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Exxaro Coal Pty (Ltd) Grootegeluk Short-Term Stockpiles Amendment Project

Ecological Assessment

Project Number:

EXX3666

Prepared for:

Exxaro Coal (Pty) Ltd (Grootegeluk)

April 2016

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This document has been prepared by Digby Wells Environmental.

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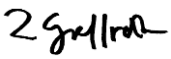
Rudi Greffrath	Report Reviewer		May 2016
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EXECUTIVE SUMMARY

This report assesses the terrestrial ecological condition of the GG10B stockyard, multiproduct stockpile laydown area and the additional area inside the rail loop and describes the fauna and flora present within the Exxaro Coal (Pty) Ltd, Grootegeluk Coal Mine. A detailed wet season fauna and flora assessment of the areas located within the proposed expansion areas was completed in April 2014, with the corresponding dry season flora and fauna assessment conducted in July 2014 by Digby Wells Environmental.

The Grootegeluk Coal Mine Infrastructure Expansion Project was authorised in terms of the NEMA and the Environmental Impact Assessment Regulations of 2010[1], (which have been repealed). The Limpopo Department of Economic Development, Environment and Tourism (LEDET), and the Record of Decision is dated 27 October 2014, with reference number 12/1/9/1-W89. The Department of Mineral Resources (DMR) Environmental Management Programme (EMP) Amendment approval was granted on the 28 August 2015.

Exxaro applied to expand certain infrastructure within the mine boundary area, referred to as the Grootegeluk Coal Mine Infrastructure Expansion Project. Exxaro submitted Applications in terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) and Minerals and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002) to include the following activities / expansions within the mine boundary:

- Expansion of the rail loop, load out stations and associated infrastructure;
- Expansion of the existing coal stockyard and stockpiles;
- Expansion of the fuel storage depot;
- Expansion of beneficiation plants and associated infrastructure;
- New road and conveyors to fines recovery area;
- New gate and hard park area; and
- Expansion of ancillary infrastructure and new 33 kV power line.

The aforementioned 2014 amendment was also associated with the expansion of the existing coal product stockpiles. The following stockpiles and stockyards were included in the applications and approved:

- GG 6/2 stockyard;
- GG 10 stockyards;
  - Conical Stock pile;
  - Stockyard A and

[1] Dated 18 June 2010

- Stockyard B;
- Multi-product overflow stockyard

The approved uses of the stockpile areas will need to be changed to also utilise the laydown Area, GG10B, and multiproduct stockyard footprints to stock excess Eskom-grade coal only (in the form of a compacted coal stockpile), for an approximate period of five years, until Medupi station is fully operational. These changes will also include the extension of the GG10B Stockyard footprint by approximately 12.8 hectares (ha) by including the current D8 rail loop area, which will be decommissioned with the construction of the new loadout area, also referred to as the extension area.

The vegetation in the Extension Area and a portion of the GG10 B stockyard (Fig: 1-12) has been previously surveyed and the community structure described as ***Vachellia-Aristida* Open Bush Veld and according to Digby Wells 2014.

During this assessment 16 plant, 4 mammal and 10 bird species were identified. Two protected tree species were recorded, namely: *Vachellia (Acacia) erioloba* (Camel Thorn) and *Sclerocarya birrea subsp. caffra* (Marula). One protected mammal species was recorded, namely: the Common Tsessebe (*Damaliscus lunatus*).

The ecological assessment finds that the ingress of species and the presence of protected species in the project site is an indication that the area can be regarded as having a measure of sensitivity.

The surveyed portion of the project site can be classified in being in a state of secondary succession which is the recolonization of vegetation in to an area which had previously supported life.

Clearing for the establishment of stockpiles will result in the loss of both fauna and flora species, with only the topsoil remaining. Although a previously disturbed area and is now recovering, it is recommended that:

- Strip the soil to the recommended level ascertained in the soil survey;
- Stockpile the soil in a designated area, revegetate and apply soil erosion measures;
- Identify an area to compensate for the loss of habitat.

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1 Introduction

Digby Wells Environmental (hereafter Digby Wells) completed the fauna and flora specialist studies in 2014 for the original infrastructure expansion project for Exxaro Coal (Pty) Ltd. (Hereafter Exxaro) Grootegeluk Coal Mine. Subsequently, the offtake of coal by Medupi Power Station has slowed and Exxaro requires additional stockpiling space to accommodate the excess coal on site

Exxaro applied to expand certain infrastructure within the mine boundary area, referred to as the Grootegeluk Coal Mine Infrastructure Expansion Project. Exxaro submitted Applications in terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) and Minerals and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002) to include the following activities / expansions within the mine boundary:

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- GG 6/2 stockyard;
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  - Conical Stock pile;
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The Grootegeluk Coal Mine Infrastructure Expansion Project was authorised in terms of the NEMA and the Environmental Impact Assessment Regulations of 2010[2], (which have been repealed). The Limpopo Department of Economic Development, Environment and Tourism (LEDET), and the Record of Decision are dated 27 October 2014, with reference number 12/1/9/1-W89. The Department of Mineral Resources (DMR) Environmental Management Programme (EMP) Amendment approval was granted on the 28th August 2015.

[2] Dated 18 June 2010

Exxaro proposed a phased authorisation approach for the amendments that are being requested. Exxaro proposes to amend the existing Authorisation relevant to the Grootegeluk Mine Infrastructure Expansion Project (which included the expansion of the GG10 Stockyards and several other stockpile areas).

The purpose of these amendments is to allow Exxaro to legally stockpile Eskom-grade coal currently being mined from the upper coal benches at the Grootegeluk Mine. In summary the two phases included the following:

- Phase 1: Amendment of the GG10A stockyard for temporary use - The amendment of the GG10A stockyard area with the capacity of 400,000m^3 to include the alternative of a temporary 2 Mt compacted Power Station Coal Stockpile in the same footprint area.
- Phase 2: Amend the GG10B stockyard area - The amendment of the GG10B stockyard to include the additional area inside the loop not originally included. To also amend the use of the multi-product overflow stockpiles to stacking and loading areas. The additional 1.1mil stockpiles area in the footprint of the original Coke and Co-gen area will need to be included as an additional area.

Further to what has been noted above regarding the requested amendment, Exxaro received approval from Department of Water Affairs (DWS) and DMR for Phase 1 of the project on the 5th May 2016 and 7th July 2016 respectively. This part of the project and associated specialist studies conducted is in support of the Phase 2 amendment that is being requested for in terms Section 31 of the 2014 NEMA Regulations applies as this is an amendment to an existing Environmental Authorisation. Thus the information contained within this specialist report is specific to the Phase 2 amendment process, however does make reference to Phase 1 with respect to the areas assessed.

The approved uses of the stockpile areas will need to be changed to also utilise the laydown Area, GG10B, and multiproduct stockyard footprints to stock excess Eskom-grade coal only (in the form of a compacted coal stockpile), for an approximate period of five years, until Medupi station is fully operational. These changes will also include the extension of the GG10B Stockyard footprint by approximately 12.8 hectares (ha) by including the current D8 rail loop area, which will be decommissioned with the construction of the new loadout area, also referred to as the extension area.

In addition to this the report describes and summarises the fauna and flora present within the area, including finding of the impact assessment conducted. A detailed wet season fauna and flora assessment of the undisturbed areas located within the proposed expansion areas was completed in April 2014, with the corresponding dry season flora and fauna assessment conducted in July 2014.

1.1 Project Description

The project is located within the Grootegeluk mine complex approximately 20 km west of Lephalale in the Limpopo Province and consists of various disturbed areas, which were used for stockpiles or infrastructure storage and other mine activities (Figure 1-1).

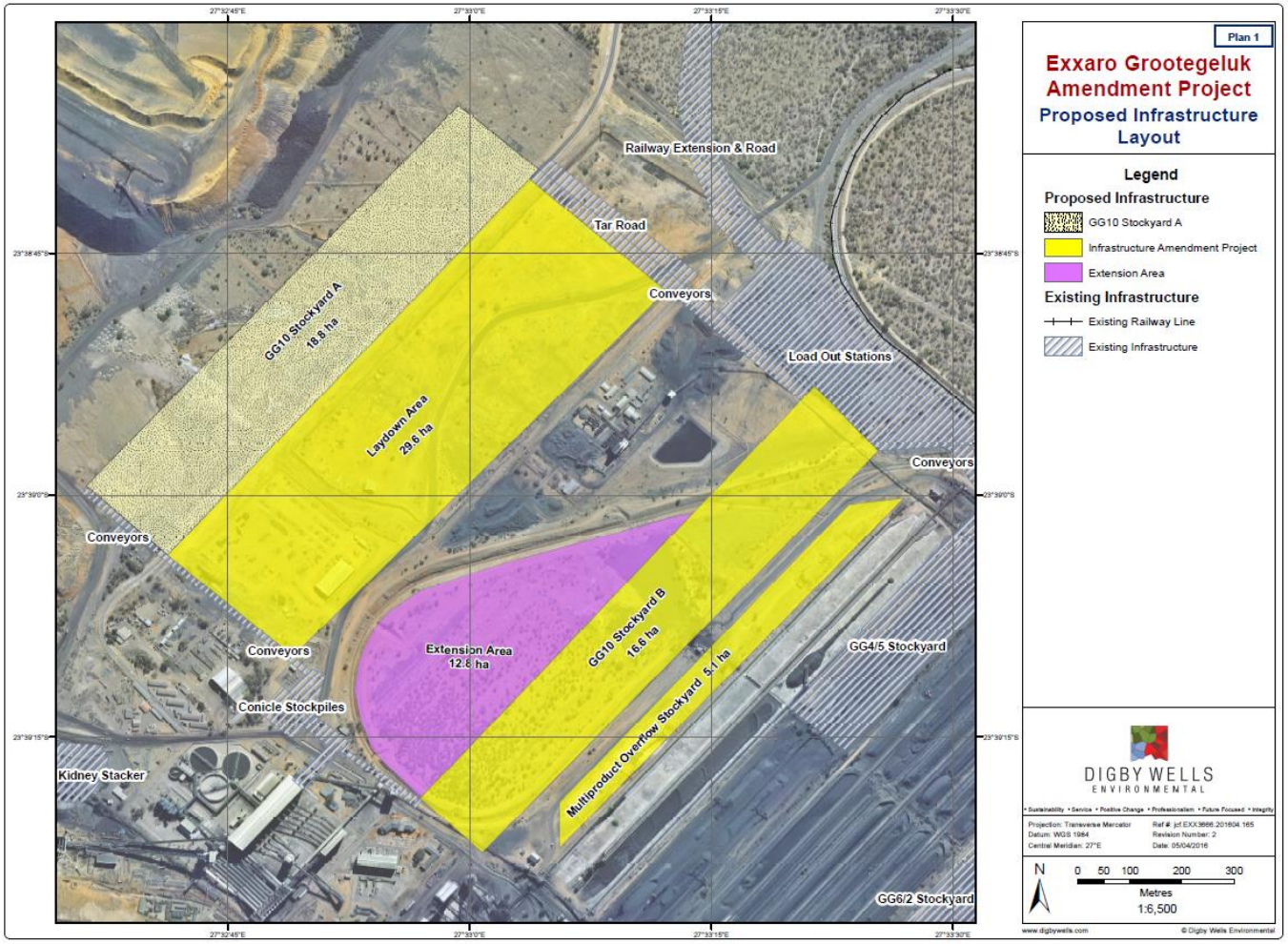

Figure 1-1: Location of the Proposed Stockpile and Disturbed Areas at the Grootegeluk Mine near Lephalale

1.2 Terms of Reference

Digby Wells Environmental (Digby Wells) was commissioned by Exxaro to complete an ecological assessment report as detailed in the methodology section below. Previously identified potential impacts (DWE, 2014) on terrestrial biodiversity will be reviewed and the addition 12.8ha area that was not previously part of the study area will be included. The mitigation measures will thus be updated where required to include the additional impacted area within the rail loop.

The agreed Terms of Reference (ToR) are summarised below:

- Desktop assessment with regards to fauna and flora of the proposed area of development;
- Flora and fauna list of expected species for the area;
- Identification and description of habitats on site;
- Identification of flora and fauna on site;
- Sensitivity assessment and
- Review of the Impacts Assessment, as well as relevant mitigation and management measures if required.

1.3 Regional Vegetation

The regional vegetation for South Africa has been mapped several times, with Acocks (1953) and Low & Rebelo (1996) having done this mapping in the past. A more recent and much more detailed map was completed by Mucina & Rutherford in 2006 and is now used as the standard reference to vegetation types country-wide.

The Grootegeluk Coal Mine project area falls within the Limpopo Sweet Bushveld (mapping Unit SVcb19) as described by Mucina and Rutherford (2006) (Figure 1-2). This vegetation type occurs within Limpopo Province at an altitude of 700-1000 metres. Soils with calcrete and surface limestone layers, brownish sandy (Clovelly soil form) clayey loam soils (Hutton soil form) on the plains and low-lying areas and shallow, gravelly soils on undulating areas; are typical of the area.

The vegetation extends across the border, into Botswana and consists of plains, which are traversed by several tributaries of the Limpopo River and is made up of short, open woodland. Areas which have been disturbed are dominated by thickets of Blue Thorn (*Senegalia erubescens*), Black Thorn (*Senegalia mellifera*) and Sickle Bush (*Dichrostachys cinerea*) (Mucina and Rutherford, 2006). This vegetation type is classified as Least Threatened and approximately 5% of the vegetation type has been transformed according to Mucina and Rutherford (2006). Owing to the pressures of coal mining in the area, however, a considerably larger proportion of the Limpopo Sweet Bushveld has been transformed since this figure was reported in 2006. Table 1-1 lists the expected plant species for the area.

