



Appendix C-5

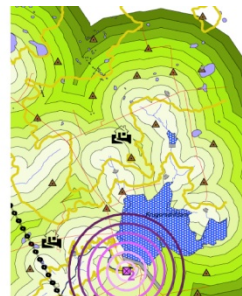
Avifaunal Assessment Report

Avifaunal Assessment for the Kangra Coal (Pty) Ltd Maquasa East Discard Dump

Report

Version - Final
13 February 2015

Kangra Coal (Pty) Ltd
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EXECUTIVE SUMMARY

Kangra Coal (Pty) Ltd (Kangra) owns various operational and defunct coal mines in the vicinity of Piet Retief in the Mpumalanga Province.

The proposed 80 ha discard dump will be designed to accommodate 20 million tonnes of discard, comprising a volume of 10 million m³ over a period of 15 years. The Maquasa East discard dump will be situated on Portion 0 (RE) the farm Rooikop 18 HT, with a portion of the dump overlapping onto Portion 0 (RE) of the farm Maquasa 19HT.

The discard dump complex will include the discard dump, Pollution Control Dam (PCD) stormwater management infrastructure such as trenches and berms.

The scope of work is to provide a description of the avifaunal reference conditions for the Project areas.

The objectives of the study are to characterize the potential and existing avifauna associated with the proposed project footprint, including:

- Description of the main groups of avifauna of potential occurrence in the region;
- Identification of endemic, rare or endangered species, considering both South African legislation and international conservation status, and of species with economic or scientific interest; and
- Identification of areas of particular importance to fauna, such as particularly important nesting, feeding or shelter habitats.

Results

The study area is located in the Grassland Biome as defined by Mucina & Rutherford (VegMap, 2006). The proposed Discard Dump area is located within the Eastern Highveld Grassland ecological type, which is currently listed as Endangered due to its medium-high environmental sensitivity. The site is further situated within the Grassland IBA area which comprises of 1 050 000 ha. The area was previously proposed, however not declared, a Biosphere Reserve. This IBA holds a significant of South Africa's threatened and endemic grassland species. The main affects associated with the loss of this habitat are that of mining, grassland afforestation, wetland degradation, accidental and targeted poisoning of cranes and increased acid rain from local power station sulphur emissions. On a more local scale the area is characterised by four vegetation types.

These are that of degraded grassland habitat, which has a moderate to low impact associated with the loss of these environments. Natural grassland habitats, have a high to moderate impacted associated with the loss of these environments. This is due to the sensitive nature of the grassland system and associated avifaunal communities associated within these areas. The last floral habitat is that of wetlands and riparian habitat. This vegetation type has a high impact associated with its potential loss, this being due to the sensitive nature of wetland and riparian ecosystems. Loss of these systems or degradation is often associated with high avifaunal loss, as many species survive within or in close proximity to wetlands and riparian zones.

The total number of species which have been identified via a desktop assessment within the sites QDS is 248 species. Of the 248 species, 1 species is introduced, 32 species are uncommon, 43 species fairly common and the remaining 172 are common species. The majority of the species identified are residents, this being 205 species. There was one listed migrant species identified as **Vulnerable**, this being the **Lesser Kestrel**. The residents have 20 listed species, these being 11 Near Threatened, and 9 Vulnerable, with one species being listed as Critically Endangered in South Africa. The 9 listed species identified are:

- **Blue Crane:** this species is listed as **Vulnerable** with a global population estimated at 21 000 individuals.
- **Grey Crowned Crane:** this species is listed as **Vulnerable** with a global population estimated at 85 000 – 95 000 individuals.
- **Wattled Crane:** this species is listed as **Vulnerable** globally, however within South Africa this species is currently listed as **Critically Endangered** with the South African population only estimated at 230 individuals.
- **African Marsh-Harrier:** this species is listed as **Vulnerable** with a global population estimated at 3 000 – 5 000 pairs.
- **White-Bellied Korhaan:** this species is listed as **Vulnerable** with a global population estimated at less than 5 000 individuals.
- **Southern Bald Ibis:** this species is listed as **Vulnerable** with a global population estimated at less than 10 000 individuals.
- **Denham's Bustard:** this species is listed as **Vulnerable** with a global population estimated at less than 5 000 individuals.
- **Martial Eagle:** this species is listed as **Vulnerable** with a global population estimated at less than 600 pairs.

- **African Grass-Owl:** this species is listed as **Vulnerable** with a global population estimated at less than 5 000 individuals.

The impacts are not only associated with general loss of avifaunal communities, but also with associated services these communities provide. There is currently little knowledge known as to the value of these services but some such services identified are that of pollination, seed dispersal and pest control. These services are important in flora species which utilize either avifaunal pollination or seed dispersal mechanisms. The loss of these services could possibly have detrimental effects to IUCN listed flora species. Some IUCN listed species which might depend on the avifaunal community for pollination are, *Aloe Kniphofiodes*, *Protea roupelliae* and *Protea subvestita*.

The main identified impacts for the site on the avifaunal community are during the construction and operational phases. The closure and post closure phases through appropriate rehabilitation are generally associated with lower impacts. During the construction phase the impacts are expected to be moderate. These impacts are generally reduced through the mitigation measures.

Impact Statement

The overall impact statement for the site is that if all mitigation and action plans are followed the overall impact will be limited to moderate or low. Appropriate measures for rehabilitation post – closure need to be followed to ensure low levels of impacts associated with the area.

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1 INTRODUCTION

Kangra Coal (Pty) Ltd (Kangra) owns various operational and defunct coal mines in the vicinity of Piet Retief in the Mpumalanga Province.

Kangra holds approved Environmental Management Programmes (EMPr) for their Maquasa East (current), Maquasa West (current), Rooikop (historical) and Nooitgesien (historical underground) mining areas, situated approximately 40 km west of the town of Piet Retief, which were combined into one EMPr during the application process undertaken by GCS (Pty) Ltd (GCS) in terms of Section 102 of the MPRDA during 2013. These mining areas are all located within close proximity to the Heyshope Dam.

All coal from these mining areas is transported (via conveyor and truck) to the coal washing plant situated at the Maquasa East mining area.

Kangra intends to expand their operations in the area, pending the outcomes of the various environmental application processes undertaken. The expansion will include opencast pits at Maquasa West and Nooitgesien, which will provide future feed to the Maquasa East coal washing plant.

Furthermore, an expansion the Kangra Group (Pty) Ltd (Kangra Group) Savmore Colliery in the form of the Kusipongo underground mining area, is proposed. The proposed Kusipongo adit (-27.016267°S, 30.285800°E) will be located approximately 10 km to the west of the Maquasa East mining area, with a conveyor planned between the adit and the Maquasa East coal washing plant.

The proposed expansions will increase the life of the operations and will require a larger capacity for coal discard than currently exists within the Maquasa East Discard Dump, therefore a new discard dump is required. Kangra proposed to construct this discard to the west of the Maquasa East mining area, within an area previously earmarked for the Kangra Power Station.

The proposed 80 hectare (ha) Discard Dump will be designed to accommodate 20 million tons (t) of discard, comprising a volume of 10 million cubic meters (m³) over a period of 15 years. The Maquasa East discard dump will be situated on Portion 0 (RE) the farm Rooikop 18 HT, with a portion of the dump overlapping onto Portion 0 (RE) of the farm Maquasa 19HT.

The Discard Dump complex will include the Discard Dump, Pollution Control Dam (PCD) stormwater management infrastructure such as trenches and berms.

2 SCOPE OF WORK

The scope of work is to provide a description of the avifaunal reference conditions for the Project areas.

The objectives of the study is to characterize the potential and existing avifauna associated with the proposed project footprint, including:

- Description of the main groups of avifauna of potential occurrence in the region;
- Identification of endemic, rare or endangered species, considering South African legislation and international conservation status, and of species with economic or scientific interest; and
- Identification of areas of particular importance to avifauna, such as particularly important nesting, feeding or shelter habitats.

3 METHODOLOGY

This study was carried out in two parts, these being a desktop assessment, reviewing all available documentation and followed by an impact assessment. The desktop assessment involved an in-depth desktop assessment, using all available literature and historical information. This was followed by an impact assessment which aimed to identify the impacts associated with the proposed mining activities and proposed mitigation measures.

3.1 Avifaunal Assessment

The avifaunal assessment comprised of an in depth desktop review of identified species within the Quarter Degree Square (QDS) in which the site is located. The desktop method used information gathered from all the primary data sources listed in **Section 3.2.3**. This information was then combined to identify possible impacts the proposed discard dump will have on the identified avifaunal biodiversity.

3.2 Impact Assessment

With the site information obtained, the avifaunal assessment included:

- The production of avian impact matrices for the proposed development;

- Identification of any 'no-go' areas (exclusion and/or buffer zones), alternatives and/or the lowest risk/least sensitive areas;
- Identifying and describing appropriate mitigation measures; and
- Drafting measures to be included in the Environmental Management Programme (EMP) based on the proposed impacts and mitigation measures.

3.2.1 Red Listed Avifauna Probabilities

Three parameters are used to assess the Probability of Occurrence for Red Listed species:

- Habitat Requirements (HR) - Red Listed animals have specific habitat requirements and the presence of these habitat characteristics in the study area is evaluated.
- Habitat Status (HS) - The status or ecological condition of available habitat in the study area is assessed. Often, a high level of degradation of a specific habitat type will negate the potential presence of Red Listed species (especially wetland-related habitats where water quality plays a major role); and
- Habitat Linkage (HL) - Movement between areas used for breeding and feeding purposes forms an essential part of ecological existence of many species. The connectivity of the study area to surrounding habitats and adequacy of these linkages are evaluated for the ecological functioning of Red Listed species within the study area.

