# APPENDIX D1

## Avifauna Impact Assessment

***GIBB Terms of Reference: Avifaunal Assessment***

1. Mapping of sensitive sites: The bird sensitive sections of the study area will be mapped and attached as an annexure to the main document.
2. Describe affected environment and determine status quo: The existing environment will described and the bird communities most likely to be impacted will be identified. Different bird micro-habitats will be described as well as the species associated with those habitats.
3. Indicate how a resource or community will be affected. Typical impacts that could be expected from the development will be listed as well as the expected impact on the bird communities. Impacts will be quantified (if possible) and a full description of predicted impacts (direct and indirect) will be provided.
4. Gaps in baseline data. Gaps in baseline data will be highlighted and discussed. An indication of the confidence levels will be given. The best available data sources will be used to predict the impacts, and extensive use will be made of local knowledge.
5. Assessment of impacts: The potential impact on the birds will be assessed and evaluated according to the magnitude, spatial scale, timing, duration, reversibility, probability and significance. Propose and explain mitigation measures. Practical mitigation measures will be recommended and discussed.
6. Summarise residual impacts after mitigation. An impact summary table will be provided, discussing expected impacts before and after mitigation.
7. Indicate a monitoring programme. If a need for a monitoring programme is evident, it will be highlighted and a programme proposed.
8. Draft an impact statement of the proposed development on the identified avifauna communities.

# MELKHOUT PATENSIE 132KV

## BASIC ASSESSMENT

## Avifaunal Impact Assessment

## April 2012

**J2012-09**

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**EXECUTIVE SUMMARY**

Eskom is proposing to construct a new 132kV overhead power line from a new proposed substation at Patensie to the existing Melkhout Substation near Humansdorp, a distance of approximately 32km. Arcus Gibb (Gibb) has been appointed to undertake the necessary Environmental Impact Assessment (EIA) investigations for the planned infrastructure. Gibb subsequently contracted Indwe Environmental Consulting (Indwe) as avifaunal specialists. A site visit was conducted during April 2012.

The proposed power line runs north – south over varied terrain, generally flatter in the south. The land use in the area is predominantly livestock farming, except for the area close to the Gamtoos River where most of the land has been cultivated, mostly to citrus and vegetable (and also maize). To the west of the route is the Baviaanskloof complex, which has been classified as an Important Bird Area (Barnes 1998). Up to approximately 136 bird species could be expected in the study area, based on what has been recorded by this project so far. Across the three pentads a total of 4 Red Listed species were recorded, comprising 2 Vulnerable and 2 Near-threatened. In addition, the White Stork *Ciconia ciconia* is included in Table 1 as it is protected internationally under the Bonn Convention on Migratory Species. The most important of these species for this study are the Blue Crane, Secretarybird, and White Stork (all vulnerable to collision with overhead power lines), and the Martial Eagle *Polemaetus bellicosus* (although not yet recorded by SABAP2 it is believed likely occurs here occasionally) and Verreaux's Eagle *Aquila verreaux* (both highly vulnerable to electrocution on power lines). These species are thus the main focus of most of this study.

The impacts of disturbance of birds, and destruction or alteration of habitat are determined to be of relatively low significance for the proposed project. A relatively small amount of habitat will be affected, and the area is already impacted by other existing power lines, farming activities, roads and other infrastructure. Where the line passes through natural Fynbos and thicket this will impact on some of the smaller bird species frequenting this micro habitat, but this is not believed to be a significant impact. The impact of collision of birds with certain sections of the proposed line is considered to be of high significance and warrants mitigation measures, which have been detailed in the report. This includes the need for an avifaunal walk down to determine the exact spans of line requiring marking with anti- collision marking devices. Whilst electrocution is possible on 132kV lines, the proposed pole structure should be safe for the birds in area, particularly if used with the standard Eskom Perching Bracket. Vultures do not occur in the area, so the only species large enough to be at risk of electrocution on a 132kV line are the eagles, which are generally solitary. This means that one bird will typically perch on each pylon, and use the bird perch provided. [as opposed to the gregarious vultures which will try to perch on insulators]. Electrocution of birds in the substation is judged to be of low significance due to the fact that sensitive species are not likely to frequent the substation yard.

Four alternative routes have been proposed for the power line. The preferred route from an avifaunal perspective is the "Preferred route', for various reasons, detailed in the main report.

The proposed power line and substation can be allowed to proceed, subject to the mitigation measures recommended in this report.

**DECLARATION OF INDEPENDANCE**

*Specialist Investigator*

The Natural Scientific Professions Act of 2003 aims to "Provide for the establishment of the South African Council of Natural Scientific Professions (SACNASP) and for the registration of professional, candidate and certified natural scientists; and to provide for matters connected therewith."