Table 1-1: Expected Plant Species for the Study Area

Plant Form	Species
Trees:	***Senegalia burkei,*** *S. erubescens (d), S.fleckii (d), Vanchellia nilotica (d), V. robusta (d), V. tenuispina (d), Albizia anthelmintica (d), Boscia albitrunca (d),* ***Combretum apiculatum*** *(d)* and ***Terminalia sericea.***
Shrubs:	*Catophractes alexandri (d),* ***Commiphora africana****,* ***Dichrostachys cinerea*** *(d), Felicia muricata, Gossypium herbaceum, Leucosphaera bainesii, Phaeoptilum spinosum (d), Rhigozum obovatum (d), Cadaba aphylla,* ***Combretum hereroense****, Commiphora pyracanthioides, Ehretia rigida, Euclea undulata,* ***Grewia flava*** and ***Gymnosporia senegalensis****.*
Grasses:	***Digitaria eriantha*** *(d), Enneapogon cenchroides (d), Eragrostis lehmanniana (d), Panicum coloratum (d),* ***Schmidtia pappophoroides*** *(d),* ***Aristida congesta,*** *Cymbopogon nardus, Eragrostis pallens, E.rigidior, E. trichophora, Ischaemum afrum, Panicum maximum, Setaria verticillata, Stipagrostis uniplumis* and *Urochloa mosambicensis.*
Forbs:	*Acanthosicyos naudinianus,* ***Commelina benghalensis,*** *Harpagophytum procumbens, Hemizygia elliottii, Hermbstaedtia odorata, Indigofera daleoides, Kleinia fulgens and Plectranthes neochilus.*
Key: ‘d’ denotes dominant species; species in **Bold** were recorded on site.	

(Source: Mucina & Rutherford, 2006)

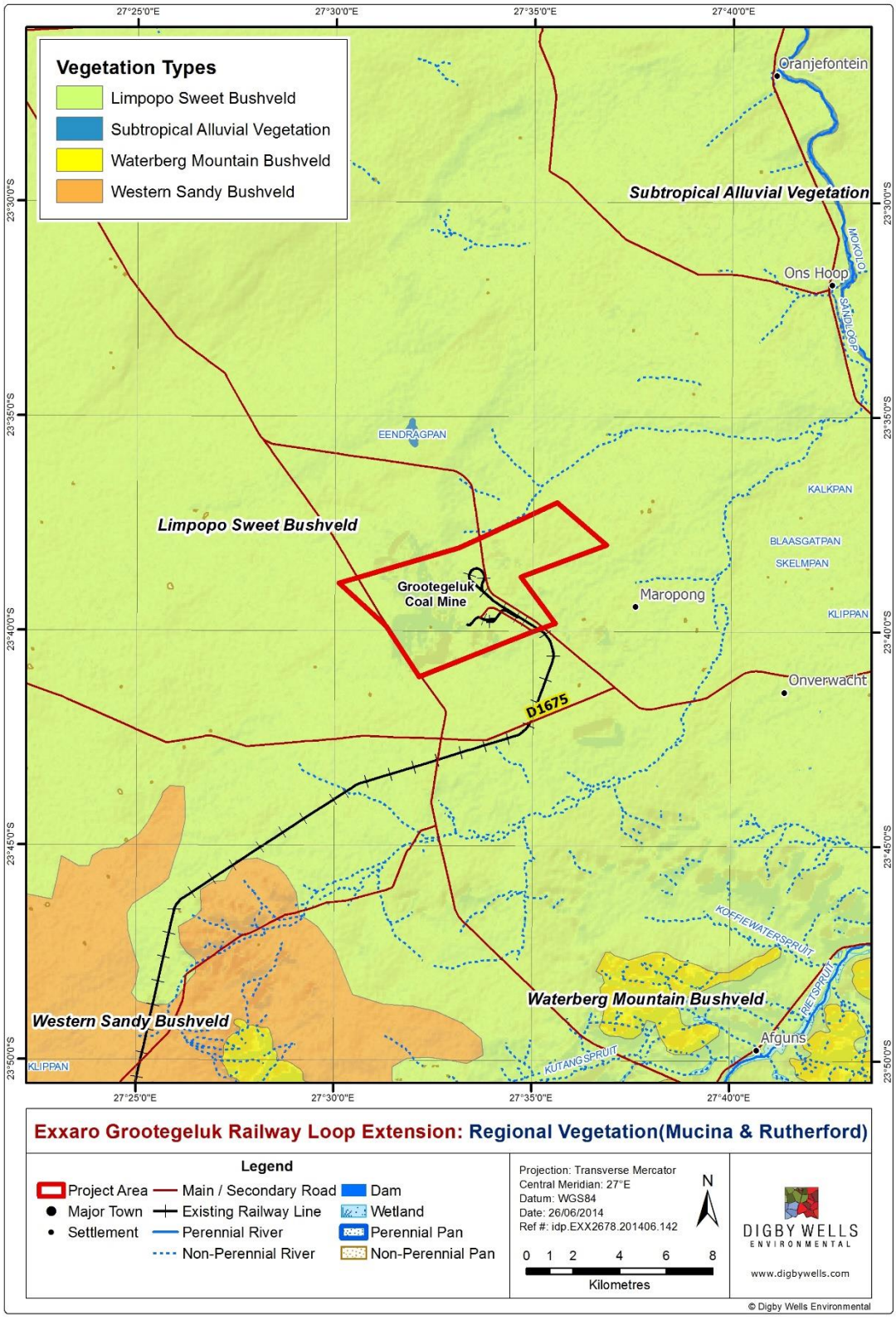

Figure 1-2: Regional Vegetation

1.4 Limpopo Conservation Plan

The Limpopo Conservation Plan Version 2 (C-Plan v2) was published in September 2013 and delivered a detailed map of Critical Biodiversity Areas (CBAs) for the Limpopo Province. CBA's within the bioregion are the series of sites that are required to meet the region's biodiversity targets, and need to be maintained in the appropriate condition for their category. The purpose of a conservation plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. Accompanying the map of the CBA's are land-use guidelines that are compatible or not with the biodiversity management objective of the CBA category. The CBA's are summarised below.

- **Protected Areas:** Formal Protected Areas and protected Areas pending declaration under National Environmental Management; Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPA).
- **Critical Biodiversity Area 1:** Irreplaceable sites. Areas required to meet biodiversity pattern and/or ecological process targets. No alternative sites are available to meet targets.
- **Critical Biodiversity Area 2:** Best Design Selected sites. Areas selected to meet biodiversity patter and/or ecological process targets. Alternative sites may be available to meet targets.
- **Ecological Support Areas 1:** Natural, near natural and degraded areas supporting CBAs by maintaining ecological processes.
- **Ecological Support Areas 2:** Areas with no natural habitat that is important for supporting ecological processes.
- **Other Natural Areas:** Natural and intact but not required to meet targets, or identified as CBA or ESA.
- **No natural habitat remaining:** Areas with no significant direct biodiversity value. Not natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry, and human infrastructure.

Based on the C-Plan, the Waterberg District Municipality (WDM) Bioregional Plan (BRP) draft version was published in December 2014; making it the most recent municipal biodiversity and conservation document. Bioregional plans are one of a range of tools provided for in National Environmental Biodiversity Act, 2004. (NEMBA) that can be used to facilitate the management and conservation of biodiversity priority areas outside the protected area network. The final version is currently under review by the South African National Biodiversity Institute (SANBI) and thereafter the DEA. The C-Plan and BRP for the area is looked at for the project at hand and the relevant findings are discussed in relation to the overall biodiversity of the area.

2 Methodology

2.1 Desktop Assessment

- A review of previous fauna and flora studies conducted by Digby Wells and other consulting companies in the area to determine the species composition and any species of special concern (SCC).
- Review the maps of the area to establish from which vantage points photographs may be taken which will best represent the area, the scale of the disturbances and vegetation present.

2.2 Impact Assessment

The flora and fauna impacts are assessed based on the impact's magnitude, as well as the receiver's sensitivity, culminating in an impact significance which identifies the most important impacts that require management.

Based on international guidelines and South African legislation, the following criteria are taken into account when examining potentially significant impacts:

- Nature of impacts (direct/indirect, positive/ negative);
- Duration (short/medium/long-term, permanent(irreversible) / temporary (reversible), frequent/seldom);
- Extent (geographical area, size of affected population/habitat/species);
- Intensity (minimal, severe, replaceable/irreplaceable);
- Probability (high/medium/low probability); and
- Possibility to mitigate, avoid or offset significant adverse impacts.

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

Significance = Consequence x Probability x Nature

Where

Consequence = Intensity + Extent + Duration

And

Probability = Likelihood of an impact occurring

And

Nature = Positive (+1) or negative (-1) impact

Note: In the formula for calculating consequence, the type of impact is multiplied by +1 for positive impacts and -1 for negative impacts.

The matrix calculates the rating out of 147, whereby Intensity, Extent, Duration and Probability are each rated out of seven as indicated in Table 2-1. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in this Report. The significance of an impact is then determined and categorised into one of eight categories, as indicated in Table 2-2, which is extracted from Table 2-1. The description of the significance ratings is discussed in Table 2-3.

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, i.e. there may already be certain types of mitigation measures included in the design (for example due to legal requirements). If the potential impact is still considered too high, additional mitigation measures are proposed.

Table 2-1: Impact Assessment Parameter Ratings

RATING	INTENSITY/ REPLACEABILITY		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts	Positive impacts			
7	Irreplaceable damage to highly valued items of great natural or social significance or complete breakdown of natural and / or social order.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	International The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable damage to highly valued items of natural or social significance or breakdown of natural and / or social order.	Great improvement to the overall conditions of a large percentage of the baseline.	National Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.
5	Very serious widespread natural and / or social baseline changes. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	Province/ Region Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.

RATING	INTENSITY/ REPLACEABILITY		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts	Positive impacts			
4	On-going serious natural and / or social issues. Significant changes to structures / items of natural or social significance.	Average to intense natural and / or social benefits to some elements of the baseline.	Municipal Area Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.
3	On-going natural and / or social issues. Discernible changes to natural or social baseline.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	Local Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	Minor natural and / or social impacts which are mostly replaceable. Very little change to the baseline.	Low positive impacts experience by a small percentage of the baseline.	Limited Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.
1	Minimal natural and / or social impacts, low-level replaceable damage with no change to the baseline.	Some low-level natural and / or social benefits felt by a very small percentage of the baseline.	Very limited Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.	Highly unlikely / None: Expected never to happen. <1% probability.

Table 2-2: Probability/Consequence Matrix

Probability \ Significance	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Consequence

Table 2-3: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Substantial (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Major (positive)
36 to 72	An positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Major (negative)
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Substantial (negative)

2.3 Field Assessment

- Take photographs of the areas, at the predetermined points from the north, east, south and west
- Record the flora and fauna species present.

- Record any species of special concern (SCC); and
- Note any changes to the ecology of the area and record these changes.

2.4 Limitations

- Time allowed for the survey was short and not all aspects were covered in detail, information required was gleaned from previous studies.

3 Results

3.1 Desktop Assessment

3.1.1 Flora

SANBI's PRECIS database provides a list of plant species for quarter degree grid squares in South Africa, according to the format of Germishuizen and Meyer (2003). This list is updated every two months with changes due to additional data collection. The PRECIS list for the study area lists 229 species for the study area(this list is presented in Appendix A), of these, *Acalypha caperonioides* var. *caperonioides* is Data Deficient (DD), *Euphorbia waterbergensis*, Rare, *Corchorus psammophilus* is listed as Threatened, six species were not evaluated and the remaining species are listed as Least Concern. This list does not include the listings for the National Forests Act, 1998, which is separate with few of the trees on this list actually classified as of conservation concern. In addition, the PRECIS list for the study area does not contain any alien invasive species.

The vegetation in the Extension Area and a portion of the GG10 B stockyard (Fig: 1-12) has been previously surveyed and the community structure described as ***Vachellia-Aristida** Open Bush Veld and according to Digby Wells 2014.

Vachellia – Aristida Open Bushveld

This community type was found to occur in a disturbed area closer to the active plant area of the mine site. The vegetation comprised of some species including *Vachellia karoo* (Sweet Thorn), which was dominant, as well as an individual *Vachellia xanthophloea* (Fever tree); and a number of adult *Sclerocarya birrea* (Marula) trees. The area was characterised by extensive past and current disturbance including the dumping of mine waste and piles of discarded debris.

For the most part the site was largely impenetrable due to thorny *Vachellia/Senegalia shrubs* but in some areas there were some grass swards of primarily *Aristida* species. This community type hosted the alien invasive species such as *Lantana camara* and *Pennesetum setaceum* were found for the site although the presence of such species was very low overall.

*** Note:** All southern African *Acacia* names have been revised to *Senegalia* and *Vachellia.* The taxonomy of the rest of the African *Acacia*'s is in progress.

The remainder of the disturbed area as indicated in Figure 3-1 had not been surveyed.