The estimated probabilities (PoC) for the Red Data assessment are based on:

- The size of the study area;
- The location of the study area;
- The diversity and status of each faunal habitat within the study area; and
- The connectivity of the study area to other untransformed faunal habitats.

3.2.2 Avifaunal Habitat Sensitivities

Faunal habitat sensitivities are subjectively estimated based on the following criteria:

- Habitat status;
- Connectivity;
- Observed species composition & Red Data probabilities; and

- Functionality.

The Environmental Impacts associated with the proposed expansion were evaluated using **Table 3.1**.

Table 3.1: Status of Impacts

<i>Status of Impact</i>	
+: Positive (A benefit to the receiving environment)	
N: Neutral (No cost or benefit to the receiving environment)	
-: Negative (A cost to the receiving environment)	
<i>Magnitude:=M</i>	<i>Duration:=D</i>
10: Very high/don't know	5: Permanent
8: High	4: Long-term (ceases with the operational life)
6: Moderate	3: Medium-term (5-15 years)
4: Low	2: Short-term (0-5 years)
2: Minor	1: Immediate
0: Not applicable/none/negligible	0: Not applicable/none/negligible
<i>Scale:=S</i>	<i>Probability:=P</i>
5: International	5: Definite/don't know
4: National	4: Highly probable
3: Regional	3: Medium probability
2: Local	2: Low probability
1: Site only	1: Improbable
0: Not applicable/none/negligible	0: Not applicable/none/negligible

The Environmental Effects are rated according to **Table 3.2**.

Table 3.2: Rating of Environmental Effects

Significance	Environmental Significance Points	Colour Code
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N

Significance	Environmental Significance Points	Colour Code
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	<-60	H

3.2.3 Data sources

The following published and unpublished sources were used for this study:

- Chittenden, H., Roberts Bird Guide: A comprehensive field guide to over 950 species in Southern Africa, ISBN: 978-0-620-37557-3.
- SABAP2., 2015. South African Bird Atlas Project, URL [<http://sabap2.adu.org.za/>].
- IUCN Red Data Listed Species, 2014.3. The IUCN Red Data List of Threatened Species, URL [<http://www.iucnredlist.org/>].
- Mucina, L., & Rutherford, M.C., 2006. The Vegetation of South Africa, Lesotho and Swaziland, Strelitzia 19 South.
- Birdlife International., 2015, URL [<http://www.birdlife.org/>].
- Birdlife South Africa., 2015, URL [<http://www.birdlife.org.za/>]
- Barnes, K.N., 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. *Birdlife South Africa*, ISBN: 0-620-25499-8.

4 RESULTS

4.1 General Habitat Assessment

The study area is located in the Grassland Biome as defined by Mucina & Rutherford (VegMap, 2006). The proposed Discard Dump area is located within the Eastern Highveld Grassland ecological type.

4.1.1 Eastern Highveld Grassland

This vegetation unit is distributed along slightly, to moderately undulating plains, including some low hills and pan depressions, in Mpumalanga and Gauteng Provinces. The vegetation is short dense grassland dominated by the usual Highveld grass composition (*Aristida*, *Digitaria*, *Erigeron*, *Themeda*, *Tristachya*, etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismsontanum*).

The Eastern Highveld Grassland is an 'Endangered' vegetation type and only small fractions are conserved in statutory reserves. Some 44% is already transformed by cultivation, plantations, mines, urbanisation and by building of dams. Cultivation may have had a more extensive impact, than indicated by land cover data. The Endangered status of this vegetation type warrants a medium-high environmental sensitivity. The species previously listed are regarded representative of the Eastern Highveld Grassland vegetation type.

The diversity of plants within the study area represents 56 plant families, typically dominated by Poaceae (graminoids), comprising 29 species (15.3%) and Asteraceae (Daisy family), comprising 28 species, (14.7%).

4.1.2 Important Bird and Biodiversity Areas (IBAs)

4.1.2.1 SA125 Grassland

This 1 050 000 ha Grassland IBA is centred on the towns of Volksrust and Wakkerstroom. This area was previously proposed, however was not declared, a Biosphere Reserve. This Biosphere would comprise of approximately 800 private farms, several municipalities, conservancies, biodiversity Stewardship Protected Environments and considerable amount of state owned land (Birdlife South Africa, 2015).

The area comprises of gentle rolling hills on the South African plateau ranging in altitude from 1 700 – 1 800 m, the area is broken up regularly by parts of the Drakensberg escarpment along with various other mountain ranges within the IBA. The area covers several catchments and holds many perennial rivers and wetlands. The following wetlands are of international importance and deserve the highest possible conservation attention:

- **Wakkerstroom vlei (27°22'S; 30°07'E)**, a proposed RAMSAR site, lies on the north-western border of the town. The permanently wet centre of this 700 ha vlei is surrounded by an often extensive belt of sedge marsh, on permanently to seasonally flooded ground. This marsh grades into a narrow zone of sedge meadow and then into extensive wet grassland. The vlei contains very little open water, the largest area being in the northeastern corner, close to the Amersfoort road.

- **Seekoeivlei Nature Reserve (27°35'S; 29°35'E)**, a RAMSAR site, is situated in the northeastern Free State, 500 m from the town of Memel. The vlei consists of a floodplain holding numerous seasonally flooded oxbow lakes, which are drained by the Klip River, a tributary of the Vaal. The wetland area stretches northwards for approximately 20 km to where the Klip River floodplain narrows, making it the largest floodplain on the Highveld. The vlei holds much open water, often shallow, with extensive fringing vegetation and some relatively small patches of emergent vegetation.
- **Heyshope Dam (27°00'S; 30°30'E)** is a large impoundment in the Assegai River catchment of southeastern Mpumalanga, located 60 km northeast of Wakkerstroom and about 30 km west of Piet Retief. Lying at an altitude of 1 300 m and with a surface area of 12 000 ha, this storage dam is the sixth largest in South Africa. It was built for the transferral of water from the Usutu catchment to the Vaal catchment. The country surrounding the dam is mainly agricultural land used for beef and maize production, with two informal settlements, Driefontein and Kangema adjoining the dam. The grass along the dam's gently sloping shoreline is either severely grazed or else it occurs as areas of unutilised rank grass and weed.
- The privately owned **Vanger Natural Heritage Site (27°52'S; 29°40'E)**, which lies about 30 km southeast of Memel, supports another important wetland. This permanently flooded wetland is about 2 km long. The fringing vegetation, once heavily grazed, is being allowed to regenerate. This site should be regarded as a significant wetland, in national and global terms. In terms of richness of its palustrine wetland habitats it is probably better than most high-altitude wetlands in South Africa.
- **Blood River Vlei (27°47'S; 30°35'E)**, another important wetland, is situated 20 km southwest of Vryheid.

Several other small important wetlands are scattered throughout the IBA. The area receives summer rainfall, averaging between 635 - 1 400 mm per annum depending on topography; the upper limit being reached on the escarpment. The terrestrial vegetation matrix is dominated by some of the finest rolling grasslands remaining in South Africa (Birdlife South Africa, 2015).

4.1.2.2 Birds

This area holds a significant proportion of South Africa's small known population of the globally endangered White-winged Flufftail (*Sarothrura ayresi*). Three wetlands within the IBA are known or thought to regularly hold White-winged Flufftail in seasons of suitable rainfall. Corn Crake (*Crex crex*) is also regular at some of the wetlands. The various wetland systems also hold large numbers of Little Bittern (*Ixobrychus minutus*), Baillon's Crake (*Porzana pusilla*), Red-chested Flufftail (*Sarothrura rufa*), African Rail (*Rallus caerulescens*) and several breeding populations of African Marsh Harrier (*Circus ranivorus*), Grey Crowned Crane (*Balearica regulorum*) and African Grass Owl (*Tyto capensis*).

Seekoeivlei supports large numbers of a rich diversity of resident and migratory waterbirds. The reserve and surrounding farmlands also holds all three of South Africa's crane species, including important numbers of Wattled Crane (*Bugeranus carunculatus*). Globally significant numbers of Yellow-billed Duck (*Anas undulate*) and Spur-winged Goose (*Plectropterus gambensis*) also occur at Seekoeivlei. Eurasian Bittern (*Botaurus stellaris*) has been recorded at Seekoeivlei and it probably breeds in the area. The area also holds several active heronries holding breeding egrets, African Spoonbill (*Platalea alba*) and Black-crowned Night Heron (*Nycticorax nycticorax*). Glossy Ibis (*Plegadis falcinellus*), Little Egret (*Egretta garzetta*), Yellow-billed Egret (*Egretta intermedia*), Squacco Heron (*Ardeola ralloides*), Red-billed Teal (*Anas erythrorhyncha*) and Hottentot Teal (*Anas hottentota*) are also usually present in good numbers.

Heyshope Dam is known to hold extremely large numbers of at least 52 species of resident, migratory and nomadic waterbirds. Small portions of the dam, which are regularly counted, hold up to 45 000 waterbirds, suggesting that the entire system may hold an extrapolated total of some 100 000 individuals. The waterbirds tend to concentrate at the 17 bays where rivers enter the Dam.

Of the terrestrial birds, most of South Africa's threatened and endemic grassland species have their core populations centred on the IBA. An estimated 85% of the Rudd's Lark (*Heteromirafr ruddi*) global population is thought to occur within the IBA. Although this lark ranges throughout the IBA, it is highly localised within open, moderately to heavily grazed level grassland, without forb invasion. Rudd's Lark prefers hill tops or plateaus where it favours trampled areas.

Botha's Lark (*Spizocorys fringillaris*), which also occurs within the IBA, is highly localised within Amersfoort Highveld Clay Grassland on black clays or dolerite soils where it favours short, dense, natural grassland on plateaus and upper hill slopes, avoiding rocky areas, taller grass in bottomlands, vleis, croplands and planted pastures. Within the IBA, Botha's Lark is more common in the Wielspruit catchment and around the settlement of Perdekop.