"Only a registered person may practice in a consulting capacity" – Natural Scientific Professions Act of 2003 (20(1)-pg 14)

| | |
|---|---|
| Investigator: | Jon Smallie (Pri.Sci.Nat) |
| Qualification: | BSc (hons) Wildlife Science |
| Affiliation: | South African Council for Natural Scientific Professions |
| Registration number: | 400020/06 |
| Fields of Expertise: | Ecological Science |
| Registration: | Professional Member |

*Declaration of Independence*

All specialist investigators specified above declare that:

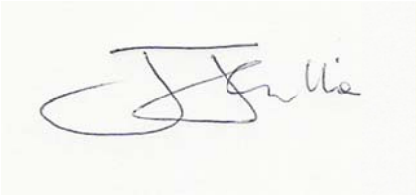
- We act as independent specialists for this project.
- We consider ourselves bound by the rules and ethics of the South African Council for Natural Scientific Professions.
- We do not have any personal or financial interest in the project except for financial compensation for specialist investigations completed in a professional capacity as specified by the Environmental Impact Assessment Regulations, 2006.
- We will not be affected by the outcome of the environmental process, of which this report forms part of.
- We do not have any influence over the decisions made by the governing authorities.
- We do not object to or endorse the proposed developments, but aim to present facts and our best scientific and professional opinion with regard to the impacts of the development.
- We 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, 2006.
- Should we consider ourselves to be in conflict with any of the above declarations, we shall formally submit a Notice of Withdrawal to all relevant parties and formally register as an Interested and Affected Party.

*Terms and Liabilities*

- This report is based on a short term investigation using the available information and data related to the site to be affected. No long term investigation or monitoring was conducted.
- The Precautionary Principle has been applied throughout this investigation.

- 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 investigator withholds the right to amend this report, recommendations and conclusions at any stage should additional information become available.
- Information, recommendations and conclusions 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 investigator as specified above.
- Acceptance of this report, in any physical or digital form, serves to confirm acknowledgment of these terms and liabilities.

Signed on the 20 April 2012 by Jon Smallie in his capacity as specialist investigator.



## INTRODUCTION

### 1.1 Background

Eskom is proposing to construct a new 132kV overhead power line from a new proposed substation at Patensie to the existing Melkhout Substation near Humansdorp, a distance of approximately 32km. Arcus Gibb (Gibb) has been appointed to undertake the necessary Environmental Impact Assessment (EIA) investigations for the planned infrastructure. Gibb subsequently contracted Indwe Environmental Consulting (Indwe) as avifaunal specialists. A site visit was conducted during April 2012.

Up to approximately 136 bird species can be expected in the area, of which the most important of these species for this study are the Blue Crane *Anthropoides paradiseus*, Secretarybird *Sagittarius serpentarius*, White Stork *Ciconia ciconia*, Black Harrier *Circus maurus*, Martial Eagle *Polemaeetus bellicosus* and Verreaux's Eagle *Aquila verreaux*. These species all have a strong likelihood of occurring on the site and are highly vulnerable to collision with (cranes, Secretarybird and storks), and electrocution (eagles) on overhead power lines in South Africa. These species are the focus of most of this study as explained elsewhere in this report.

In general terms, the impacts that could be associated with a project of this nature include: collision of birds with the overhead cables; electrocution of birds whilst perched on the tower structures or in the substation; destruction of habitat; and disturbance of birds.

### 1.2 Terms of reference

The following terms of reference were utilized for this study:

- A desktop review of all existing literature.
- 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 Listed species potentially affected by the proposed power lines and substation.
- Assess the avifaunal status of the study area with the view to identifying sensitive areas and areas that may be considered as "no-go". If appropriate deviations can be suggested, please do so, and provide supporting reasons for the choice.
- Map all relevant aspects.
- Identify potential impacts (positive and negative, including cumulative impacts if relevant) of the proposed development on avifauna during construction and operation. Particular attention should be paid to bird collisions and preventative measures.
- Pay particular attention to wetlands.
- Identify mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of proposed distribution line.
- Identify and address any other aspects related to avifauna in the study area that should be incorporated into the reports.

### 1.3 Description of proposed activities

The following are the proposed project activities (see Figure 1):

- Construction of a 132kV overhead power line from the new proposed Patensie Substation to the existing Melkhout Substation, a distance of approximately 32km.
- In the northern section of the route four route alternatives exist for the alignment of the power line, as shown in Figure 1.
- The proposed tower/pylon structure is the 7611 monopole, with Perching Bracket. This pole design has a phase-phase clearance of 2200mm and the phase-earth clearance is 1554mm. Since vultures don't occur in the area, the largest bird that could perch on the pole are the Martial and Verreaux's Eagles. These are both 'solitary species' which will perch on the top of the pole well clear of the dangerous hardware (as opposed to gregarious vultures which will try to perch multiple birds on one structure). This structure should therefore be for birds in terms of electrocution, particularly when used with the Eskom Bird Perching Bracket.


Figure 1. The layout of the Melkhout Patensie 132kV line. Map supplied by Arcus Gibb.