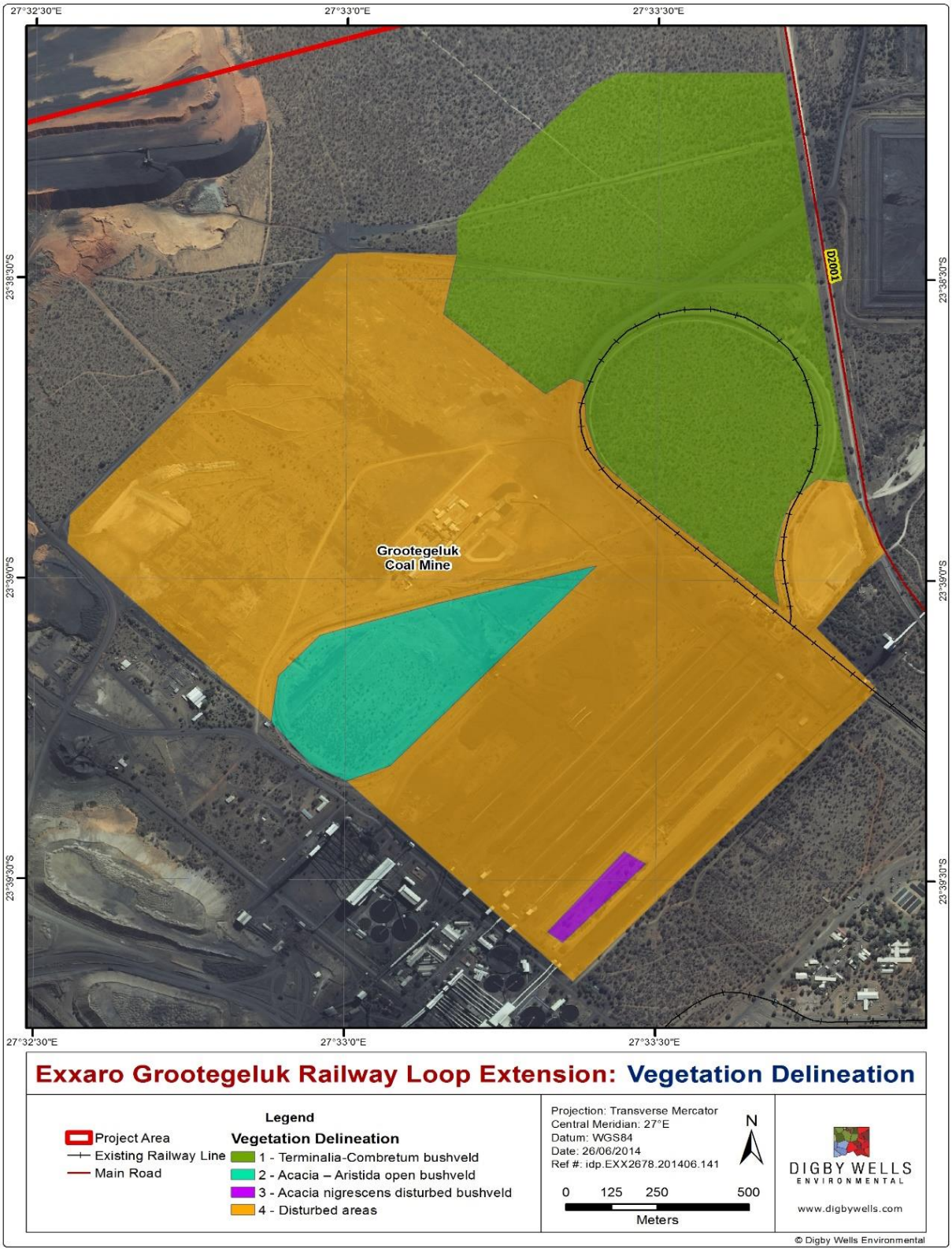

Figure 3-1: Vegetation Delineation by Digby Wells, 2014 at the Grootegeluk Mine

3.1.2 Mammals

The desktop study conducted by DWE, 2014, listed 175 mammal species that may occur in the area (Appendix B), with four species listed as endangered according to NEMBA, namely: Tsessebe (*Damaliscus lunatus lunatus*), African Wild Dog (*Lycaon pictus*), Gunning's Golden Mole (*Neamblysomus gunning*) and the Four-toed Elephant Shrew (*Petrodromus tetradactylus*).

Percival's Trident Bat (*Cloeotis percivali*) is listed as Critically Endangered according to the national IUCN list and has been identified in the region according to SANBI and the Southern African Hedgehog *(Atelerix frontalis)* which is likely to occur within the project area is listed as Near Threatened.

A total of thirteen mammals were recorded on site in 2014, although additional species may occur. No additional mammals were recorded during the site visit for this report (Table 3-1)

Table 3-1: Mammal Species found to occur on site according to Digby Wells, 2014

Species name	Common Name	IUCN
Rapbicerus campestris	Steenbok	LC
Sylvicarpa grimmia	Grey Duiker	LC
Cercopithecus aethiops	Vervet Monkey	LC
Aepyceros melampus	Impala	LC
Kobus ellipsiprymnus	Waterbuck	LC
Tragelaphus strepsiceros	Kudu	LC
Phacochoerus africanus	Warthog	LC
Hystrix africaeaustralis	Porcupine	LC
Aethomys chrysophilis	Red Veld Rat	LC
Tatera leucogaster	Bushveld Gerbil	LC
Lepus saxatilis	Scrubhare	LC
Paraxerus cepapi	Tree Squirrel	LC
Mungos mungo	Banded Mongoose	LC

3.1.3 Birds

The desktop study conducted by DWE, 2014, listed 300 bird species that may occur in the area according to the South African Bird Atlas Project (SABAP 2). Of these, 37 have been assigned a Red Data status and 25 are either endemic or near-endemic to South Africa (Table 3-2).

A total of 81 species were identified by Digby Wells in 2014 (see Appendix C in Bold) and no additional species were recorded during the most recent survey.

Table 3-2: Red Data and endemic avifauna species found on the Grootegeluk Coal Mine site (DWE, 2014)

Common name	Scientific name	IUCN status	Endemicity
Bustard, Kori	*Ardeotis kori*	VU	
Eagle, Martial	*Aquila rapax*	VU	
Babbler, Southern Pied	*Turdoides bicolor*	LC	Endemic
Oxpecker, Red-billed	*Buphagus erythrorhynchus*	LC	Near-endemic
Barbet, Acacia Pied	*Tricholaema leucomelas*	LC	Near-endemic
Finch, Scaly-feathered	*Sporopipes squamifrons*	LC	Near-endemic
Flycatcher, Marico	*Bradornis mariquensis*	LC	Near-endemic
Goshawk, Southern Pale Chanting	*Melierax canorus*	LC	Near-endemic
Hornbill, Southern Yellow-billed	*Tockus leucomelas*	LC	Near-endemic
Korhaan, Red-crested	*Lophotis ruficrista*	LC	Near-endemic
Lark, Sabota	*Calendulauda sabota*	LC	Near-endemic
Sandgrouse, Double-banded	*Pterocles bicinctus*	LC	Near-endemic
Shrike, Crimson-breasted	*Laniarius atrococcineus*	LC	Near-endemic
Sparrow, Cape	*Passer melanurus*	LC	Near-endemic
Sparrow, Great	*Passer motitensis*	LC	Near-endemic
Tit-Babbler, Chestnut-vented	*Parisoma subcaeruleum*	LC	Near-endemic
Whydah, Shaft-tailed	*Vidua regia*	LC	Near-endemic
Wren-Warbler, Barred	*Calamonastes fasciolatus*	LC	Near-endemic

3.1.4 Herpetofauna (Reptiles and Amphibians)

DWE 2014, listed 88 species to occur in the area and are listed in Appendix D, 32 reptile and 17 amphibian species to occur in the close vicinity of the laydown area site.

The 2014 survey found one species, the Spotted Sand Lizard *(Pedioplanis lineoocellata)* which had not been previously recorded in the area; and the Leopard Tortoise *(Stigmochelys pardalis)* to be present.

3.1.5 Invertebrates

Butterflies are useful indicators of available habitats as they are relatively easy to locate and catch, and to identify. Although only three butterflies, namely Yellow Pansy (*Junonia hierta)*, African Monarch (*Danaus chrysippus*) and Dusky Acea (*Hylites esebria*), were recorded during field investigations, 14 species are expected to occur, based on previous studies in the Grootegeluk Coal Mine area. (Table 3-3).

Table 3-3: Butterfly Species Expected to Occur at the Grootegeluk Mine

Family	Species Name	Common Name
Lycaenidae	*Azanus moriqua*	Thorn-tree Blue butterfly
Nymphalidae	*Acraea anemosa*	Broad-bordered Acraea
	Danaus chrysippus	African Monarch butterfly
	Junonia hierta cebrene	Yellow Pansy butterfly
	Hamanumida daedalus	Guinea Fowl butterfly
	Charaxes spp.	Emperor/ Charaxes butterfly
	Byblia ilythia	Spotted Joker butterfly
	Hyalites esebria esebria	Dusky Acrea butterfly
Pieridae	*Colotis danae annae*	Scarlet Tip butterfly
	Colotis ione	Bushveld Purple Tip butterfly
	Pinacopteryx eriphia eriphia	Zebra White butterfly
	Eurema brigitta brigitta	Broad-bordered yellow
Hesperiidae	*Spalia spp.*	Sandman butterfly
Papilionidae	*Papilio demodocus*	Citrus Swallowtail butterfly

3.2 Field Survey

On the 4th of April 2016 survey of the project area was conducted around the two proposed GG 10 stockpiles, the laydown area, multiproduct stockpile and the additional 12.8 ha footprint within the rail loop that was not previously assessed in the expansion project conducted in 2014 as indicated in Figure 3-2. Photographs taken at selected points as identified in the desktop survey, to put into perspective the general state of the area, occurrence flora species, evidence of mammals, birds and reptiles and SCC.

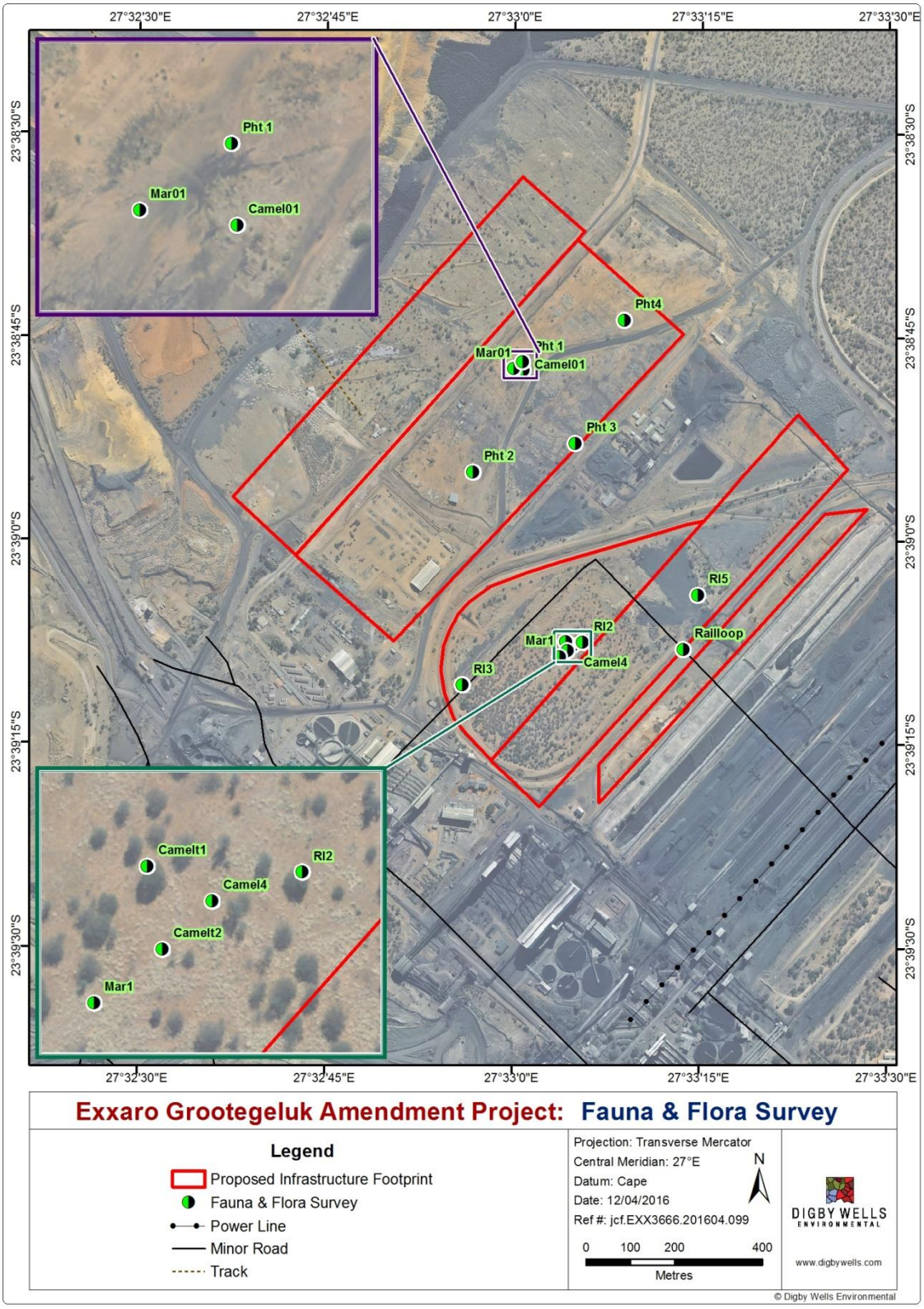

Figure 3-2: Locality of the Photographic Points and the Species of Special Concern at the two GG 10 Stockyard and Laydown Areas at the Grootegeluk Mine

3.2.1 Flora

Sixteen plant species were identified, seven tree species, three grass species and three shrubs and three forb species and these species which were recorded during the survey are marked in bold in Appendix A with any new species added to the list.

One species *Stipagrostis ciliata var; capensis* (Tall Bushman grass) had not been previously listed as occurring in the project area.

The photo points identified in the desktop study and the species and disturbance are described as follows;

Photo Point Rail Loop: These three photographs (Figure 3-3) were taken at the point marked in Figure 3-2 as the Rail loop. (a) taken to the west, (b) north, and (c) to the south, within the rail loop the photographs indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation from stock piling and machinery movement. The dominant plant species encountered were *Vachellia spp*. *Dichrostachys cinerea* (Sicklebush) and *Stipagrostis ciliata var; capensis* (Tall Bushman grass).

Figure 3-3: Photo Point: Rail loop (a), (b) and (c) indicating the level of disturbance and vegetation occurring at the point

Photo Point RI2: These four photographs (Figure 3-4) were taken at the point marked RI2 in Figure 3-2, and taken to (a) the east, (b) south, (c) west and (d) north.

The encountered plant species being *Senegalia spp.*, *Vachellia spp. Dichrotachys cinerea (*Sickle bush*)*, *Stipagrostis ciliata var: capensis* (Tall Bushman grass), a few unidentified forbs were present in the area. This also indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation

Figure 3-4: Photo Point RI2: (a), (b), (c) and (d) indicating the level of disturbance and vegetation recovery occurring at the point

Photo Point RI 5 (Figure 3-5), these four photographs (Figure 3-2) were taken (a) north, (b)east, (c) south, (d) west indicates a higher level of disturbance than in RI3 with predominantly *Senegalia spp* and *Stipagrostis ciliata var capensis* (Tall Bushman grass). This also indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation.