The Yellow-breasted Pipit (*Anthus chloris*) favours mid-altitude, well-developed lightly grazed or ungrazed grassland. The largest Southern Bald Ibis (*Geronticus calvus*) breeding colonies in the world occur within the IBA. Large numbers also forage and roost throughout the area. Blue Crane (*Anthropoides paradiseus*), Denham's Bustard (*Neotis denhami*), White-bellied Korhaan (*Eupodotis senegalensis*), Short-tailed Pipit (*Anthus brachyurus*) and Black-winged Lapwing (*Vanellus melanopterus*) are widespread at low densities. Black-winged Pratincole (*Glareola nordmanni*) and White Stork (*Ciconia ciconia*) occasionally occur in very large numbers during the austral summer.

On exposed outcrops and rocky slopes at higher altitudes African Rock Pipit (*Anthus crenatus*), Ground Woodpecker (*Geocolaptes olivaceus*), Buff-streaked Chat (*Campicoloides bifasciata*) and Sentinel Rock Thrush (*Monticola exploratory*) are common. Gurney's Sugarbird (*Promerops gurneyi*) is found around proteoid woodland on the escarpment, and Black Stork (*Ciconia nigra*) breed on steep cliffs. Pongola Bush Nature Reserve and other forest patches hold Crowned Eagle (*Stephanoaetus coronatus*), Chorister Robin-Chat (*Cossypha dichroa*), Forest Canary (*Crithagra scotops*), Bush Blackcap (*Lioptilus nigricapillus*) and Orange Ground Thrush (*Zoothera gurneyi*). Occasionally, Cape Vulture (*Gyps coprotheres*), Martial Eagle (*Polemaetus bellicosus*), Lesser Kestrel (*Falco naumanni*), Black Harrier (*Circus maurus*) and Pallid Harrier (*Circus macrourus*) are found at low densities within the area.

4.1.2.3 Conservation issues

The proposed Grassland Biosphere Reserve is one of the most important biodiversity areas in Africa. Despite 'proposed Biosphere Reserve' status, this area is severely threatened and it faces some major conservation problems. Foremost amongst these is grassland afforestation, wetland degradation, mining, accidental and targeted poisoning of cranes and increased acid rain from local power station sulphur emissions.

Providing incentives through the Biodiversity Stewardship Programme for landowners to manage the grassland on their farms for particular species or communities of birds can be a very effective conservation strategy. For many threatened species, effective conservation is not about establishing reserves, but about ensuring that deleterious land-use practices are minimised or prevented. Much of South Africa's remaining natural grassland is used for stock production. Under natural conditions, burning and grazing would have driven the functioning of these grasslands. Although domestic stock has replaced most of the wild ungulates, and humans control fire regimes, the processes remain unchanged. Grassland birds can and do continue to survive, and occasionally thrive. The mosaic created by varying stocking rates and varying burning regimes, provides areas of suitable habitat for a wide spectrum of species. To prevent habitat loss from our grasslands, management practices should attempt to emulate the natural burning and grazing regime.

4.2 Site Specific Habitat Assessment

The close relationship between vegetation units and specific faunal composition has been noted in several scientific studies. For the purpose of this investigation, floristic units are therefore considered representative of the faunal habitat types. The following habitat types were condensed from the botanical assessment:

- Degraded Grassland Habitat;
- Natural Grassland Habitat; and
- Wetland Habitat Types.

A basic description of the perceived ecological status and potential biodiversity sensitivity is presented. Information utilized in this section was taken from BEC's (2008) Preliminary Site Selection Report.

4.2.1 Degraded Grassland Habitat

Within the study area, large areas of transformed faunal habitat were encountered. These areas have lost all of the original ecological elements of the original regional vegetation communities and have no biodiversity value left (i.e. it does not constitute habitat for a significant number of natural faunal species). Transformed faunal habitats of the study area include excavations, roads and infrastructure. Because of the transformed nature of these areas found within the study area, low faunal sensitivities are ascribed to these portions:

- Degraded habitat: low faunal sensitivity.

The likelihood of encountering Red Data plant and animal species within this habitat type is regarded low as a result of habitat transformation. A medium-low ecological status is attributed to these parts of the study area.

4.2.2 Natural Grassland Habitat

Extensive parts of the study area comprises grassland habitat that is representative of the regional vegetation. Although the status might vary across the study area this area is characterized by fairly undisturbed habitats, high species diversity, low isolation and fragmentation as well as high conservation value. These factors contribute to a high ecological status of these parts. Factors that contribute to the degradation of this habitat type include the proliferation of exotic trees, agriculture, habitat transformation and urbanization to name a few.

This habitat type is situated in areas where the slopes are generally low and surface rocks are absent. It was observed that extensive parts of this habitat type is located some distance away from informal settlements and the grazing factor is therefore fairly low as a result of inaccessibility. This has resulted in the pristine status of these grasslands to remain. The estimated faunal sensitivities of all the natural faunal habitats in the study area are estimated to be medium - high faunal sensitivity:

- Natural Grassland Habitat: medium – high faunal sensitivity.

A high ecological status is attributed to these parts; the likelihood of these areas being utilized as habitat for Red Data fauna species, or encountering Red Data plant species is regarded medium-high.

4.2.3 Riparian Wetlands, Rivers, Streams and Drainage Lines

All areas of a wetland nature are included in this category. The atypical habitat conditions render these parts extremely sensitive and the habitat is regarded highly suitable for Red Data flora and fauna species. The ecological status of these parts might not always be pristine, as a result of aspects that contribute to degradation. These systems are usually impacted through the proliferation of exotic trees, high grazing pressures (particularly in moist grassland and seepage areas), nearby agricultural practices and upstream activities. Wetlands and Riparian zones are considered of both regional and national importance. High conservation value and biodiversity sensitivity are attributed to these parts.

- Riparian Wetlands, Rivers, Streams & Drainage Lines: high faunal sensitivity.

A high ecological status is attributed to these parts; the likelihood of these areas being utilized as habitat for Red Data fauna species, or encountering Red Data plant species is regarded high.

4.3 Faunal Habitat Sensitivity Assessment

Through the general and site specific habitat characterization the identified habitat sites were investigated and assessed in terms of the following biodiversity attributes:

- Habitat status: level of habitat transformation and degradation vs. pristine faunal habitat;
- Habitat diversity: the number of different faunal habitat types (both on micro- and macro-scale) found within the proposed site and bordering areas;
- Habitat linkage: the degree to which the faunal habitat of the proposed site is linked to other natural areas enabling movement of animals to and from the habitat found on site;
- Red Data species: the degree to which suitable habitat for the red data species likely to be found in the study area (larger study area) is located on each site; and
- Sensitive faunal habitat: the relative presence of faunal sensitive habitat type elements such as surface rock associated with outcrops and hills as well as wetland elements.

The faunal habitat sensitivity of the study area is detailed in **Table 4.1**.

Table 4.1: Faunal habitat sensitivity of the study area.

Criteria	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						
	M	D	S	P	TOTAL	STATUS	SP
Degraded Grassland Habit	4	4	1	4	36	-	M
Natural Grassland Habitat	8	4	3	4	60	-	M
Wetland Habitat Types	10	4	3	4	68	-	H

The following could be concluded:

- Degraded Grassland Habitat: Moderate to Low Impact expected through the loss of this habitat type. This vegetation type is moderate to low as certain biogeographically important avifaunal species utilize degraded sites as nesting and feeding sites. This is however until a certain threshold has been reached.
- Natural Grassland Habitat: High to Moderate Impacted expected through the loss of this habitat type. The natural habitat is home to numerous grassland species and due to the conservation status of this habitat. The impacts on the avifaunal community associated with it are expected to be high to moderate.
- Wetland Habitat Types: High Impact expected if these systems are loss due to their sensitive nature and ability to support a high diversity of avifaunal species. Large majorities of the identified avifaunal species are associated within wetland areas and thus any loss or deterioration of these ecosystems will result in high losses of avifaunal species.

4.4 Avifaunal Assessment

4.4.1 Identified species occurring within QDS

A list of species that have been recorded within the greater study area is given in **Appendix A**. The total number of species for which have been identified within the sites QDS is 248 species. Of the 248 species, 1 species is introduced, 32 species are uncommon, 43 species fairly common and the remaining 172 are common species. The majority of the species identified are residents, this being 205 species. There were 20 Non – Breeding Palearctic Migrants, 18 Intra Africa Migrant, 3 Breeding Migrants and 1 Intra Africa Partial Migrant. The 1 Intra Africa Partial Migrant is the South African Cliff Swallow, this species is also listed as endemic.

There was one listed migrant species identified as **Vulnerable**, this being the **Lesser Kestrel**. The world population of Lesser Kestrels was estimated for South Africa as 154 000 Birds in the early 1980's which has seen a decline by possibly 50%. This species is heavily affected by the transformation of grasslands in South Africa. In terms of conservation in South Africa it is the conservation management of the highly threatened grassland biome.

Of the 205 resident species, 1 was Breeding Intra Africa, 1 Non – Breeding, and the remaining 203 were permanent residents. The Breeding Intra Africa species is the African Black Swift, this species is both resident and migrant. The Non – Breeding species is the Southern Pochard, which is both resident and non-breeding migratory species. Of the residents there are, 30 uncommon species, 31 fairly common species and 144 common species.

