TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

FOR MATERIAL STOCKPILE ON PORTION 240 OF THE FARM ZWARTKOP 356 JR, CITY OF TSHWANE, GAUTENG PROVINCE

DOCUMENT CONTROL

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BACKGROUND AND EXECUTIVE SUMMARY

MORA Ecological Services (Pty) Ltd was appointed by Greenmined Environmental on to conduct a terrestrial biodiversity impact assessment for the proposed stockpile and selling of materials on Portion 240 of the Farm Zwartkop 356 JR, City of Tshwane, Gauteng Province.

The study site was investigated to determine potential impacts on the immediate natural environment. Survey methodology included a comprehensive desktop review, utilising available provincial ecological data, relevant literature, SANBI BGIS databases, topographical maps, and aerial photography. This was then supplemented through a ground-truthing phase, where the site was visited during a field survey in October 2022. This allowed for the assessment of the habitat integrity and status of the vegetation that was identified during the desktop review.

Floral features:

The study site falls within the Grassland biome, and the vegetation type typically found on site is Carletonville Dolomite Grassland. No species of Conservation Concern were observed on site. The vegetation within the site has been transformed, and few representatives remain. In addition, transformation has resulted in an invasion of alien plants.

Faunal features:

The birds, mammals and reptiles were surveyed through direct method. Although no mammal and reptile species were observed during the survey, observations were made of five bird species which were recorded, and these were generalist species. From the direct survey conducted, no species of Conservation Concern were observed.

Conclusions and Recommendations:

The project area has a low ecological function due to previous mining activities that have transformed the habitats. It is recommended that an Alien Management Plan is compiled prior to operations and implemented during operations.

From the survey conducted, there are no evident fatal flaws that would prevent this application from being authorised, nor being conducted in a sustainable manner.

TABLE OF CONTENTS

List of tables

List of figures

DECLARATION OF INDEPENDENCE

I, Mokgatla Molepo, in my capacity as a lead specialist consultant, hereby declare that I:

- Act/acted as an independent specialist to Greenmined Environmental for this project.
- Do not have any personal, business or financial interest in the project expect for financial remuneration for specialist investigations completed in a professional capacity as specified by the Environmental Impact Assessment Regulations, 2017.
- Will not be affected by the outcome of the environmental process, of which this report forms part of.
- Do not have any influence over the decisions made by the governing authorities.
- Do not object to or endorse the proposed developments but aim to present facts and my best scientific and professional opinion regarding the impacts of the development.
- Undertake to disclose to the relevant authorities any information that has or may have the potential to influence its decision or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2017.

INDEMNITY

- This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken.
- This report is based on a desktop investigation using available information and data related to the site to be affected, *in situ* fieldwork, surveys and assessments and the specialists best scientific and professional knowledge.
- The Precautionary Principle has been applied throughout this investigation.
- The findings, results, observations, conclusions and recommendations given in this report are based on the specialist's best scientific and professional knowledge as well as information available at the time of study.
- Additional information may become known or available during a later stage of the process for which no allowance could have been made at the time of this report.
- The specialist reserves the right to modify this report, recommendations and conclusions at any stage should additional information become available.
- Information and recommendations in this report cannot be applied to any other area without proper investigation.
- This report, in its entirety or any portion thereof, may not be altered in any manner or form or for any purpose without the specific and written consent of the specialist as specified above.
- Acceptance of this report, in any physical or digital form, serves to confirm acknowledgement of these terms and liabilities.

Mokgatla Molepo *Pr. Nat. Sci* (009509)

06 October 2022

1. INTRODUCTION

Humans alter their environment to suit their needs, to improve their quality of life, and to encourage economic growth. Generally, it is now accepted that development should be planned to make the best possible use of natural resources and to avoid degradation of the environment. Hence the need to pay explicit attention to environmental factors in the decision-making process. This should entail an accurate prediction and assessment of the impact of any development on the environment. It is essential for such assessment procedures to be developed alongside development planning, with the necessary mitigation that could inform development projects to conserve the natural environment.

Lomeza Mining Services (Pty) Ltd (Lomeza) intends to stockpile and sell materials on a site which was previously used for mining purposes (Greenmined Environmental, 2022). To apply for the Environmental Authorisation (EA), Lomeza appointed Greenmined Environmental as the Environmental Assessment Practitioner to undertake the application process. Due to the site falling within sensitive habitats, according to Gauteng Conservation Plan, 2013 and Department of Foresrty, Fisheries and Environment (DFFE) Screening Tool, MORA Ecological Services (Pty) Ltd was appointed by Lomeza to undertake terrestrial biodiversity impact assessment for the proposed stockpile and selling of materials on Portion 240 of the Farm Zwartkop 356 JR, City of Tshwane, Gauteng Province. (Fig. 1). The site is located in Pretoria West and was accessed via R55 towards Centurion.

Figure 1: Location of the study site.

2. TERMS OF REFERENCES

- The study included the following activities:
- Provide a broad-scale map of the vegetation of the proposed site.
- A description of the dominant and characteristic species within the broad-scale plant communities.
- Provide a list of red data plant and animal species previously recorded within the study site, and information obtained from the relevant authorities and literature reviews.
- Identification of sensitive habitats and plant communities.
- Preliminary investigation of the impacts of the project and the provision of recommended mitigation measures; and
- Recommend practical mitigation measures to minimize or eliminate negative impacts and or enhance potential project benefits.

2.1. Objectives of this study

- To provide a description of the flora and fauna occurring around the proposed project area.
- To provide description of any threatened species occurring or likely to occur within the study area in terms of the National Red List Status (SANBI, 2012) and Red Data List (IUCN, 2018) specifying species that are either: rare, threatened, endangered, or critically endangered.
- Determine conservation priory areas according to authorised Critical Biodiversity Areas (CBAs).
- To describe the available habitats on the study site including areas of important conservation value.
- Identify and assess the potential impacts associated with a proposed development.

2.2. Assumptions, Limitations, Uncertainties, and Gap analysis

- The findings, results, observations, conclusions, and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the perceived impacts on terrestrial environment.
- A description of vegetation was based on the physical field surveys and site walkthrough and investigations as performed on site.
- Results presented in this report are based on a snapshot investigation of the study site and not on detailed and long-term investigations of all environmental attributes and the varying degrees of biological diversity that may be present in the study site.
- The assessment of impacts and recommendation of mitigation measures were informed by the site-specific ecological issues arising from the field survey and based on the assessor's working knowledge and experience with similar projects**.**

3. SURVEY METHODS AND REPORTING

Climate

The climate is classified as warm and temperate. In winter, there is much less rainfall than in summer. This climate is considered to be Cwb according to the Köppen-Geiger climate classification. The average annual temperature is 16.3 °C. About 755 mm of precipitation falls annually.

Biophysical Environment

Vegetation of the study site

Floral diversity was determined by walkthroughs around the project area. The vegetation units of Mucina and Rutherford (2006) were used as references but where necessary communities are named according to the recommendations of a standardised South African Syntaxonomic nomenclature system. By combining the available literature with the survey results, stratification of vegetation communities was possible.

The study site is covered predominantly by open grassland with a patch of woody tree species. This type of vegetation has the potential to support a variety of faunal species including birds, but surrounding human activities seem to be a limiting factor.

The site falls within Grassland Biome and the vegetation type is Carletonville Dolomite Grassland. The vegetation type is explained below.

Distribution

This vegetation is found in North-West (mainly) and Gauteng and marginally into the Free State Province: In the region of Potchefstroom, Ventersdorp and Carletonville, extending westwards to the vicinity of Ottoshoop, but also occurring as far east as Centurion and Bapsfontein in Gauteng Province. It occurs on a varying altitude ranging between 1360-1620 m a.s.l (Bredenkamp & van Rooyen, 1996).

Vegetation & Landscape Features:

Moderately undulating plains and low hills supporting tall, usually *Hyparrhenia hirta* dominated grassland, with some woody species on rocky outcrops or rock sheets. The rocky habitats show a high diversity of woody species, which occur in the form of scattered shrub groups or solitary small trees.

Geology & Soils:

Dolomite and chert of the Malmani Subgroup (Transvaal Supergroup) supporting mostly shallow Mispah and Glenrosa soil forms typical of the Fa land type, dominating the landscapes of this unit. Deeper red to yellow apedal soils (Hutton and Clovelly forms) occur sporadically, representing the Ab land type.

Figure 2: Vegetation of the study site.

4. LEGAL REQUIREMENTS

4.1. RELEVANT LEGISLATION

The Constitution of the Republic of South Africa Act (Act No. 108 of 1996) – Section 24.

