AVIFAUNAL IMPACT ASSESSMENT

FOR THE PROPOSED 2X 400 KV TRANSMISSION LINE FROM ARIES SUBSTATION TO UPINGTON SUBSTATION IN NORTHERN CAPE

September 2021

COMPLIANCE WITH APPENDIX 6 OF THE 2017 EIA REGULATIONS

Requirements of Appendix 6 – GN R326 EIA Regulations 7 April 2017	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain- **a) details of-** **i. the specialist who prepared the report; and** **ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;**	*Appendix A*
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	1
c) an indication of the scope of, and the purpose for which, the report was prepared;	2
(cA) an indication of the quality and age of base data used for thespecialist report;	6
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	28
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	6
e) a description of the methodology adopted in preparing the report orcarrying out the specialised process inclusive of equipment and modelling used;	6-7
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associatedstructures and infrastructure, inclusive of a site plan identifying site alternatives;	21-27
g) an identification of any areas to be avoided, including buffers;	21-27
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the siteincluding areas to be avoided, including buffers;	21-27
i) a description of any assumptions made and any uncertainties or gapsin knowledge;	5
j) a description of the findings and potential implications of such findingson the impact of the proposed activity or activities;	18
k) any mitigation measures for inclusion in the EMPr;	28
l) any conditions for inclusion in the environmental authorisation;	29
m) any monitoring requirements for inclusion in the EMPr or environmentalauthorisation;	29
n) a reasoned opinion- **i. whether the proposed activity, activities or portions thereofshould be authorised;** **(iA) regarding the acceptability of the proposed activity or activities and** **ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;**	29
o) a description of any consultation process that was undertaken duringthe course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during anyconsultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the competent authority.	

2) Where a government notice gazetted by the Minister provides for any protocolor minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

DOCUMENT CONTROL

Report Name	MOLEPO, M. 2021. AVIFAUNAL IMPACT ASSESSMENT FOR THE PROPOSED 2X 400 KV TRANSMISSION LINE FROM ARIES SUBSTATION TO UPINGTON SUBSTATION IN NORTHERN CAPE
Reference	ARIUP_AVI/21
Submitted to	Vombe Consulting
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Internal Reviewer	Ramokone Mothwa BSc. Hons (University of Limpopo)

EXECUTIVE SUMMARY

In South Africa birds are faced with two major problems when it comes to electricity structures. Those are electrocution and collision.

MORA Ecological Services (Pty) Ltd was appointed by Vombe Consulting to conduct an avifaunal impact assessment for the proposed 2x 400kV Transmission line. The project entails a 2 x 400kV powerline that includes two substations, one named Upington and the other Aries both located outside Upington in Northern Cape.

More than 500 bird species are known to occur in this province. The birds of greatest potential relevance and importance with regard to possible impacts of the powerline transmission and associated infrastructure are likely to be local populations of endemic passerines, resident or migrant large bodied raptors, waterbirds and other terrestrial birds.

The terms of reference for the project were as follow;

- Describe the current state of avifauna in the study area, outlining important characteristics which may be influenced by the proposed infrastructure, or which may influence the proposed infrastructure during construction and operation;
- Identify Red Data species that may be potentially affected by the proposed project;
- Identify potential impacts on the avifauna that may arise from the proposed development;
- Undertake an impact assessment as specified in the NEMA 2014 regulations;
- Provide guidance on where the proposed transmission powerline and associated infrastructure should be situated to have the least impact on avifauna;
- Delineate where necessary any obvious, highly sensitive, no-go areas to be avoided during the construction of the transmission powerline and associated infrastructure; and
- Recommend practicable mitigation measures to minimize or eliminate negative impacts and or enhance potential project benefits.

The current state of avifauna in the study area was described, outlining important characteristics which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.

Potential impacts that have been identified during the study include bird collision, electrocution, and loss of habitats. Mitigation measures to safeguard the avifauna around the area were provided.

Sensitive avifaunal areas of the site were identified and discussed in the report. These areas were found to be associated with the Orange River and several drainage lines along the transmission powerline route.

Overall, the avifaunal sensitivity of the study area was regarded as Low-Medium around majority of the habitats. With the exception of the Orange River crossing. With proper mitigations as recommended in this report, impacts can be reduced to Low.

The impacts associated with the proposed project are summarised below.

Impact	Phase	Without mitigation	With mitigation
Electrocutions	Construction Phase	L	L
	Operation Phase	M	L
Collisions	Construction Phase	M	L
	Operation Phase	H	L
Habitat loss	Construction Phase	M	L
	Operation Phase	L	L

From the desktop and fieldwork data and analysis, it was concluded that the proposed transmission powerline and associated infrastructure can proceed, provided that the recommendations from the specialist are adhered to.

TABLE OF CONTENTS

List of figures

List of tables

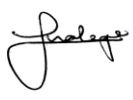
1. DECLARATION OF INDEPENDENCE

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

- Act/acted as an independent specialist to Vombe Consulting 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 with regard to 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 009509.

20 September 2021

2. TERMS OF REFERENCES

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3. INTRODUCTION AND PROJECT LOCATION

Electricity supply is an essential service for South Africa's society and economy. In South Africa birds are faced with several problems when it comes to electricity structures. Those are electrocution and collision.

When it comes to interaction of birds with powerlines, birds are categorised as follows:

- Streamers
- Collision
- Electrocution
- Insulator Pollution
- Nesting

Electrocution: Birds perching on towers/conducting cables are killed if they cause short circuits.

Collision: In flight, birds can collide into the powerlines because powerlines are difficult to perceive as obstacles.

The risk of collisions in majority of the birds is increased by body size and limited manoeuvrability (McCann. 2005).

MORA Ecological Services (Pty) Ltd were appointed to conduct an avifaunal impact assessment for the proposed deviation of a 2x 400kV transmission powerline construction namely, Aries to Upington (Fig. 1).

This assessment was expected to provide a detailed description of the local avifauna and current ecological status of the proposed site and provide appropriate management recommendations.

Figure 1: Location of the study site.

Assumptions, Limitations, uncertainties and gap analysis

- It is assumed that third party information (obtained from government, academic institutions and non-governmental organisations) is accurate and true;
- The study area was previously poorly surveyed prior to the baseline survey, as a result, species richness information is incomplete;
- 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 wetland and terrestrial environment;
- The study was conducted at a time when palearctic migrants have not arrived at their final wintering grounds;
- Limited time in the field means that important components of the local avifauna (i.e.nest sites or localised areas of key habitats for rare or threatened species) could have been missed;
- The site visits as well as personal experience of the avifauna of the area and of similar species in different parts of South Africa, through the specialist's experience working across the country, goes some way to remedying any knowledge deficiencies.

MORA and its employees do not accept any responsibility for conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from the surveys or requests made to them at the time of this report.

SURVEY METHODS AND REPORTING

Study area

The proposed transmission powerline falls within Northern Cape. It starts north of Aries Substation outside Kenhardt to Upington Substation.

Climate

The climate in Northern Cape varies according to regions, and the prevalent one around the study area is Hot semi-arid climate.

Birdlife

South Africa has recorded approximately 856 bird species, of which 68 are endemic or near endemic and 132 are Threatened or Near Threatened (Taylor & Peacock, 2018).

Northern Cape has recorded approximately 557 species including 28 species which are globally threatened (Avibase)

Data Collection

Desktop

Prior to commencement of the fieldwork, desktop data was collected from the following:

Southern African Bird Atlas Project 2 (SABAP2).

Coordinated Waterbird Counts (CWAC) which has data of more than 400 wetlands countrywide. None of the transmission powerline nor substation is located near CWAC site.

SANBI BGIS for vegetation types (Mucina and Rutherford, 2006).