The results show that there are 30 Endemic and 7 Near Endemic resident species occupying the QDS within which the site is located. The residents have 20 listed species, these being 11 **Near Threatened**, and 9 **Vulnerable**, however one species is listed as **Critically Endangered** in South Africa. The vulnerable species identified within the sites QDS are:

- **Blue Crane:** this species is listed as **Vulnerable** as it has seen rapid declines between 1978 – 1998. The global population is estimated at 21 000 individuals. The major threats driving this species decline are that of the loss of the grassland habitats used during breeding. Another major threat to these birds is that of power line Collisions. In terms of the conservation of this species rely on landowner management participation.
- **Grey Crowned Crane:** this species is listed as **Vulnerable** as this species has seen a 20% decrease in population size in the last three generations. The global population is estimated at 85 000 – 95 000 individuals. The major threat to this species survival is that of degradation of both its feeding and breeding habitat. In terms of the conservation of this species management recommendations need to be implemented to allow anthropogenic utilization and crane coexistence.
- **Wattled Crane:** this species is listed as **Vulnerable** globally, however within South Africa this species is currently listed as **Critically Endangered** this being due to its 36% decline. The South African population is estimated at 230 individuals. The largest population is located in south – central Africa (Zambia, Botswana, Angola, Democratic Republic of Congo, Tanzania and Zimbabwe) with an estimated population of 7 000 individuals. The major threats to this species are that of loss and degradation of wetland habitats. In terms of conservation this species is reliant on the maintenance of undisturbed pristine or semi – pristine high – altitude wetland and grassland areas.

- **African Marsh-Harrier:** this species is listed as **Vulnerable** as this species has seen a 20% decrease in population size in the last three generations. The global population is estimated at 3 000 – 5 000 pairs. The major threats to this species survival are that of continued pressure on sensitive wetland habitats. In terms of the future conservation of this species is through the protection and monitoring of important wetland areas associated with this species.
- **White-Bellied Korhaan:** this species is listed as **Vulnerable** as this species has seen a 20% decrease in population size in the last three generations. The global population is estimated at less than 5 000 individuals. The major threats to the survival of this species are that of commercial afforestation. In terms of the conservation of this species is for the protection of suitable taller undisturbed grassland areas.
- **Southern Bald Ibis:** this species is listed as **Vulnerable** as this species has seen a 20% decline over the past three generations. The global population is estimated at less than 10 000 individuals. The major threats to the survival of this species are that of loss and degradation through commercial afforestation, intensive crop farming, open cast mining, coal extraction activities, acid rains and dense human settlements. In terms of the conservation of this species involve the protection of natural grassland foraging habitats and cliffs supporting breeding sites.
- **Denham's Bustard:** this species is listed as **Vulnerable** as it has seen a 20% decline in population size in the last three generations. The global population is estimated at less than 5 000 individuals. The major threats to the survival of this species are through the afforestation of natural grassland habitats. In terms of the conservation of this species is reliant on the maintenance of pastoral farming and appropriate management of natural habitats.
- **Martial Eagle:** this species is listed as **Vulnerable** as it has seen a 20% loss in its regional population size. The global population is estimated at less than 600 pairs. The major threats to this species are through direct persecution by small stock and game farmers. Another major threat to this species is electrocution on electricity structures. In terms of conservation the most important actions are to create awareness and education programmes in order to prevent the persecution of this species.

- **African Grass-Owl:** this species is listed as **Vulnerable** as it has declined by 10% in the last three generations and is expected to decline by 20% in the next three generations. The global population is estimated at less than 5 000 individuals. The major threats to the survival of this species is through the ecological requirements of this species make it susceptible to many of the land – use changes impacting contemporary South Africa

A photo list of the IUCN listed species identified as **Vulnerable** is provided in **Appendix B**.

For the general conservation of the avifaunal community it is important to identify nesting and foraging sites of threatened avifaunal species as these sites are important to the longevity and survival of listed species, in future generations. It is also important to determine the impact of noise on natural sites, as this can result in the loss of noise sensitive species. Other important impacts that need to be limited are that of pollution either through direct contamination of areas or indirect contamination resulting in the degradation of important habitats.

4.5 Avifaunal and Flora Services

4.5.1 Avifaunal Services

There are numerous services provided by the avifaunal communities of the world. These services have however not been clearly valued, with little research being placed on calculating the value of the services provided by the avifaunal community. Some of the identified services provided by the avifaunal community are that of pollination, seed dispersal and pest control.

Pollinator interactions by the avifaunal community are important to flora species identified to utilise this pollination mechanism. Pollination services provided by this mechanism are that of natural vegetation types. This has resulted in limited valuation being calculated by the avifaunal species in this regard.

The avifaunal community is considered to play a vital role in seed dispersal. These services help to maintain and restore plant communities. With restoration increasingly key to global conservation, it is important to understand the landscape attributes and bird community characteristics that most influence avian seed dispersal in human-altered landscapes. In their role as dispersers, birds are not only fundamental to the maintenance of diverse plant communities, but may also have the capacity to restore them.

The avifaunal community also provides and mitigates the impacts of pests. Insectivore species limited the affect associated with pests.

4.5.2 IUCN Listed Flora Identified to Utilize Avifaunal Services

Table 4.2 details the IUCN listed flora species occurring within the greater habitat area. The following IUCN listed flora species utilize avifaunal services:

- *Aloe kniphofioides*, pollinator services;
- *Protea roupelliae*, pollinator services; and
- *Protea subvestita*, pollinator services.

These rare and listed species might be limited to a singular avifaunal species. And thus the loss of this pollinator could result in the flora species becoming Extinct through the loss of the ability to effectively transfer pollen between individuals. This service is important to the successful production of offspring needed for species to survive.

Table 4.2: IUCN listed flora species occurring within greater habitat area.

Family	Genus	Species	Subspecies	Red list category
Amaryllidaceae	<i>Nerine</i>	<i>platypetala</i>		Vulnerable
Asphodelaceae	<i>Aloe</i>	<i>kniphofioides</i>		Vulnerable
Asphodelaceae	<i>Aloe</i>	<i>modesta</i>		Vulnerable
Fabaceae	<i>Lotononis</i>	<i>difformis</i>		Vulnerable
Geraniaceae	<i>Geranium</i>	<i>ornithopodioides</i>		Endangered
Mesembryanthemaceae	<i>Khadia</i>	<i>carolinensis</i>		Vulnerable
Proteaceae	<i>Protea</i>	<i>roupelliae</i>	<i>hamiltonii</i>	Critically Endangered
Proteaceae	<i>Protea</i>	<i>subvestita</i>		Vulnerable

5 AVIFAUNAL IMPACT ASSESSMENT

The Environmental Impacts associated with the proposed expansion were evaluated using the criteria listed in **Table 3.1** and rated according to the criteria specified in **Table 3.2**. All identified impacts associated through the life of the proposed discard dump are identified throughout the following phases specified in the following sections.

5.1 Construction Phase

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE							ACTION PLAN	PHASE	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
CONSTRUCTION PHASE ACTIVITIES: SITE PREPARATION, FOOTPRINT CLEARANCE, INFRASTRUCTURE																				
Maquasa East Coal Discard Dump																				
AVIFAUNAL ASSESSMENT																				
Avifaunal species identified as Common Residents	Proposed Discard Dump	All construction activities	4	3	1	3	24	-	L	Maintaining natural areas surrounding site, pollution control and degradation of neighbouring natural sites.	4	3	1	2	16	-	L	1. Compile relocation programme where necessary/practical	Prior to vegetation clearing	Project Manager Ecologist Environmental Officer
Avifaunal species identified as Fairly Common Residents	Proposed Discard Dump	All construction activities	6	4	2	4	48	-	M	Maintaining natural areas surrounding site, pollution control and degradation of neighbouring natural sites.	6	3	2	2	22	-	L	1. Compile relocation programme where necessary/practical	Prior to vegetation clearing	Project Manager Ecologist Environmental Officer
Afivaunal species identified as Uncommon Residents	Proposed Discard Dump	All construction activities	8	4	3	4	60	-	M	Maintaining natural areas surrounding site, pollution control and degradation of neighbouring natural sites. It is also important to ensure no impacts associated with the site are impacting on the neighbouring wetland and Riparian zone.	8	3	2	3	39	-	M	1. Compile relocation programme where necessary/practical	Prior to vegetation clearing	Project Manager Ecologist Environmental Officer

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE							ACTION PLAN	PHASE	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
Avifaunal species identified as Migratory	Proposed Discard Dump	All construction activities	8	4	5	3	51	-	M	Maintaining natural areas surrounding site, pollution control and degradation of neighbouring natural sites. It important to ensure that no breeding sites or foraging sites neighbouring the discard dump are impacted. (especially for the IUCN listed Lesser Kestrel).	8	3	3	3	42	-	M	1. Conduct detailed, multi-seasonal walk-through prior to construction activities 2. Compile list of protected and RD species 3. Compile relocation programme where necessary / practical	Prior to vegetation clearing	Project Manager Ecologist Environmental Officer
IUCN listed Avifaunal species	Proposed Discard Dump	All construction activities	10	4	5	4	76	-	H	Maintaining natural areas surrounding site, pollution control and degradation of neighbouring natural sites. It important to ensure that no breeding sites or foraging sites neighbouring the discard dump are impacted. These species require limited and specific habitat and thus any loss of these habitats would be detrimental to the survival of these species.	8	4	5	3	51	-	M	1. Conduct detailed, multi-seasonal walk-through prior to construction activities 2. Compile list of protected and RD species 3. Compile relocation programme where necessary / practical	Prior to vegetation clearing	Project Manager Ecologist Environmental Officer