Figure 3-5: Photo Point Rl5: (a), (b), (c) and (d) indicating the level of disturbance and vegetation occurring at the point

Photo Point PHT 1 These photographs were taken to the area west of the Rail Loop (Figure 3-6) and is described as the old capital yard, photograph (Figure 3-2) (a) South, (b) West, (c) North and (d) East. The area is dominated by *Dichrostachys cinerea* (sickle bush), various forb species mainly *Tephorsia spp.,* and *Stipagrostis ciliata var capensis (*Tall Bushman grass) being dominant, this also indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation.

Figure 3-6: Photo Point PHT1: (a), (b), (c) and (d) indicating the level of disturbance and vegetation occurring at the point

Photo Point PHT 2 is further to the South of PHT 1 (Figure 3-7), photograph (Figure 3-2 below) (a) south, (b) west, (c) north and (d) east. The area is also dominated by *Dichrotachys cinerea* (Sickle Bush), the grass cover is dominated by *Stipagrostis ciliata var; capensis* (Tall Bushman Grass) and forb *Tephrosia spp*, this also indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation.

Figure 3-7: Photo Point PHT2: (a), (b), (c) and (d) indicating the level of disturbance and vegetation occurring at the point

Photo Point PHT 3 is located to the East of PHT 2 (Figure 3-8), photograph (Figure 3-2 below) (a) North, (b) West, (c) South, (d) East. The area is dominated by *Vachellia spp*. and Sickle Bush (*Dichrostachys cinerea*), the grass cover is low with, *Stipagrostis ciliata var; capensis (Tall Bushman Grass), Melinis repens* (Natal Red Top), *Eragrostis curvula* (Weeping Love Grass) evident and a forb species (Unidentified) being present. This also indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation, the ingress of vegetation is less than at the other sites.

Figure 3-8: Photo Point PHT3: (a), (b), (c) and (d) indicating the level of disturbance and vegetation occurring at the point

Photo Point PHT 4 is located North of PHT 3 (Figure 3-9), photograph (Figure 3-2 below) (a) North, (b) East, (c) South, (d) West.

The area is dominated by forbs (*Tephrosia*.sp) and occasional *Dichrostachys cinerea* (Sickle bush) and *Eragrostis curvula* (Weeping Love Grass) and the occasional *Stipagrostis ciliata var; capensis* (Tall Bushman grass).This also indicates the ingress of vegetation and previous high level of disturbance to the soil and vegetation.

Figure 3-9: Photo Point PHT4: (a), (b), (c) and (d) indicating the level of disturbance and vegetation occurring at the point

3.2.1.1 Species of Special Concern

Two protected tree species (Figure 3-10 below) *Vachellia erioloba* (Camel Thorn) were observed at the following points indicated in Figure 3-2 as Camel 01, Camelt 1, Camelt2, Camel4) and *Sclerocarya birrea subsp. caffra* (Marula) indicated in Figure 3-2 as Mar01, Mar1.

The photographs in indicates the age and condition of; (a) Vachellia erioloba (Camel Thorn) and (b), (c) *Sclerocarya birrea subsp. caffra* (Marula) found on the site.

Figure 3-10: Photographs of the protected tree species occurring on site, (a) *Vachellia erioloba* (Camel Thorn), (b) and (c) *Sclerocarya birrea subsp. caffra* (Marula)

3.2.2 Fauna

DWE 2014, found thirteen mammal species, eighty one bird species, two reptile and two butterfly species to occur in and around the project area, during this survey four mammal species, ten bird species and two butterfly species were recorded with one protected species Common Tsessebe (*Damaliscus lunatus*) being recorded.

The occurrence of faunal species in the Grootegeluk mining area is not unusual and according to the conservation manager, the occurrence of the Tsessebe in the rail loop area is also not uncommon as they migrate there from the larger reserve area to utilize the forage found there. It must be noted that Tsessebe are not limited to the area and to move through the area.

3.2.2.1 Mammals

The laydown area within the rail loop is known from previous surveys to hold various mammal species and the following mammals were recorded within the rail loop (Table 3-4).

Only warthog (*Phacochoerus aethiopicus*) was encountered outside of the rail loop but spoor and dung was found of other mammals. (Unidentified) (Figure 3-11).

Table 3-4: Mammal Species Found During the Survey

Common Name	Scientific Name
Warthog	*Phacochoerus aethiopicus*
Common Tsessebe	*Damaliscus lunatus*
Kudu	*Tregelaphus strepsiceros*
Common Duiker	*Sylvicapra grimmia*

Figure 3-11: Photo (a) Spoor (a) and (b) Dung of mammals (unidentified) utilising the site

3.2.2.2 Birds

During the DWE 2014 survey 81 bird species were recorded in the project area, during this survey ten bird species were identified which were also identified in the previous survey (Table 3-5) the low number can be ascribed to the time of day the survey was conducted 11am to 3pm and absence of water in the immediate vicinity.

No species of special concern were recorded.

Table 3-5: Birds recorded at the Project Site on the 12th April 2016

Common Name	Scientific Name
Laughing Dove	*Streptopelia senegalensis*
Bronze Manikin	*Spermestes cucullatus*
Golden Breasted Bunting	*Emberiza flaviventris*
Masked Weaver	*Ploceus velatus*
Blue Waxbill	*Uraeginthus angolensis*
Spotted Flycatcher	*Muscicapa striata*
House Sparrow	*Passer domesticus*
Jameson's Fire Finch	*Lagonosticta rhodopareia*

Common Name	Scientific Name
Red Backed Shrike	*Lanius collurio*
Rattling Cisticola	*Cisticola chiniana*

3.2.2.3 Reptiles and Amphibians

Although some time was taken to search in discarded rock piles no reptiles were found, there was no water in the area and no amphibians were observed.

3.2.2.4 Butterflies

As stated in the desktop study butterflies are a good indication of habitats available and are useful indicators as they are relatively easy to locate and identify.

The two species of butterflies (a) African Monarch (*Danaus chrysippus*), (b) Yellow Pansy (*Junonia hierta*) recorded during the survey where found close to PHT 2. (Figure 3-12)

The presence of butterflies indicates the availability of food and habitat for their survival albeit a disturbed one.

Figure 3-12: Photographs of two butterfly species (a) African Monarch (*Danaus chrysippus*) and (b) Yellow Pansy (*Junonia hierta*)

3.2.2.5 Species of Special Concern

One protected species was recorded, the Tsessebe (*Damaliscus lunatus*), this species occurs naturally in the area and was identified in the DWE 2014 survey as occurring in the area, they are known to inhabit the project site due to the absence of a) competition from other grazers and b) food availability (Fuls, 2016) . It must be noted that Tsessebe are not limited or restricted to the area and free movement to other areas is possible and does occur with the change is season and the availability of water and food.

4 Review of the Impacts of the Proposed Activities

According to Digby Wells 2014, the aim of the Impact Assessment is to strive to avoid damage or loss of ecosystems and services that they provide, and where they cannot be avoided, to reduce and mitigate these impacts (DEA, 2013). Offsets to compensate for loss of habitat are regarded as a last resort, after all efforts have been made to avoid, reduce and mitigate. The mitigation hierarchy is represented in Figure 4-1.

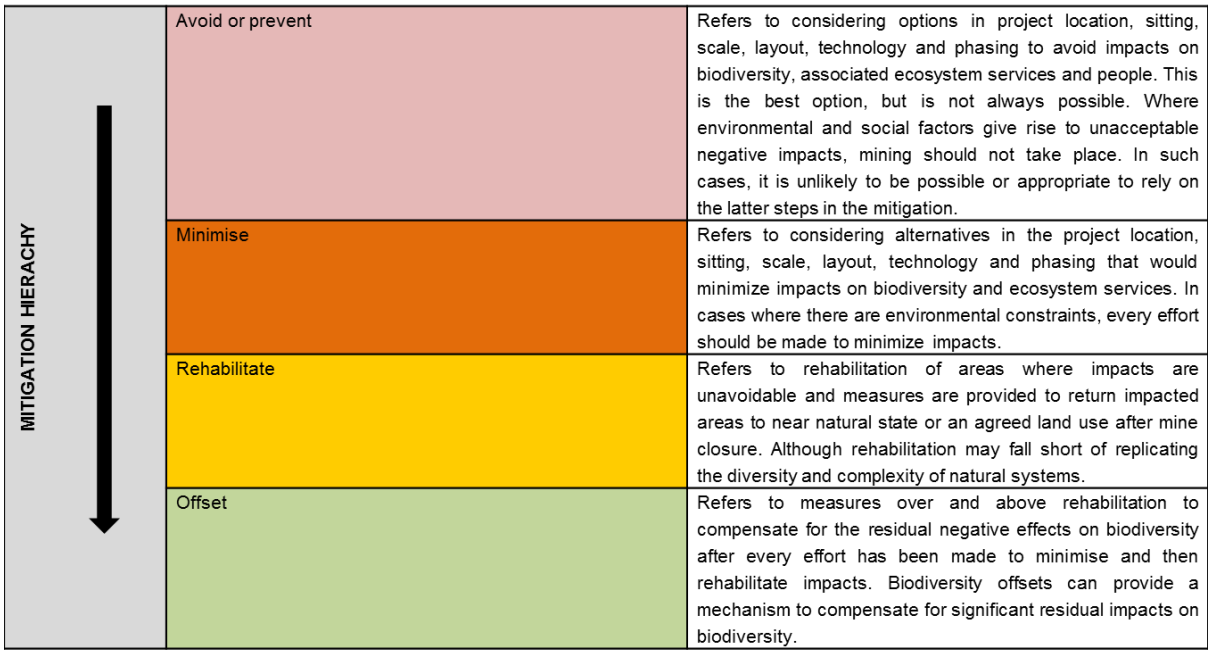

Figure 4-1: Mitigation hierarchy

4.1 Issues and Impacts

The following section describes the flora and fauna issues and impacts for;

- Current land use (existing railway loop, unused capital yard and roads and the no-go option) and
- Proposed new Grootegeluk Coal Mine stockpile area GG10 A, B, Laydown and Extension Area (Fig: 2-1)

4.1.1 Impacts of the Proposed Stockpiling Activities

4.1.1.1 Issue 1: Loss of Plant Communities

Stockpiling will lead to the direct loss of the vegetation on site. This is regarded as a concern because the natural vegetation is in the process of re-establishing itself, the extent of anticipated disturbance will be over the entire project boundary.

4.1.1.2 Mitigation and Management

There is no mitigation for the loss of habitat; however, efforts can be made to reduce the overall impact. Areas that are not directly affected by the proposed activities should be conserved. This entails removal of the topsoil for rehabilitation elsewhere, restricting access, and controlling any alien invasive plants as well as keeping clearing to a minimum.

According to Digby Wells, 2014, Exxaro currently manages the Manketti Nature Reserve the Waterberg region as wildlife areas and is currently not considered as an official offset area, even though it is currently managed as such. Fourteen of the nineteen farms that form part of Manketti are part of the approved mining authorisations and/or earmarked for future development in the forms of Mining and the development of Independent Power Producers.

Offsets can be an unsustainable solution in many cases, owing to the lack of formal protection of areas that are demarcated for offsetting. As a consequence, offset areas may be utilised in future for further development, resulting in a loss of funds, time and expert advice invested in the initial offset establishment. The benefit of the Manketti Nature Reserve, however, is that it is currently being managed by Exxaro and this offers some control over the management of biodiversity. It is important that the Manketti Nature Reserve is conserved as far as possible and that future development within this area be controlled as far as practicable.. It is recommended that should future developments by Exxaro, in the Waterberg region, exceeds the capacity of the area set aside as official offset area, additional land should be encompassed into an offset strategy. The overall aim of biodiversity offsetting, in accordance with the guidelines stipulated by the international Business and Biodiversity Offsets Programme (BBOP) and the DEA (2003) is a 'no-net-loss' approach.

4.1.1.3 Impact Rating

Refer to the impact rated below in the table.

Table 4-1: Loss of Habitat

IMPACT DESCRIPTION: Loss of Habitat as a result of Stockpiling Activities			
Dimension	**Rating**	**Motivation**	**Significance**
Pre-Mitigation			
Duration	Medium Term (3)	Equal to the duration of the construction and operation phases which will be a medium period	Minor Negative (-63)
Extent	Site Area (3)	The impacts will be limited to the project area	
Intensity of type of impact	Moderate (3)	This will have impacts on the recovering plant community within the project area	

IMPACT DESCRIPTION: Loss of Habitat as a result of Stockpiling Activities			
Dimension	**Rating**	**Motivation**	**Significance**
Probability	Almost certain (7)	Without appropriate mitigation there will loss of habitat that could extend beyond the project area.	
Mitigation/ Management actions			
▪ Clearing of vegetation must be limited to the project site and the cleared area; and ▪ Conservation of surrounding areas such as the Manketti Reserve.			
Post-Mitigation			
Duration	Medium Term (3)	Equal to the duration of the construction and operation phases which will be a medium period	Negligible Negative (-27)
Extent	Site Area (3)	The impacts will be limited to the project area	
Intensity of type of impact	Moderate (3)	Impacts experience within the stockpile areas	
Probability	Probable (3)	Necessary mitigations will reduce the significance of the impact and limit the impact to the project area	

4.1.1.4 Issue 2: Loss of Biodiversity

The loss of vegetation due to site clearing and stockpiling will result in a reduction in biodiversity on a local scale. Loss of vegetation will in turn cause a loss of habitat for birds, mammals and herpetofauna that make use of the area. This is particularly applicable to the loss of Species of Special Concern (SSC). With regard to faunal SSC, it is expected that red-data birds will move on to a different area during the stockpiling activities. Further to this, they will make use of natural habitat elsewhere in the greater study area.

4.1.1.5 Mitigation and Management

Efforts should be made not to exceed the footprint area as far as reasonably practicable. However, post the stockpiling activities, which may be for a duration of 5 years, the site is earmarked for future mine development.