Fieldwork

The site surveys were conducted in August 2021. Avifaunal surveys were conducted by a combination of walk transects, drive transects and point count method. A 12 minute point count method on a 20 m radius was used (Macchi & Grau 2012). For drive transects, observers used existing gravel roads where possible. For walk transects, observers walked along selected sections of the proposed transmission powerline.

Avifaunal micro habitats were identified using both ornithological and ecological experience.

No formal consultation process was conducted as part of this faunal study as it was not deemed necessary at the time of the study.

Vegetation of the study site

While broad-scale vegetation patterns influence the distribution and abundance of bird species holistically, it is the fine-scale vegetation patterns and various avian microhabitats in an area that determine local avifauna populations. While this is an avifaunal specialist report, vegetation and micro habitats are very important in determining avifaunal abundances and likelihood of occurrences.

The proposed transmission line runs through four vegetation types as described by Mucina & Rutherford (2006). These vegetation types are displayed below (Fig. 2).

Figure 2: Vegetation map of the study site.

4. RELEVANT LEGISLATION

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 bio-prospecting of biological resources; and cooperative governance in biodiversity management and conservation within the framework of NEMA.

CMS

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) aims to conserve terrestrial, aquatic and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned 22 with the conservation of wildlife and habitats on a global scale. Since the Convention's entry into force, its membership has grown steadily to include 117 (as of 1 June 2012) Parties from Africa, Central and South America, Asia, Europe and Oceania. South Africa is a signatory to this convention.

AEWA

The African-Eurasian Waterbird Agreement. The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) is the largest of its kind developed so far under the CMS. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including many species of divers, grebes, pelicans, cormorants, herons, storks, rails, ibises, spoonbills, flamingos, ducks, swans, geese, cranes, waders, gulls, terns, tropic birds, auks, frigate birds and even the South African penguin. The agreement covers 119 countries and the European Union (EU) from Europe, parts of Asia and Canada, the Middle East and Africa.

5. IMPORTANT BIRD & BIODIVERSITY AREAS (IBAs)

BirdLife's Important Bird and Biodiversity Area concept has been developed and applied for over 30 years. Considerable effort has been devoted to refining and agreeing a set of simple but robust criteria that can be applied worldwide.

Initially, IBAs were identified only for terrestrial and freshwater environments, but over the past decade, the IBA process and method has been adapted and applied in the marine

realm. In 2012, BirdLife published the first Marine IBA “e-atlas”, with details of 3,000 IBAs in coastal and territorial waters as well as on the high seas.

Important Bird and Biodiversity Areas (IBAs) are:

- Places of international significance for the conservation of birds and other biodiversity
- Recognised world-wide as practical tools for conservation.
- Distinct areas amenable to practical conservation action.
- Identified using robust, standardised criteria.
- Sites that together form part of a wider integrated approach to the conservation and sustainable use of the natural environment.

There is no IBA in proximity of the proposed transmission line. The nearest IBA is located approximately 30 km west of the transmission line (Fig. 3).

Augrabies Falls National Park

Site description

The Augrabies Falls National Park is situated on the vast Bushmanland peneplain where it straddles the Orange River, c. 35 km north-west of Kakamas. Before reaching the falls, the Orange River flows through a wide, flat valley where mainly commercial viticulture farming is practised. After cascading down the 56-m-high falls it meanders down a deep, narrow gorge for 18 km before reaching the level surface of the surrounding plains at Blouputs, where viticulture continues.

The largest section of the park is flat with low relief and scattered rocky hills. Large rounded granite domes and black granulite hills provide a variety of habitats. Ephemeral riverbeds and drainage lines are sandy, gravelly and dry and are mostly very shallow; some, however, are deeper with rocky sides and broad beds. The very low rainfall is sporadic and unpredictable, and this IBA is prone to long periods of drought.

The IBA belongs to the Bushmanland Bioregion, and lies within the Nama Karoo Biome. The ecosystem status for most of the area is Least Threatened with one vegetation type, Lower Gariep Alluvial, classified as Endangered. The remaining vegetation types are Bushmanland Arid Grassland, Kalahari Karroid Shrubland, Blouputs Karroid Thornveld and Lower Gariep Broken Veld. Very little transformation has taken place.

Birds

Despite having a low species diversity, this IBA is important for many biome-restricted assemblage birds and a host of other arid-zone species. A total of 192 species has been recorded in the park. The total number of species recorded during SABAP2 is 186, with the pentads having been fairly well atlased at the time the IBA was assessed.

The lowland plains support large wide-ranging species such as Martial Eagle *Polemaetus bellicosus*, Kori Bustard *Ardeotis kori*, Ludwig's Bustard *Neotis ludwigii* and Karoo Korhaan *Eupodotis vigorsii*. Karoo Chat *Cercomela schlegelii*, Tractrac Chat *C. tractrac*, Sickle-winged Chat *C. sinuata* and Rufous-eared Warbler *Malcorus pectoralis* frequent the plains. Black-headed Canary *Serinus alario* is common where there is seed and water.

Large trees, including camel thorn *Vachellia* (formerly *Acacia*) *erioloba* and quiver tree *Aloe dichotoma*, occasionally support Sociable Weaver *Philetairus socius* nests, with the associated Pygmy Falcon *Polihierax semitorquatus* frequently present. In very wet years, large numbers of nomadic Black-eared Sparrow-lark *Eremopterix australis* and Stark's Lark *Spizocorys starki* move in for a brief period and breed. Verreauxs' Eagle *Aquila verreauxii,* Peregrine Falcon *Falco peregrinus*, Black Stork *Ciconia nigra*, Pale-winged Starling *Onychognathus nabouroup*, Bradfield's Swift *Apus bradfieldi* and Cinnamon-breasted Warbler *Euryptila subcinnamomea* occur in the river's steep gorges and associated rocky kloofs.

The belts of riparian *Vachellia* (formerly *Acacia*) *karroo* woodland hold Kalahari Scrub Robin *Erythropygia paena*, Namaqua Warbler *Phragmacia substriata*, Layard's Tit-Babbler *Sylvia layardi*, Marico Flycatcher *Bradornis mariquensis*, Scaly-feathered Finch *Sporopipes squamifrons* and Rosy-faced Lovebird *Agapornis roseicollis.* Waterbirds are associated with the river, although no globally important populations are supported.

IBA trigger species

Globally threatened birds are Martial Eagle, Kori Bustard and Ludwig's Bustard. Regionally threatened birds are Karoo Korhaan, Lanner Falcon *Falco biarmicus* and breeding Verreauxs' Eagle (4 to 6 birds; N du Plessis *pers. comm*.). Biome-restricted species are Stark's Lark, Karoo Long-billed Lark *Certhilauda subcoronata*, Kalahari Scrub Robin, Karoo Chat, Tractrac Chat, Sickle-winged Chat, Cinnamon-breasted Warbler, Namaqua Warbler, Layard's Tit-Babbler, Sociable Weaver, Pale-winged Starling and Black-headed Canary.

Other biodiversity

This IBA conserves populations of various near-endemic and endemic species. These include the distinctive quiver tree, the endemic marbled rubber frog *Phrynomantis annectens* and Broadley's flat lizard *Platysaurus broadleyi*. The healthy population of Hartmann's mountain zebra *Equus zebra hartmannae* (Vulnerable) is closely monitored.

After being re-introduced to the AFNP in 1985, black rhinos *Diceros bicornis* (Critically Endangered) were relocated to the Addo Elephant National Park in 1998. There are plans to re-introduce a small population again soon.