## 2. METHODS

### 2.1. Methodology

In predicting impacts of a proposed power line on birds, a combination of science, field experience and common sense is required. More specifically the methodology used to predict impacts in the current study was as follows:

- The various data sets discussed below under "sources of information" were collected and examined.
- The data was examined to determine the location and abundance of power line sensitive Red Listed species as well as non-Red Listed power line sensitive species in the study area.
- The area was visited to obtain a first-hand perspective of the proposed route (and substation site) and birdlife and to determine which bird micro-habitats are present and relevant to the study. This involved driving the study area to see as much as possible of the proposed routes for the power line.
- The impacts of the proposed power line on birds were predicted on the basis of experience in gathering and analysing data on wildlife impacts with power lines throughout southern Africa since 1996 (see van Rooyen & Ledger 1999 for an overview of methodology), supplemented with first hand data.

### 2.2 Sources of information

The study made use of the following data sources:

- Bird distribution data of the second Southern African Bird Atlas Project (SABAP2 – http://sabap2.adu.org.za) for the relevant pentads 3345_2445, 3350_2445, and 3355_2445.
- The conservation status of all bird species occurring in the aforementioned degree squares was then determined with the use of The Eskom Red Data book of birds of South Africa, Lesotho and Swaziland (Barnes, 2000).
- A classification of the vegetation types in the study area was obtained from Mucina *et al* (2005).
- Information on the micro-habitat level was obtained through visiting the area and obtaining a first hand perspective.
- Electronic 1:50 000 maps were obtained from the Surveyor General.

### 2.3 Limitations & assumptions

This study made the assumption that the above sources of information are reliable. Predictions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can not be reduced to formulas that will hold true under all circumstances. However, power line impacts can be predicted with a fair amount of certainty, based on experience gained by the author through the investigation of hundreds of localities in southern Africa where birds have interacted with power lines since 1999.

## 3. DESCRIPTION OF AFFECTED ENVIRONMENT

### 3.1 Study area vegetation

The study area is relatively complex in terms of vegetation. Most of the southern half of the power line route is classified as "Kouga Grassy Sandstone Fynbos". The northern half is mostly "Loerie Conglomerate Fynbos" and "Gamtoos Thicket". It is widely agreed in ornithological circles that vegetation structure is more important than species composition, in determining bird species presence and abundance. Taking this into account then the most important aspect of the above mentioned vegetation types for avifauna is that they are all relatively short, Fynbos type vegetation types, with the exception of the Thicket, which occurs mostly on the higher ground and in valleys. This means that we can expect bird species associated with Fynbos to dominate the avifauna of the area. Interestingly, the botanical diversity of Fynbos is not matched by the avifauna associated with it. The diversity of avifauna associated with Fynbos is normally relatively low. In addition, due to its dense nature most the species that are attracted to Fynbos are physically small species, for which predator detection at long distances is not as important as for large terrestrial species such as cranes and bustards. Various raptors also utilise Fynbos, such as harriers and Verreaux's Eagle *Aquila verreaux*. Much of the study area has however been transformed, making the below description of the micro habitats actually available to birds on site far more informative than the vegetation description.

### 3.2 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. In transformed areas, the micro habitat descriptions describe what is actually available to birds on site, whereas the vegetation description describes the original vegetation on site, before any transformation.

Investigation of this study area revealed the following bird micro habitats, examples of which are shown in Figure 2.

*Arable lands:*
Arable or cultivated land represents a significant feeding area for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources readily accessible to birds and other predators; the crop or pasture plants cultivated are often eaten themselves by birds, or attract insects which are in turn eaten by birds; during the dry season arable lands often represent the only green or attractive food sources in an otherwise dry landscape. Arable lands exist in this study area, mostly planted to pastures of some type at the time of site visit, and maize closer to the Gamtoos River. Relevant bird species that will be attracted to these areas include most importantly the Blue Crane, Denham's Bustard and White Stork. Fruit orchards also exist in this study area, but these are not attractive to the larger bird species that are most relevant to this study.

*Dams:*
Artificially constructed dams have become important attractants to various bird species in the South African landscape. Several small dams exist in the study area. Various waterfowl frequent these areas and are vulnerable

to collision with power lines. More importantly, one of the main focus species of this study, the Blue Crane, uses dams to roost in communally. This means that large numbers of these birds enter the roost at last light and exit it at first light, both times when power lines are even less visible and the chances of collisions is greater. Therefore dams are a key element of this study, and power line passing close to them will require mitigation as detailed elsewhere in this report. Of particular importance is the dam shown in Figure 4. This area is home to numerous water fowl and a broad diversity of bird species. Power line close to this area will required effective mitigation for collision of these bird species. It would be preferable if this portion of the route could be moved further away from the dam.

*Rivers or drainage lines:*
Most rivers in southern Africa are in the east and extreme south, in the higher rainfall areas. Various species of water bird are mostly restricted to riverine habitat in southern Africa. The map distribution of these species correlates with the river courses in southern Africa. Many of these species, particularly the larger ones, are known to interact with power lines through collision. These rivers also form significant flight paths for many of these species, such as ducks, geese, herons, ibises and storks. The proposed power line runs close to and across the Gamtoos River in the far north of the study area.

*Fynbos:*
This micro habitat is the only remaining natural vegetation in the study area and has been described adequately above under the vegetation section.