Therefore those ecological attributes, such as soil and the flora SCC that can be recovered prior to the stockpiling commencing should be extracted for use elsewhere.

Although there is no mitigation for the loss of SSC, there are management measures in place to ensure that there is a ‘no-net-loss’ approach.

Faunal SCC, such as Tsessebe (*Damaliscus lunatus*), can be captured and relocated to Manketti should they be present during the clearing of the area. These animals move freely within the larger Grootegeluk area and an encouraged to move across to the Manketti areas during the winter months where water is more freely available.

Flora SCC recorded for the site, namely: *Vachellia erioloba(Camel Thorn), Combretum imberbe (Leadwood:* Digby Wells,2014*))* and *Sclerocarya birrea(Marula)* are of varying ages,

Adult *Vachellia erioloba(Camel Thorn), Combretum imberbe (Leadwood)* are notoriously difficult to transplant, whereas *Sclerocarya birrea(Marula)* less so.

Due to the fact that the rehabilitation of the site may only take place at mine closure it is recommended that a nursery be established on site where naturally occurring species can be grown and re-planted. A ratio of 1:3 for large trees, 1:2 for juvenile tees (medium height) and 1:1 for saplings should be applied for propagation (Digby Wells 2014). Should a nursery not be established the trees impacted and removed will need to be replaced as per the requirements of the protected tree licenses issued by DAFF.

4.1.1.6 Impact Rating

Refer to the impact rated below in the table.

Table 4-2: Loss of Biodiversity

IMPACT DESCRIPTION: Loss of Biodiversity as a result of Stockpiling Activities			
Dimension	**Rating**	**Motivation**	**Significance**
Pre-Mitigation			
Duration	Medium Term (3)	Equal to the duration of the construction and operation phases which will be a medium period	Minor Negative (-54)
Extent	Site Area (3)	The impacts will be limited to the project area	
Intensity of type of impact	Moderate (3)	This will have impacts on the recovering plant community within the project area	
Probability	Almost certain (6)	Without appropriate mitigation there will loss of habitat that could extend beyond the project area.	
Mitigation/ Management actions			
▪ Clearing of vegetation must be limited to the project site and the cleared area; and ▪ Conservation of surrounding areas such as the Manketti Reserve; ▪ Planting of protected trees that could be lost as a result of clearing activities; and			
Post-Mitigation			

IMPACT DESCRIPTION: Loss of Biodiversity as a result of Stockpiling Activities			
Dimension	**Rating**	**Motivation**	**Significance**
Duration	Medium Term (3)	Equal to the duration of the construction and operation phases which will be a medium period	Minor Negative (-36)
Extent	Site Area (3)	The impacts will be limited to the project area	
Intensity of type of impact	Moderate (3)	Impacts experience within the stockpile areas	
Probability	Probable (4)	Necessary mitigations will reduce the significance of the impact and limit the impact to the project area	

4.1.1.7 Issue 3: Loss of Ecosystem Function

Ecosystem function is the measure of the combined functioning of the vegetation and associated species and faunal habitats, all of which result in the ecosystem health. (Digby Wells, 2014.) The stockpiling of coal on the site will affect the ecosystem function, stockpiling will result of the loss of biotic (Fauna & flora) components as the land surface changes, this will sterilise the site until the stockpiles are removed and rehabilitation measures are instituted.

4.1.1.8 Mitigation and Management

Due to the fact that site will be used for some considerable time, either for stockpiling or mine infrastructure and rehabilitation of the site may only take place at mine closure, it is unlikely that the ecosystem function will be restored in the near future.

However this loss, as with the other losses in fauna and flora, must be offset in a manner which serves the greater conservation of the ecosystem.

A review of the extent of the mine development, quantification of the loss of ecosystem functions in the development area and identification of similar habitat as an offset should be considered, such as areas located within Manketii,

4.1.1.9 Impact Rating

Refer to the impact rated below in the table.

Table 4-3: Loss of Ecosystem Function

IMPACT DESCRIPTION: Loss of Ecosystem Function as a result of Stockpiling Activities			
Dimension	**Rating**	**Motivation**	**Significance**
Pre-Mitigation			

Duration	Medium Term (3)	Equal to the duration of the construction and operation phases which will be a medium period	Minor Negative (-36)
Extent	Site Area (3)	The impacts will be limited to the project area	
Intensity of type of impact	Moderate (3)	This will have impacts on the recovering plant community within the project area	
Probability	Probable (4)	Without appropriate mitigation there will loss of habitat that could extend beyond the project area.	
Mitigation/ Management actions			
▪ Clearing of vegetation must be limited to the project site and the cleared area; ▪ Conservation of surrounding areas such as the Manketti Reserve; ▪ Planting of protected trees that could be lost as a result of clearing activities; and ▪ Rehabilitation at end of life of mine to restore loss of ecosystem function.			
Post-Mitigation			
Duration	Medium Term (3)	Equal to the duration of the construction and operation phases which will be a medium period	Negligible Negative (-32)
Extent	Limited (2)	The impacts will be limited to the project area	
Intensity of type of impact	Moderate (3)	Impacts experience within the stockpile areas	
Probability	Probable (4)	Necessary mitigations will reduce the significance of the impact and limit the impact to the project area	

4.2 Ecological Assessment

The areas assessed indicate that there was previously a high level of mechanical disturbance which transformed the landscape.

It is reasonable to conclude that the areas assessed were at some time in a natural state (Limpopo Sweet Bushveld, DWE, 2014) prior to mining commencing. It is evident that the areas are going through a stages of secondary succession opposed to primary succession as a result of historically disturbance in these area and the utilisation of these areas.

Secondary succession is defined by Smith, R.L, (1996) as: “plant succession taking place on site that have already supported life.” and;

Primary succession is vegetational development starting from a new site never before colonised by life (Smith, 1996).

Evidence of this secondary succession is demonstrated in the photographs taken at the various sites indicated in Figure 3-2, namely; Rail loop, Rl1, Rl2, Rl3, Rl5, Pht1, Pht2, Pht3, and Pht 4.

The survey results indicates a close resemblance to the *Vanchellia- Aristida* open bushveld described by Digby Wells, 2014.

The abundance of trees, grasses and in some areas forbs as at PHT 2, is providing a habitat and food for the mammals, birds and insects that have been found there.

The presence of young trees and with a mention of the protected species according to the NEMBA and the National Forestry Act, namely; *Vachellia erioloba* (Camel Thorn), and *Sclerocarya birrea subsp. caffra* (Marula) trees can be ascribed to two things a) the area has not been used for some time allowing the tress to grow to their current age or; b) the protected tree status of these trees was known and they were not removed.

Therefore the area still remains in a disturbed state as identified and described by Digby Wells in 2014, and is showing signs of recovery based on the ingress and establishment of flora into to the previously disturbed areas.

5 Conclusion

In the conclusion, to reach a balance between the utilization of an area for stockpiling coal and the rehabilitation post the actives remains a challenge form an ecological recovery perspective.

It is clear that the presence of protected species both flora and fauna, as described in this report, gives a definite indication that the site is able to support these and other species even in its current state of disturbance.

This indicates a measure of sensitivity and supports the assessment in so far as the area is in a stage of secondary succession opposed to primary succession which is defined as vegetational development starting from a new site never before colonised by life (Smith, 1996) is occurring.

The species found on site indicated by the ingress and regrowth of plant species provide the proof that the original ecological state was not completely destroyed when the area was cleared for previous activities.

This is an important aspect as it indicates that there is an ability of some of the ecological attributes to recover post the proposed activities on the site.

Stockpiling of coal or any other material means the loss of all species both fauna and flora within these The remaining topsoil that will be stripped will thus be the only remaining ecological attribute, which is to be considered a valuable asset as it can be utilised elsewhere for rehabilitation purposes.

6 Recommendations

As the project area has already been subject to very large disturbances it's recommended that:

- Strip the soil to the recommended level ascertained in the soil survey.
- Stockpile the soil in a designated area, revegetate and apply soil erosion measures.
- Look at the conservation of surrounding areas like the Manketti Reserve.

7 References

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Appendix A: Expected (DWE, 2014) & Identified Flora Species

Scientific name	Common name
Acacia burkei	**Black monkey-thorn**
Acacia erioloba	**Camel Thorn**
Acacia karoo	Sweet Thorn
Acacia mellifera	Monkey thorn
Acacia nigrescens	Knob thorn
Vachellia nilotica	**Scented thorn**
Acacia tortilis	Umbrella thorn
Acacia xanthophloea	Fever tree
Aristida congesta subsp. Barbicollis	Spreading three-awn
Aristida junciformis	Gongoni three-awn
Bauhinia galpinii	Pride-of-De Kaap
Blepharis subvolvubis	
Combretum apiculatum	Red bushwillow
Combretum hereroense	Mouse-eared bushwillow
Combretum imberbe	Leadwood
Combretum molle	Velvet bushwillow
Combretum zeheri	Large-fruited bushwillow
Commelina africana	Yellow Commelina
Commelina bengalensis	Benghal dayflower
Commiphora africana	Hairy corkwood
Commiphora angolensis	Sand corkwood
Dichrostachys cinerea	**Sickle-bush**
Digitaria eriantha	Common finger grass
Diospyros lycioides	Bushveld bluebush
Dombeya rotundifolia	Wild pear
Eragrostis curvula	**Weeping love grass**
Forbes	**Unidentified**
Gardenia volkensii	**Savanna gardenia**
Grewia bicolor	White raisin
Grewia flava	**Velvet raisin**
Grewia flavescens	**Sandpaper raisin**

Scientific name	Common name
Gymnosporia senegalensis	Spike thorn
Lantana camara	Tick berry bush
Melinis repens	**Natal red-top**
Momordica balsamina	African cucumber
Ochna pulchra	Peeling plane
Peltophorum africanum	African wattle
Pennesetum setaceum	Fountain grass
Sarcostemma viminale	Caustic Vine
Schmidtia pappophoroides	Sand quick grass
Sclerocarya birrea	**Marula**
Solanum incanum	Thorn apple
Striga asiatica	Red witchweed
Stipagrostis ciliata var. capensis	**Tall bushman grass**
Tephrosia sp	
Terminalia sericea	**Silver cluster-leaf**
Vernonia vastigiata	
Vigna vexillata	
Viscum rotundifolium	Misstletoe
Ziziphus mucronata	**Buffalo thorn**

Appendix B: Expected (DWE, 2014) and Identified Mammal Species

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Cheetah	*Acinonyx jubatus*	Vulnerable	Vulnerable	Vulnerable
Spiny Mouse	*Acomys spinosissimus*	Least Concern	Least Concern	Not listed
Impala	*Aepyceros melampus*	Least Concern	Least Concern	Not listed
Red Veld Rat	*Aethomys chrysophilus*	Least Concern	Least Concern	Not listed
Tete Veld Rat	*Aethomys ineptus*	Least Concern	Least Concern	Not listed
Namaqua Rock Mouse	*Aethomys namaquensis*	Endangered	Least Concern	Not listed
Red Hartebeest	*Alcelaphus buselaphus*	Least Concern	Least Concern	Not listed
Hottentot's Golden Mole	*Amblysomus hottentotus*	Not evaluated	Data Deficient	Not listed
Springbuck	*Antidorcas marsupialis*	Least Concern	Least Concern	Not listed
African Clawless Otter	*Aonyx capensis*	Least Concern	Least Concern	Protected
South African Hedgehog	*Atelerix frontalis*	Least Concern	Near Threatened	Protected
Water Mongoose	*Atilax paludinosus*	Least Concern	Least Concern	Not listed
Yellow Golden Mole	*Calcochloris obtusirostris*	Least Concern	Vulnerable	Not listed
Side-striped Jackal	*Canis adustus*	Least Concern	Near Threatened	Not listed
Black-backed Jackal	*Canis mesomelas*	Least Concern	Least Concern	Not listed
Caracal	*Caracal*	Least Concern	Least Concern	Not listed
Red Duiker	*Cephalophus natalensis*	Least Concern	Least Concern	Not listed
White Rhinoceros	*Ceratotherium simum*	Near Threatened	Least Concern	Protected