Conservation issues

Threats

This IBA is well managed, with far fewer threats than the surrounding landscape. Overgrazing of the surrounding farmland is, however, a threat. It results in degradation of habitat outside the park, potentially reducing populations of wide-ranging species such as bustards, which depend on large foraging areas that fall mostly outside the IBA's borders. Invasive alien plants are a continuing threat, especially in the riparian vegetation zone. Three invasive species are being actively controlled.

Historically, poisons were used extensively in the region to control damage-causing predators, such as black-backed jackal Canis mesomelas and caracal Caracal caracal. Poison use may be continuing in the surrounding livestock farming areas, but is likely to be at a lower level than previously. The potential impacts of poison use on several threatened raptor species has not been quantified.

Renewable energy developments, including hydropower, are a new threat. There are two approved applications to develop solar energy facilities on neighbouring farms at the southern boundary of this IBA. Possible impacts on birds are loss of habitat, breeding disturbance during construction, collisions with the reflective solar panels and, in the case of concentrated solar plants with power towers, solar flux injuries. Existing and new power lines from substations to renewable energy facilities are significant threats to trigger species.

The Nama Karoo and Succulent Karoo Biomes, which hold 76% of southern Africa's endemic birds, are under serious threat from climate change. Restricted-range and biome-restricted species tend to show greater sensitivity to climate change, arising from their comparatively narrow climatic niches. Large, mainly resident species dependent on rainfall are also more vulnerable to climate change. This would include the slow-breeding Verreauxs' Eagle and Martial Eagle, which also exhibit extended parental care.

Temperatures in most South African parks have increased between 1 and 1.5 ^{o}C over the past 50 years.

Conservation action

This IBA is a formally protected national park, established in 1966. It is an important tourist attraction, drawing up to 89 000 visitors per annum. The highest numbers were recorded during recent floods in 2010 and 2011.

Land claims on two property portions are still in process, and discussions are ongoing to find mutually beneficial co-management arrangements. Negotiations are in progress to contractually include private land in the western section of the park, which will increase its extent by approximately 5 392 ha.

Because of the threat of climate change to this region's biodiversity in the coming decades, it is critical to maintain the ability of species to migrate to new locations in response to changing conditions across the landscape. The effective conservation of much of the planet's biodiversity under climate change will depend upon rigorously defined networks of protected areas displaying functional connectivity at regional and continental scales.

The National Protected Areas Expansion Strategy priority areas are included in the buffer zone that surrounds the park. The priority expansion footprint of the buffer zone just reaches the eastern extent of the Mattheus-Gat Conservation Area IBA (SA034). Privately owned land in this area linking the two IBAs should be considered for declaration as protected environments under the Biodiversity Stewardship programme.

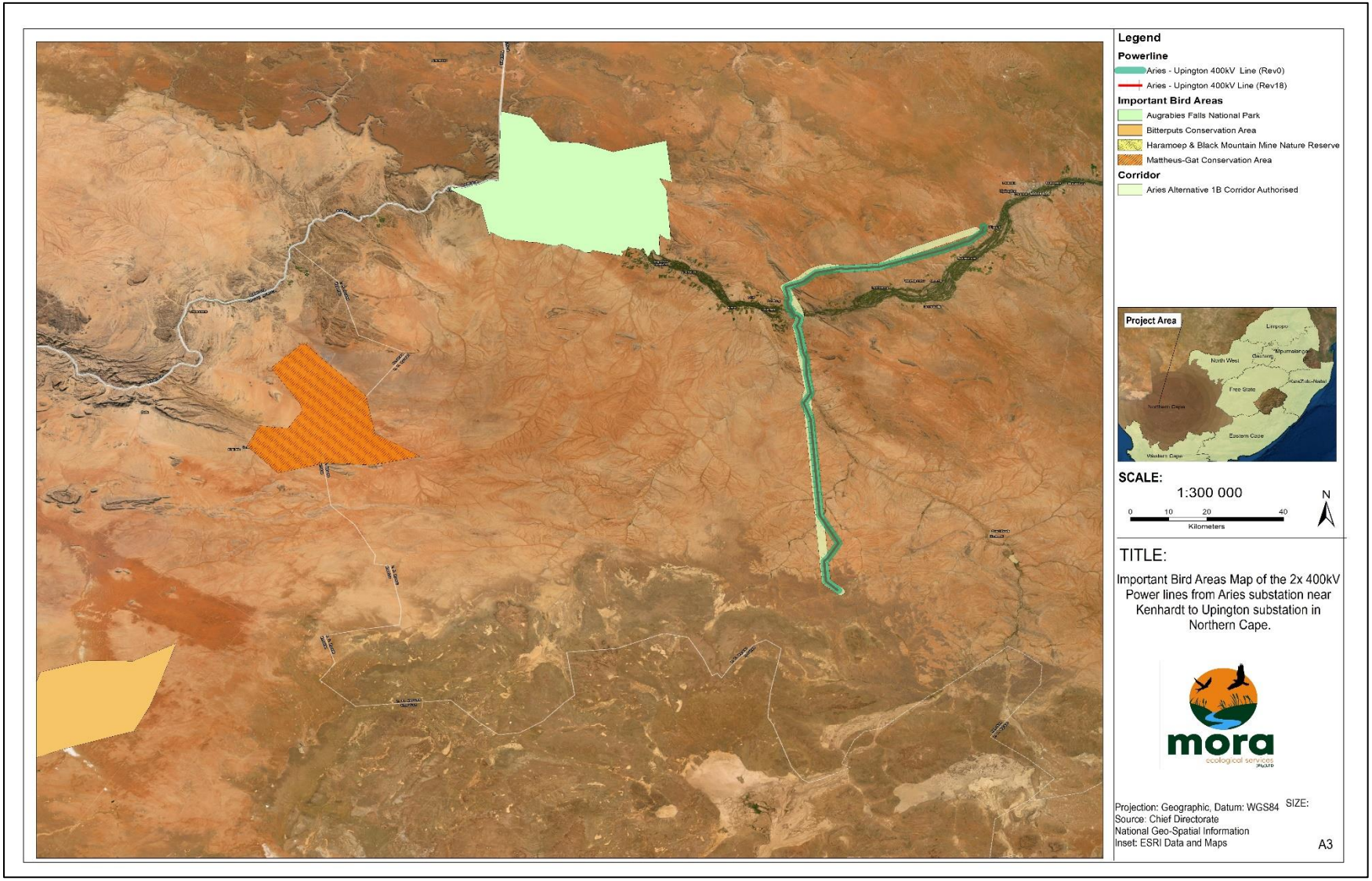

Figure 3: Important Bird and Biodiversity Areas in relation to the powerline.

Bird micro habitats

In addition to the description of vegetation, it is important to understand the habitats available to birds at a smaller spatial scale, i.e. micro habitats. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food sources and man-made factors. Investigation of this study area revealed the following bird micro habitats.

Waterbodies:

Waterbodies have become important attractants to various bird species in the South African landscape. Various waterfowl, such as Egyptian goose, Spur-winged goose and numerous duck species, are likely to frequent these areas and are vulnerable to collision with power lines. More importantly, Flamingos are likely use these areas as stop over points while moving between larger water bodies. Various Storks may also frequent these water bodies. There is a pond and drainage lines in the study area which are of great importance to avifauna.

Figure 4: Several waterbodies observed around the study area.

Vegetation:

The powerline route is dominated by Bushveld and Grassland vegetation with croplands in between. This type of vegetation is likely to support a variety of bird species. Furthermore, low shrubs will mostly be important to physically smaller bird species to escape heat during the day. Majority of the trees are less likely to interact directly with the proposed powerline. They may, however, provide perching, roosting and nesting habitat for various raptor species, as well as larger birds such as francolins, Guineafowl, Herons and Hadeda Ibises.

Figure 5: Typical vegetation along the powerline route.

6. RESULTS

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).