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE							ACTION PLAN	PHASE	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
Loss of habitat suitable for IUCN or uncommon species	Proposed Discard Dump	All construction activities	8	4	1	5	65	-	H	Maintenance of neighbouring habitat and pollution control. These habitats if well maintained will help in the rehabilitation and resettlement of the natural flora communities associated with this area.	6	4	1	4	44	-	M	Identify corridor areas	Prior to vegetation clearing	Engineer in consultation with Environmental Officer
Loss of unique or protected habitat types (including loss and degradation)	Proposed Discard Dump	All construction activities	8	4	2	4	56	-	M	All unique habitat should be assessed as to the impacts on listed species and management plans created for either the appropriate relocation or protection of these unique habitats.	6	3	2	3	33	-	M	1. Identify suitable offset area/s, taking cognisance of existing and formal (declared) conservation programmes in the immediate region. 2. Implement Biodiversity Offset Principles	Construction	Engineer in consultation with Environmental Officer
Loss of nesting sites for breeding species	Proposed Discard Dump	All construction activities	6	4	2	4	48	-	M	Protection of Nesting trees, rocky outcrops, wetlands and other such habitats utilized for the breeding of avifaunal species.	6	3	2	3	33	-	M	1. Identify suitable offset area/s, taking cognisance of existing and formal (declared) conservation programmes in the immediate region. 2. Implement Biodiversity Offset Principles	Construction	Engineer in consultation with Environmental Officer

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE							ACTION PLAN	PHASE	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
Loss of ecological connectivity and ecosystem functioning	Proposed Discard Dump	All construction activities	6	4	2	3	36	-	M	Maintain habitats within surrounding area, prevention of pollution, contamination and degradation of the surrounding natural / disturbed environment.	6	3	2	2	22	-	L	1. Identify suitable offset area/s, taking cognisance of existing and formal (declared) conservation programmes in the immediate region. 2. Implement Biodiversity Offset Principles	Construction	Engineer in consultation with Environmental Officer

5.2 Operational Phase

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
OPERATIONAL PHASE ACTIVITIES: WASTE STOCKPILING, WATER MANAGEMENT WASTE HANDLING (DOMESTIC, HAZARDOUS & SEWAGE)																				
Maquasa East Coal Discard Dump																				
AVIFAUNAL ASSESSMENT																				
Indirect impacts on surrounding habitats	Proposed Discard Dump	All operation activities	6	4	2	3	36	-	M	Monitoring and invasive prevention in neighbouring habitat. All impacts identified and appropriately delt with to ensure the survival and maintenance of surrounding habitats.	4	4	2	2	20	-	L	1. Contain activities to the mine site only	Continual Bi-annual assessments	Engineer
Migratory species habitat lost / disturbed	Proposed Discard Dump	All operation activities	6	4	5	3	45	-	M	Maintenance of edge environment and surrounding area.	4	4	5	2	26	-	L	Ensure some large trees remain as nesting sites	Closure Phase	Engineer
Neighbouring functionality and connectivity between the various habitat types.	Proposed Discard Dump	All operation activities	6	4	2	3	36	-	M	Monitoring and invasive prevention in neighbouring habitat.	2	4	1	3	21	-	L	Identify corridor areas	Prior to vegetation clearing	Engineer in consultation with Environmental Officer
Water and Riparian hapitat.	Proposed Discard Dump	All operation activities	8	4	2	3	42	-	M	Monitoring and invasive prevention in neighbouring habitat.	8	4	2	2	28	-	L	1. Identify suitable offset area/s, taking cognisance of existing and formal (declared) conservation programmes in the immediate region. 2. Implement Biodiversity Offset Principles	Continual Bi-annual assessments	Engineer in consultation with Environmental Officer

5.3 Decommissioning & Closure Phase

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
DECOMISSIONING and CLOSURE ACTIVITIES: REMOVAL OF INFRASTRUCTURE AND RUBBLE, REHABILITATION OF DISTURBED AREAS																				
Maquasa East Coal Discard Dump																				
AVIFAUNAL ASSESSMENT																				
Indirect impacts to surrounding plant and avifaunal communities (fragmentation)	Proposed Discard Dump	All Decomissioning & Closure	6	2	2	3	30	-	M	Minimise impact area to infrastructure area.	6	2	2	2	20	-	L	1. Contain activities to the mine site only	Decomissioning and Closure Phase	Engineer
Water quality deterioration	Proposed Discard Dump	All Decomissioning & Closure	6	4	3	3	39	-	M	Treatment of contaminated water and establishment monitoring points.	4	4	3	2	22	-	L	1. Maintain the clean and dirty water separation structures 2. Ensure drains and storm water structures are maintained and free from obstruction	Decomissioning and Closure Phase	Engineer

5.4 Post - Closure Phase

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
POST-CLOSURE ACTIVITIES: MONITORING AND MAINTENANCE																				
Maquasa East Coal Discard Dump																				
AVIFAUNAL ASSESSMENT																				
Increase in alien vegetation	Proposed Discard Dump	All Post - Closure Activities	6	3	2	3	33	-	M	Establish monitoring transects throughout site area, and appropriate removal of the invasive communities.	4	2	2	3	24	-	L	1. Alien invasive species should be removed from the site as far as practically possible. 2. Monitor surrounding properties and riparian zones for the spread of alien vegetation and remove where practically possible	Post-closure	Environmental Personnel
Inappropriate rehabilitation of pit area and infrastructure. Resulting in the degradation of the rehabilitated area, and site remaining in a degraded state.	Proposed Discard Dump	All Post - Closure Activities	8	5	3	4	64	-	H	Appropriate species selections, slope stabilisation and restoration of glassland species. Maintenance of neighbouring land will assist in the return of important grassland species.	6	5	3	2	28	+	L	1. Conduct soil testing and amelioration (fertilization) should vegetation establishment not be successful post rehabilitation.	Post-closure	Environmental Personnel
Habbitat fragmentation and establishment of secondary climax vegetation types.	Proposed Discard Dump	All Post - Closure Activities	6	5	2	3	39	-	M	Appropriate species selection will help ensure sites remains and establishes appropriate climax state. Transects should be established to assess the progress of the rehabilitation. By the establishment of appropriate plant communities, successful return of the avifaunal community	4	5	2	2	22	+	L	1. Conduct soil testing and amelioration (fertilization) should vegetation establishment not be successful post rehabilitation.	Post-closure	Environmental Personnel
Rehabilitation of the wetland and associated riparian zones, affected by the discard dump.	Proposed Discard Dump	All Post - Closure Activities	6	5	3	2	28	-	L	Monitor riparian habitat and removal of invasie inhabitants.	6	5	3	2	28	+	L	1. Continue with a water monitoring programme	Post-closure	Environmental Personnel

5.5 Cumulative All Phases

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE COAL MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	RESPONSIBLE PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
CUMULATIVE IMPACTS: IMPACTS CONSIDERED ON A REGIONAL SCALE																				
Maquasa East Coal Discard Dump																				
AVIFAUNAL ASSESSMENT																				
Loss of Resident Avifaunal species	Proposed Discard Dump	Cumulative Impacts	4	4	1	2	18	-	L	Maintenance of neighbouring habitat	2	4	1	1	7	-	L	1. Implement action plans for construction phase	Prior to vegetation clearing	Engineer , in consultation with Environmental Officer
Loss of Migratory Avifaunal species	Proposed Discard Dump	Cumulative Impacts	8	4	5	3	51	-	M	Maintenance of neighbouring habitat	4	4	1	2	18	-	L	1. Implement action plans for construction phase	Prior to vegetation clearing	Engineer , in consultation with Environmental Officer
Loss of Conservation Important species	Proposed Discard Dump	Cumulative Impacts	8	4	5	4	68	-	H	Maintenance of neighbouring habitat and appropriate rehabilitation of the impacted site.	6	4	5	3	45	-	M	1. Implement action plans for construction phase	Prior to vegetation clearing	Engineer , in consultation with Environmental Officer
Fragmentation of vegetation communities and habitats	Proposed Discard Dump	Cumulative Impacts	4	4	2	3	30	-	M	Maintenance of neighbouring habitat	2	4	1	2	14	-	L	1. Implement action plans for all phases	All Phases	Engineer , in consultation with Environmental Officer
Introduction of invasive plant species and loss of nesting sites	Proposed Discard Dump	Cumulative Impacts	6	4	2	3	36	-	M	Monitoring transects through the site Post Closure	4	4	2	2	20	-	L	1. Implement action plans for all phases	All Phases	Engineer , in consultation with Environmental Officer
Loss of Wetland and Riparian Habitat and decrease in water quality	Proposed Discard Dump	Cumulative Impacts	8	4	3	3	45	-	M	River Monitoring programme	6	4	3	2	26	-	L	1. Implement action plans for all phases	All Phases	Engineer , in consultation with Environmental Officer

6 GAPS AND ASSUMPTIONS

This survey comprised of a desktop analysis of the identified avifaunal communities previously identified to occur within the sites QDS. This process results in assumptions being made that the QDS has relatively similar habitat types. However due to natural and anthropogenic characteristics this is known not to be true. Thus the species identified within this QDS are a simple best estimate of the possible species within the mining area.

The sites habitat is largely characterised by degraded or transformed land which is not considered suitable for the maintenance of high number of avifaunal species. Due to the nature of rare and listed species it is expected that due to the proximity to the mining area these species are not likely to utilise the area identified for both nesting or foraging.

The wetland habitat is approximately 100 m from the discard dump area and thus little to no pollution of this area is expected to take place. Avifaunal wetland species are expected to be only slightly affected through noise generated at the site.

7 CONCLUSIONS AND IMPACT STATEMENT

The study area is located in the Grassland Biome as defined by Mucina & Rutherford (VegMap, 2006). The proposed Discard Dump area is located within the Eastern Highveld Grassland ecological type, which is currently listed as Endangered due to its medium-high environmental sensitivity. The site is further situated within the Grassland IBA area which comprises of 1 050 000 ha. The area was previously proposed, however not declared, a Biosphere Reserve. This IBA holds an significant of South Africa's threatened and endemic grassland species. The main affects associated with the loss of this habitat are that of grassland afforestation, wetland degradation, mining, accidental and targeted poisoning of cranes and increased acid rain from local power station sulphur emissions. On a more local scale is characterised by four vegetation types.