The Constitution is South Africa's overarching law. It prescribes minimum standards with which existing and new laws must comply. Chapter 2 of the Constitution contains the Bill of Rights in which basic human rights are enshrined. Government's commitment to give effect to the environmental rights enshrined in the Constitution is evident from the enactment of various pieces of environmental legislation since 1996, including the National Water Act, the National Environmental Management Act, etc.

The Constitution deals with the environment in Section 24 and proclaims the right of everyone—

(a) To an environment that is not harmful to their health or well-being; and

(b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—

(i) Prevent pollution and ecological degradation.

(ii) Promote conservation; and

(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management Act (Act No. 107 of 1998) (NEMA), as amended.

NEMA replaces a number of the provisions of the Environment Conservation Act, 1989 (Act No. 73 of 1989). The Act provides for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions. The principles enshrined in NEMA guide the interpretation, administration and implementation of the Act with regards to the protection and / or management of the environment. These principles serve as a framework within which environmental management must be formulated. Section 2(4) specifies that "sustainable development requires the consideration of all relevant factors including aspects specifically relevant to biodiversity":

National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA).

NEMBA provides for the management and conservation of biological diversity and components thereof; the use of indigenous biological resources in a sustainable manner; the fair and equitable sharing of benefits rising from bioprospecting of biological resources; and cooperative governance in biodiversity management and conservation within the framework of NEMA.

National Water Act (Act No. 36 of 1998) (NWA).

The National Water Act (NWA) is a legal framework for the effective and sustainable management of water resources in South Africa. Central to the NWA is recognition that water is a scarce resource in the country which belongs to all the people of South Africa and needs to be managed in a sustainable manner to benefit all members of society. The NWA places a strong emphasis on the protection of water resources in South Africa, especially against its exploitation, and the insurance that there is water for social and economic development in the country for present and future generations.

The National Water Act, requires any development to secure Water Use Licences with the following activities:

Section 21 (a), abstractive use of water for construction (if possible and required).

Section 21 (c) and (i) use, i.e., river or wetland crossings, which includes any drainage lines by any infrastructure.

In terms of the definitions provided, activities included under Sections 21(c) and 21(i) are (amongst others) the construction of roads, bridges, pipelines, culverts and structures for slope stabilisation and erosion protection. DWS will however need to be approached to provide guidance on whether approval for Section 21 (c) and (i) water uses would be required.

GENERAL AUTHORISATION IN TERMS OF SECTION 39 OF THE NWA

According to the preamble to Part 6 of the NWA, “This Part established a procedure to enable a responsible authority, after public consultation, to permit the use of water by publishing general authorisations in the Gazette…” “The use of water under a general authorisation does not require a licence until the general authorisation is revoked, in which case licensing will be necessary…”

The General Authorisations for Section 21 (c) and (i) water uses (impeding or diverting flow or changing the bed, banks or characteristics of a watercourse) as defined under the NWA have recently been revised (Government Notice R509 of 2016). Determining if a water use licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a General Authorisations (GA).

Provincial legislation

In addition to national legislation such as Protected Areas Act No. 57 of 2003, National Environmental Management: Biodiversity Act No. of 2004 and Conservation of Agricultural Resources Act No. 43 of 1983, some of South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution (Act 108 of 1996).

Gauteng Conservation Plan

Gauteng Department of Agriculture and Rural Development initiated a conservation plan which is called, Gauteng Conservation Plan (Gauteng C-Plan v3.3). This Gauteng C-Plan

v3.3 delineates on a map, commonly known as a Critical Biodiversity Areas (CBA), biodiversity priority areas called Critical Biodiversity Areas, Ecological Support Areas and Protected Areas. The map is designed to be used at approximately 1:50 000 scale as the integrated biodiversity input into land use planning and decision making. It is highly recommended that this Gauteng C-Plan be a primary biodiversity consideration in Environmental Impact Assessments (GDARD 2014).

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses.

Ecological Support Areas (ESAs) are terrestrial and aquatic areas that are not essential for meeting biodiversity representation targets (thresholds), but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree or extent of restriction on land use and resource use in these areas may be lower than that recommended for CBAs.

According to the plan, the eastern part of the site falls within ESA (Figure 3). However, the conditions on the ground do not agree with the desktop conservation plan class.

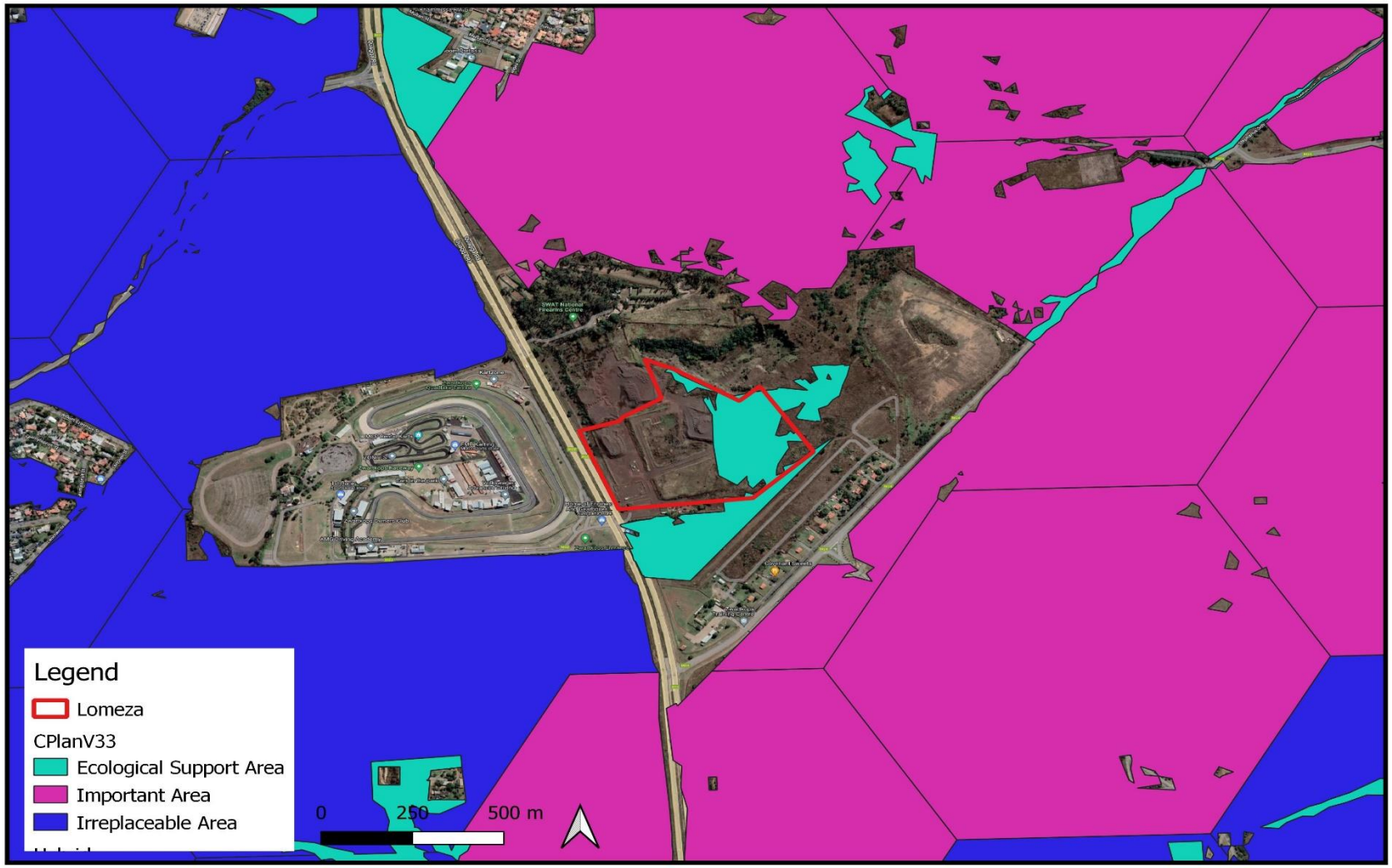

Figure 3: Conservation plan of the study site.