More than 500 bird species are known to occur in the province referred to as the study area. Generally, the areas along the proposed transmission powerline are of **Low Sensitivity** due to anthropogenic activities in majority of the area. Furthermore, very few Species of Conservation Concern were observed, and SABPA2 also has few of the abovementioned. Below is the table containing species recorded on site during the survey.

Table 1: Non-threatened terrestrial and waterbird species recorded including Red Data bird species that are likely to occur within the impact area including.

Species	Common Name	IUCN Conservation Status	Preferred habitat
Phoenicopterus roseus	Greater Flamingo	NT	Wetlands
Ciconia nigra	Black Stork	VU	Wetlands
Polemaetus bellicosus	Martial Eagle	EN	Natural veld
Falco biarmicus	Lanner Falcon	VU	Natural veld and Farmland
Falco rupicoloides	*Greater Kestrel	LC	Natural veld and Farmland
Oena capensis	*Namaqua Dove	LC	Natural veld, Semi-arid and Farmland
Crithagra flaviventris	*Yellow Canary	LC	Open shrubland, Grassland
Corvus capensis	*Cape Crow	LC	Grassland, Open Savanna, and Farmland
Sylvia subcoerulea	*Chestnut-vented Warbler	LC	Semi-arid woodlands and shrubland
Colius colius	*White-backed Mousebird	LC	Semi-arid and arid
Lamprotornis nitens	*Cape Starling	LC	Savanna, Farmland, Riverine bush
Motacilla capensis	*Cape Wagtail	LC	Generalist
Turdus litsitsirupa	*Groundscraper Thrush	LC	Open woodland
Cercotrichas coryphoeus	*Karoo Scrub Robin	LC	Drainage line woodland and Bushveld clumps
Petrochelidon spilodera	*South African Cliff Swallow	LC	Grassland and Savanna

Chrysococcyx caprius	Diederik Cuckoo	LC	Savanna, Semi-arid shrubland, Drainage lines
Himantopus Himantopus	*Black-winged Stilt	LC	Wetlands and Sewage dams
Tricholama leucomelas	*Acacia Pied Barbet	LC	Semi-arid Savanna
Ardea goliath	*Goliath Heron	LC	Shallow waterbodies
Tadorna cana	*South African Shelduck	LC	Wetlands
Threskiornis aethiopicus	African Sacred Ibis	LC	Wetlands, Farmland, Landfills and Grasslands
Bubulcus ibis	*Western Cattle Egret	LC	Grassland and Farmland
Eupodotis vigorsi	Karoo Korhaan	LC	Shrubland
Afrotis afraoides	Northern Black Korhaan	LC	Grassland, Bushveld and Farmland
Alopochen aegyptiaca	*Egyptian Goose	LC	Wetlands and Farmland
Plectropterus gambensis	*Spur-winged Goose	LC	Wetlands and Farmland
Numida meleagris	*Helmeted Guineafowl	LC	Generalist
Sagittarius serpentarius	Secretarybird	VU	Open Grassland with scattered trees
Struthio camelus	*Common Ostrich	LC	Open Arid Savanna, Shrubland and Desert

*=Recorded

Sociable Weaver nest

African Fish Eagle

Ant Eating Chat

White Browed Sparrow Weaver nest

Sickle-winged Chat

Karoo Korhaan

Figure 6: Some of the birds observed along the powerline route.

Avifaunal Sensitivity

The proposed transmission powerline and associated infrastructures were checked for avifaunal sensitivity. During the survey it was observed that avifaunal sensitive sites were mainly associated with rivers, drainage lines and ridge lines.

Upington Substation to Loxtonvale Deviation:

This section was observed to be of Low Avifaunal Sensitivity due to its distance away from the Orange River (see Fig. 7).

Kakamas Orange River Deviation:

This section was observed to be of Low-Medium and High Avifaunal Sensitivity due to the ridge line and Orange River and a canal. Presence of rivers attract migrant and large bodied waterbirds (see Fig. 8).

Uitsig to Aries Substation Deviation:

This section was observed to be of Low-Medium Avifaunal Sensitivity due to the presence several tributaries of Graafwaters River (see Fig. 9). Species of Conservation Concern such as Karoo Korhaan were observed along this section.

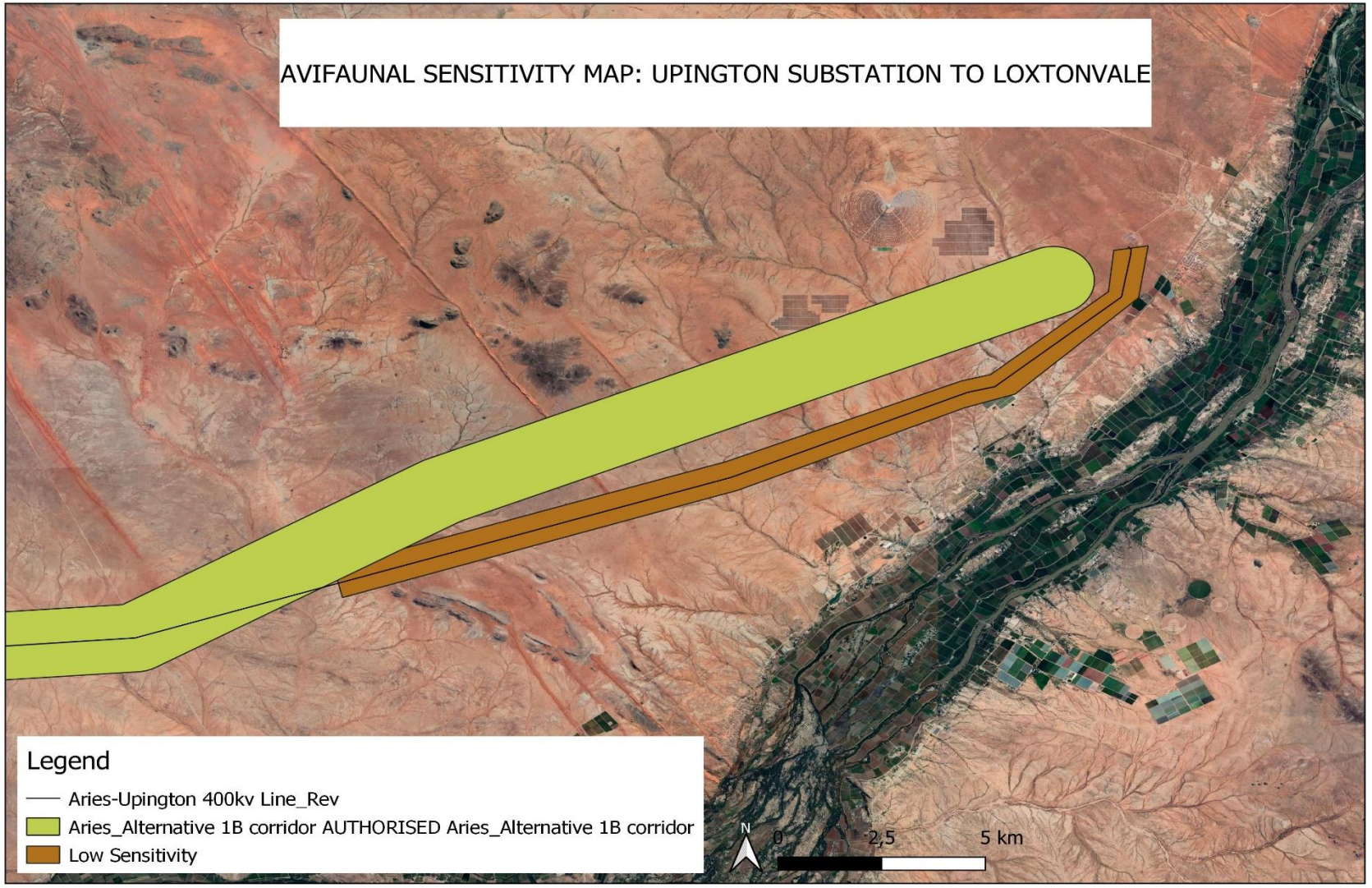

Figure 7: Avifaunal Sensitivity A.