These are that of degraded grassland habitat, which has a moderate to low impact associated with the loss of these environments. Natural grassland habitats, have a high to moderate impacted associated with the loss of these environments. This is due to the sensitive nature of the grassland system and associated avifaunal communities associated within these areas. The last floral habitat is that of wetlands and riparian habitat. This vegetation type has a high impact associated with its potential loss, this being due to the sensitive nature of wetland and riparian ecosystems. Loss of these systems or degradation is often associated with high avifaunal loss, as many species survive within or in close proximity to wetlands and riparian zones.

The total number of species for which have been identified within the sites QDS is 248 species. Of the 248 species, 1 species is introduced, 32 species are uncommon, 43 species fairly common and the remaining 172 are common species. The majority of the species identified are residents, this being 205 species. There was one listed migrant species identified as **Vulnerable**, this being the **Lesser Kestrel**. The residents have 20 listed species, these being 11 Near Threatened, and 9 Vulnerable, with one species being listed as Critically Endangered in South Africa. The 9 listed species identified are:

- **Blue Crane:** this species is listed as **Vulnerable** with a global population estimated at 21 000 individuals.
- **Grey Crowned Crane:** this species is listed as **Vulnerable** with a global population estimated at 85 000 – 95 000 individuals.
- **Wattled Crane:** this species is listed as **Vulnerable** globally, however within South Africa this species is currently listed as **Critically Endangered** with the South African population only estimated at 230 individuals.
- **African Marsh-Harrier:** this species is listed as **Vulnerable** with a global population estimated at 3 000 – 5 000 pairs.
- **White-Bellied Korhaan:** this species is listed as **Vulnerable** with a global population estimated at less than 5 000 individuals.
- **Southern Bald Ibis:** this species is listed as **Vulnerable** with a global population estimated at less than 10 000 individuals.
- **Denham's Bustard:** this species is listed as **Vulnerable** with a global population estimated at less than 5 000 individuals.
- **Martial Eagle:** this species is listed as **Vulnerable** with a global population estimated at less than 600 pairs.

- **African Grass-Owl:** this species is listed as **Vulnerable** with a global population estimated at less than 5 000 individuals.

The impacts are not only associated with general loss of avifaunal communities, but also with associated services these communities provide. There is currently little knowledge known as to the value of these services but some such services identified are that of pollination, seed dispersal and pest control. These services are important in flora species which utilize either avifaunal pollination or seed dispersal mechanisms. The loss of these services could possibly have detrimental effects to IUCN listed flora species. Some IUCN listed species which might depend on the avifaunal community for pollination are, *Aloe kniphofioides*, *Protea roupelliae* and *Protea subvestita*.

The main identified impacts for the site on the avifaunal community are during the construction and operational phases. The closure and post closure phases through appropriate rehabilitation are generally associated with lower impacts. During the construction phase the impacts are expected to be moderate. These impacts are generally reduced through the mitigation measures. However due to the nature of construction most still remain as moderate impacts.

The operational phase of the proposed discard dump is also rated to have a moderate impact level. This is however controlled through the implementation of mitigation measures reducing the associated operational impacts to low. The main mitigation measure is through the prevention of contamination and maintenance of neighbouring natural sites.

The decommissioning and closure phase had two main impacts associated with it these being indirect impacts and water quality impacts. These without mitigation measures are calculated to be moderate. This is reduced to low through the implementation of the described mitigation measures.

Post – closure phase has impacts ranging from low to high. These impacts are associated with inappropriate rehabilitation and monitoring of the disturbed sites post – closure. With correct monitoring and rehabilitation practices these impacts are limited to a low level. And in some cases sites can be restored to a point where avifaunal communities return to these areas.

The overall impact statement for the site is that if all mitigation and action plans are followed the overall impact will be limited to moderate or low. Appropriate measures for rehabilitation post - closure need to be followed to ensure low levels of impacts associated with the area.

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APPENDIX A: AVIFAUNAL SPECIES LIST

