonotus tricolor</i>	Bulbul, Dark-capped				
Rallidae	<i>Amauornis flavirostris</i>	Crake, Black				
	<i>Fulica cristata</i>	Coot, Red-knobbed				
	<i>Gallinula chloropus</i>	Moorhen, Common				
	<i>Porphyrio alleni</i>	Gallinule, Allen's				
	<i>Porphyrio madagascariensis</i>	Swamphen, African Purple				
	<i>Rallus caerulescens</i>	Rail, African				
	<i>Sarothrura elegans</i>	Flufftail, Buff-spotted				
Recurvirostridae	<i>Himantopus himantopus</i>	Stilt, Black-winged				
	<i>Recurvirostra avosetta</i>	Avocet, Pied				
Rostratulidae	<i>Rostratula benghalensis</i>	Painted-snipe, Greater	VU	LC		
Scolopacidae	<i>Actitis hypoleucos</i>	Sandpiper, Common				
	<i>Arenaria interpres</i>	Turnstone, Ruddy				
	<i>Calidris alba</i>	Sanderling, Sanderling				
	<i>Calidris canutus</i>	Knot, Red				
	<i>Calidris ferruginea</i>	Sandpiper, Curlew				
	<i>Calidris minuta</i>	Stint, Little				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
	<i>Gallinago nigripennis</i>	Snipe, African				
	<i>Limosa lapponica</i>	Godwit, Bar-tailed				
	<i>Numenius arquata</i>	Curlew, Eurasian	NT	NT		
	<i>Numenius phaeopus</i>	Whimbrel, Common				
	<i>Philomachus pugnax</i>	Ruff, Ruff				
	<i>Tringa glareola</i>	Sandpiper, Wood				
	<i>Tringa nebularia</i>	Greenshank, Common				
	<i>Tringa stagnatilis</i>	Sandpiper, Marsh				
	<i>Xenus cinereus</i>	Sandpiper, Terek				
Scopidae	<i>Scopus umbretta</i>	Hamerkop, Hamerkop				
Stercorariidae	<i>Catharacta antarctica</i>	Skua, Subantarctic				
Strigidae	<i>Asio capensis</i>	Owl, Marsh				
	<i>Bubo africanus</i>	Eagle-owl, Spotted				
	<i>Strix woodfordii</i>	Wood-owl, African				
Sturnidae	<i>Acridotheres tristis</i>	Myna, Common				
	<i>Cinnyricinclus leucogaster</i>	Starling, Violet-backed				
	<i>Creatophora cinerea</i>	Starling, Wattled				
	<i>Lamprotornis corruscus</i>	Starling, Black-bellied				
	<i>Lamprotornis nitens</i>	Starling, Cape Glossy				
	<i>Onychognathus morio</i>	Starling, Red-winged				
	<i>Sturnus vulgaris</i>	Starling, Common				
Sulidae	<i>Morus capensis</i>	Gannet, Cape	VU	VU		
Sylviidae	<i>Sylvia borin</i>	Warbler, Garden				
Threskiornithidae	<i>Bostrychia hagedash</i>	Ibis, Hadedda				
	<i>Platalea alba</i>	Spoonbill, African				
	<i>Plegadis falcinellus</i>	Ibis, Glossy				
	<i>Threskiornis aethiopicus</i>	Ibis, African Sacred				
Trogonidae	<i>Apaloderma narina</i>	Trogon, Narina				
Turdidae	<i>Psophocichla litsipsirupa</i>	Thrush, Groundscraper				
	<i>Zoothera guttata</i>	Ground-thrush, Spotted				
Turnicidae	<i>Turnix sylvaticus</i>	Buttonquail, Kurrichane				
Tytonidae	<i>Tyto alba</i>	Owl, Barn				

Family	Scientific name	Common name	SA Red List ¹⁵	Global Red List	KZN ¹⁶	TOPS ¹⁷
Upupidae	<i>Upupa africana</i>	Hoopoe, African				
Viduidae	<i>Vidua chalybeata</i>	Indigobird, Village				
	<i>Vidua funerea</i>	Indigobird, Dusky				
	<i>Vidua macroura</i>	Whydah, Pin-tailed				
Zosteropidae	<i>Zosterops virens</i>	White-eye, Cape				

10 Appendix C: Expected Mammals¹⁸

Family	Scientific name	Common Name	SA Red List ¹⁹	KZN ²⁰	TOPS ²¹
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	LC		
Cercopithecidae	<i>Chlorocebus pygerythrus</i> subsp <i>pygerythrus</i>	Vervet Monkey			
Felidae	<i>Panthera pardus</i>	Leopard	VU	Sch3	VU
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	LC		
Herpestidae	<i>Herpestes sanguineus</i>	Slender Mongoose	LC		
Herpestidae	<i>Mungos mungo</i>	Banded Mongoose	LC		
Muridae	<i>Mastomys natalensis</i>	Natal Mastomys	LC		
Muridae	<i>Mus (Nannomys) minutoides</i>	Southern African Pygmy Mouse	LC		
Mustelidae	<i>Aonyx capensis</i>	African Clawless Otter	NT		
Nesomyidae	<i>Saccostomus campestris</i>	Southern African Pouched Mouse	LC		
Pteropodidae	<i>Epomophorus sp.</i>	Epauletted Fruit Bats			
Soricidae	<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	LC		
Thryonomyidae	<i>Thryonomys swinderianus</i>	Greater Cane Rat	LC		
Viverridae	<i>Genetta tigrina</i>	Cape Genet	LC		

¹⁸ Animal Demography Unit (2018). MammalMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=MammalMAP> on 2018-08-03

¹⁹ 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.