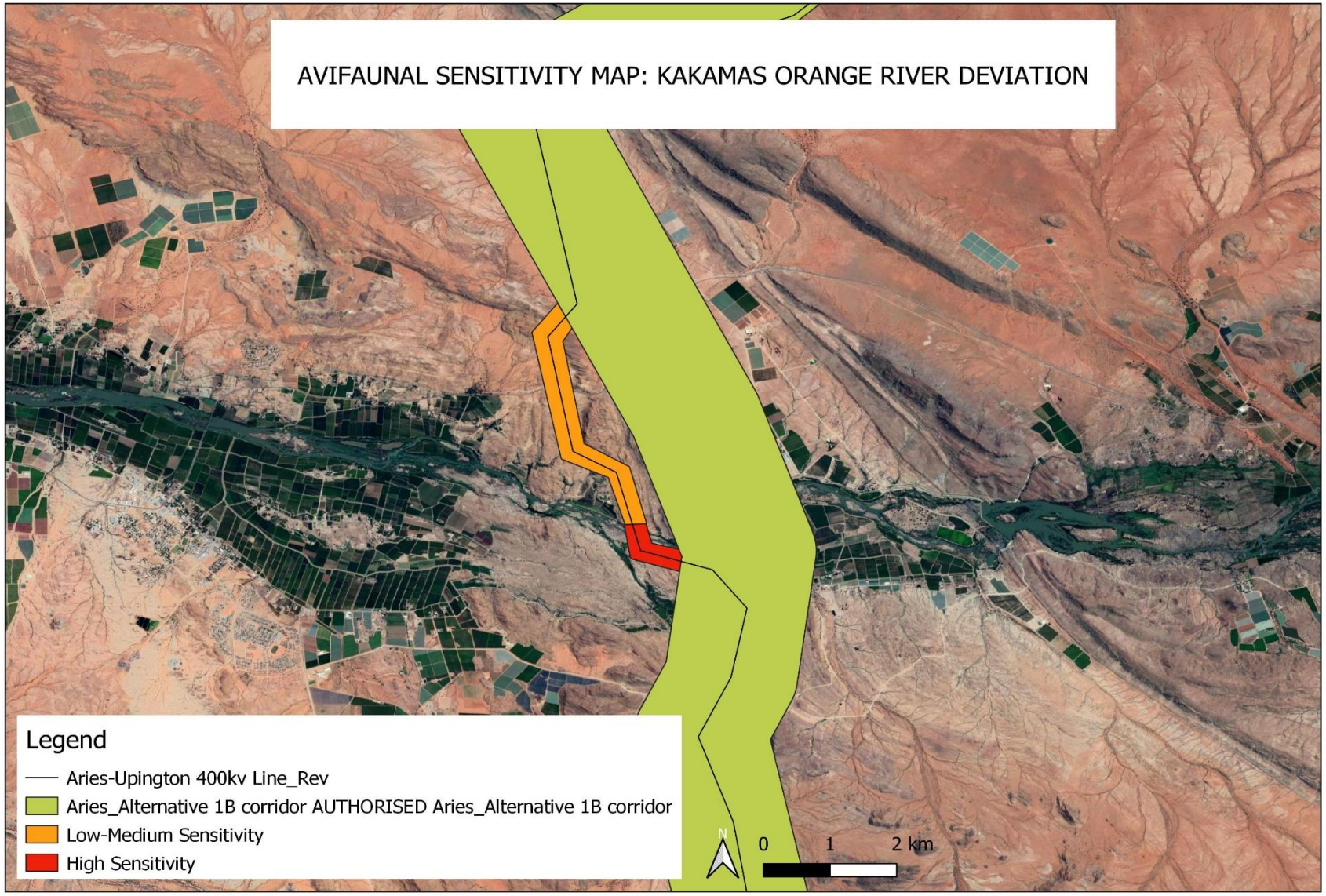

Figure 8: Avifaunal Sensitivity B.

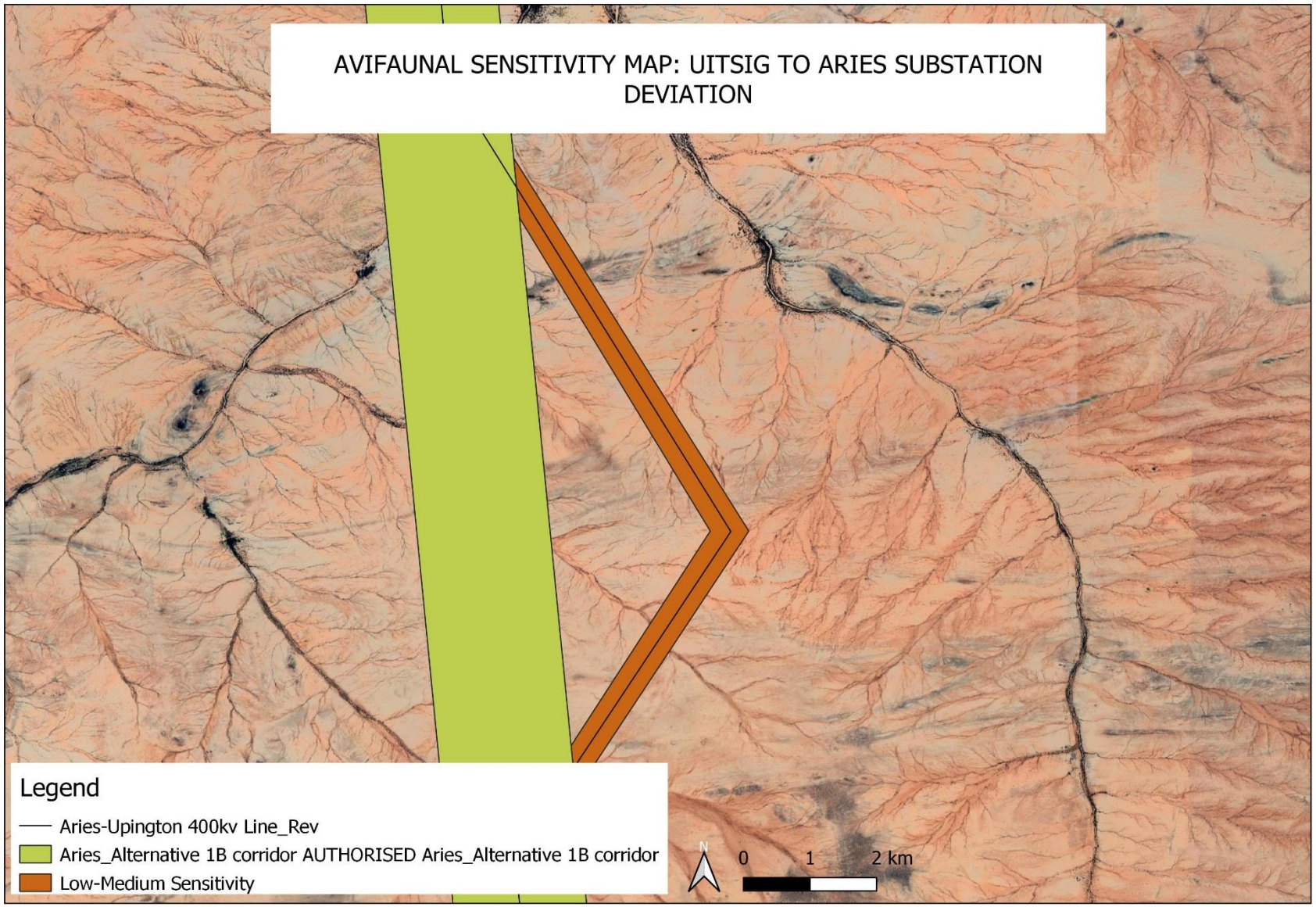

Figure 9: Avifaunal Sensitivity C.