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Accipiter melanoleucus</i>	Black Sparrowhawk	Fairly Common	Resident			N/A	
<i>Acridotheres tristis</i>	Common Myna	Common	Introduced			N/A	
<i>Acrocephalus gracilirostris</i>	Lesser Swamp-Warbler	Common	Resident			N/A	
<i>Actitis hypoleucos</i>	Common Sandpiper	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Actophilornis africanus</i>	African Jacana	Common	Resident			N/A	
<i>Alcedo cristata</i>	Malachite Kingfisher	Common	Resident			N/A	
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	Uncommon	Resident		Near Threatened	Low	Species is limited to riparian zones for breeding and foraging. Loss of these could result in declining population.
<i>Alopochen aegyptiacus</i>	Egyptian Goose	Common	Resident			N/A	
<i>Amadina erythrocephala</i>	Red-headed Finch	Common	Resident	Near Endemic		N/A	
<i>Amandava subflava</i>	Orange-breasted Waxbill	Fairly Common	Resident			N/A	
<i>Anas capensis</i>	Cape Teal	Uncommon	Resident			Low	Impacts to site might have an effect on the habitat suitable for this species.
<i>Anas erythrorhyncha</i>	Red-billed Teal	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Anas hottentota</i>	Hottentot Teal	Common	Resident			N/A	
<i>Anas smithii</i>	Cape Shoveler	Uncommon	Resident	Endemic		Low	Endemic nature of this species could suggest possible loss of habitable land loss causing a decline in the species population.
<i>Anas sparsa</i>	African Black Duck	Fairly Common	Resident			N/A	
<i>Anas undulata</i>	Yellow-billed Duck	Common	Resident			N/A	
<i>Andropadus importunus</i>	Sombre Greenbul	Common	Resident			N/A	
<i>Anhinga rufa</i>	African Darter	Fairly Common	Resident			N/A	
<i>Anthropoides paradiseus</i>	Blue Crane	Common	Resident	Endemic	Vulnerable	Moderate	The endemic and vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 21 000 individuals.
<i>Anthus cinnamomeus</i>	African Pipit	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Anthus crenatus</i>	African Rock Pipit	Uncommon	Resident	Endemic		Low	Endemic nature of this species could suggest possible loss of habitable land loss causing a decline in the species population.
<i>Anthus leucophrys</i>	Plain-backed Pipit	Common	Resident			N/A	
<i>Anthus similis</i>	Long-billed Pipit	Fairly Common	Resident			N/A	
<i>Anthus vaalensis</i>	Buffy Pipit	Common	Resident			N/A	
<i>Apalis thoracica</i>	Bar-throated Apalis	Common	Resident			N/A	
<i>Apaloderma narina</i>	Narina Trogon	Fairly Common	Resident			N/A	
<i>Aplopelia larvata</i>	Lemon Dove	Fairly Common	Resident			N/A	
<i>Apus affinis</i>	Little Swift	Common	Resident			N/A	
<i>Apus barbatus</i>	African Black Swift	Common	Resident	Breeding Intra Africa Migrant		N/A	
<i>Apus caffer</i>	White-rumped Swift	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Apus horus</i>	Horus Swift	Uncommon	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Aquila verreauxii</i>	Verreaux's Eagle	Fairly Common	Resident			N/A	
<i>Ardea cinerea</i>	Grey Heron	Common	Resident			N/A	
<i>Ardea goliath</i>	Goliath Heron	Uncommon	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Ardea melanocephala</i>	Black-headed Heron	Common	Resident			N/A	
<i>Ardea purpurea</i>	Purple Heron	Common	Resident			N/A	
<i>Ardeola ralloides</i>	Squacco Heron	Common	Resident			N/A	
<i>Asio capensis</i>	Marsh Owl	Common	Resident			N/A	
<i>Balearica regulorum</i>	Grey Crowned Crane	Uncommon	Resident		Vulnerable	Moderate / High	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 3000 individuals.
<i>Batis capensis</i>	Cape Batis	Common	Resident			N/A	
<i>Bostrychia hagedash</i>	Hadedda Ibis	Common	Resident			N/A	
<i>Bradypterus baboecala</i>	Little Rush-Warbler	Common	Resident			N/A	
<i>Bradypterus barratti</i>	Barratt's Warbler	Uncommon	Resident	Endemic		Low	Endemic nature of this species could suggest possible loss of habitable land loss causing a decline in the species population.
<i>Bubo africanus</i>	Spotted Eagle-Owl	Common	Resident			N/A	
<i>Bubulcus ibis</i>	Cattle Egret	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Buggeranus carunculatus</i>	Wattled Crane	Uncommon	Resident	Critically Endangered in South Africa	Vulnerable	High	This species is Critically Endangered within South Africa and listed as Vulnerable globally. Loss of suitable habitat is the leading cause for the status of this species. Population is currently limited to approximately 230 individuals.
<i>Burhinus capensis</i>	Spotted Thick-knee	Fairly Common	Resident			N/A	
<i>Buteo rufofuscus</i>	Jackal Buzzard	Common	Resident	Endemic		N/A	
<i>Buteo trizonatus</i>	Forest Buzzard	Uncommon	Resident	Endemic		Low	Endemic nature of this species could suggest possible loss of habitable land loss causing a decline in the species population.
<i>Buteo vulpinus</i>	Steppe Buzzard	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Calandrella cinerea</i>	Red-capped Lark	Common	Resident			N/A	
<i>Calidris minuta</i>	Little Stint	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Campephaga flava</i>	Black Cuckooshrike	Uncommon	Resident			N/A	
<i>Campethera abingoni</i>	Golden-tailed Woodpecker	Fairly Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Caprimulgus europaeus</i>	European Nightjar	Uncommon	Migrant	Non - Breeding Palearctic Migrant		Low	Little impact expected due to uncommon status and migratory nature of species.
<i>Caprimulgus pectoralis</i>	Fiery-necked Nightjar	Common	Resident			N/A	
<i>Cercomela familiaris</i>	Familiar Chat	Common	Resident			N/A	
<i>Certhilauda semitorquata</i>	Eastern Long-billed Lark	Fairly Common	Resident	Endemic		N/A	
<i>Ceryle rudis</i>	Pied Kingfisher	Common	Resident			N/A	
<i>Chalcomitra amethystina</i>	Amethyst Sunbird	Common	Resident			N/A	
<i>Charadrius tricollaris</i>	Three-banded Plover	Common	Resident			N/A	
<i>Chersomanes albofasciata</i>	Spike-heeled Lark	Fairly Common	Resident	Endemic		N/A	
<i>Chlidonias hybrida</i>	Whiskered Tern	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Chlidonias leucopterus</i>	White-winged Tern	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Chloropeta natalensis</i>	Dark-capped Yellow Warbler	Common	Resident			N/A	
<i>Chrysococcyx caprius</i>	Diderick Cuckoo	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Chrysococcyx klaas</i>	Klaas's Cuckoo	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Ciconia ciconia</i>	White Stork	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Ciconia nigra</i>	Black Stork	Uncommon	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Cinnyricinclus leucogaster</i>	Violet-backed Starling	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Cinnyris afer</i>	Greater Double- collared Sunbird	Common	Resident	Endemic		N/A	
<i>Circus ranivorus</i>	African Marsh- Harrier	Common	Resident		Vulnerable	Moderate	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 5000 pairs.
<i>Cisticola aberrans</i>	Lazy Cisticola	Common	Resident			N/A	
<i>Cisticola ayresii</i>	Wing-snapping Cisticola	Common	Resident			N/A	
<i>Cisticola cinnamomeus</i>	Pale-crowned Cisticola	Fairly Common	Resident			N/A	
<i>Cisticola fulvicapilla</i>	Neddicky	Common	Resident			N/A	
<i>Cisticola juncidis</i>	Zitting Cisticola	Common	Resident			N/A	
<i>Cisticola lais</i>	Wailing Cisticola	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Cisticola natalensis</i>	Croaking Cisticola	Common	Resident			N/A	
<i>Cisticola textrix</i>	Cloud Cisticola	Common	Resident	Near Endemic		N/A	
<i>Cisticola tinniens</i>	Levaillant's Cisticola	Common	Resident			N/A	
<i>Clamator jacobinus</i>	Jacobin Cuckoo	Fairly Common	Migrant	Breeding Migrant		N/A	
<i>Coccyzygia melanotis</i>	Swee Waxbill	Fairly Common	Resident	Endemic		N/A	
<i>Colius striatus</i>	Speckled Mousebird	Common	Resident			N/A	
<i>Columba arquatrix</i>	African Olive-Pigeon	Fairly Common	Resident			N/A	
<i>Columba guinea</i>	Speckled Pigeon	Common	Resident			N/A	
<i>Columba livia</i>	Rock Dove	Common	Resident			N/A	
<i>Corvus albus</i>	Pied Crow	Common	Resident			N/A	
<i>Corvus capensis</i>	Cape Crow	Common	Resident			N/A	
<i>Cossypha caffra</i>	Cape Robin-Chat	Common	Resident			N/A	
<i>Cossypha dichroa</i>	Chorister Robin-Chat	Fairly Common	Resident	Endemic		N/A	
<i>Coturnix coturnix</i>	Common Quail	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Creatophora cinerea</i>	Wattled Starling	Common	Resident			N/A	
<i>Crithagra atrogularis</i>	Black-throated Canary	Common	Resident			N/A	
<i>Crithagra gularis</i>	Streaky-headed Seed-eater	Fairly Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Crithagra mozambicus</i>	Yellow-fronted Canary	Common	Resident			N/A	
<i>Crithagra scotops</i>	Forest Canary	Common	Resident	Endemic		N/A	
<i>Cuculus clamosus</i>	Black Cuckoo	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Cuculus gularis</i>	African Cuckoo	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Cuculus solitarius</i>	Red-chested Cuckoo	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Delichon urbicum</i>	Common House- Martin	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Dendrocygna viduata</i>	White-faced Duck	Common	Resident			N/A	
<i>Dendropicos fuscescens</i>	Cardinal Woodpecker	Common	Resident			N/A	
<i>Dendropicos griseocephalus</i>	Olive Woodpecker	Fairly Common	Resident			N/A	
<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	Common	Resident			N/A	
<i>Dryoscopus cubla</i>	Black-backed Puffback	Common	Resident			N/A	
<i>Egretta alba</i>	Great Egret	Uncommon	Resident			N/A	
<i>Egretta garzetta</i>	Little Egret	Fairly Common	Resident			N/A	
<i>Egretta intermedia</i>	Yellow-billed Egret	Uncommon	Resident			N/A	
<i>Elanus caeruleus</i>	Black-shouldered Kite	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Emberiza capensis</i>	Cape Bunting	Common	Resident	Near Endemic		N/A	
<i>Emberiza flaviventris</i>	Golden-breasted Bunting	Common	Resident			N/A	
<i>Emberiza tahapisi</i>	Cinnamon-breasted Bunting	Common	Resident			N/A	
<i>Estrilda astrild</i>	Common Waxbill	Common	Resident			N/A	
<i>Euplectes afer</i>	Yellow-crowned Bishop	Common	Resident			N/A	
<i>Euplectes albonotatus</i>	White-winged Widowbird	Common	Resident			N/A	
<i>Euplectes ardens</i>	Red-collared Widowbird	Common	Resident			N/A	
<i>Euplectes axillaris</i>	Fan-tailed Widowbird	Common	Resident			N/A	
<i>Euplectes capensis</i>	Yellow Bishop	Common	Resident			N/A	
<i>Euplectes orix</i>	Southern Red Bishop	Common	Resident			N/A	
<i>Euplectes progne</i>	Long-tailed Widowbird	Common	Resident			N/A	
<i>Eupodotis caerulescens</i>	Blue Korhaan	Uncommon	Resident	Endemic	Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Eupodotis senegalensis</i>	White-bellied Korhaan	Uncommon	Resident		Vulnerable	Moderate	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 5000 individuals.
<i>Falco amurensis</i>	Amur Falcon	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Falco biarmicus</i>	Lanner Falcon	Fairly Common	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Falco naumanni</i>	Lesser Kestrel	Common	Migrant	Non - Breeding Palearctic Migrant	Vulnerable	Moderate	Migratory species, which is currently listed globally as near threatened. Globally the population has been estimated at 60 000 individuals.
<i>Falco rupicolus</i>	Rock Kestrel	Common	Resident			N/A	
<i>Falco vespertinus</i>	Red-footed Falcon	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Fulica cristata</i>	Red-knobbed Coot	Common	Resident			N/A	
<i>Gallinago nigripennis</i>	African Snipe	Uncommon	Resident			N/A	
<i>Gallinula chloropus</i>	Common Moorhen	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Geocolaptes olivaceus</i>	Ground Woodpecker	Common	Resident	Endemic		Low	
<i>Geronticus calvus</i>	Southern Bald Ibis	Uncommon	Resident	Endemic	Vulnerable	Moderate / High	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 10 000 individuals.
<i>Halcyon albiventris</i>	Brown-hooded Kingfisher	Common	Resident			N/A	
<i>Haliaeetus vocifer</i>	African Fish-Eagle	Common	Resident			N/A	
<i>Himantopus himantopus</i>	Black-winged Stilt	Common	Resident			N/A	
<i>Hirundo albigularis</i>	White-throated Swallow	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Hirundo cucullata</i>	Greater Striped Swallow	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Hirundo fuligula</i>	Rock Martin	Common	Resident			N/A	
<i>Hirundo rustica</i>	Barn Swallow	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Hirundo spilodera</i>	South African Cliff-Swallow	Common	Migrant	Breeding Intra Africa Migrant Endemic		N/A	
<i>Indicator indicator</i>	Greater Honeyguide	Uncommon	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Jynx ruficollis</i>	Red-throated Wryneck	Common	Resident			N/A	
<i>Lagonosticta rubricata</i>	African Firefinch	Common	Resident			N/A	
<i>Lamprotornis nitens</i>	Cape Glossy Starling	Common	Resident			N/A	
<i>Laniarius ferrugineus</i>	Southern Boubou	Common	Resident	Endemic		N/A	
<i>Lanius collaris</i>	Common Fiscal	Common	Resident			N/A	
<i>Lanius collurio</i>	Red-backed Shrike	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Lanius minor</i>	Lesser Grey Shrike	Fairly Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Larus cirrocephalus</i>	Grey-headed Gull	Common	Resident			N/A	
<i>Lioptilus nigricapillus</i>	Bush Blackcap	Uncommon	Resident	Endemic	Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Lissotis melanogaster</i>	Black-bellied Bustard	Uncommon	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Lybius torquatus</i>	Black-collared Barbet	Common	Resident			N/A	
<i>Macronyx capensis</i>	Cape Longclaw	Common	Resident	Endemic		N/A	
<i>Megaceryle maximus</i>	Giant Kingfisher	Common	Resident			N/A	
<i>Melaenornis pammelaina</i>	Southern Black Flycatcher	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Merops apiaster</i>	European Bee-eater	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Milvus aegyptius</i>	Yellow-billed Kite	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Mirafraga africana</i>	Rufous-naped Lark	Common	Resident			N/A	
<i>Monticola explorator</i>	Sentinel Rock-Thrush	Common	Resident	Endemic		N/A	
<i>Monticola rupestris</i>	Cape Rock-Thrush	Fairly Common	Resident	Endemic		N/A	
<i>Motacilla capensis</i>	Cape Wagtail	Common	Resident			N/A	
<i>Muscicapa adusta</i>	African Dusky Flycatcher	Common	Resident			N/A	
<i>Muscicapa striata</i>	Spotted Flycatcher	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Myrmecocichla formicivora</i>	Anteater Chat	Common	Resident	Endemic		N/A	
<i>Nectarinia famosa</i>	Malachite Sunbird	Common	Resident			N/A	
<i>Neotis denhami</i>	Denham's Bustard	Uncommon	Resident		Vulnerable	Moderate	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 5000 individuals.