*Thicket:*
The northern, higher ground along the proposed power line route, consists of natural thicket. These areas will be most attractive to various raptor species, such as the eagle species mentioned elsewhere in this report.

Cliffs:
Several cliff areas exist along the Gamtoos River valley. These areas will be attractive to cliff roosting and nesting species in the area. Species such as raptors could utilise these cliffs extensively for breeding in particular.

Table 1 shows the micro habitats that each Red Listed bird species typically frequents in the study area. It must be stressed that birds can and will, by virtue of their mobility, utilise almost any areas in a landscape from time to time. However, the analysis below represents each species' most preferred or normal habitats. These locations are where most of the birds of that species will spend most of their time – so logically that is where impacts on those species will be most significant. Table 1 makes use of the authors' extensive experience gained through personal observations.

(a)

(b)

(c)

(d)

(e)

(f)

(g)

Figure 2. Examples of available micro habitats in the study area. a – wetland, reedbed; b – pasture land, c – fynbos, d – Gamtoos River, e – dam; f- thicket; & g - arable land.

### 3.3 Relevant bird populations

The data source used to determine the distribution and abundance of bird species in the study area was the Southern African Bird Atlas Project 2 data (SABAP2 – http://sabap2.adu.org.za). Fortunately for this study area, reasonable coverage by counters has already been achieved for one of the three pentads at least. This is shown with the number of cards in Table 1, ranging from 1 to 6 for the three relevant pentads. This data was collected on the basis of pentads, and the species recorded in the relevant pentads could have been recorded anywhere within these pentads and not necessarily in the exact study area for the proposed developments. It does however provide a good indication of what could be found in the study area. Reporting rates (as per Table 1) are an expression (%) of the number of times a species was seen in a pentad divided by the number of times that pentad was counted.

Up to approximately 136 bird species could be expected in the study area, based on what has been recorded by this project so far. Across the three pentads a total of 4 Red Listed species were recorded, comprising 2 Vulnerable and 2 Near-threatened. In addition, the White Stork *Ciconia ciconia* is included in Table 1 as it is protected internationally under the Bonn Convention on Migratory Species. The most important of these species for this study are the Blue Crane, Secretarybird, and White Stork. Although not yet recorded by SABAP2 it is believed likely that Martial Eagle *Polemaetus bellicosus* occurs here occasionally, and Verreaux's Eagle *Aquila verreaux* regularly. These species are all highly vulnerable to collision and electrocution with overhead power lines in South Africa. These species are thus the main focus of most of this study.

The nearest Important Bird Area (IBA – Barnes 1998) IBA SA093-Baviaanskloof, lies approximately 2km west of the alternative routes for the proposed power line route at its closest point. The preferred alignment is approximately 10km east of the IBA, which is an advantage, discussed more under section 5. This area is classified as an IBA on account of its three habitats: mountainous Fynbos (home to many of the Fynbos specials); forest patches (home to several forest specialists); and Karoo plains – home to all of the large and small terrestrial species. Although many of the smaller species are less likely to move out of the IBA general area, and also will not interact directly with the proposed power line, the large species will. The most important of these include: Black Stork *Ciconia nigra*; Booted Eagle *Hieraaetus pennatus;* Verreaux's Eagle *Aquila verreaux*; Peregrine Falcon *Falco peregrinus*; and Martial Eagle.

Most of these species (exception being Black Stork) are likely to interact with the proposed power line predominantly through electrocution, making it important to construct the power line on a safe pole structure. Blue Crane, Denham's Bustard Neotis denhamii, Black Harrier Circus maurus and White Stork are also likely to disperse from the IBA. This set of species will interact with the proposed power line predominantly through collision.


Figure 3. The position of the preferred route for the proposed power line (yellow) relative to the Important Bird Area – SA093 – Baviaanskloof Complex (red).

The broader area within which the project is situated (from the Baviaanskloof mountains down to the coast) is particularly well known as a stronghold of the Blue Crane, Denham's Bustard and White-bellied Korhaan. The proposed project is marginally within this broader area, on its' northern edge. Where suitable habitat exists along the proposed power line we can therefore expect these three species to occur (despite this not being reflected in the report rates in Table 1, probably due to inadequate coverage of the area by counters). The Co-ordinated Avifaunal Roadcount (CAR – Young *et al,* 2003) project has several routes in this area, and has recorded the highest density of Denham's Bustard and White-bellied Korhaan of any routes in South Africa. The habitats that these species favour are the mixture of pastures, natural vegetation and dams and wetlands. All of these are present on the proposed route, particularly in the south on the flatter areas towards Humansdorp. The Denham's Bustard has proven highly vulnerable to collision with overhead power lines throughout South Africa. Additional mortality due to this unnatural cause should be prevented where possible. Although few records of collisions of White-bellied Korhaan exist, other korhaan species have been recorded colliding with power lines and it stands to reason that White-bellied Korhaan would also be at risk. Although not its core range, the Blue Crane is also common in this area, and is probably the species recorded colliding with power lines most frequently in South Africa. This species,

South Africa's national bird, and also a near endemic to South Africa should also be protected from additional mortality as far as possible.