5. METHODOLOGY

Our methodology included both background information search (Desktop) and field survey. Below is the method used in our study for each of the subfields of biodiversity and the limitations encountered:

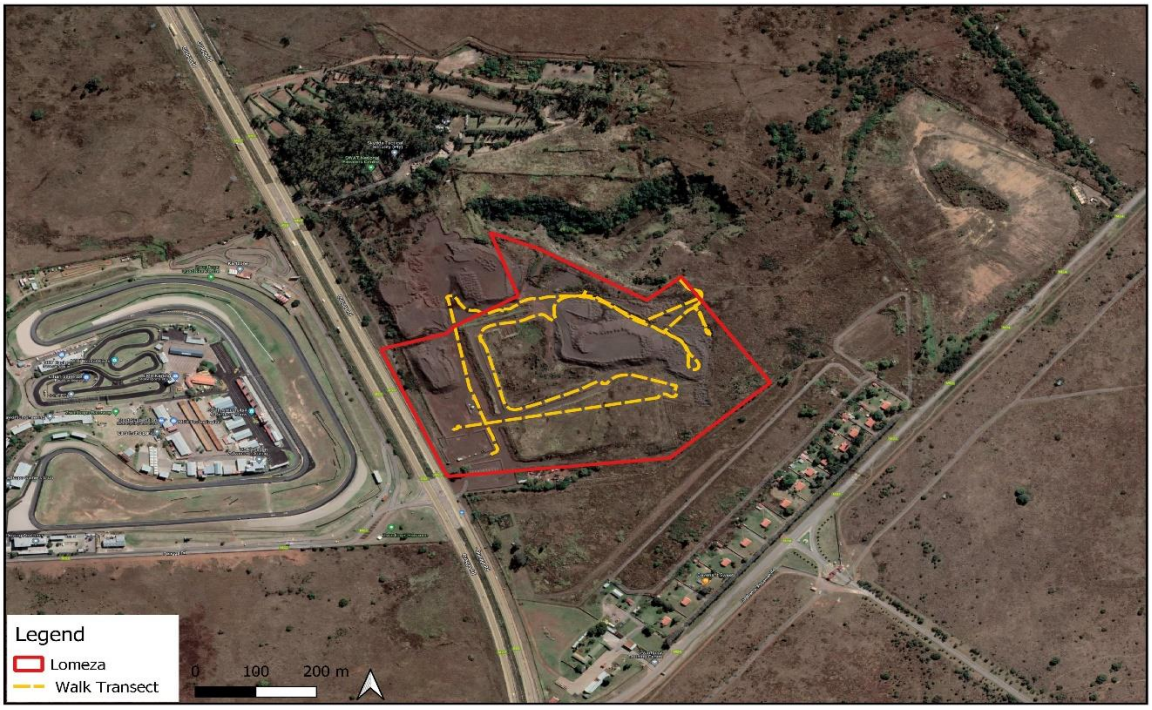

Figure 4: Walk transect conducted within the site.

5.1. Flora Study

Random walkthrough method was used to identify the plants and vegetation structure occurring on the study site. Plants that could not be identified on site were photographed for later identification.

5.2. Fauna Study

Visual observations stand counts and indirect counts method were used to assess the animals occurring on the study site.

Red Data Analysis and Floral Assessment

SANBI NEW POSA was compared to relevant literature detailing Protected and Red Data plant species lists in order to compile a list of Red Data plant species that may potentially occur within the study area. There are no historical floral records around the study area. The status is determined in table 1 below.

Table 1: Red Data Status definitions (SANBI, 2010).

p- protected Species **M- Medicinal species**		
EX	**Extinct**	A taxon is Extinct when there is no reasonable doubt that the last individual has died. Taxa should be listed as extinct only once exhaustive surveys throughout the historic range have failed to record an individual.
EW	**Extinct in the Wild**	A taxon is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.
CR PE	**Critically Endangered (Possibly Extinct**	Critically Endangered (Possibly Extinct) taxa are those that are, on the balance of evidence, likely to be extinct, but for which there is a small chance that they may be extant. Hence, they should not be listed as Extinct until adequate surveys have failed to record the taxon.
CR	**Critically Endangered**	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five IUCN criteria for Critically Endangered and is therefore facing an extremely high risk of extinction in the wild.
EN	**Endangered**	A taxon is Endangered when the best available evidence indicates that it meets any of the five IUCN criteria for Endangered and is therefore facing a very high risk of extinction in the wild.
VU	**Vulnerable**	A taxon is Vulnerable when the best available evidence indicates that it meets any of the five IUCN criteria for Vulnerable and is therefore facing a high risk of extinction in the wild.
NT	**Near Threatened**	A taxon is Near Threatened when available evidence indicates that it nearly meets any of the five IUCN criteria for Vulnerable and is therefore likely to qualify for a threatened category in the near future.
CRITICALLY RARE		A taxon is Critically Rare when it is known to occur only at a single site but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to the five IUCN criteria.
RARE		A taxon is Rare when it meets any of the four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to the five IUCN criteria.
DECLINING		A taxon is Declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes causing a continuing decline in the population.
DDD	**Data Deficient—Insufficient Information**	A taxon is DDD when there is inadequate information to make an assessment of its risk of extinction, but the taxon is well defined. Data Deficient is not a category of threat. However, listing of taxa in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate.
LC	**Least Concern**	A taxon is Least Concern when it has been evaluated against the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, and it is not rare, and the population is not declining.

6. Ecological function

Ecological function relates to the degree of ecological connectivity between systems within a landscape matrix. Therefore, systems with a high degree of landscape connectivity amongst one another are perceived to be more sensitive and will be those contributing to ecosystem service (for example wetlands for water and food) or overall preservation of biodiversity. Conservation importance relates to species diversity, endemism (unique species or unique processes) and the high occurrence of threatened and protected species or ecosystems protected by legislation.

Weeds and Invasive Plants

Alien invasive species

Few alien invasive species were recorded during the field surveys within the actual study site but there were a more species in the surrounding area. Declared weeds and invaders have the tendency to dominate or replace the herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. Therefore, it is important that all these aliens be eradicated and controlled by means of an eradication and monitoring programme. Invader plants degrade ecosystems through superior competitive capabilities to exclude indigenous plant species. Below is a discussion of the four categories of Invasive Alien Plants as per the National Environmental Management Biodiversity Act (NEMBA).

Category 1a: invasive species that may not be owned, imported into South A frica, grown, moved, sold, given as a gift or dumped in a waterway. These species need to be controlled on your property, and officials from the Department of Environmental Affairs must be allowed access to monitor or assist with control.

Category 1b: invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. Category 1b species are major invaders that may need government assistance to remove. All Category 1b species must be contained, and in many cases, they already fall under a government sponsored management programme.

Category 2: These are invasive species that can remain in your garden, but only with a permit, which is granted under very few circumstances.

Category 3: These are invasive species that can remain in your garden. However, you cannot propagate or sell these species and must control them in your garden. In riparian zones or wetlands all Category 3 plants become Category 1b plants.

Sensitivity scale

Prior to conducting fieldwork, the DFFE screening tool was consulted in order to get preliminary site sensitivity. Both plant and animal themes yielded medium sensitivity scales (Fig 5 & 6). However, the overall site is highly sensitive in terms of terrestrial biodiversity (Fig. 7). This is due to the area being within Critical Biodiversity Areas.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

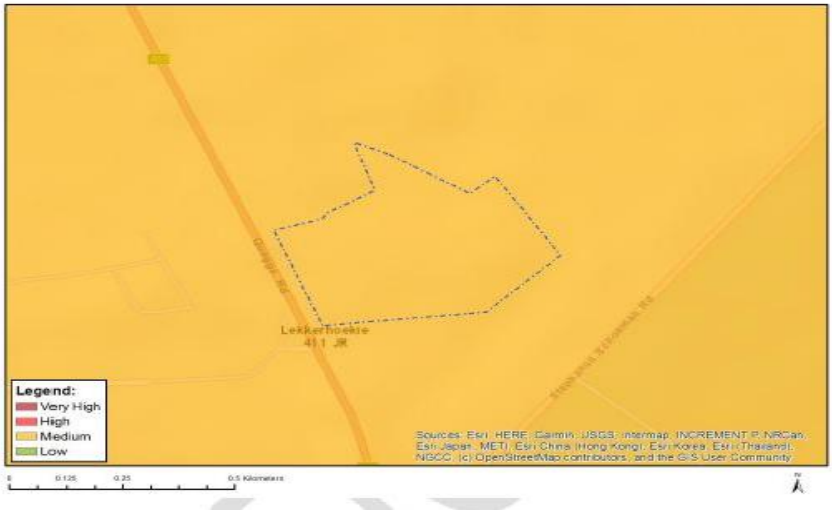

Figure 5: DFFE screening tool outputs for animal species.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

Figure 6: DFFE screening tool outputs for plant species.

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

Figure 7: DFFE screening tool outputs for terrestrial biodiversity.

- ***High ecological function***: Sensitive ecosystems with either low inherent resistance or resilience towards disturbance factors or highly dynamic systems considered to be stable and important for the maintenance of ecosystems integrity for example pristine grasslands, pristine wetlands and pristine ridges.
- ***Medium ecological function***: Relatively important ecosystems at gradients of intermediate disturbances. An area may be considered of medium ecological function if it is directly adjacent to sensitive/pristine ecosystem.
- ***Low ecological function***: Degraded and highly disturbed systems with little or no ecological function.
- ***No Go Areas***: Areas that have irreplaceable biodiversity or important ecosystem function values which may be lost permanently if these ecosystems are transformed, with a high potential of also affecting adjacent and/or downstream ecosystems negatively.