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Netta erythrophthalma</i>	Southern Pochard	Fairly Common	Resident	Non - Breeding Migrant		N/A	
<i>Numida meleagris</i>	Helmeted Guineafowl	Common	Resident			N/A	
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	Fairly Common	Resident			N/A	
<i>Oenanthe bifasciata</i>	Buff-streaked Chat	Common	Resident	Endemic		N/A	
<i>Oenanthe monticola</i>	Mountain Wheatear	Common	Resident	Near Endemic		N/A	
<i>Onychognathus morio</i>	Red-winged Starling	Common	Resident			N/A	
<i>Oriolus larvatus</i>	Black-headed Oriole	Common	Resident			N/A	
<i>Ortygospiza atricollis</i>	African Quailfinch	Fairly Common	Resident			N/A	
<i>Parus niger</i>	Southern Black Tit	Common	Resident			N/A	
<i>Passer diffusus</i>	Southern Grey- headed Sparrow	Common	Resident			N/A	
<i>Passer domesticus</i>	House Sparrow	Common	Resident			N/A	
<i>Passer melanurus</i>	Cape Sparrow	Common	Resident	Near Endemic		N/A	
<i>Petronia supercilialis</i>	Yellow-throated Petronia	Fairly Common	Resident			N/A	
<i>Phalacrocorax africanus</i>	Reed Cormorant	Common	Resident			N/A	
<i>Phalacrocorax carbo</i>	White-breasted Cormorant	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Philomachus pugnax</i>	Ruff	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Phoenicopterus minor</i>	Lesser Flamingo	Common	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Phoenicopterus ruber</i>	Greater Flamingo	Common	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Phoeniculus purpureus</i>	Green Wood- Hoopoe	Common	Resident			N/A	
<i>Phylloscopus ruficapilla</i>	Yellow-throated Woodland-Warbler	Common	Resident			N/A	
<i>Phylloscopus trochilus</i>	Willow Warbler	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Platalea alba</i>	African Spoonbill	Common	Resident			N/A	
<i>Plectropterus gambensis</i>	Spur-winged Goose	Common	Resident			N/A	
<i>Plegadis falcinellus</i>	Glossy Ibis	Uncommon	Resident			N/A	
<i>Ploceus capensis</i>	Cape Weaver	Common	Resident	Endemic		N/A	
<i>Ploceus velatus</i>	Southern Masked- Weaver	Common	Resident			N/A	
<i>Podiceps cristatus</i>	Great Crested Grebe	Fairly Common	Resident			N/A	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Uncommon	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Pogonocichla stellata</i>	White-starred Robin	Fairly Common	Resident			N/A	
<i>Polemaetus bellicosus</i>	Martial Eagle	Uncommon	Resident		Vulnerable	Moderate	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 600 pairs.
<i>Polyboroides typus</i>	African Harrier-Hawk	Fairly Common	Resident			N/A	
<i>Porphyrio madagascariensis</i>	African Purple Swamphen	Common	Resident			N/A	
<i>Prinia hypoxantha</i>	Drakensberg Prinia	Common	Resident	Endemic		Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Prinia subflava</i>	Tawny-flanked Prinia	Common	Resident			N/A	
<i>Psaldoprocne holomelas</i>	Black Saw-wing	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Psophocichla litsipsirupa</i>	Groundscraper Thrush	Common	Resident			N/A	
<i>Pternistis swainsonii</i>	Swainson's Spurfowl	Common	Resident			N/A	
<i>Pycnonotus tricolor</i>	Dark-capped Bulbul	Common	Resident			N/A	
<i>Quelea quelea</i>	Red-billed Quelea	Common	Migrant	Breeding Migrant		N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Riparia cincta</i>	Banded Martin	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Riparia paludicola</i>	Brown-throated Martin	Common	Resident			N/A	
<i>Sagittarius serpentarius</i>	Secretarybird	Uncommon	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Sarkidiornis melanotos</i>	Comb Duck	Fairly Common	Migrant	Intra Africa Partial Migrant		N/A	
<i>Saxicola torquatus</i>	African Stonechat	Common	Resident			N/A	
<i>Scleroptila lewaillantii</i>	Red-winged Francolin	Uncommon	Resident			N/A	
<i>Scopus umbretta</i>	Hamerkop	Common	Resident			N/A	
<i>Serinus canicollis</i>	Cape Canary	Common	Resident	Endemic		N/A	
<i>Sigelus silens</i>	Fiscal Flycatcher	Common	Resident	Endemic		N/A	
<i>Sphenoeacus afer</i>	Cape Grassbird	Fairly Common	Resident	Endemic		N/A	
<i>Spreo bicolor</i>	Pied Starling	Common	Resident	Endemic		N/A	
<i>Stephanoaetus coronatus</i>	African Crowned Eagle	Uncommon	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Streptopelia capicola</i>	Cape Turtle-Dove	Common	Resident			N/A	
<i>Streptopelia semitorquata</i>	Red-eyed Dove	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Streptopelia senegalensis</i>	Laughing Dove	Common	Resident			N/A	
<i>Tachybaptus ruficollis</i>	Little Grebe	Common	Resident			N/A	
<i>Tachymarptis melba</i>	Alpine Swift	Fairly Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Tchagra senegalus</i>	Black-crowned Tchagra	Common	Resident			N/A	
<i>Telophorus olivaceus</i>	Olive Bush-Shrike	Common	Resident	Near Endemic		N/A	
<i>Telophorus zeylonus</i>	Bokmakierie	Common	Resident	Near Endemic		N/A	
<i>Terpsiphone viridis</i>	African Paradise- Flycatcher	Common	Migrant	Breeding Intra Africa Migrant		N/A	
<i>Thalassornis leuconotus</i>	White-backed Duck	Uncommon	Resident			N/A	
<i>Thamnolaea cinnamomeiventris</i>	Mocking Cliff-Chat	Common	Resident			N/A	
<i>Threskiornis aethiopicus</i>	African Sacred Ibis	Common	Resident			N/A	
<i>Trachyphonus vaillantii</i>	Crested Barbet	Common	Resident			N/A	
<i>Tringa glareola</i>	Wood Sandpiper	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Tringa nebularia</i>	Common Greenshank	Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Fairly Common	Migrant	Non - Breeding Palearctic Migrant		N/A	
<i>Turdus libonyanus</i>	Kurrichane Thrush	Common	Resident			N/A	

SPECIES	COMMON NAME	STATUS	RESIDENTS, MIGRANTS OR VAGRANT	INHABITANT CATEGORY	IUCN RATING	IMPACT	REASON
<i>Turdus olivaceus</i>	Olive Thrush	Common	Resident			N/A	
<i>Turdus smithi</i>	Karoo Thrush	Common	Resident	Endemic		N/A	
<i>Turnix sylvaticus</i>	Kurrichane Buttonquail	Common	Migrant	Breeding Migrant		N/A	
<i>Tyto capensis</i>	African Grass-Owl	Uncommon	Resident		Vulnerable	Moderate	The vulnerable status of this species, suggests that losses to its habitat for breeding and foraging could result in population declines. Population is currently limited to less than 5000 individuals.
<i>Upupa africana</i>	African Hoopoe	Common	Resident			N/A	
<i>Uraeginthus angolensis</i>	Blue Waxbill	Common	Resident			N/A	
<i>Vanellus armatus</i>	Blacksmith Lapwing	Common	Resident			N/A	
<i>Vanellus coronatus</i>	Crowned Lapwing	Common	Resident			N/A	
<i>Vanellus melanopterus</i>	Black-winged Lapwing	Uncommon	Resident		Near Threatened	Low	Declining suitable breeding habitat is likely to result in declining population.
<i>Vanellus senegallus</i>	African Wattled Lapwing	Fairly Common	Resident			N/A	
<i>Vidua funerea</i>	Dusky Indigobird	Fairly Common	Resident			N/A	
<i>Vidua macroura</i>	Pin-tailed Whydah	Common	Resident			N/A	
<i>Zosterops virens</i>	Cape White-eye	Common	Resident	Endemic		N/A	

APPENDIX B: IUCN PHOTO LIST

SPECIES (COMMON NAME)	IUCN STATUS	PHOTO
Falco naumanni (Lesser Kestrel)	Vulnerable	
Anthropoides paradiseus (Blue Crane)	Vulnerable	

SPECIES (COMMON NAME)	IUCN STATUS	PHOTO
Balearica regulorum (Grey Crowned Crane)	Vulnerable	
Bugeranus carunculatus (Wattled Crane)	Critically Endangered and globally Vulnerable	
Circus ranivorus (African Marsh Harrier)	Vulnerable	

SPECIES (COMMON NAME)	IUCN STATUS	PHOTO
Eupodotis senegalensis (White - Bellied Korhaan)	Vulnerable	
Geronticus calvus (Southern Bald Ibis)	Vulnerable	
Neotis denhami (Denham's Bustard)	Vulnerable	

SPECIES (COMMON NAME)	IUCN STATUS	PHOTO
Polemaetus bellicosus (Martial Eagle)	Vulnerable	
Tyto capensis (African Grass Owl)	Vulnerable	