In terms of large raptors in the area, Martial Eagle is probably the most likely Red Listed species to occur, although it is certainly not abundant in the area. This species utilizes massive territories, and so it is possible that just one pair exists in the broader area. This species will certainly utilise power line poles to perch on, and will therefore be at risk of electrocution if incorrect pole structures are used. Although not Red Listed, the Verreaux's and African Fish Eagle are also large raptors likely to occur in the area. Verreaux's Eagle would be more towards the mountainous areas in the north of the proposed line, whilst African Fish Eagle would frequent the farm dams and the Gamtoos River. The presence of these three large eagles is sufficient grounds to ensure that a bird friendly pole structure is used for the proposed power line, as has been discussed elsewhere in this report.

It must be noted that many "non-Red Listed" bird species also occur in the study area and could be impacted on by the power line. Although this impact assessment focuses on Red Listed species, the impact on non-Red Listed species is also assessed, albeit in less detail. Furthermore, much of the mitigation recommended for Red Listed species will also protect non Red Listed species in the study area. It could be argued that if impact assessment does not focus on non-threatened species these species will make their way onto threatened status thus making our list of species to conserve even greater. Whilst this argument does hold some merit, the limited resources available for most impact assessments make it necessary to prioritise species on the basis of their conservation status.

Table 1. Data from the Southern African Bird Atlas Project 2 (http://sabap2.adu.org.za) for the Red Listed species likely to occur in the study area.

| Common name | Scientific name | Conservation status | 3345_2445 (1 card) | 3350_2445 (2 cards) | 3355_2445 (6 cards) | Preferred micro habitat | Likelihood of occurring on site | Relative importance of site for national populations of species |
|---|---|---|---|---|---|---|---|---|
| Blue Crane | *Anthropoides paradiseus* | *V* | | 50.00% | 50.00% | Grassland, fynbos, arable land, wetland, dam | Probable | Low |
| Knysna Warbler | *Bradypterus sylvaticus* | *V* | | 50.00% | | Forest | Possible | Low |
| Black Harrier | *Circus maurus* | *NT* | | | 16.70% | Fynbos, grassland | Possible | Low |
| Secretarybird | *Sagittarius serpentarius* | *NT* | | | 16.70% | Grassland, short fynbos | Possible | Low |
| White Stork | *Ciconia ciconia* | *Bonn* | | | 16.70% | Arable lands, wetland, grassland, fynbos | Probable | Low |

V = Vulnerable; NT = Near-threatened; Bonn = Protected Internationally under the Bonn Convention on Migratory Species.

## 4. ASSESSMENT OF IMPACTS

### 4.1. General description of impacts of power lines on birds

Because of its' size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines. (Ledger & Annegarn 1981; Ledger 1983; Ledger 1984; Hobbs & Ledger 1986a; Hobbs & Ledger 1986b; Ledger, Hobbs & Smith, 1992; Verdoorn 1996; Kruger & Van Rooyen 1998; Van Rooyen 1998; Kruger 1999; Van Rooyen 1999; Van Rooyen 2000). Other problems are electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure, (Van Rooyen & Taylor 1999) and disturbance and habitat destruction during construction and maintenance activities.

**Electrocutions**

Electrocution of birds on overhead lines is an important cause of unnatural mortality of raptors and storks. It has attracted plenty of attention in Europe, USA and South Africa (APLIC 1994; van Rooyen & Ledger 1999). Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004). Electrocution is also possible in the new substation. However this is unlikely to affect sensitive bird species as they are not likely to frequent the substation yard.

**Collisions**

Collisions are the biggest single threat posed by overhead power lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001).

Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. The Red Listed species vulnerable to power line collisions are generally long living, slow reproducing species under natural conditions. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the long or even medium term. Many of the anthropogenic threats to these species are non-discriminatory as far as age is concerned (e.g. habitat destruction, disturbance and power lines) and therefore contribute to adult mortality, and it is not known what the cumulative effect of these impacts could be over the long term.

**Habitat destruction**

During the construction phase and maintenance of power lines and substations some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line which can result in electrical flashovers.

These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat.

**Disturbance**

Similarly, the above mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities.

### 4.2 Description of impacts of this proposed project

The impacts of the proposed power lines and substation were rated in the tables below. The criteria used for this rating can be seen in Appendix 1.

**Electrocutions**

The proposed tower/pylon structure is the 7611 monopole, with Perching Bracket. This pole design has a phase-phase clearance of 2200mm and the phase-earth clearance is 1554mm. Since vultures don't occur in the area, the largest birds that could perch on the pole are the Martial and Verreaux's Eagles. These are both 'solitary species' which will perch on the top of the pole well clear of the dangerous hardware (as opposed to gregarious vultures which will try to perch multiple birds on one structure). This structure should therefore be safe for birds in area. The impact of electrocution is therefore likely to be of low significance for the proposed power line. If birds are electrocuted in the substation regularly once operational it is recommended that case specific recommendations be developed for mitigation. The exact positions within a substation whereon birds can be electrocuted are too numerous to warrant proactive mitigation.