Conservation status of the vegetation

- ***High conservation importance***: Ecosystems with high species richness which usually provide suitable habitat for several threatened species. Usually termed 'no-go' areas and unsuitable for development and should be conserved.
- ***Medium conservation importance***: Ecosystems with intermediate levels of species diversity without any threatened species. Low-density development may be accommodated, provided the current species diversity is conserved.
- ***Low conservation importance***: Areas with little or no conservation potential and usually species poor (most species are usually exotic).

Of the seven sensitive plant species that were obtained from SANBI, none were observed within the site. Therefore, the site was observed to be of **Low Ecological Function with Low Conservation importance** when looking at the sensitivity scale and the conservation status of the vegetation of the area.

7. RESULTS

Biological diversity everywhere is at great risk as a direct result of an ever-expanding human population and its associated needs for energy, water, food and minerals. Landscape transformation that is needed to accommodate these activities inevitably leads to habitat loss and habitat fragmentation, resulting in the mosaical appearance of undisturbed habitat within a matrix of transformed areas. These remaining areas of natural habitat are frequently too small to support the biodiversity that previously occupied the area, and the region loses its ecological integrity (Kamffer 2004). Conservation of the remaining ecosystem is vital and beneficial in the long run. However, the assessment results revealed that the site does not have important plant species that warrant conservation but is relatively in good health.

During the site assessment, no mammals were observed. This is due to the conditions of the site which is highly disturbed. Historical records of species previously recorded around the broader study area are listed in the appendices.

Plants

The vegetation has been exposed to a high level of disturbances. The site is dominated by alien plants, which require interventions through Alien Invasive Management.

Table 2: List of plant species recorded at the study site.

Species	Common Name	Growth Form	IUCN Conservation Status
Vachellia karoo	Sweet Thorn Tree	Tree	Least Concern
Elephantorrhiza elephantina	Dwarf elephant root	Herb	Least Concern
Xerophyte retivernis	Monkey's tail	Shrub	Least Concern
**Melia azedarach*	Syringa	Tree	(Declared Category 1b)
**Lantana camara*	Tick berry	Shrub	(Declared Category 1b)
**Ricinus communis*	Castor oil plant	Shrub	(Declared Category 2)
**Nicotina glauca*	Wild tobacco	Shrub	(Declared Category 1b)
* *Solanum mauritianum*	Bugweed	Shrub	(Declared Category 1b)
**Argemone mexicana*	Yellow-flowered Mexican Poppy	Herb	(Declared Category 1b)
**Eucalyptus camaldulenis*	River Red Gum	Tree	(Declared Category 1b)
Hyparrhenia hirta	Common Thatching Grass	Grass	Least Concern
Melinis repens	Natal Grass	Grass	Least Concern
Themeda triandra	Red Grass	Grass	Least Concern
Aridistida congesta	Tassel Three Awn Grass	Grass	Least Concern
Cynodon dactylon	Couch Grass	Grass	Least Concern

*Alien invasive plant

Castor oil plant

Monkey's tail

Bugweed

Wild tobacco

Birds

Birds are regarded as one of the most useful bioindicators, and they have been used extensively as models to determine ecosystem function (see review Koskimies 1989; Potts et al. 2014; Bregman et al. 2016). High levels of human disturbance as well as habitat transformation and degradation on adjacent areas would result in the disappearance of the more elusive bird species. Very few birds were recorded around the study site (Table 3).

Table 3: List of bird species recorded at the study site.

Species	Common Name	IUCN Conservation Status
Onychognathus morio	Red-winged Starling	LC
Bostrychia hagedash	Hadeda Ibis	LC
Trachybhonus vainnantii	Crested barbet	LC
Numida meleagris	Hemeted Guineafowl	LC
Lanius collaris	Southern Fiscal	LC
Dicrurus adsimilis	Fork-tailed Drongo	LC
Spilopelia senegalensis	Laughing Dove	LC
Streptopelia capicola	Cape Turtle Dove	LC

SENSITIVITY ANALYSIS

Vegetation has been used as a common biological indicator to identify the Present Ecological State (PES) or ecological health of ecosystems, given their overall ability to respond rapidly to disturbance. Conservative plant species are the most affected species given their high conservatism status, high sensitivity, narrow distribution ranges and low tolerance to disturbance, these species are the first to be eradicated in disturbed conditions (Rocchio, 2007).

The sensitivity within the study area was predominantly low due to the severe land transformation within the proposed stockpile area and surroundings.

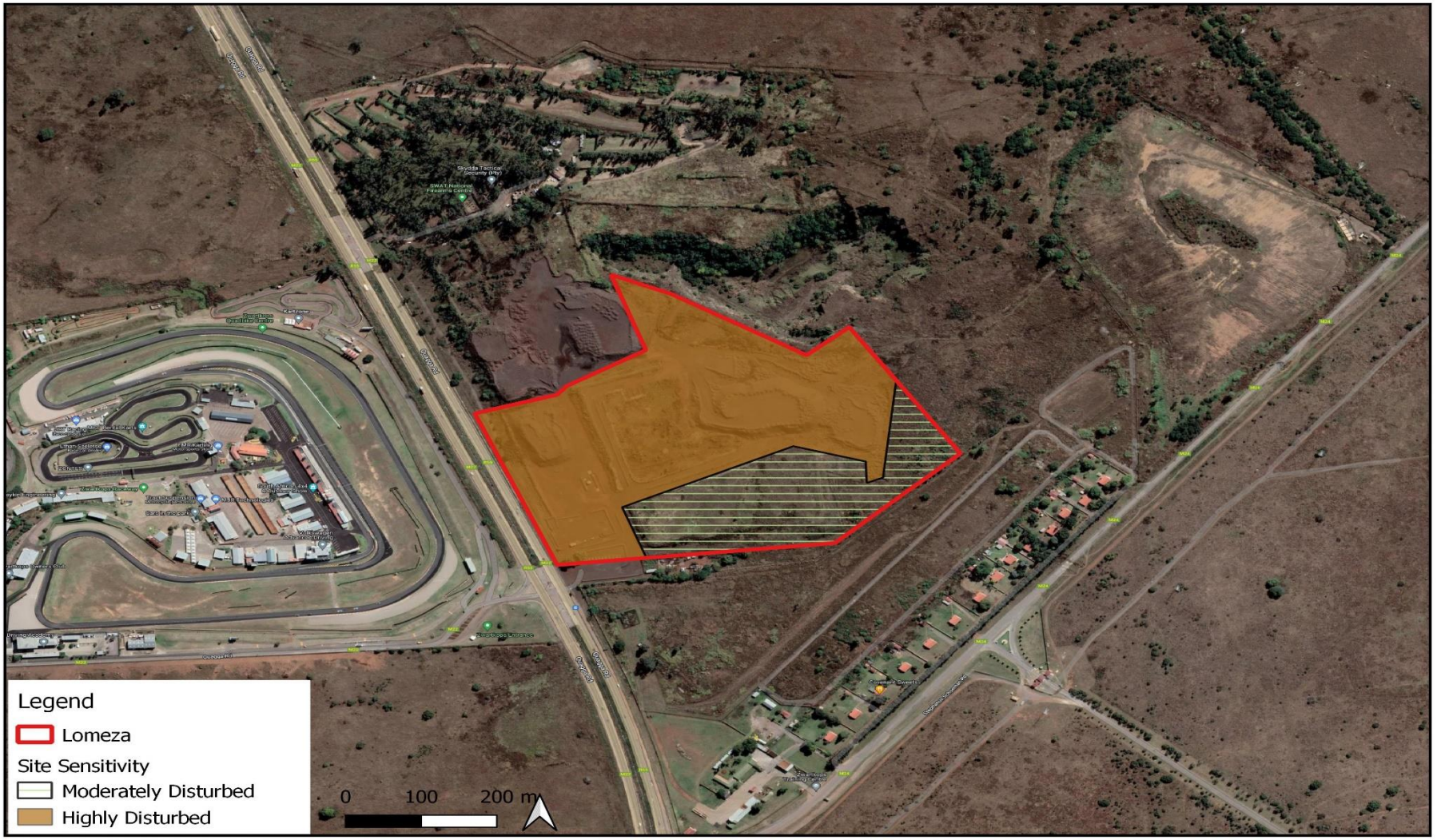

Figure 8: Site sensitivity of the study site.

THE MAIN IMPACTS

- Permanent loss of vegetation on disturbed sites; and
- Introduction and spread of declared weeds and alien invasive plants: This may occur in disturbed areas and/or where propagules of these plants are readily available.