POTENTIAL IMPACTS AND MITIGATION MEASURES

- Bird mortality through collision and electrocution.
- Loss of nesting and foraging grounds for birds.
- Disturbance and displacement of local endemic passerines - from nesting and/or foraging areas by construction, operation and maintenance.

Impact 1: Electrocutions

Potential impact description: Electrocution of birds when perched on towers							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	M	L	Negative	M	M	H
Can the impact be reversed?	No.						
Will impact cause irreplaceable loss or resources?	Yes. Birds may be killed						
Can impact be avoided, managed or mitigated?	Not required						
Mitigation measures: • No mitigations are required as the risk of birds being electrocuted is considered negligible.							
Cumulative impacts: Impacts could be very low if the installation follows Eskom approved guidelines.							
Residual impacts: Once the transmission lines are decommissioned, the impacts would cease.							

Impact 2: Collisions

Potential impact description: Collision of birds with wires.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	H	Negative	M	H	H
With Mitigation	L	H	L	Negative	L	M	H
Can the impact be reversed?	This impact can be prevented through appropriated mitigation measures						
Will impact cause irreplaceable loss or resources?	Yes. Species of Conservation Concern are likely to be killed.						
Can impact be avoided, managed or mitigated?	Yes.						
Mitigation measures: • Bird Flight Diverters should be installed on selected sections of the powerlines (i.e., Where it crosses drainage lines, waterbodies).							

Cumulative impacts: Impacts could be substantial if contractors do not adhere to Eskom approved line marking guidelines.
Residual impacts: Although birds that would have been killed by the powerlines can be considered as residual, the impacts would cease once the transmission lines are decommissioned.

Impact 3: Habitat Destruction/ Loss

Potential impact description: The construction of the transmission powerline and associated infrastructure will result in habitat loss

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	H	H
With Mitigation	L	M	L	Negative	M	M	H

Can the impact be reversed?	No, once vegetation is cleared, it would be possible to return it to its previous state.
Will impact cause irreplaceable loss or resources?	No. No Species of Conservation Concern are likely to be impacted by vegetation clearance.
Can impact be avoided, managed or mitigated?	Yes. Although mitigations will be provided, minimal vegetation loss would be inevitable.

Mitigation measures:

- All vegetation not required to be removed should be protected against damage.
- Sensitive areas such as wetlands and drainage lines must be avoided.
- Existing roads must be used where possible during construction of the transmission powerline.
- Ideally, an Ornithologist should conduct a preconstruction walk-through of the selected alignment to check for possible nesting sites of Red Data birds immediately before construction commences.

Cumulative impacts: Impacts could be substantial if cleared areas that are no longer used are left bare without rehabilitation measures.

Residual impacts: Vegetation would recover to a large extent.

SUMMARY OF ASSESSMENT

Impact	Phase	Without mitigation	With mitigation
Electrocutions	Construction Phase	L	L
	Operation Phase	M	L
Collisions	Construction Phase	M	L
	Operation Phase	H	L
Habitat loss	Construction Phase	M	L
	Operation Phase	L	L

7. CONCLUSION AND SUMMARY OF RECOMMENDATIONS

While electricity supply is an essential service for the country, it important that it does not negatively impact our ecological resources (plants, birds and other animals). Conservation of these resources should be prioritized.

Impacts such as collisions, electrocutions, avifaunal displacement, and loss of habitats especially nesting site are expected during developments of this nature.

Bird mortalities caused by transmission infrastructures have been documented worldwide and applicable methods to prevent such mortalities have been developed.

Some of the listed mitigation measures will also protect other collision prone species, which include non-threatened large terrestrial and waterbird species.

The following recommendations are applicable for the proposed transmission powerlines and associated infrastructures:

A “Bird Friendly” structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower infrastructure.

All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting, 2002).

Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie, 2006; Prinsen *et al*., 2012).

Bird Flight Diverters should be placed from tower/pylon to tower/pylon instead of 60% placement along the collision risk areas. The relevant sections of power line requiring this mitigation should be confirmed by an avifaunal walk down once the exact route and tower positions are confirmed just prior to construction.

Shaw (2013) found that collision still occurred near the towers/pylons. As a result, they recommended a 100% marking of a powerline on high collision risk sections.

Overall, the impacts associated with this proposed transmission powerline are considered Low-Medium with the exception of collisions with powerlines and habitat loss resulting from establishment of servitudes.

It is the opinion of the specialist that the proposed construction of 2x 400kV transmission powerline namely, Aries to Upington be considered favourably, provided that the mitigations and recommendations are adhered to.

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9. APPENDIX A: Short CV/Summary of Expertise – Mokgatla Molepo

Mokgatla Molepo is Director and Principal Ecologist at MORA Ecological Services and has over 10 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 50 projects across South Africa. He is registered with the South African Council for Natural Scientific Professions (No. 009509).

TERTIARY EDUCATION:

- MSc Zoology, Nelson Mandela University

  Research Project Topic: Foraging behaviour and thermal physiology in Cape Sugarbirds: sex-specific responses to temperature.

- BSc Honours in Zoology, University of Limpopo

  Research Project Topic: Morphometrics and plumage variation in the South African Fiscal flycatcher *Sigelus silens* Shaw 1809.

- BSc Botany & Zoology, University of Venda

CERTIFICATES:

- Hydropedology and Wetland Functioning, Terra Soil Science & Water Business Academy
- Section 21 (c) & (i) Water Use Authorisation Training, Department of Water and Sanitation
- Basic Project Management, Hudisa Business School

PROFESSIONAL MEMBERSHIP:

- South African Council for Natural Scientific Professions (SACNASP) – Professionally registered as Professional Natural Scientist. **Registration number:** 009509
- British Ecological Society (BES). **Membership number**: 1010709
- Zoological Society of Southern Africa (ZSSA). **Membership number**: 691

WORK EXPERIENCE:

- MORA Ecological Services (Pty) Ltd: April 2018 – Current, I am an Environmental Specialist and my duties include; (i) conducting ecological and environmental impact assessments, (ii) and writing specialist reports.
- Arcus Consulting: May - November 2017
- Centre for African Conservation Ecology (ACE), Nelson Mandela University: 2015 – 2016.
- South African National Biodiversity Institute (SANBI): May – December 2014.
- Department of Zoology, University of Venda: 2009 – 2013.
- Percy FitzPatrick Institute of African Ornithology: March – April 2014.