Mitigation: If the above structure is used in tandem with the Eskom Bird Perch no further mitigation will be required.

**Collisions**

Collision of certain bird species, particularly Blue Crane, Denham's Bustard and White Stork is highly probable on the proposed power line.

Mitigation: Certain sections of the power line will need to be marked with an Eskom approved anti-collision marking device according to Eskom standards. These sections of line have been identified on a preliminary basis in this report (Figure 4), but this will need to be refined and finalised once the final route and pylon positions are surveyed and pegged. It is recommended that at this stage an avifaunal walk through is done to identify the exact spans requiring marking.

**Habitat destruction**

Habitat destruction is not anticipated to be a significant impact in this study area, as a relatively small amount of habitat will be affected, much of the area is already transformed, and the broader area is already relatively disturbed by other infrastructure.

Mitigation: Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable.

**Disturbance**

Disturbance of birds is anticipated to be of low significance in this study area, for the reasons described above for habitat destruction.

Mitigation: Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some disturbance is inevitable.

Table 2. Assessment of the operational phase impacts of the proposed project.

| GENERAL AND SPECIALIST STUDY IMPACTS | SPATIAL SCALE | TEMPORAL SCALE (DURATION) | CERTAINTY SCALE (LIKELIHOOD) | SEVERITY/ BENEFICIAL SCALE | SIGNIFICANCE PRE-MITIGATION | MITIGATION MEASURES | SIGNIFICANCE AFTER MITIGATION |
|---|---|---|---|---|---|---|---|
| **ISSUE: Avifauna** | | | | | | | |
| **IMPACT: Bird collision with overhead power line, particularly earth wire, Impact on Red Listed and other species** | | | | | | | |
| DIRECT IMPACTS | | | | | | | |
| | National – populations of Red Listed species affected | Permanent | Probable | Severe | Moderate negative | Mark certain sections of the line with anti-collision marking devices on the earth wire (as per Eskom guidelines) to increase the visibility of the line and reduce likelihood of collisions. These sections of line will need to be identified by an avifaunal walk through/site specific EMP once the final route is selected and tower positions are finalised. A preliminary indication of the sections of the line that pose a concern are shown in Figure 4. At the dam identified in Figure 4 it is proposed that the line be moved further away from the dam if possible in order to further reduce the threat of collision of various bird species at this site. | Low negative |
| **IMPACT: Bird electrocution, Impact on Red Listed and other species** | | | | | | | |
| DIRECT IMPACT | | | | | | | |
| | National – populations of Red Listed species affected | Permanent | Possible | Slight | Moderate negative | The proposed 7611 monopole structure is safe for birds and will mitigate this impact successfully | Insignificant |

Table 3. Assessment of the construction phase impacts of the project.

| GENERAL AND SPECIALIST STUDY IMPACTS | SPATIAL SCALE | TEMPORAL SCALE (DURATION) | CERTAINTY SCALE (LIKELIHOOD) | SEVERITY/ BENEFICIAL SCALE | SIGNIFICANCE PRE-MITIGATION | MITIGATION MEASURES | SIGNIFICANCE POST-MITIGATION |
|---|---|---|---|---|---|---|---|
| **ISSUE: Avifauna** | | | | | | | |
| **IMPACT: Disturbance of birds, Impact on Red Listed and other species** | | | | | | | |
| DIRECT IMPACTS | | | | | | | |
| | Localised | Short term | Possible | Slight | Low negative | Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some disturbance is inevitable. The Krom River and associated riparian habitat is particularly sensitive in this regard | Low negative |
| **IMPACT: Destruction or alteration of bird habitat, Impact on Red Listed and other species** | | | | | | | |
| INDIRECT IMPACTS: | | | | | | | |
| | Localised | permanent | probable | Slight – area already highly impacted on | Low negative | Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable | Low negative |