Impact Phase: Operational							
Potential impact description: Introduction of alien invasive plants Cleared areas which are not rehabilitated are likely to be invaded by aliens and pioneer plants.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	H	H	Negative	H	H	H
With Mitigation	L	L	M	Negative	M	M	M
Can the impact be reversed?	Yes. This impact can be prevented through appropriate mitigation measures such as alien eradication.						
Will impact cause irreplaceable loss or resources?	No. If this impact is correctly addressed, then no loss of resources will occur.						
Can impact be avoided, managed or mitigated?	Yes. This impact can be avoided if appropriate mitigation measures are followed.						
Mitigation measures: • Any cleared areas that are no longer or not required for drilling activities should be re-seeded with locally sourced seed of suitable species. Bare areas can also be packed with brush removed from other parts of the site to encourage natural vegetation regeneration and limit erosion. • Identify and demarcate areas within which activities are to be undertaken. Ensure that activities are restricted to these areas to ensure unnecessary impacts on surrounding natural vegetation are avoided. • Alien management plan to be implemented during the operational phase of the development, which makes provision for regular alien clearing and monitoring.							

Impact Phase: Operational							
Potential impact description: Impacts on vegetation The major impact during this phase will result from vegetation clearance							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	H	H	Negative	H	H	H
With Mitigation	M	M	M	Negative	M	M	M
Can the impact be reversed?	No, once vegetation is cleared, it would not be possible to return it to its previous state. Majority of the indigenous vegetation has already been lost.						
Will impact cause irreplaceable loss or resources?	No. the site is of low ecological integrity.						
Can impact be avoided, managed or mitigated?	Yes, the stockpiling should be restricted to the project boundary.						
Mitigation measures: • All natural vegetation not required to be removed should be protected against damage. • Unnecessary impacts on surrounding natural vegetation must be avoided, e.g. driving around in the veld where there are no existing roads or where there aren't new roads planned. • The site should be rehabilitated.							

MITIGATION MEASURES

All natural vegetation not required to be removed should be protected against damage.

Any cleared areas that are no longer or not required for stockpiling activities should be re-seeded with locally sourced seed of suitable species. Bare areas can also be packed with brush removed from other parts of the site to encourage natural vegetation regeneration and limit erosion.

Maintenance vehicles must not veer from dedicated access roads and activities should be

restricted to the previously disturbed footprint.

No animal may be hunted, trapped, snared or captured for any purpose whatsoever.

Speed of vehicles should be limited to allow for sufficient safety margins.

Workers may not remove flora, and neither may anyone collect seed from the plants without permission from the local authority.

8. CONCLUSION AND RECOMMENDATIONS

The study site has been severely disturbed due to previous mining activities. Very few patches of natural vegetation remain within the property boundaries. The site shows low sensitivity, and no species of conservation concern were observed. However, disturbance should be limited strictly to the specified activities associated with the stockpiling.
The client should appoint an ecologist to compile an Alien Management Plan and it should be implemented during operation of the site.

From the survey conducted, there are no evident fatal flaws that would prevent this development from being authorised, nor being conducted in a sustainable manner

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APPENDICES

Appendix 1: Historical Faunal Records

A, Mammal Records. Animal Demographic Unit.

No	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1		*ORDER Rodentia*	Unidentified Rodentia		1	2016-08-03
2	Bovidae	*Aepyceros melampus*	Impala	Least Concern	3	2013-08-05
3	Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern (2016)	1	2013-07-16
4	Bovidae	*Connochaetes taurinus*	Blue Wildebeest	Least Concern (ver 3.1, 2017)	1	2014-09-13
5	Bovidae	*Connochaetes taurinus taurinus*		Least Concern (2016)	2	2014-01-26
6	Bovidae	*Damaliscus pygargus phillipsi*	Blesbok	Least Concern (2016)	3	2014-01-26
7	Bovidae	*Hippotragus niger*	Sable Antelope	Least Concern (ver 3.1, 2017)	2	2012-11-07
8	Bovidae	*Tragelaphus strepsiceros*	Greater Kudu	Least Concern (2016)	1	2013-07-05
9	Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)	4	2014-10-18
10	Equidae	*Equus grevyi*	Grévy's Zebra		1	2013-02-27
11	Equidae	*Equus quagga*	Plains Zebra	Near Threatened (IUCN, 2016)	7	2019-12-08
12	Erinaceidae	*Atelerix frontalis*	Southern African Hedgehog	Near Threatened (2016)	3	2015-09-01
13	Felidae	*Caracal caracal*	Caracal	Least Concern (2016)	1	2016-04-01
14	Felidae	*Felis catus*	Domestic Cat	Introduced	2	2014-11-04
15	Felidae	*Leptailurus serval*	Serval	Near Threatened (2016)	4	2016-05-27
16	Galagidae	*Galago moholi*	Mohol Bushbaby	Least Concern (2016)	1	2019-05-28
17	Giraffidae	*Giraffa giraffa giraffa*	South African Giraffe	Least Concern (2016)	1	2013-07-05
18	Herpestidae	*Atilax paludinosus*	Marsh Mongoose	Least Concern (2016)	1	2016-05-27
19	Herpestidae	*Cynictis sp.*	Yellow Mongoose		1	2002-09-23
20	Herpestidae	*Cynictis penicillata*	Yellow Mongoose	Least Concern (2016)	1	2022-01-08
21	Hippopotamidae	*Hippopotamus amphibius*	Common Hippopotamus	Least Concern (2016)	1	2012-12-03
22	Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	Least Concern	1	2015-09-01
23	Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern	1	2009-02-01
24	Muridae	*Aethomys sp.*	Veld rats		1	2002-01-22
25	Muridae	*Mastomys sp.*	Multimammate Mice		1	2003-01-22
26	Muridae	*Otomys auratus*	Southern African Vlei Rat (Grassland type)	Near Threatened (2016)	2	2016-05-01
27	Muridae	*Rattus sp.*	Genus Rattus		4	2007-06-07
28	Muridae	*Rattus rattus*	Roof Rat	Least Concern	2	2020-05-22
29	Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)	1	2003-01-22

30	Muridae	*Tatera sp.*			1	2003-01-28
31	Procaviidae	*Procavia capensis*	Cape Rock Hyrax	Least Concern (2016)	2	2013-10-27
32	Rhinolophidae	*Rhinolophus clivosus*	Geoffroy's Horseshoe Bat	Least Concern (2016)	2	2010-07-12
33	Soricidae	*Crocidura sp.*	Shrews		2	2003-01-24
34	Vespertilionidae	*Miniopterus natalensis*	Natal Long-fingered Bat	Least Concern (2016)	4	2012-10-20
35	Vespertilionidae	*Neoromicia sp.*			7	2005-07-24
36	Vespertilionidae	*Neoromicia capensis*	Cape Serotine	Least Concern (2016)	9	2005-07-24
37	Vespertilionidae	*Pipistrellus (Pipistrellus) rusticus*	Rusty Pipistrelle	Near Threatened	2	2007-08-17
38	Viveridae	*Genetta maculata*	Common Large-spotted Genet	Least Concern	3	2015-09-01
39	Viverridae	*Genetta genetta*	Common Genet	Least Concern (2016)	1	2008-12-02

B, Reptile Records. Animal Demographic Unit.

No	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1	Agamidae	*Agama aculeata distanti*	Distant's Ground Agama	Least Concern (SARCA 2014)	1	2004-01-08
2	Chamaeleonidae	*Chamaeleo dilepis*	Common Flap-neck Chameleon	Least Concern (SARCA 2014)	11	2019-01-16
3	Colubridae	*Crotaphopeltis hotamboeia*	Red-lipped Snake	Least Concern (SARCA 2014)	5	2017-05-09
4	Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)	2	2015-05-08
5	Colubridae	*Philothamnus occidentalis*	Western Natal Green Snake	Least Concern (SARCA 2014)	1	2019-08-22
6	Cordylidae	*Cordylus vittifer*	Common Girdled Lizard	Least Concern (SARCA 2014)	1	2003-01-27
7	Elapidae	*Hemachatus haemachatus*	Rinkhals	Least Concern (SARCA 2014)	2	2005-06-26
8	Elapidae	*Naja annulifera*	Snouted Cobra	Least Concern (SARCA 2014)	1	2008-05-07
9	Gekkonidae	*Hemidactylus mabouia*	Common Tropical House Gecko	Least Concern (SARCA 2014)	2	2014-04-05
10	Gekkonidae	*Lygodactylus capensis*	Common Dwarf Gecko	Least Concern (SARCA 2014)	5	2013-07-24
11	Gekkonidae	*Pachydactylus affinis*	Transvaal Gecko	Least Concern (SARCA 2014)	11	2019-11-14
12	Gerrhosauridae	*Gerrhosaurus flavigularis*	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)	2	2003-01-29
13	Lacertidae	*Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard	Least Concern (SARCA 2014)	1	2018-11-25
14	Lamprophiidae	*Aparallactus capensis*	Black-headed Centipede-eater	Least Concern (SARCA 2014)	8	2021-07-24
15	Lamprophiidae	*Atractaspis bibronii*	Bibron's Stiletto Snake	Least Concern (SARCA 2014)	1	2007-03-08