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Vervet Monkey	*Cercopithecus aethiops pygerythrus*	Least Concern	Least Concern	Not listed
Stairs's or Mozambique Monkey	*Cercopithecus mitis erythrarchus*	Least Concern	Least Concern	Not listed
Samango Monkey	*Cercopithecus mitis labiatus*	Least Concern	Endangered	Not listed
Ansorge's Free-tailed Bat	*Chaerephon ansorgei*	Least Concern	Least Concern	Not listed
Little Free-tailed Bat	*Chaerephon pumila*	Least Concern	Least Concern	Not listed
African Civet	*Civettictis civetta*	Least Concern	Least Concern	Not listed
Percival's Trident Bat	*Cloeotis percivali*	Near Threatened	Critically Endangered	Not listed
Black Wildebeest	*Connochaetes gnou*	Least Concern	Least Concern	Protected
Blue Wildebeest	*Connochaetes taurinus taurinus*	Least Concern	Least Concern	Not listed
Giant Rat	*Cricetomys gambianus*	Least Concern	Vulnerable	Vulnerable
Reddish-grey Musk Shrew	*Crocidura cyanea*	Least Concern	Data Deficient	Not listed
Tiny Musk Shrew	*Crocidura fuscomurina*	Least Concern	Data Deficient	Not listed
Lesser Red Musk Shrew	*Crocidura hirta*	Least Concern	Data Deficient	Not listed
Maquassie Musk Shrew	*Crocidura maquassiensis*	Least Concern	Vulnerable	Not listed
Swamp Musk Shrew	*Crocidura mariquensis*	Least Concern	Data Deficient	Not listed
Lesser Grey-brown Musk Shrew	*Crocidura silacea*	Least Concern	Data Deficient	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Spotted Hyaena	*Crocuta crocuta*	Least Concern	Near Threatened	Protected
Common Molerat	*Cryptomys hottentotus*	Least Concern	Least Concern	Not listed
Yellow Mongoose	*Cynictis penicillata*	Least Concern	Least Concern	Not listed
Tsessebe	***Damaliscus lunatus lunatus***	**Least Concern**	**Endangered**	**Endangered**
Blesbuck	*Damaliscus pygargus phillipsi*	Least Concern	Least Concern	Not listed
Water Rat	*Dasymys incomtus*	Least Concern	Near Threatened	Not listed
Grey Climbing Mouse	*Dendromus melanotis*	Least Concern	Least Concern	Not listed
Brants' Climbing Mouse	*Dendromus mesomelas*	Least Concern	Least Concern	Not listed
Chestnut Climbing Mouse	*Dendromus mystacalis*	Least Concern	Least Concern	Not listed
Nyika Climbing Mouse	*Dendromus nyikae*	Least Concern	Near Threatened	Not listed
Short-tailed Gerbil	*Desmodillus auricularis*	Least Concern	Least Concern	Not listed
Black Rhino	*Diceros bicornis minor*	Critically Endangered	Vulnerable	Not listed
Short-snouted Elephant-shrew	*Elephantulus brachyrhynchus*	Least Concern	Data Deficient	Not listed
Bushveld Elephant-shrew	*Elephantulus intufi*	Least Concern	Data Deficient	Not listed
Rock Elephant-shrew	*Elephantulus myurus*	Least Concern	Least Concern	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Gambian Epauletted Fruit Bat	*Epomophorus gambianus crypturus*	Least Concern	Data Deficient	Not listed
Wahlberg's Epauletted Fruit Bat	*Epomophorus wahlbergi*	Least Concern	Least Concern	Not listed
Long-tailed Serotine Bat	*Eptesicus hottentotus*	Least Concern	Least Concern	Not listed
Burchell's Zebra	*Equus burchellii*	Least Concern	Least Concern	Not listed
African Wild Cat	*Felis silvestris*	Least Concern	Least Concern	Not listed
Lesser Bushbaby	*Galago moholi*	Least Concern	Least Concern	Not listed
Slender Mongoose	*Galerella sanguinea*	Least Concern	Least Concern	Not listed
Small-spotted Genet	*Genetta genetta*	Least Concern	Least Concern	Not listed
Large-spotted Genet	*Genetta tigrina*	Least Concern	Least Concern	Not listed
Hairy-footed Gerbil	*Gerbillurus paeba*	Least Concern	Least Concern	Not listed
Giraffe	*Giraffa camelopardalis*	Least Concern	Least Concern	Not listed
Butterfly Bat	*Glauconycteris variegatus*	Least Concern	Near Threatened	Not listed
Mozambique Woodland Mouse	*Grammomys cometes*	Least Concern	Data Deficient	Not listed
Woodland Mouse	*Grammomys dolichurus*	Least Concern	Data Deficient	Not listed
Woodland Dormouse	*Graphiurus murinus*	Least Concern	Least Concern	Not listed
Rock Dormouse	*Graphiurus platyops*	Least Concern	Data Deficient	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Dwarf Mongoose	*Helogale parvula*	Least Concern	Least Concern	Not listed
Large Grey Mongoose	*Herpestes ichneumon*	Least Concern	Least Concern	Not listed
Yellow-spotted Hyrax	*Heterohyrax brucei*	Least Concern	Least Concern	Not listed
Hippopotamus	*Hippopotamus amphibius*	Least Concern	Least Concern	Not listed
Sundevall's Leaf-nosed Bat	*Hipposideros caffer*	Least Concern	Data Deficient	Not listed
Roan Antelope	*Hippotragus equinus*	Least Concern	Vulnerable	Vulnerable
Sable Antelope	*Hippotragus niger niger*	Least Concern	Vulnerable	Not listed
Brown Hyaena	*Hyaena brunnea*	Near Threatened	Near Threatened	Protected
Cape Porcupine	*Hystrix africaeaustralis*	Least Concern	Least Concern	Not listed
White-tailed Mongoose	*Ichneumia albicauda*	Least Concern	Least Concern	Not listed
Striped Polecat	*Ictonyx striatus*	Least Concern	Least Concern	Not listed
Damara Woolly Bat	*Kerivoula argentata*	Least Concern	Endangered	Not listed
Lesser Woolly Bat	*Kerivoula lanosa*	Least Concern	Near Threatened	Not listed
Waterbuck	*Kobus ellipsiprymnus ellipsiprymnus*	Least Concern	Least Concern	Not listed
Botswana Long-eared Bat	*Laephotis botswanae*	Near Threatened	Vulnerable	Not listed
Single-striped Mouse	*Lemniscomys rosalia*	Least Concern	Data Deficient	Not listed
Cape Hare	*Lepus capensis*	Least Concern	Least Concern	Not listed
Scrub Hare	*Lepus saxatilis*	Least Concern	Least Concern	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
African Elephant	*Loxodonta africana*	Endangered	Least Concern	Protected
Spotted-necked Otter	*Lutra maculicollis*	Vulnerable	Near Threatened	Protected
African Wild Dog	*Lycaon pictus*	Vulnerable	Endangered	Endangered
Pangolin	*Manis temminckii*	Near Threatened	Vulnerable	Vulnerable
Multimammate Mouse	*Mastomys coucha*	Least Concern	Least Concern	Not listed
Natal Multimammate Mouse	*Mastomys natalensis*	Least Concern	Least Concern	Not listed
Honey Badger	*Mellivora capensis*	Least Concern	Near Threatened	Not listed
Lesser Long-fingered Bat	*Miniopterus fraterculus*	Near Threatened	Near Threatened	Not listed
Schreibers' Long-fingered Bat	*Miniopterus schreibersii*	Near Threatened	Near Threatened	Not listed
Angolan Free-tailed Bat	*Mops condylurus*	Least Concern	Least Concern	Not listed
Midas Free-tailed Bat	*Mops midas*	Least Concern	Least Concern	Not listed
Banded Mongoose	*Mungos mungo*	Least Concern	Least Concern	Not listed
Desert Pygmy Mouse	*Mus indutus*	Least Concern	Least Concern	Not listed
Pygmy Mouse	*Mus minutoides*	Least Concern	Least Concern	Not listed
Thomas' Pygmy Mouse	*Mus neavei*	Least Concern	Data Deficient	Not listed
Dark-footed Forest Shrew	*Myosorex cafer*	Least Concern	Data Deficient	Not listed
Forest Shrew	*Myosorex varius*	Least Concern	Data Deficient	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Rufous Hairy Bat	*Myotis bocagei*	Least Concern	Data Deficient	Not listed
Temminck's Hairy Bat	*Myotis tricolor*	Not Evaluated	Near Threatened	Not listed
Welwitsch's Hairy Bat	*Myotis welwitschii*	Least Concern	Near Threatened	Not listed
Gunning's Golden Mole	*Neamblysomus gunningi*	Vulnerable	Endangered	Endangered
Juliana's Golden Mole	*Neamblysomus julianae*	Critically Endangered	Vulnerable	Vulnerable
Cape Serotine Bat	*Neoromicia capensis*	Least Concern	Least Concern	Not listed
Banana Bat	*Neoromicia nanus*	Least Concern	Least Concern	Not listed
Aloe Bat	*Neoromicia zuluensis*	Near Threatened	Least Concern	Not listed
Livingstone's Antelope	*Neotragus moschatus zuluensis*	Least Concern	Vulnerable	Vulnerable
Common Slit-faced Bat	*Nycteris thebaica*	Least Concern	Least Concern	Not listed
Wood's Slit-faced Bat	*Nycteris woodi*	Near Threatened	Near Threatened	Not listed
Schlieffen's Bat	*Nycticeinops schlieffeni*	Near Threatened	Least Concern	Not listed
Klipspringer	*Oreotragus oreotragus*	Least Concern	Least Concern	Not listed
Antbear	*Orycteropus afer*	Least Concern	Least Concern	Not listed
Gemsbuck	*Oryx gazella*	Least Concern	Least Concern	Not listed
Bat-eared Fox	*Otocyon megalotis*	Least Concern	Least Concern	Not listed
Thick-tailed Bushbaby	*Otolemur crassicaudatus*	Least Concern	Least Concern	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Angoni Vlei Rat	*Otomys angoniensis*	Least Concern	Least Concern	Not listed
Vlei Rat	*Otomys irroratus*	Least Concern	Least Concern	Not listed
Laminate Vlei Rat	*Otomys laminatus*	Least Concern	Least Concern	Not listed
Lion	*Panthera leo*	Vulnerable	Vulnerable	Vulnerable
Leopard	*Panthera pardus*	Least Concern	Least Concern	Vulnerable
Chacma Baboon	*Papio ursinus*	Least Concern	Least Concern	Not listed
Selous' Mongoose	*Paracynictis selousi*	Least Concern	Data Deficient	Not listed
Tree Squirrel	*Paraxerus cepapi*	Least Concern	Least Concern	Not listed
Springhare	*Pedetes capensis*	Vulnerable	Least Concern	Not listed
Grey Rhebok	*Pelea capreolus*	Least Concern	Least Concern	Not listed
Four-toed Elephant-shrew	*Petrodromus tetradactylus*	Least Concern	Endangered	Endangered
Warthog	***Phacochoerus africanus***	**Least Concern**	**Least Concern**	**Not listed**
Anchieta's Pipistrelle	*Pipistrellus anchietae*	Vulnerable	Near Threatened	Not listed
Kuhl's Pipistrelle	*Pipistrellus hesperidus*	Least Concern	Least Concern	Not listed
Rusty Bat	*Pipistrellus rusticus*	Least Concern	Near Threatened	Not listed
African Weasel	*Poecilogale albinucha*	Least Concern	Data Deficient	Not listed
Bushpig	*Potamochoerus porcus koiropotamus*	Least Concern	Least Concern	Not listed
Rock Dassie	*Procavia capensis*	Least Concern	Least Concern	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Jameson's Red Rock Rabbit	*Pronolagus randensis*	Least Concern	Least Concern	Not listed
Hewitt's Red Rock Rabbit	*Pronolagus saundersiae*	Least Concern	Least Concern	Not listed
Aardwolf	*Proteles cristatus*	Least Concern	Least Concern	Not listed
Steenbuck	*Raphicerus campestris*	Least Concern	Least Concern	Not listed
Sharp's Grysbuck	*Raphicerus sharpei*	Least Concern	Near Threatened	Protected
Common Reedbuck	*Redunca arundinum*	Least Concern	Least Concern	Protected
Mountain Reedbuck	*Redunca fulvorufula*	Least Concern	Least Concern	Not listed
Striped Mouse	*Rhabdomys pumilio*	Least Concern	Least Concern	Not listed
Peak-saddle Horseshoe Bat	*Rhinolophus blasii*	Least Concern	Vulnerable	Not listed
Geoffroy's Horseshoe Bat	*Rhinolophus clivosus*	Least Concern	Near Threatened	Not listed
Darling's Horseshoe Bat	*Rhinolophus darlingi*	Least Concern	Near Threatened	Not listed
Rüppell's Horseshoe Bat	*Rhinolophus fumigatus*	Least Concern	Near Threatened	Not listed
Hildebrandt's Horseshoe Bat	*Rhinolophus hildebrandtii*	Least Concern	Near Threatened	Not listed
Lander's Horseshoe Bat	*Rhinolophus landeri*	Least Concern	Near Threatened	Not listed
Bushveld Horseshoe Bat	*Rhinolophus simulator*	Least Concern	Least Concern	Not listed
Swinny's Horseshoe Bat	*Rhinolophus swinnyi*	Least Concern	Endangered	Not listed
Meller's Mongoose	*Rhynchogale melleri*	Least Concern	Data Deficient	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Egyptian Fruit Bat	*Rousettus aegyptiacus*	Least Concern	Least Concern	Not listed
Pouched Mouse	*Saccostomus campestris*	Least Concern	Least Concern	Not listed
Flat-headed Free-tailed Bat	*Sauromys petrophilus*	Least Concern	Least Concern	Not listed
Yellow House Bat	*Scotophilus dinganii*	Least Concern	Least Concern	Not listed
Lesser Yellow House Bat	*Scotophilus viridis*	Least Concern	Least Concern	Not listed
Krebs's Fat Mouse	*Steatomys krebsii*	Least Concern	Least Concern	Not listed
Fat Mouse	*Steatomys pratensis*	Near Threatened	Least Concern	Not listed
Least Dwarf Shrew	*Suncus infinitesimus*	Least Concern	Data Deficient	Not listed
Greater Dwarf Shrew	*Suncus lixus*	Least Concern	Data Deficient	Not listed
Lesser Dwarf Shrew	*Suncus varilla*	Least Concern	Data Deficient	Not listed
Common Duiker	***Sylvicapra grimmia***	**Least Concern**	**Least Concern**	**Not listed**
Buffalo	*Syncerus caffer*	Least Concern	Least Concern	Not listed
Egyptian Free-tailed Bat	*Tadarida aegyptiaca*	Least Concern	Least Concern	Not listed
Mauritian Tomb Bat	*Taphozous mauritianus*	Least Concern	Least Concern	Not listed
Highveld Gerbil	*Tatera brantsii*	Least Concern	Least Concern	Not listed
Bushveld Gerbil	*Tatera leucogaster*	Least Concern	Data Deficient	Not listed
Common Eland	*Taurotragus oryx*	Least Concern	Least Concern	Not listed
Tree Rat	*Thallomys paedulcus*	Least Concern	Least Concern	Not listed

Common Name	Scientific Name	IUCN Status (Global)	IUCN Status (National)	NEMBA Status
Greater Cane Rat	*Thryonomys swinderianus*	Least Concern	Least Concern	Not listed
Nyala	*Tragelaphus angasii*	Least Concern	Least Concern	Not listed
Bushbuck	*Tragelaphus scriptus*	Least Concern	Least Concern	Not listed
Kudu	***Tragelaphus strepsiceros***	**Least Concern**	**Least Concern**	**Not listed**
Cape Fox	*Vulpes chama*	Least Concern	Least Concern	Protected