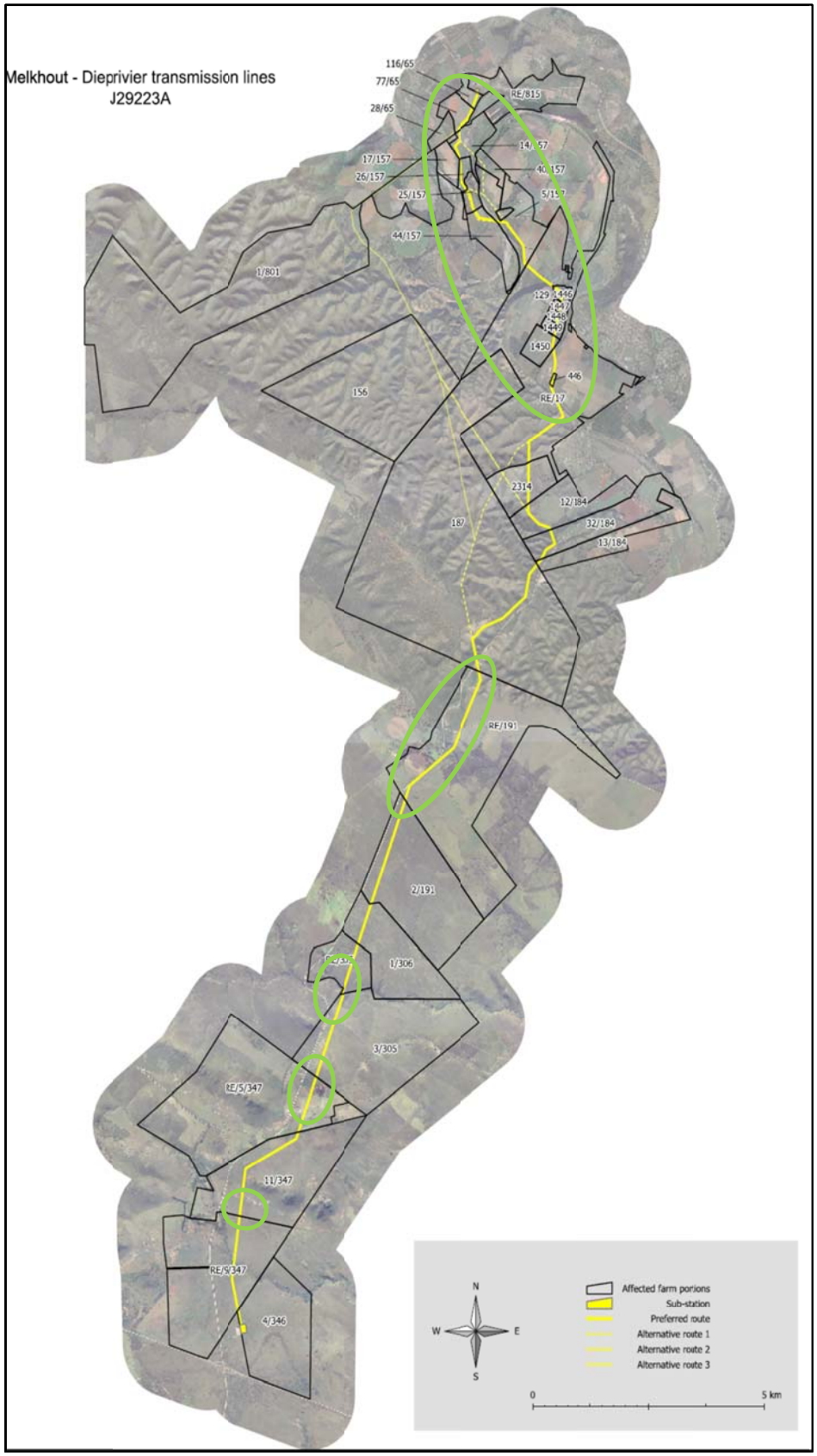



Figure 4. Preliminary identification of high collision risk sections of the proposed power line (green circles)

Figure 4 identifies the likely high risk sections of power line for collision of birds. From the top, these areas are as follows:

- the Gamtoos River crossings and associated arable area – a flight path for various bird species;
- a farm dam and associated pastures – will attract various collision prone species;
- a river crossing – flight path for most bird species;
- a piggery and dam – this is likely to attract various bird species to forage in the area as the waste from the piggery will attract various insects and rodents. It is recommended that at this site the route of the power line be altered if possible to be placed further away from the dam. This will reduce the risk of collision of various bird species associated with this site. Experience has shown that particularly at dams such as this one that is frequented by large numbers of birds, marking lines is not always adequate mitigation.
- a small wetland – likely to attract various collision prone species.

As mentioned elsewhere in this report, these high risk areas should be considered preliminary. When final pole or pylon positions and route are available, a more detailed avifaunal 'walk through' should be conducted to assess the collision risk at each of the sites and identify the exact spans of power line that will require marking. At that time, the most effective marking device available at the time will also be recommended.

## 5. COMPARISON OF ALTERNATIVES

The preferred alternative from an avifaunal perspective is the preferred route (Figure 1 and 4) for the following reasons:

- The route runs close to the main road for most of its length. This is an advantage as the road is an existing source of disturbance in the landscape, making it less likely that sensitive bird species will frequent the area. It is also believed that birds in flight tend to gain altitude when crossing a road as they are aware of the risk of vehicles. This would mean they would probably be at less risk of collision with the proposed power line.
- The route runs the furthest (approximately 10km) of all alternatives from the IBA described elsewhere in this report. This is an advantage as threatened bird species dispersing from the IBA are less likely to interact with the power line than if it were closer.
- The route runs adjacent to an existing medium voltage power line for much of its route. This is an advantage as it is believed that more power lines adjacent to each other become more visible to birds in flight, partially reducing the risk of collisions. Furthermore fewer new roads would be required for construction if the proposed power line is placed adjacent to the existing line.

It is therefore recommended that the power line be constructed on the 'Preferred route'.

## 6. IMPACT STATEMENT

In conclusion, the proposed power line can be built provided that the various mitigation measures recommended in this report are implemented. Of particular concern is the collision mitigation. Provided that an avifaunal walk down is done to identify the exact spans requiring collision mitigation in the form of marking devices installed on the earth wires, this impact should hopefully be restricted to acceptable levels.