SELECTED ECOLOGICAL ASSESSMENT PROJECTS:

Year	Project	Location:	Role(s)
2021	Avifaunal Impact Assessment: Musina-Makhado Special Economic Zone	Musina & Makhado Local Municipality	Avifaunal Specialist/Ornithologist
2021	Avifaunal Impact Assessment: Proposed 400kV Kimberley Strengthening	North West & Northern Cape	Avifaunal Specialist/Ornithologist
2020	Avifaunal Impact Assessment for the proposed 33kV overhead powerlines on Roggeveld Wind Energy Farm	Laingsburg Local Municipality, Western Cape	Avifaunal Specialist/Ornithologist
2020	Avifaunal & Ecological Impact Assessment for the proposed solar farm on Vaalkloof Nature Reserve.	Breede Valley Municipality, Western Cape	Ecologist
2020	Biodiversity Impact Assessment (BIA) for the proposed township establishment in Pretoria North	Pretoria, Gauteng	Ecologist
2019	Ecological assessment for the proposed mine on Farm Palmietfontein 189 IP situated within JB Marks Local Municipality, North West Province	Ventersdorp, North West	Ecologist
2019	Biodiversity Management Plans for Evander Gold Mine	Evander, Mpumalanga	Ecologist
2019	Avifaunal assessment for the proposed granite mine outside Mokopane	Mogalakwena Local Municipality, Limpopo	Avifaunal Specialist/ Ornithologist
2019	Ecological assessment for the proposed for Nandoni mixed development.	Nandoni, Thulamela Local Municipality, Limpopo	Ecologist
2019	Ecological assessment for the proposed cultural village on farm Mphaphuli 278MT	Mukomaasinandu, Thulamela Local Municipality, Limpopo	Ecologist
2019	Ecological assessment for the proposed Musina mixed development.	Musina, Limpopo	Ecologist
2019	Preliminary Ecological assessment for the prospecting on Kroomdrai farm, Mokopane	Mokopane, Mogalakwena Local Municipality, Limpopo	Ecologist
2018	Avifaunal impact assessment for the proposed construction of two double storey on Mooifontein farm no 14IR, Portion 22 in Norkem, Kempton Park	City of Ekurhuleni, Gauteng province	Avifaunal Specialist/ Ornithologist

10. APPENDIX B: Selected SABAP 2 species list

Upington	Ref	Common group	Common species	Genus	Species
1	432	Barbet	Acacia Pied	*Tricholaema*	*leucomelas*
2	431	Barbet	Black-collared	*Lybius*	*torquatus*
3	439	Barbet	Crested	*Trachyphonus*	*vaillantii*
4	674	Batis	Pririt	*Batis*	*pririt*
5	404	Bee-eater	European	*Merops*	*apiaster*
6	410	Bee-eater	Little	*Merops*	*pusillus*
7	411	Bee-eater	Swallow-tailed	*Merops*	*hirundineus*
8	808	Bishop	Southern Red	*Euplectes*	*orix*
9	812	Bishop	Yellow-crowned	*Euplectes*	*afer*
10	722	Bokmakierie	Bokmakierie	*Telophorus*	*zeylonus*
11	731	Brubru	Brubru	*Nilaus*	*afer*
12	544	Bulbul	African Red-eyed	*Pycnonotus*	*nigricans*
13	545	Bulbul	Dark-capped	*Pycnonotus*	*tricolor*
14	872	Bunting	Cinnamon-breasted	*Emberiza*	*tahapisi*
15	874	Bunting	Golden-breasted	*Emberiza*	*flaviventris*
16	871	Bunting	Lark-like	*Emberiza*	*impetuani*
17	154	Buzzard	Steppe	*Buteo*	*vulpinus*
18	860	Canary	Black-throated	*Crithagra*	*atrogularis*
19	866	Canary	Yellow	*Crithagra*	*flaviventris*
20	575	Chat	Anteating	*Myrmecocichla*	*formicivora*
21	570	Chat	Familiar	*Cercomela*	*familiaris*
22	630	Cisticola	Desert	*Cisticola*	*aridulus*
23	646	Cisticola	Levaillant's	*Cisticola*	*tinniens*
24	642	Cisticola	Rattling	*Cisticola*	*chiniana*

Upington	Ref	Common group	Common species	Genus	Species
25	641	Cisticola	Tinkling	*Cisticola*	*rufilatus*
26	629	Cisticola	Zitting	*Cisticola*	*juncidis*
27	504	Cliff-swallow	South African	*Hirundo*	*spilodera*
28	212	Coot	Red-knobbed	*Fulica*	*cristata*
29	50	Cormorant	Reed	*Phalacrocorax*	*africanus*
30	4131	Coucal	Burchell's	*Centropus*	*burchellii*
31	277	Courser	Temminck's	*Cursorius*	*temminckii*
32	203	Crake	Black	*Amaurornis*	*flavirostris*
33	621	Crombec	Long-billed	*Sylvietta*	*rufescens*
34	523	Crow	Cape	*Corvus*	*capensis*
35	522	Crow	Pied	*Corvus*	*albus*
36	352	Cuckoo	Diderick	*Chrysococcyx*	*caprius*
37	348	Cuckoo	Jacobin	*Clamator*	*jacobinus*
38	351	Cuckoo	Klaas's	*Chrysococcyx*	*klaas*
39	317	Dove	Laughing	*Streptopelia*	*senegalensis*
40	318	Dove	Namaqua	*Oena*	*capensis*
41	314	Dove	Red-eyed	*Streptopelia*	*semitorquata*
42	940	Dove	Rock	*Columba*	*livia*
43	517	Drongo	Fork-tailed	*Dicrurus*	*adsimilis*
44	103	Duck	Maccoa	*Oxyura*	*maccoa*
45	100	Duck	White-faced	*Dendrocygna*	*viduata*
46	96	Duck	Yellow-billed	*Anas*	*undulata*
46	70	Eagle	African Fish	*Haliaeeetus*	*vocifer*
47	368	Eagle-owl	Spotted	*Bubo*	*africanus*
48	61	Egret	Cattle	*Bubulcus*	*ibis*
49	59	Egret	Little	*Egretta*	*garzetta*
50	600	Eremomela	Yellow-bellied	*Eremomela*	*icteropygialis*
51	119	Falcon	Amur	*Falco*	*amurensis*

Upington	Ref	Common group	Common species	Genus	Species
52	820	Finch	Red-headed	*Amadina*	*erythrocephala*
53	789	Finch	Scaly-feathered	*Sporopipes*	*squamifrons*
54	835	Firefinch	Jameson's	*Lagonosticta*	*rhodopareia*
55	837	Firefinch	Red-billed	*Lagonosticta*	*senegala*
56	707	Fiscal	Common (Southern)	*Lanius*	*collaris*
57	663	Flycatcher	Chat	*Bradornis*	*infuscatus*
58	665	Flycatcher	Fiscal	*Sigelus*	*silens*
59	661	Flycatcher	Marico	*Bradornis*	*mariquensis*
60	654	Flycatcher	Spotted	*Muscicapa*	*striata*
61	179	Francolin	Orange River	*Scleroptila*	*levaillantoides*
62	339	Go-away-bird	Grey	*Corythaixoides*	*concolor*
63	89	Goose	Egyptian	*Alopochen*	*aegyptiacus*
64	88	Goose	Spur-winged	*Plectropterus*	*gambensis*
65	162	Goshawk	Gabar	*Melierax*	*gabar*
66	165	Goshawk	Southern Pale Chanting	*Melierax*	*canorus*
67	6	Grebe	Little	*Tachybaptus*	*ruficollis*
68	192	Guineafowl	Helmeted	*Numida*	*meleagris*
69	288	Gull	Grey-headed	*Larus*	*cirrocephalus*
70	72	Hamerkop	Hamerkop	*Scopus*	*umbretta*
71	171	Harrier-Hawk	African	*Polyboroides*	*typus*
72	55	Heron	Black-headed	*Ardea*	*melanocephala*
73	54	Heron	Grey	*Ardea*	*cinerea*
74	442	Honeyguide	Lesser	*Indicator*	*minor*
75	418	Hoopoe	African	*Upupa*	*africana*
76	424	Hornbill	African Grey	*Tockus*	*nasutus*
77	426	Hornbill	Southern Yellow-billed	*Tockus*	*leucomelas*
78	81	Ibis	African Sacred	*Threskiornis*	*aethiopicus*
79	83	Ibis	Glossy	*Plegadis*	*falcinellus*