Appendix C: Expected (DWE, 2014) and Identified Bird Species

Common Name	Species Name	NEMBA	IUCN
Avocet, Pied	*Recurvirostra avosetta*	LC	LC
Babbler, Arrow-marked	***Turdoides jardineii***	**LC**	**LC**
Babbler, Southern Pied	*Turdoides bicolor*	LC	LC
Barbet, Acacia Pied	***Tricholaema leucomelas***	**LC**	**LC**
Barbet, Black-collared	*Lybius torquatus*	LC	LC
Barbet, Crested	***Trachyphonus vaillantii***	**LC**	**LC**
Bateleur, Bateleur	*Terathopius ecaudatus*	EN	NT
Batis, Chinspot	***Batis molitor***	**LC**	**LC**
Bee-eater, Blue-cheeked	*Merops persicus*	LC	LC
Bee-eater, European	***Merops apiaster***	**LC**	**LC**
Bee-eater, Little	***Merops pusillus***	**LC**	**LC**
Bee-eater, Southern Carmine	*Merops nubicoides*	LC	LC
Bee-eater, Swallow-tailed	*Merops hirundineus*	LC	LC
Bee-eater, White-fronted	*Merops bullockoides*	LC	LC
Bishop, Southern Red	*Euplectes orix*	LC	LC
Boubou, Southern	*Laniarius ferrugineus*	LC	LC
Brubru	***Nilaus afer***	**LC**	**LC**
Buffalo-Weaver, Red-billed	*Bubalornis niger*	LC	LC
Bulbul, Dark-capped	***Pycnonotus tricolor***	**LC**	**LC**
Bunting, Cinnamon-breasted	***Emberiza tahapisi***	**LC**	**LC**
Bunting, Golden-breasted	***Emberiza flaviventris***	**LC**	**LC**
Bunting, Lark-like	*Emberiza impetuani*	LC	LC
Bush-Shrike, Grey-headed	*Malaconotus blanchoti*	LC	LC
Bush-Shrike, Orange-breasted	*Telophorus sulfureopectus*	LC	LC
Bustard, Kori	*Ardeotis kori*	NT	NT
Buzzard, Lizard	*Kaupifalco monogrammicus*	LC	LC
Buzzard, Steppe	*Buteo vulpinus*	LC	LC
Camaroptera, Grey-backed	***Camaroptera brachyura***	**LC**	**LC**
Canary, Black-throated	*Crithagra atrogularis*	LC	LC
Canary, Yellow	*Crithagra flaviventris*	LC	LC
Canary, Yellow-fronted	***Crithagra mozambicus***	**LC**	**LC**

Common Name	Species Name	NEMBA	IUCN
Chat, Anteating	*Myrmecocichla formicivora*	LC	LC
Chat, Familiar	*Cercomela familiaris*	LC	LC
Cisticola, Desert	*Cisticola aridulus*	LC	LC
Cisticola, Levaillant's	*Cisticola tinniens*	LC	LC
Cisticola, Rattling	***Cisticola chiniana***	**LC**	**LC**
Cisticola, Zitting	*Cisticola juncidis*	LC	LC
Cliff-Chat, Mocking	*Thamnolaea cinnamomeiventris*	LC	LC
Coot, Red-knobbed	*Fulica cristata*	LC	LC
Cormorant, Reed	***Phalacrocorax africanus***	**LC**	**LC**
Cormorant, White-breasted	*Phalacrocorax carbo*	LC	LC
Coucal, Burchell's	*Centropus burchellii*	LC	LC
Courser, Temminck's	*Cursorius temminckii*	LC	LC
Crake, Black	*Amaurornis flavirostris*	LC	LC
Crombec, Long-billed	*Sylvietta rufescens*	LC	LC
Crow, Pied	***Corvus albus***	**LC**	**LC**
Cuckoo, African	*Cuculus gularis*	LC	LC
Cuckoo, Black	*Cuculus clamosus*	LC	LC
Cuckoo, Diderick	***Chrysococcyx caprius***	**LC**	**LC**
Cuckoo, Great Spotted	*Clamator glandarius*	LC	LC
Cuckoo, Jacobin	*Clamator jacobinus*	LC	LC
Cuckoo, Klaas's	*Chrysococcyx klaas*	LC	LC
Cuckoo, Levaillant's	*Clamator levaillantii*	LC	LC
Cuckoo, Red-chested	*Cuculus solitarius*	LC	LC
Darter, African	*Anhinga rufa*	LC	LC
Dove, Laughing	***Streptopelia senegalensis***	**LC**	**LC**
Dove, Namaqua	***Oena capensis***	**LC**	**LC**
Dove, Red-eyed	***Streptopelia semitorquata***	**LC**	**LC**
Dove, Rock	*Columba livia*	LC	LC
Drongo, Fork-tailed	***Dicrurus adsimilis***	**LC**	**LC**
Duck, African Black	*Anas sparsa*	LC	LC
Duck, Comb	*Sarkidiornis melanotos*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Duck, Fulvous	*Dendrocygna bicolor*	LC	LC
Duck, Maccoa	*Oxyura maccoa*	NT	NT
Duck, White-backed	*Thalassornis leuconotus*	LC	LC
Duck, White-faced	*Dendrocygna viduata*	LC	LC
Duck, Yellow-billed	*Anas undulata*	LC	LC
Eagle, Martial	*Polemaetus bellicosus*	EN	VU
Eagle, Tawny	*Aquila rapax*	EN	LC
Eagle, Wahlberg's	*Aquila wahlbergi*	LC	LC
Eagle-Owl, Spotted	*Bubo africanus*	LC	LC
Egret, Cattle	***Bubulcus ibis***	**LC**	**LC**
Egret, Great	*Egretta alba*	LC	LC
Egret, Little	*Egretta garzetta*	LC	LC
Egret, Yellow-billed	*Egretta intermedia*	LC	LC
Eremomela, Burnt-necked	*Eremomela usticollis*	LC	LC
Eremomela, Yellow-bellied	*Eremomela icteropygialis*	LC	LC
Falcon, Amur	*Falco amurensis*	LC	LC
Finch, Cuckoo	*Anomalospiza imberbis*	LC	LC
Finch, Cut-throat	*Amadina fasciata*	LC	LC
Finch, Red-headed	*Amadina erythrocephala*	LC	LC
Finch, Scaly-feathered	***Sporopipes squamifrons***	**LC**	**LC**
Firefinch, Jameson's	*Lagonosticta rhodopareia*	LC	LC
Firefinch, Red-billed	***Lagonosticta senegala***	**LC**	**LC**
Fiscal, Common	*Lanius collaris*	LC	LC
Fish-Eagle, African	*Haliaeetus vocifer*	LC	LC
Flamingo, Greater	*Phoenicopterus ruber*	NT	LC
Flamingo, Lesser	*Phoenicopterus minor*	NT	NT
Flycatcher, Fiscal	*Sigelus silens*	LC	LC
Flycatcher, Marico	*Bradornis mariquensis*	LC	LC
Flycatcher, Southern Black	*Melaenornis pammelaina*	LC	LC
Flycatcher, Spotted	***Muscicapa striata***	**LC**	**LC**
Francolin, Coqui	*Peliperdix coqui*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Francolin, Crested	***Dendroperdix sephaena***	**LC**	**LC**
Go-away-bird, Grey	***Corythaixoides concolor***	**LC**	**LC**
Goose, Egyptian	***Alopochen aegyptiacus***	**LC**	**LC**
Goose, Spur-winged	*Plectropterus gambensis*	LC	LC
Goshawk, Gabar	*Melierax gabar*	LC	LC
Goshawk, Southern Pale Chanting	*Melierax canorus*	LC	LC
Grebe, Little	*Tachybaptus ruficollis*	LC	LC
Green-Pigeon, African	*Treron calvus*	LC	LC
Greenbul, Yellow-bellied	*Chlorocichla flaviventris*	LC	LC
Greenshank, Common	*Tringa nebularia*	LC	LC
Guineafowl, Helmeted	***Numida meleagris***	**LC**	**LC**
Gull, Grey-headed	*Larus cirrocephalus*	LC	LC
Hamerkop, Hamerkop	*Scopus umbretta*	LC	LC
Harrier, Montagu's	*Circus pygargus*	LC	LC
Harrier-Hawk, African	*Polyboroides typus*	LC	LC
Hawk-Eagle, African	***Aquila spilogaster***	**LC**	**LC**
Helmet-Shrike, White-crested	***Prionops plumatus***	**LC**	**LC**
Heron, Black-headed	*Ardea melanocephala*	LC	LC
Heron, Goliath	*Ardea goliath*	LC	LC
Heron, Green-backed	*Butorides striata*	LC	LC
Heron, Grey	*Ardea cinerea*	LC	LC
Heron, Purple	*Ardea purpurea*	LC	LC
Heron, Squacco	*Ardeola ralloides*	LC	LC
Honeyguide, Greater	***Indicator indicator***	**LC**	**LC**
Honeyguide, Lesser	*Indicator minor*	LC	LC
Hoopoe, African	***Upupa africana***	**LC**	**LC**
Hornbill, African Grey	***Tockus nasutus***	**LC**	**LC**
Hornbill, Red-billed	***Tockus erythrorhynchus***	**LC**	**LC**
Hornbill, Southern Yellow-billed	***Tockus leucomelas***	**LC**	**LC**
House-Martin, Common	*Delichon urbicum*	LC	LC
Ibis, African Sacred	*Threskiornis aethiopicus*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Ibis, Glossy	*Plegadis falcinellus*	LC	LC
Ibis, Hadeda	***Bostrychia hagedash***	**LC**	**LC**
Indigobird, Village	*Vidua chalybeata*	LC	LC
Jacana, African	*Actophilornis africanus*	LC	LC
Kestrel, Rock	*Falco rupicolus*	LC	LC
Kingfisher, Brown-hooded	***Halcyon albiventris***	**LC**	**LC**
Kingfisher, Giant	*Megaceryle maximus*	LC	LC
Kingfisher, Malachite	*Alcedo cristata*	LC	LC
Kingfisher, Pied	*Ceryle rudis*	LC	LC
Kingfisher, Striped	*Halcyon chelicuti*	LC	LC
Kingfisher, Woodland	*Halcyon senegalensis*	LC	LC
Kite, Black & Yellowbilled	*Milvus migrans*	LC	LC
Kite, Black-shouldered	***Elanus caeruleus***	**LC**	**LC**
Kite, Yellow-billed	*Milvus aegyptius*	LC	LC
Korhaan, Northern Black	*Afrotis afraoides*	LC	LC
Korhaan, Red-crested	***Lophotis ruficrista***	**LC**	**LC**
Lapwing, African Wattled	*Vanellus senegallus*	LC	LC
Lapwing, Blacksmith	*Vanellus armatus*	LC	LC
Lapwing, Crowned	***Vanellus coronatus***	**LC**	**LC**
Lark, Fawn-coloured	*Calendulauda africanoides*	NT	LC
Lark, Monotonous	*Mirafra passerina*	LC	LC
Lark, Red-capped	*Calandrella cinerea*	LC	LC
Lark, Rufous-naped	*Mirafra africana*	LC	LC
Lark, Sabota	***Calendulauda sabota***	**LC**	**LC**
Mannikin, Bronze	*Spermestes cucullatus*	LC	LC
Martin, Brown-throated	*Riparia paludicola*	LC	LC
Martin, Rock	*Hirundo fuligula*	LC	LC
Martin, Sand	*Riparia riparia*	LC	LC
Masked-Weaver, Lesser	*Ploceus intermedius*	LC	LC
Masked-Weaver, Southern	*Ploceus velatus*	LC	LC
Moorhen, Common	*Gallinula chloropus*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Mousebird, Red-faced	***Urocolius indicus***	**LC**	**LC**
Mousebird, Speckled	*Colius striatus*	LC	LC
Myna, Common	***Acridotheres tristis***	**LC**	**LC**
Neddicky, Neddicky	***Cisticola fulvicapilla***	**LC**	**LC**
Nightjar, Fiery-necked	*Caprimulgus pectoralis*	LC	LC
Oriole, Black-headed	***Oriolus larvatus***	**LC**	**LC**
Oriole, Eurasian Golden	*Oriolus oriolus*	LC	LC
Owl, Barn	*Tyto alba*	LC	LC
Owlet, Pearl-spotted	***Glaucidium perlatum***	**LC**	**LC**
Oxpecker, Red-billed	***Buphagus erythrorhynchus***	**NT**	**NT**
Palm-Swift, African	***Cypsiurus parvus***	**LC**	**LC**
Paradise-Flycatcher, African	*Terpsiphone viridis*	LC	LC
Paradise-Whydah, Long-tailed	*Vidua paradisaea*	LC	LC
Parrot, Meyer's	***Poicephalus meyeri***	**LC**	**LC**
Penduline-Tit, Cape	*Anthoscopus minutus*	LC	LC
Petronia, Yellow-throated	***Petronia superciliaris***	**LC**	**LC**
Pigeon, Speckled	*Columba guinea*	LC	LC
Pipit, African	*Anthus cinnamomeus*	LC	LC
Pipit, Bushveld	*Anthus caffer*	LC	LC
Pipit, Long-billed	*Anthus similis*	LC	LC
Plover, Kittlitz's	*Charadrius pecuarius*	LC	LC
Plover, Three-banded	*Charadrius tricollaris*	LC	LC
Pochard, Southern	*Netta erythrophthalma*	LC	LC
Pratincole, Black-winged	*Glareola nordmanni*	LC	LC
Prinia, Black-chested	*Prinia flavicans*	LC	LC
Prinia, Tawny-flanked	***Prinia subflava***	**LC**	**LC**
Puffback, Black-backed	***Dryoscopus cubla***	**LC**	**LC**
Pygmy-Kingfisher, African	*Ispidina picta*	LC	LC
Pytilia, Green-winged	***Pytilia melba***	**LC**	**LC**
Quail, Common	*Coturnix coturnix*	LC	LC
Quail, Harlequin	*Coturnix delegorguei*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Quailfinch, African	*Ortygospiza atricollis*	LC	LC
Quelea, Red-billed	***Quelea quelea***	**LC**	**LC**
Reed-Warbler, African	*Acrocephalus baeticatus*	LC	LC
Robin-Chat, Cape	*Cossypha caffra*	LC	LC
Robin-Chat, White-throated	*Cossypha humeralis*	LC	LC
Roller, European	***Coracias garrulus***	**NT**	**NT**
Roller, Lilac-breasted	***Coracias caudatus***	**LC**	**LC**
Roller, Purple	*Coracias naevius*	LC	LC
Ruff	*Philomachus pugnax*	LC	LC
Rush-Warbler, Little	*Bradypterus baboecala*	LC	LC
Sandgrouse, Burchell's	*Pterocles burchelli*	LC	LC
Sandgrouse, Double-banded	*Pterocles bicinctus*	LC	LC
Sandpiper, Common	***Actitis hypoleucos***	**LC**	**LC**
Sandpiper, Marsh	*Tringa stagnatilis*	LC	LC
Sandpiper, Wood	*Tringa glareola*	LC	LC
Scimitarbill, Common	***Rhinopomastus cyanomelas***	**LC**	**LC**
Scops-Owl, African	*Otus senegalensis*	LC	LC
Scrub-Robin, Kalahari	*Cercotrichas paena*	LC	LC
Scrub-Robin, White-browed	*Cercotrichas leucophrys*	LC	LC
Secretarybird, Secretarybird	*Sagittarius serpentarius*	VU	VU
Shoveler, Cape	*Anas smithii*	LC	LC
Shrike, Crimson-breasted	***Laniarius atrococcineus***	**LC**	**LC**
Shrike, Lesser Grey	***Lanius minor***	**LC**	**LC**
Shrike, Magpie	***Corvinella melanoleuca***	**LC**	**LC**
Shrike, Red-backed	***Lanius collurio***	**LC**	**LC**
Shrike, Southern White-crowned	*Eurocephalus anguitimens*	LC	LC
Snake-Eagle, Black-chested	*Circaetus pectoralis*	LC	LC
Snake-Eagle, Brown	*Circaetus cinereus*	LC	LC
Snipe, African	*Gallinago nigripennis*	LC	LC
Sparrow, Cape	*Passer melanurus*	LC	LC
Sparrow, Great	*Passer motitensis*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Sparrow, House	***Passer domesticus***	**LC**	**LC**
Sparrow, Southern Grey-headed	***Passer diffusus***	**LC**	**LC**
Sparrow-Weaver, White-browed	***Plocepasser mahali***	**LC**	**LC**
Sparrowhawk, Little	*Accipiter minullus*	LC	LC
Sparrowhawk, Ovambo	*Accipiter ovampensis*	LC	LC
Sparrowlark, Chestnut-backed	*Eremopterix leucotis*	LC	LC
Sparrowlark, Grey-backed	*Eremopterix verticalis*	LC	LC
Spoonbill, African	*Platalea alba*	LC	LC
Spurfowl, Natal	***Pternistis natalensis***	**LC**	**LC**
Spurfowl, Swainson's	***Pternistis swainsonii***	**LC**	**LC**
Starling, Burchell's	***Lamprotornis australis***	**LC**	**LC**
Starling, Cape Glossy	***Lamprotornis nitens***	**LC**	**LC**
Starling, Greater Blue-eared	*Lamprotornis chalybaeus*	LC	LC
Starling, Red-winged	***Onychognathus morio***	**LC**	**LC**
Starling, Violet-backed	*Cinnyricinclus leucogaster*	LC	LC
Starling, Wattled	***Creatophora cinerea***	**LC**	**LC**
Stilt, Black-winged	*Himantopus himantopus*	LC	LC
Stint, Little	*Calidris minuta*	LC	LC
Stonechat, African	*Saxicola torquatus*	LC	LC
Stork, Abdim's	*Ciconia abdimii*	NT	LC
Stork, Black	*Ciconia nigra*	VU	LC
Stork, Marabou	*Leptoptilos crumeniferus*	NT	LC
Stork, White	*Ciconia ciconia*	LC	LC
Stork, Yellow-billed	*Mycteria ibis*	EN	LC
Sunbird, Amethyst	*Chalcomitra amethystina*	LC	LC
Sunbird, Marico	***Cinnyris mariquensis***	**LC**	**LC**
Sunbird, White-bellied	*Cinnyris talatala*	LC	LC
Swallow, Barn	*Hirundo rustica*	LC	LC
Swallow, Greater Striped	*Hirundo cucullata*	LC	LC
Swallow, Lesser Striped	***Hirundo abyssinica***	**LC**	**LC**
Swallow, Pearl-breasted	*Hirundo dimidiata*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Swallow, Red-breasted	*Hirundo semirufa*	LC	LC
Swallow, White-throated	*Hirundo albigularis*	LC	LC
Swamp-Warbler, Lesser	*Acrocephalus gracilirostris*	LC	LC
Swift, African Black	*Apus barbatus*	LC	LC
Swift, Alpine	*Tachymarptis melba*	LC	LC
Swift, Common	*Apus apus*	LC	LC
Swift, Little	*Apus affinis*	LC	LC
Swift, White-rumped	*Apus caffer*	LC	LC
Tchagra, Black-crowned	*Tchagra senegalus*	LC	LC
Tchagra, Brown-crowned	*Tchagra australis*	LC	LC
Teal, Cape	*Anas capensis*	LC	LC
Teal, Hottentot	*Anas hottentota*	LC	LC
Teal, Red-billed	*Anas erythrorhyncha*	LC	LC
Tern, White-winged	*Chlidonias leucopterus*	LC	LC
Thick-knee, Spotted	*Burhinus capensis*	LC	LC
Thick-knee, Water	*Burhinus vermiculatus*	LC	LC
Thrush, Groundscraper	*Psophocichla litsipsirupa*	LC	LC
Thrush, Kurrichane	*Turdus libonyanus*	LC	LC
Tinkerbird, Yellow-fronted	*Pogoniulus chrysoconus*	LC	LC
Tit, Ashy	*Parus cinerascens*	LC	LC
Tit, Southern Black	*Parus niger*	LC	LC
Tit-Babbler, Chestnut-vented	***Parisoma subcaeruleum***	**LC**	**LC**
Tit-Flycatcher, Grey	*Myioparus plumbeus*	LC	LC
Turtle-Dove, Cape	***Streptopelia capicola***	**LC**	**LC**
Vulture, Cape	*Gyps coprotheres*	EN	VU
Vulture, White-backed	*Gyps africanus*	EN	EN
Wagtail, African Pied	*Motacilla aguimp*	LC	LC
Wagtail, Cape	***Motacilla capensis***	**LC**	**LC**
Warbler, Icterine	*Hippolais icterina*	LC	LC
Warbler, Marsh	*Acrocephalus palustris*	LC	LC
Warbler, Willow	*Phylloscopus trochilus*	LC	LC