16	Lamprophiidae	*Boaedon capensis*	Brown House Snake	Least Concern (SARCA 2014)	9	2016-01-27
17	Lamprophiidae	*Lamprophis aurora*	Aurora House Snake	Least Concern (SARCA 2014)	1	2015-05-08
18	Lamprophiidae	*Psammophis brevirostris*	Short-snouted Grass Snake	Least Concern (SARCA 2014)	1	2003-01-29
19	Lamprophiidae	*Psammophylax rhombeatus*	Spotted Grass Snake	Least Concern (SARCA 2014)	1	2000-06-15
20	Lamprophiidae	*Pseudaspis cana*	Mole Snake	Least Concern (SARCA 2014)	2	2019-10-04
21	Leptotyphlopidae	*Leptotyphlops sp.*			1	2007-06-07
22	Leptotyphlopidae	*Leptotyphlops incognitus*	Incognito Thread Snake	Least Concern (SARCA 2014)	1	2000-06-15
23	Pelomedusidae	*Pelomedusa galeata*	South African Marsh Terrapin	Not evaluated	4	2022-04-25
24	Scincidae	*Panaspis wahlbergii*	Wahlberg's Snake-eyed Skink	Least Concern (SARCA 2014)	5	2015-12-08
25	Scincidae	*Trachylepis capensis*	Cape Skink	Least Concern (SARCA 2014)	3	2016-01-21
26	Scincidae	*Trachylepis punctatissima*	Speckled Rock Skink	Least Concern (SARCA 2014)	11	2022-04-25
27	Scincidae	*Trachylepis varia sensu lato*	Common Variable Skink Complex	Least Concern (SARCA 2014)	5	2019-11-14
28	Testudinidae	*Kinixys lobatsiana*	Lobatse Hinged Tortoise	Least Concern (SARCA 2014)	2	2021-07-24
29	Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	Least Concern (SARCA 2014)	4	2022-01-14
30	Typhlopidae	*Afrotyphlops bibronii*	Bibron's Blind Snake	Least Concern (SARCA 2014)	1	2003-01-27
31	Varanidae	*Varanus albigularis albigularis*	Rock Monitor	Least Concern (SARCA 2014)	2	2019-01-19
32	Varanidae	*Varanus niloticus*	Water Monitor	Least Concern (SARCA 2014)	1	2016-03-21
33	Viperidae	*Bitis arietans arietans*	Puff Adder	Least Concern (SARCA 2014)	1	2019-03-26
34	Viperidae	*Causus rhombeatus*	Rhombic Night Adder	Least Concern (SARCA 2014)	2	2007-10-31

C, Frog Records, Animal Demographic Unit.

No	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1	Bufonidae	*Schismaderma carens*	Red Toad	Least Concern	9	2019-11-05
2	Bufonidae	*Sclerophrys capensis*	Raucous Toad	Least Concern	2	2018-02-02
3	Bufonidae	*Sclerophrys gutturalis*	Guttural Toad	Least Concern (IUCN, 2016)	16	2021-10-09
4	Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina	Least Concern	8	2000-12-08
5	Phrynobatrachidae	*Phrynobatrachus natalensis*	Snoring Puddle Frog	Least Concern (IUCN, 2013)	2	2000-12-08
6	Pipidae	*Xenopus laevis*	Common Platanna	Least Concern	9	2000-12-08
7	Pyxicephalidae	*Amietia sp.*			1	2014-09-13
8	Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	Least Concern (2017)	4	2021-06-01
9	Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern (2017)	1	2000-01-14
10	Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern (2013)	16	2019-01-01

11	Pyxicephalidae	*Pyxicephalus adspersus*	Giant Bull Frog	Near Threatened	121	2021-01-07
12	Pyxicephalidae	*Tomopterna sp.*			1	2013-03-09
13	Pyxicephalidae	*Tomopterna cryptotis*	Tremelo Sand Frog	Least Concern	9	2000-12-08
14	Pyxicephalidae	*Tomopterna natalensis*	Natal Sand Frog	Least Concern	9	2020-10-25

D, Scorpion Records. Animal Demographic Unit

No	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1	BUTHIDAE	*Pseudolychas ochraceus*			1	2019-11-26
2	BUTHIDAE	*Uroplectes triangulifer*			5	2018-11-25
3	HORMURIDAE	*Hadogenes gunningi*			4	2018-04-05
4	SCORPIONIDAE	*Opistophthalmus glabrifrons*			2	2018-10-30
5	SCORPIONIDAE	*Opistophthalmus pugnax*			3	2018-11-25

E, Avifaunal Records. SABAP2, Animal Demographic Unit.

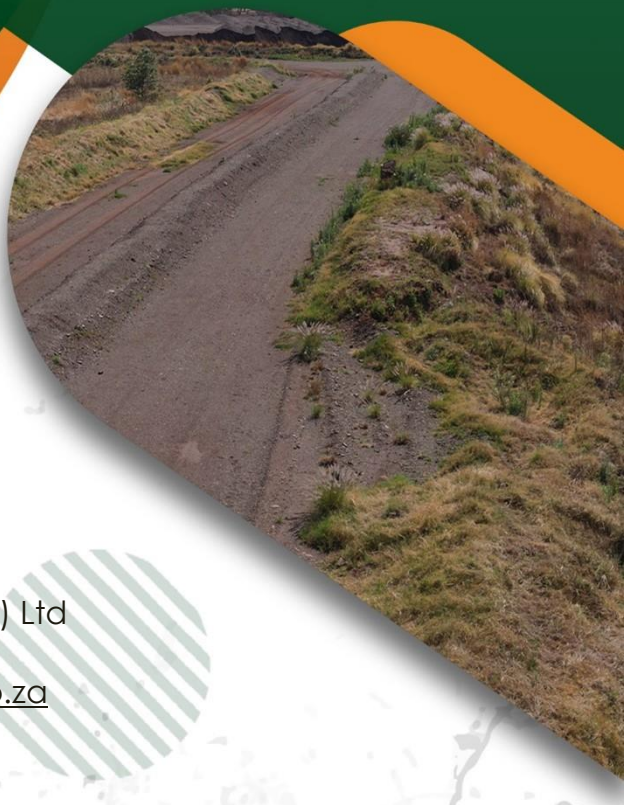
No	Common group	Common species	Genus	Species	FP (RR%)	Latest Adhoc
1		Bokmakierie	*Telophorus*	*zeylonus*	20.5	2008-08-19
2		Hamerkop	*Scopus*	*umbretta*	6.4	2017-04-28
3		Hybrid Mallard	*Anas*	*hybrid*	1.3	-
4		Mallard	*Anas*	*platyrhynchos*	3.8	-
5		Neddicky	*Cisticola*	*fulvicapilla*	50.0	2017-03-31
6		Quailfinch	*Ortygospiza*	*atricollis*	1.3	-
7	Babbler	Arrow-marked	*Turdoides*	*jardineii*	30.8	2017-04-28
8	Barbet	Acacia Pied	*Tricholaema*	*leucomelas*	1.3	-
9	Barbet	Black-collared	*Lybius*	*torquatus*	65.4	2022-08-08
10	Barbet	Crested	*Trachyphonus*	*vaillantii*	94.9	2022-08-08
11	Batis	Chinspot	*Batis*	*molitor*	2.6	-
12	Bee-eater	European	*Merops*	*apiaster*	19.2	2020-04-11
13	Bee-eater	Little	*Merops*	*pusillus*	3.8	-
14	Bishop	Southern Red	*Euplectes*	*orix*	61.5	2022-08-08
15	Boubou	Southern	*Laniarius*	*ferrugineus*	71.8	2015-09-18
16	Bulbul	Dark-capped	*Pycnonotus*	*tricolor*	97.4	2022-08-08
17	Bunting	Cinnamon-breasted	*Emberiza*	*tahapisi*	2.6	2007-12-15
18	Bunting	Golden-breasted	*Emberiza*	*flaviventris*	1.3	-
19	Bushshrike	Orange-breasted	*Chlorophoneus*	*sulfureopectus*	2.6	-
20	Buzzard	Common	*Buteo*	*buteo*	3.8	-
21	Canary	Black-throated	*Crithagra*	*atrogularis*	55.1	2020-05-16
22	Canary	Yellow	*Crithagra*	*flaviventris*	1.3	2022-08-08
23	Canary	Yellow-fronted	*Crithagra*	*mozambica*	30.8	2020-05-16
24	Chat	Familiar	*Oenanthe*	*familiaris*	1.3	-
25	Chat	Mocking Cliff	*Thamnolaea*	*cinnamomeiventris*	3.8	-
26	Cisticola	Cloud	*Cisticola*	*textrix*	1.3	2015-02-08
27	Cisticola	Desert	*Cisticola*	*aridulus*	5.1	2017-03-31
28	Cisticola	Lazy	*Cisticola*	*aberrans*	3.8	-
29	Cisticola	Levaillant's	*Cisticola*	*tinniens*	9.0	-