Upington	Ref	Common group	Common species	Genus	Species
80	84	Ibis	Hadeda	*Bostrychia*	*hagedash*
81	851	Indigobird	Village	*Vidua*	*chalybeata*
82	122	Kestrel	Greater	*Falco*	*rupicoloides*
83	125	Kestrel	Lesser	*Falco*	*naumanni*
84	123	Kestrel	Rock	*Falco*	*rupicolus*
85	402	Kingfisher	Brown-hooded	*Halcyon*	*albiventris*
86	130	Kite	Black-shouldered	*Elanus*	*caeruleus*
87	1035	Korhaan	Northern Black	*Afrotis*	*afraoides*
88	224	Korhaan	Red-crested	*Lophotis*	*ruficrista*
89	245	Lapwing	Blacksmith	*Vanellus*	*armatus*
90	242	Lapwing	Crowned	*Vanellus*	*coronatus*
91	1183	Lark	Eastern Clapper	*Mirafra*	*fasciolata*
92	459	Lark	Fawn-coloured	*Calendulauda*	*africanoides*
93	488	Lark	Red-capped	*Calandrella*	*cinerea*
94	458	Lark	Rufous-naped	*Mirafra*	*africana*
95	460	Lark	Sabota	*Calendulauda*	*sabota*
96	474	Lark	Spike-heeled	*Chersomanes*	*albofasciata*
97	823	Mannikin	Bronze	*Spermestes*	*cucullatus*
98	509	Martin	Brown-throated	*Riparia*	*paludicola*
99	506	Martin	Rock	*Hirundo*	*fuligula*
100	803	Masked-weaver	Southern	*Ploceus*	*velatus*
101	210	Moorhen	Common	*Gallinula*	*chloropus*
102	392	Mousebird	Red-faced	*Urocolius*	*indicus*
103	390	Mousebird	Speckled	*Colius*	*striatus*
104	391	Mousebird	White-backed	*Colius*	*colius*
105	734	Myna	Common	*Acridotheres*	*tristis*
106	637	Neddicky	Neddicky	*Cisticola*	*fulvicapilla*
107	1	Ostrich	Common	*Struthio*	*camelus*

Upington	Ref	Common group	Common species	Genus	Species
108	359	Owl	Barn	*Tyto*	*alba*
109	365	Owlet	Pearl-spotted	*Glaucidium*	*perlatum*
110	387	Palm-swift	African	*Cypsiurus*	*parvus*
111	682	Paradise-flycatcher	African	*Terpsiphone*	*viridis*
112	852	Paradise-whydah	Long-tailed	*Vidua*	*paradisaea*
113	531	Penduline-tit	Cape	*Anthoscopus*	*minutus*
114	311	Pigeon	Speckled	*Columba*	*guinea*
115	692	Pipit	African	*Anthus*	*cinnamomeus*
116	694	Pipit	Plain-backed	*Anthus*	*leucophrys*
117	238	Plover	Three-banded	*Charadrius*	*tricollaris*
118	650	Prinia	Black-chested	*Prinia*	*flavicans*
119	830	Pytilia	Green-winged	*Pytilia*	*melba*
120	844	Quailfinch	African	*Ortygospiza*	*atricollis*
121	805	Quelea	Red-billed	*Quelea*	*quelea*
122	581	Robin-chat	Cape	*Cossypha*	*caffra*
123	413	Roller	Lilac-breasted	*Coracias*	*caudatus*
124	415	Roller	Purple	*Coracias*	*naevius*
125	308	Sandgrouse	Burchell's	*Pterocles*	*burchelli*
126	307	Sandgrouse	Namaqua	*Pterocles*	*namaqua*
127	258	Sandpiper	Common	*Actitis*	*hypoleucos*
128	262	Sandpiper	Marsh	*Tringa*	*stagnatilis*
129	421	Scimitarbill	Common	*Rhinopomastus*	*cyanomelas*
130	586	Scrub-robin	Kalahari	*Cercotrichas*	*paena*
131	711	Shrike	Crimson-breasted	*Laniarius*	*atrococcineus*
132	706	Shrike	Lesser Grey	*Lanius*	*minor*
133	708	Shrike	Red-backed	*Lanius*	*collurio*
134	146	Snake-eagle	Black-chested	*Circaetus*	*pectoralis*
135	786	Sparrow	Cape	*Passer*	*melanurus*

Upington	Ref	Common group	Common species	Genus	Species
136	784	Sparrow	House	*Passer*	*domesticus*
137	4142	Sparrow	Southern Grey-headed	*Passer*	*diffusus*
138	780	Sparrow-weaver	White-browed	*Plocepasser*	*mahali*
139	185	Spurfowl	Swainson's	*Pternistis*	*swainsonii*
140	737	Starling	Cape Glossy	*Lamprotornis*	*nitens*
141	735	Starling	Wattled	*Creatophora*	*cinerea*
142	270	Stilt	Black-winged	*Himantopus*	*himantopus*
143	576	Stonechat	African	*Saxicola*	*torquatus*
144	79	Stork	Black	*Ciconia*	*nigra*
145	755	Sunbird	Marico	*Cinnyris*	*mariquensis*
146	763	Sunbird	White-bellied	*Cinnyris*	*talatala*
147	493	Swallow	Barn	*Hirundo*	*rustica*
148	502	Swallow	Greater Striped	*Hirundo*	*cucullata*
149	501	Swallow	Red-breasted	*Hirundo*	*semirufa*
150	495	Swallow	White-throated	*Hirundo*	*albigularis*
151	604	Swamp-warbler	Lesser	*Acrocephalus*	*gracilirostris*
152	208	Swamphen	African Purple	*Porphyrio*	*madagascariensis*
153	380	Swift	African Black	*Apus*	*barbatus*
154	381	Swift	Bradfield's	*Apus*	*bradfieldi*
155	385	Swift	Little	*Apus*	*affinis*
156	383	Swift	White-rumped	*Apus*	*caffer*
157	714	Tchagra	Brown-crowned	*Tchagra*	*australis*
158	97	Teal	Red-billed	*Anas*	*erythrorhyncha*
159	275	Thick-knee	Spotted	*Burhinus*	*capensis*
160	557	Thrush	Groundscraper	*Psophocichla*	*litsipsirupa*
161	1104	Thrush	Karoo	*Turdus*	*smithi*
162	514	Tit	Ashy	*Parus*	*cinerascens*
163	658	Tit-babbler	Chestnut-vented	*Parisoma*	*subcaeruleum*

Upington	Ref	Common group	Common species	Genus	Species
164	316	Turtle-dove	Cape	*Streptopelia*	*capicola*
165	686	Wagtail	Cape	*Motacilla*	*capensis*
166	599	Warbler	Willow	*Phylloscopus*	*trochilus*
167	841	Waxbill	Black-faced	*Estrilda*	*erythronotos*
168	839	Waxbill	Blue	*Uraeginthus*	*angolensis*
169	843	Waxbill	Common	*Estrilda*	*astrild*
170	840	Waxbill	Violet-eared	*Granatina*	*granatina*
171	783	Weaver	Sociable	*Philetairus*	*socius*
172	1172	White-eye	Cape	*Zosterops*	*virens*
173	1171	White-eye	Orange River	*Zosterops*	*pallidus*
174	846	Whydah	Pin-tailed	*Vidua*	*macroura*
175	847	Whydah	Shaft-tailed	*Vidua*	*regia*
176	818	Widowbird	Long-tailed	*Euplectes*	*progne*
177	419	Wood-hoopoe	Green	*Phoeniculus*	*purpureus*
178	450	Woodpecker	Cardinal	*Dendropicos*	*fuscescens*
179	447	Woodpecker	Golden-tailed	*Campethera*	*abingoni*

REPORT COMPILED BY:

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