Common Name	Species Name	NEMBA	IUCN
Waxbill, Black-faced	***Estrilda erythronotos***	**LC**	**LC**
Waxbill, Blue	***Uraeginthus angolensis***	**LC**	**LC**
Waxbill, Common	*Estrilda astrild*	LC	LC
Waxbill, Orange-breasted	*Amandava subflava*	LC	LC
Waxbill, Violet-eared	***Granatina granatina***	**LC**	**LC**
Weaver, Village	***Ploceus cucullatus***	**LC**	**LC**
Wheatear, Capped	*Oenanthe pileata*	LC	LC
White-eye, Cape	*Zosterops virens*	LC	LC
Whydah, Pin-tailed	*Vidua macroura*	LC	LC
Whydah, Shaft-tailed	***Vidua regia***	**LC**	**LC**
Widowbird, Red-collared	*Euplectes ardens*	LC	LC
Widowbird, White-winged	*Euplectes albonotatus*	LC	LC
Wood-Dove, Emerald-spotted	***Turtur chalcospilos***	**LC**	**LC**
Wood-Hoopoe, Green	*Phoeniculus purpureus*	LC	LC
Woodpecker, Bearded	***Dendropicos namaquus***	**LC**	**LC**
Woodpecker, Bennett's	*Campethera bennettii*	LC	LC
Woodpecker, Cardinal	***Dendropicos fuscescens***	**LC**	**LC**
Woodpecker, Golden-tailed	*Campethera abingoni*	LC	LC
Wren-Warbler, Barred	***Calamonastes fasciolatus***	**LC**	**LC**

Appendix D: Expected (DWE, 2014) and Identified Herpetofauna

Scientific name	Common name	Distribution within Limpopo
Acanthocercus atricollis	Southern Tree Agama	Limited
Acontias percivali	Percival's Legless Skink	Narrow
Acontias plumbeus	Giant Legless Skink	Limited
Agama aculeata	Ground Agama	Wide
Agama armata	Peter's Ground Agama	Wide
Agama atra	Southern Rock Agama	Limited
Amblyodipsas concolor	Natal Purple glossed Snake	Narrow
Amblyodipsas polylepis	Common Purple glossed Snake	Wide
Aparallactus capensis	Cape Centipede Eater	Wide
Aspidelaps scutatus	Shield nose Snake	Limited
Bitis arietans	Puff Adder	Wide
Causus defilippii	Snouted Night Adder	Limited
Causus rhombeatus	Common Night Adder	Wide
Chamaeleo dilepsis	Flap neck Chameleon	Wide
Cordylus breyeri	Waterberg Girdled Lizard	Narrow
Cordylus tropidosternum	Tropical Girdled Lizard	Limited
Cordylus vandami	Van Dam's Girdled Lizard	Narrow
Cordylus vittifer	Transvaal Girdled Lizard	Wide
Crotaphopeltis hotamboeia	Herald Snake	Wide
Dalophia pistillum	Blunt tailed Worm Lizard	Narrow
Dasypeltis scabra	Common Egg eater	Wide
Dendroaspis polylepsis	Black Mamba	Limited
Dispholidus typus	Boomslang	Wide
Duberria lutrix	Common Slug eater	Wide
Elapsoidea boulengeri	Boulenger's Garter Snake	Limited
Elapsoidea sunderwallii	Sundervall's Garter Snake	Wide
Geochelone pardalis	Leopard Tortoise	Wide
Gerrhosaurus flavigularis	Yellow throated Plated Lizard	Wide
Gerrhosaurus major	Roughscaled Plated Lizard	Limited
Gerrhosaurus nigrolineatus	Black lined Plated Lizard	Limited L
Gerrhosaurus validus	Giant Plated Lizard	Limited

Scientific name	Common name	Distribution within Limpopo
Hemachatus haemachatus	Rinkhals	Limited
Hemidactylus mabouia	Moreau's Tropical House Gecko	Wide
Homopholis wahlbergii	Wahlberg's Velvet Gecko	Limited
Homoroselaps lacteus	Spotted Harlequin Snake	Limited
Ichnotropis capensis	Cape Rough scaled Lizard	Limited
Ichnotropis squamulosa	Common Rough scaled Lizard	Wide
Kinixys lobatsiana	Lobatse Hinged Tortoise	Limited
Kinixys spekii	Speke's Hinged Tortoise	Limited
Lamprophis aurora	Aurora House Snake	Wide
Lamprophis fuliginosus	Brown House Snake	Wide
Lamprophis guttatus	Spotted House Snake	Limited
Lamprophis inornatus	Olive House Snake	Limited
Leptotyphlops conjunctus	Cape Thread Snake	Limited
Leptotyphlops longicaudus	Long tailed Thread Snake	Limited
Leptotyphlops scutifrons	Peters' Thread Snake	Wide
Lycodonomorphus rufulus	Common Brown Water Snake	Wide
Lycophidion capense	Cape Wolf Snake	Wide
Lycophidion variegatum	Variegated Wolf Snake	Limited
Lygodactylus capensis	Cape Dwarf Gecko	Wide
Lygosoma sundervallii	Sundervall's Writhing Skink	Limited
Mabuya capensis	Cape Skink	Wide
Mabuya striata	Striped Skink	Wide
Mabuya varia	Variable Skink	Wide
Mehelya capensis	Cape File Snake	Wide
Mehelya nyassae	Black File Snake	Wide
Monopeltis infuscata	Dusky Spade snouted Worm Lizard	Wide
Naja annulifera	Snouted Cobra	Limited
Naja mossambica	Mozambique Spitting Cobra	Wide
Nucras holubi	Holub's Sandveld Lizard	Wide
Nucras intertexta	Spotted Sandveld Lizard	Wide
Nucras ornata	Ornate Sandveld Lizard	Wide

Scientific name	Common name	Distribution within Limpopo
Pachydactylus punctatus	Speckled Thicktoed Gecko	Limited
Pachydactylus turneri	Turner's Thicktoed Gecko	Limited
Panaspis sp.	Spotted neck Snake-eyed Skink	Limited
Panaspis wahlbergii	Wahlberg's Snake-eyed Skink	Wide
Pedioplanis lineoocellata	Spotted Sand Lizard	Limited
Pelomedusa subrufa	Marsh or Helmeted Terrapin	Wide
Pelusios sinuatus	Serrated Hinged Terrapin	Limited
Philothamnus hoplogaster	Green Water Snake	Wide
Philothamnus natalensis	Eastern Green Snake	Limited
Philothamnus semivariegatus	Spotted Bush Snake	Wide
Prosymna bivittata	Twostriped Shovelsnout	Limited
Prosymna sundervallii	Sundervall's Shovelsnout	Limited
Psammophis brevirostris	Shortsnouted Grass Snake	Wide
Psammophis crucifer	Cross marked Grass Snake	Limited
Psammophis mossambicus	Olive Grass Snake	Wide
Psammophis subtaeniatus	Stripe bellied Sand Snake	Limited
Psammophylax rhombeatus	Rhombic Skaapsteker	Wide
Psammophylax tritaeniatus	Striped Skaapsteker	Wide
Pseudaspis cana	Mole Snake	Wide
Python natalensis	Southern African Python	Wide
Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	Wide
Telescopus semiannulatus	Eastern Tiger Snake	Wide
Thelotornis capensis	Vine Snake	Limited
Typhlops bibronii	Bibron's Blind Snake	Wide
Varanus albigularis	Rock Monitor	Wide
Varanus niloticus	Water Monitor	Wide