No	Common group	Common species	Genus	Species	FP (RR%)	Latest Adhoc
30	Cisticola	Rattling	*Cisticola*	*chiniana*	12.8	-
31	Cisticola	Wailing	*Cisticola*	*lais*	0.0	2017-03-31
32	Cisticola	Zitting	*Cisticola*	*juncidis*	30.8	2015-02-08
33	Coot	Red-knobbed	*Fulica*	*cristata*	17.9	-
34	Cormorant	Reed	*Microcarbo*	*africanus*	46.2	2016-06-02
35	Cormorant	White-breasted	*Phalacrocorax*	*lucidus*	33.3	2020-05-16
36	Coucal	Burchell's	*Centropus*	*burchellii*	10.3	2020-04-17
37	Crombec	Long-billed	*Sylvietta*	*rufescens*	5.1	-
38	Crow	Cape	*Corvus*	*capensis*	0.0	2017-01-20
39	Crow	Pied	*Corvus*	*albus*	61.5	2020-05-16
40	Cuckoo	Diederik	*Chrysococcyx*	*caprius*	19.2	2017-03-31
41	Cuckoo	Klaas's	*Chrysococcyx*	*klaas*	3.8	2017-12-04
42	Cuckoo	Levaillant's	*Clamator*	*levaillantii*	2.6	-
43	Cuckoo	Red-chested	*Cuculus*	*solitarius*	3.8	-
44	Darter	African	*Anhinga*	*rufa*	20.5	2016-06-02
45	Dove	Cape Turtle	*Streptopelia*	*capicola*	93.6	2022-08-08
46	Dove	Laughing	*Spilopelia*	*senegalensis*	96.2	2022-08-08
47	Dove	Namaqua	*Oena*	*capensis*	1.3	-
48	Dove	Red-eyed	*Streptopelia*	*semitorquata*	88.5	2022-08-08
49	Dove	Rock	*Columba*	*livia*	84.6	2022-08-08
50	Drongo	Fork-tailed	*Dicrurus*	*adsimilis*	32.1	-
51	Duck	African Black	*Anas*	*sparsa*	39.7	2015-09-18
52	Duck	White-faced Whistling	*Dendrocygna*	*viduata*	2.6	2010-01-31
53	Duck	Yellow-billed	*Anas*	*undulata*	34.6	2010-01-31
54	Eagle	African Fish	*Haliaeetus*	*vocifer*	2.6	-
55	Eagle	Long-crested	*Lophaetus*	*occipitalis*	1.3	-
56	Eagle-Owl	Spotted	*Bubo*	*africanus*	1.3	-
57	Egret	Great	*Ardea*	*alba*	1.3	-
58	Egret	Intermediate	*Ardea*	*intermedia*	1.3	-
59	Egret	Little	*Egretta*	*garzetta*	10.3	-
60	Egret	Western Cattle	*Bubulcus*	*ibis*	60.3	2017-12-04
61	Falcon	Amur	*Falco*	*amurensis*	1.3	-
62	Falcon	Peregrine	*Falco*	*peregrinus*	6.4	-
63	Finch	Cuckoo	*Anomalospiza*	*imberbis*	1.3	-
64	Finch	Cut-throat	*Amadina*	*fasciata*	1.3	2022-08-08
65	Finch	Red-headed	*Amadina*	*erythrocephala*	23.1	-
66	Firefinch	African	*Lagonosticta*	*rubricata*	1.3	-
67	Firefinch	Jameson's	*Lagonosticta*	*rhodopareia*	15.4	-
68	Firefinch	Red-billed	*Lagonosticta*	*senegala*	3.8	-
69	Fiscal	Southern	*Lanius*	*collaris*	88.5	2022-08-08
70	Flycatcher	African Paradise	*Terpsiphone*	*viridis*	10.3	2016-11-06
71	Flycatcher	Fairy	*Stenostira*	*scita*	1.3	-
72	Flycatcher	Fiscal	*Melaenornis*	*silens*	38.5	2020-05-16
73	Flycatcher	Spotted	*Muscicapa*	*striata*	6.4	-
74	Francolin	Coqui	*Peliperdix*	*coqui*	5.1	-

No	Common group	Common species	Genus	Species	FP (RR%)	Latest Adhoc
75	Francolin	Crested	*Dendroperdix*	*sephaena*	1.3	-
76	Francolin	Orange River	*Scleroptila*	*gutturalis*	3.8	-
77	Go-away-bird	Grey	*Crinifer*	*concolor*	84.6	2020-05-16
78	Goose	Domestic	*Anser*	*anser*	1.3	-
79	Goose	Egyptian	*Alopochen*	*aegyptiaca*	82.1	2022-08-08
80	Goose	Spur-winged	*Plectropterus*	*gambensis*	1.3	-
81	Grebe	Little	*Tachybaptus*	*ruficollis*	16.7	-
82	Guineafowl	Helmeted	*Numida*	*meleagris*	61.5	2010-10-02
83	Gull	Grey-headed	*Chroicocephalus*	*cirrocephalus*	7.7	-
84	Harrier-Hawk	African	*Polyboroides*	*typus*	3.8	2017-05-06
85	Hawk-Eagle	Ayre's	*Hieraaetus*	*ayresii*	2.6	-
86	Heron	Black-crowned Night	*Nycticorax*	*nycticorax*	2.6	-
87	Heron	Black-headed	*Ardea*	*melanocephala*	35.9	2021-02-27
88	Heron	Grey	*Ardea*	*cinerea*	23.1	2021-11-27
89	Heron	Purple	*Ardea*	*purpurea*	5.1	-
90	Heron	Striated	*Butorides*	*striata*	12.8	-
91	Honey-buzzard	European	*Pernis*	*apivorus*	1.3	-
92	Honeybird	Brown-backed	*Prodotiscus*	*regulus*	3.8	-
93	Honeyguide	Greater	*Indicator*	*indicator*	10.3	2017-08-29
94	Honeyguide	Lesser	*Indicator*	*minor*	6.4	2016-10-18
95	Hoopoe	African	*Upupa*	*africana*	67.9	2020-05-16
96	Hornbill	African Grey	*Lophoceros*	*nasutus*	38.5	2020-04-29
97	Ibis	African Sacred	*Threskiornis*	*aethiopicus*	70.5	2020-05-04
98	Ibis	Glossy	*Plegadis*	*falcinellus*	5.1	-
99	Ibis	Hadada	*Bostrychia*	*hagedash*	97.4	2022-08-08
100	Indigobird	Purple	*Vidua*	*purpurascens*	2.6	2016-05-25
101	Kestrel	Greater	*Falco*	*rupicoloides*	1.3	-
102	Kingfisher	Brown-hooded	*Halcyon*	*albiventris*	23.1	2017-12-04
103	Kingfisher	Giant	*Megaceryle*	*maxima*	6.4	-
104	Kingfisher	Pied	*Ceryle*	*rudis*	6.4	-
105	Kingfisher	Woodland	*Halcyon*	*senegalensis*	5.1	2010-01-31
106	Kite	Black-winged	*Elanus*	*caeruleus*	46.2	2021-11-27
107	Kite	Yellow-billed	*Milvus*	*aegyptius*	1.3	-
108	Korhaan	Northern Black	*Afrotis*	*afraoides*	38.5	2020-04-05
109	Lapwing	African Wattled	*Vanellus*	*senegallus*	61.5	2020-06-27
110	Lapwing	Blacksmith	*Vanellus*	*armatus*	89.7	2020-05-10
111	Lapwing	Crowned	*Vanellus*	*coronatus*	96.2	2020-05-16
112	Lark	Eastern Clapper	*Mirafra*	*fasciolata*	1.3	-
113	Lark	Red-capped	*Calandrella*	*cinerea*	2.6	-
114	Lark	Rufous-naped	*Mirafra*	*africana*	29.5	2017-03-31
115	Longclaw	Cape	*Macronyx*	*capensis*	20.5	2017-03-31
116	Mannikin	Bronze	*Spermestes*	*cucullata*	38.5	2020-05-16
117	Martin	Banded	*Riparia*	*cincta*	1.3	-
118	Martin	Brown-throated	*Riparia*	*paludicola*	21.8	2020-04-29
119	Martin	Common House	*Delichon*	*urbicum*	2.6	-