²⁰ Nature Conservation Ordinance 15 of 1974

²¹ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

11 Appendix D: Expected Reptiles²²

Family	Scientific name	Common name	SA Red List ²³	KZN ²⁴	TOPS ²⁵
Chamaeleonidae	<i>Bradypodion setaroi</i>	Setaro's Dwarf Chameleon	LC		
	<i>Chamaeleo dilepis dilepis</i>	Common Flap-neck Chameleon	LC		
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	LC		
	<i>Philothamnus hoplogaster</i>	South Eastern Green Snake	LC		
	<i>Philothamnus natalensis natalensis</i>	Eastern Natal Green Snake	LC		
	<i>Thelotornis capensis capensis</i>	Southern Twig Snake	LC		
Elapidae	<i>Naja annulifera</i>	Snouted Cobra	LC		
	<i>Naja melanoleuca</i>	Forest Cobra	LC		
Gekkonidae	<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	LC		
	<i>Lygodactylus capensis capensis</i>	Common Dwarf Gecko	LC		
Lamprophiidae	<i>Boaedon capensis</i>	Brown House Snake	LC		
	<i>Duberria variegata</i>	Variiegated Slug-eater	LC		
	<i>Lycodonomorphus inornatus</i>	Olive House Snake	LC		
	<i>Lycodonomorphus rufulus</i>	Brown Water Snake	LC		
	<i>Lycophidion capense capense</i>	Cape Wolf Snake	LC		
Scincidae	<i>Psammophis mossambicus</i>	Olive Grass Snake	LC		
	<i>Panaspis wahlbergi</i>	Wahlberg's Snake-eyed Skink	LC		
	<i>Trachylepis depressa</i>	Eastern Coastal Skink	LC		
Varanidae	<i>Trachylepis striata</i>	Striped Skink	LC		
	<i>Varanus niloticus</i>	Water Monitor	LC		
Viperidae	<i>Causus rhombeatus</i>	Rhombic Night Adder	LC		

²² Animal Demography Unit (2018). ReptileMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=ReptileMAP> on 2018-08-03

²³ 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.

²⁴ Nature Conservation Ordinance 15 of 1974

²⁵ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.

12 Appendix E: Expected Amphibians²⁶

Family	Scientific name	Common name	SA Redlist ²⁷	KZN ²⁸	TOPS ²⁹
Arthroleptidae	<i>Arthroleptis wahlbergi</i>	Bush Squeaker	LC		
	<i>Leptopelis mossambicus</i>	Brownbacked Tree Frog	LC		
	<i>Leptopelis natalensis</i>	Forest Tree Frog	LC		
Brevicipitidae	<i>Breviceps mossambicus</i>	Mozambique Rain Frog	LC		
Bufonidae	<i>Sclerophrys garmani</i>	Olive Toad	LC		
	<i>Sclerophrys gutturalis</i>	Guttural Toad	LC		
Hyperoliidae	<i>Afrixalus aureus</i>	Golden Leaf-folding Frog	LC		
	<i>Afrixalus delicatus</i>	Delicate Leaf-folding Frog	LC		
	<i>Afrixalus fornasinii</i>	Greater Leaf-folding Frog	LC		
	<i>Afrixalus spinifrons</i>	Natal Leaf-folding Frog	VU		
	<i>Hyperolius argus</i>	Argus Reed Frog	LC		
	<i>Hyperolius marmoratus</i>	Painted Reed Frog	LC		
	<i>Hyperolius marmoratus</i> subsp <i>marmoratus</i>	Painted Reed Frog	LC		
	<i>Hyperolius pusillus</i>	Water Lily Frog	LC		
	<i>Hyperolius semidiscus</i>	Yellowstriped Reed Frog	LC		
	<i>Hyperolius tuberilinguis</i>	Tinker Reed Frog	LC		
	<i>Kassina senegalensis</i>	Bubbling Kassina	LC		
<i>Phlyctimantis maculatus</i>	Redlegged Kassina	LC			
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i>	Dwarf Puddle Frog	LC		
	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	LC		
Ptychadenidae	<i>Ptychadena nilotica</i>	Nile Grass Frog	LC		
	<i>Ptychadena porosissima</i>	Striped Grass Frog	LC		
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	LC		
	<i>Tomopterna natalensis</i>	Natal Sand Frog	LC		

²⁶ Animal Demography Unit (2018). FrogMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=FrogMAP> on 2018-08-03

²⁷ 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.

²⁸ Nature Conservation Ordinance 15 of 1974

²⁹ National Environmental Management: Biodiversity Act 2004 (Act 10 Of 2004). Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. GN 30568. 14 December 2007.