No	Common group	Common species	Genus	Species	FP (RR%)	Latest Adhoc
120	Martin	Rock	*Ptyonoprogne*	*fuligula*	33.3	2020-05-16
121	Moorhen	Common	*Gallinula*	*chloropus*	38.5	-
122	Mousebird	Red-faced	*Urocolius*	*indicus*	70.5	2020-05-16
123	Mousebird	Speckled	*Colius*	*striatus*	74.4	2022-08-08
124	Myna	Common	*Acridotheres*	*tristis*	98.7	2022-08-08
125	Nightjar	Fiery-necked	*Caprimulgus*	*pectoralis*	1.3	-
126	Oriole	Black-headed	*Oriolus*	*larvatus*	6.4	-
127	Ostrich	Common	*Struthio*	*camelus*	1.3	-
128	Owl	Western Barn	*Tyto*	*alba*	2.6	2020-05-10
129	Parakeet	Rose-ringed	*Psittacula*	*krameri*	50.0	2022-08-08
130	Peafowl	Indian	*Pavo*	*cristatus*	2.6	-
131	Pigeon	African Green	*Treron*	*calvus*	0.0	2020-05-16
132	Pigeon	African Olive	*Columba*	*arquatrix*	48.7	2020-05-16
133	Pigeon	Speckled	*Columba*	*guinea*	59.0	2020-05-16
134	Pipit	African	*Anthus*	*cinnamomeus*	21.8	-
135	Pipit	Nicholson's	*Anthus*	*nicholsoni*	3.8	-
136	Pipit	Plain-backed	*Anthus*	*leucophrys*	1.3	-
137	Plover	Three-banded	*Charadrius*	*tricollaris*	1.3	-
138	Prinia	Black-chested	*Prinia*	*flavicans*	43.6	2017-03-31
139	Prinia	Tawny-flanked	*Prinia*	*subflava*	80.8	2018-11-24
140	Puffback	Black-backed	*Dryoscopus*	*cubla*	26.9	2020-05-10
141	Quelea	Red-billed	*Quelea*	*quelea*	10.3	-
142	Robin-Chat	Cape	*Cossypha*	*caffra*	79.5	2022-08-08
143	Robin-Chat	White-throated	*Cossypha*	*humeralis*	2.6	-
144	Scrub Robin	White-browed	*Cercotrichas*	*leucophrys*	1.3	-
145	Seedeater	Streaky-headed	*Crithagra*	*gularis*	64.1	2022-08-08
146	Shrike	Red-backed	*Lanius*	*collurio*	5.1	-
147	Sparrow	Cape	*Passer*	*melanurus*	96.2	2022-08-08
148	Sparrow	House	*Passer*	*domesticus*	73.1	2022-08-08
149	Sparrow	Southern Grey-headed	*Passer*	*diffusus*	67.9	2022-08-08
150	Sparrow	Yellow-throated Bush	*Gymnoris*	*superciliaris*	1.3	-
151	Sparrowhawk	Black	*Accipiter*	*melanoleucus*	3.8	-
152	Sparrowhawk	Little	*Accipiter*	*minullus*	6.4	2016-11-06
153	Sparrowhawk	Ovambo	*Accipiter*	*ovampensis*	10.3	-
154	Spurfowl	Swainson's	*Pternistis*	*swainsonii*	26.9	2017-03-31
155	Starling	Cape	*Lamprotornis*	*nitens*	82.1	2022-08-08
156	Starling	Pied	*Lamprotornis*	*bicolor*	1.3	-
157	Starling	Red-winged	*Onychognathus*	*morio*	17.9	2019-06-06
158	Starling	Wattled	*Creatophora*	*cinerea*	0.0	2017-03-31
159	Stilt	Black-winged	*Himantopus*	*himantopus*	1.3	-
160	Stonechat	African	*Saxicola*	*torquatus*	16.7	2021-11-27
161	Stork	White	*Ciconia*	*ciconia*	0.0	2016-01-17
162	Sunbird	Amethyst	*Chalcomitra*	*amethystina*	48.7	2020-05-16
163	Sunbird	White-bellied	*Cinnyris*	*talatala*	52.6	2020-05-16

No	Common group	Common species	Genus	Species	FP (RR%)	Latest Adhoc
164	Swallow	Barn	*Hirundo*	*rustica*	28.2	2020-04-05
165	Swallow	Greater Striped	*Cecropis*	*cucullata*	37.2	2020-11-12
166	Swallow	Lesser Striped	*Cecropis*	*abyssinica*	28.2	2018-03-29
167	Swallow	Pearl-breasted	*Hirundo*	*dimidiata*	3.8	-
168	Swallow	South African Cliff	*Petrochelidon*	*spilodera*	1.3	-
169	Swallow	White-throated	*Hirundo*	*albigularis*	25.6	2008-08-19
170	Swift	African Palm	*Cypsiurus*	*parvus*	76.9	2020-05-16
171	Swift	Common	*Apus*	*apus*	0.0	2017-03-31
172	Swift	Horus	*Apus*	*horus*	1.3	2017-03-31
173	Swift	Little	*Apus*	*affinis*	32.1	2020-04-11
174	Swift	White-rumped	*Apus*	*caffer*	20.5	2020-04-22
175	Tchagra	Black-crowned	*Tchagra*	*senegalus*	12.8	2010-10-02
176	Tchagra	Brown-crowned	*Tchagra*	*australis*	11.5	-
177	Thick-knee	Spotted	*Burhinus*	*capensis*	28.2	2020-05-16
178	Thrush	Groundscraper	*Turdus*	*litsitsirupa*	28.2	2020-05-16
179	Thrush	Karoo	*Turdus*	*smithi*	91.0	2022-08-08
180	Thrush	Kurrichane	*Turdus*	*libonyana*	15.4	2010-01-31
181	Wagtail	Cape	*Motacilla*	*capensis*	53.8	2020-05-16
182	Wagtail	Grey	*Motacilla*	*cinerea*	1.3	-
183	Warbler	African Reed	*Acrocephalus*	*baeticatus*	6.4	-
184	Warbler	Chestnut-vented	*Curruca*	*subcoerulea*	6.4	-
185	Warbler	Garden	*Sylvia*	*borin*	0.0	2017-03-31
186	Warbler	Great Reed	*Acrocephalus*	*arundinaceus*	2.6	-
187	Warbler	Lesser Swamp	*Acrocephalus*	*gracilirostris*	7.7	-
188	Warbler	Little Rush	*Bradypterus*	*baboecala*	1.3	-
189	Warbler	Marsh	*Acrocephalus*	*palustris*	9.0	2017-03-31
190	Warbler	Willow	*Phylloscopus*	*trochilus*	17.9	2014-03-16
191	Waxbill	Blue	*Uraeginthus*	*angolensis*	15.4	2020-05-10
192	Waxbill	Common	*Estrilda*	*astrild*	24.4	2017-03-31
193	Waxbill	Orange-breasted	*Amandava*	*subflava*	1.3	-
194	Weaver	Cape	*Ploceus*	*capensis*	1.3	2008-08-19
195	Weaver	Lesser Masked	*Ploceus*	*intermedius*	0.0	2008-08-19
196	Weaver	Southern Masked	*Ploceus*	*velatus*	94.9	2022-08-08
197	Weaver	Thick-billed	*Amblyospiza*	*albifrons*	56.4	2022-08-08
198	Weaver	Village	*Ploceus*	*cucullatus*	7.7	-
199	Wheatear	Capped	*Oenanthe*	*pileata*	3.8	-
200	Wheatear	Mountain	*Myrmecocichla*	*monticola*	3.8	2021-07-07
201	White-eye	Cape	*Zosterops*	*virens*	88.5	2022-08-08
202	Whydah	Pin-tailed	*Vidua*	*macroura*	14.1	-
203	Widowbird	Long-tailed	*Euplectes*	*progne*	2.6	-
204	Widowbird	Red-collared	*Euplectes*	*ardens*	21.8	2007-12-15
205	Widowbird	White-winged	*Euplectes*	*albonotatus*	33.3	2021-11-27
206	Wood Hoopoe	Green	*Phoeniculus*	*purpureus*	56.4	2022-08-08
207	Woodpecker	Cardinal	*Dendropicos*	*fuscescens*	14.1	-
208	Woodpecker	Golden-tailed	*Campethera*	*abingoni*	7.7	2020-04-11
209	Wryneck	Red-throated	*Jynx*	*ruficollis*	6.4	-



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