## 7 REFERENCES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**Appendix 1**

**Description of criteria**

Table 1. **Significance Rating Table**

| Significance Rating Table | |
|---|---|
| **Temporal Scale (The duration of the impact)** | |
| Short term | Less than 5 years (Many construction phase impacts are of a short duration). |
| Medium term | Between 5 and 20 years. |
| Long term | Between 20 and 40 years (From a human perspective almost permanent). |
| Permanent | Over 40 years or resulting in a permanent and lasting change that will always be there. |
| **Spatial Scale (The area in which any impact will have an affect)** | |
| **Individual** | Impacts affect an individual. |
| **Localized** | Impacts affect a small area of a few hectares in extent. Often only a portion of the project area. |
| **Project Level** | Impacts affect the entire project area. |
| **Surrounding Areas** | Impacts that affect the area surrounding the development |
| **Municipal** | Impacts affect either BCM, or any towns within them. |
| **Regional** | Impacts affect the wider district municipality or the province as a whole. |
| **National** | Impacts affect the entire country. |
| **International/Global** | Impacts affect other countries or have a global influence. |
| **Will definitely occur** | Impacts will definitely occur. |
| **Degree of Confidence or Certainty** (The confidence with which one has predicted the significance of an impact) | |
| **Definite** | More than 90% sure of a particular fact. Should have substantial supportive data. |
| **Probable** | Over 70% sure of a particular fact, or of the likelihood of that impact occurring. |
| **Possible** | Only over 40% sure of a particular fact or of the likelihood of an impact occurring. |
| **Unsure** | Less than 40% sure of a particular fact or of the likelihood of an impact occurring. |

Table 2. **Impact Severity Rating**

| **Impact severity**<br>(The severity of negative impacts, or how beneficial positive impacts would be on a particular affected system or affected party**)** | |
|---|---|
| Very severe | Very beneficial |
| An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example the permanent loss of land. | A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. For example the vast improvement of sewage effluent quality. |
| Severe | Beneficial |
| Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. For example, the clearing of forest vegetation. | A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example an increase in the local economy. |
| Moderately severe | Moderately beneficial |
| Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated. For example constructing the sewage treatment facility where there was vegetation with a low conservation value. | A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. For example a 'slight' improvement in sewage effluent quality. |
| Slight | Slightly beneficial |
| Medium or short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. For example a temporary fluctuation in the water table due to water abstraction. | A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these. |
| No effect | Don't know/Can't know |
| The system(s) or party(ies) is not affected by the proposed development. | In certain cases it may not be possible to determine the severity of an impact. |

Table 3. **Overall Significance Rating**

| **Overall Significance**<br>**(The combination of all the above criteria as an overall significance)** | |
|---|---|
| **VERY HIGH NEGATIVE** | **VERY BENEFICIAL** |
| These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in **severe** or **very severe** effects, or **beneficial** or **very beneficial** effects.<br>**Example:** The loss of a species would be viewed by informed society as being of VERY HIGH significance.<br>**Example:** The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with VERY HIGH significance. | |
| **HIGH NEGATIVE** | **BENEFICIAL** |
| These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.<br>**Example:** The loss of a diverse vegetation type, which is fairly common elsewhere, would have a significance rating of HIGH over the long term, as the area could be rehabilitated.<br>**Example:** The change to soil conditions will impact the natural system, and the impact on affected parties (such as people growing crops in the soil) would be HIGH. | |
| **MODERATE NEGATIVE** | **SOME BENEFITS** |
| These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.<br>**Example:** The loss of a sparse, open vegetation type of low diversity may be regarded as MODERATELY significant. | |
| **LOW NEGATIVE** | **FEW BENEFITS** |

| |
|---|
| These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.<br>**Example:** The temporary changes in the water table of a wetland habitat, as these systems are adapted to fluctuating water levels.<br>**Example:** The increased earning potential of people employed as a result of a development would only result in benefits of LOW significance to people who live some distance away. |
| **NO SIGNIFICANCE** |
| There are no primary or secondary effects at all that are important to scientists or the public.<br>**Example:** A change to the geology of a particular formation may be regarded as severe from a geological perspective, but is of NO significance in the overall context. |
| **DON'T KNOW** |
| In certain cases it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.<br>**Example:** The effect of a particular development on people's psychological perspective of the environment. |

**Appendix 2. Data from the second bird atlas project (SABAP2 – http://sabap2.adu.org.za)**

| Common name | Scientific name | 3345_2445 (1 card) | 3350_2445 (2 cards) | 3355_2445 (6 cards) |
|---|---|---|---|---|
| African Darter | *Anhinga rufa* | | | 33.30% |
| African Dusky Flycatcher | *Muscicapa adusta* | | 50.00% | |
| African Hoopoe | *Upupa africana* | | | 33.30% |
| African Paradise-Flycatcher | *Terpsiphone viridis* | 100.00% | | |
| African Pipit | *Anthus cinnamomeus* | | 50.00% | 50.00% |
| African Reed-Warbler | *Acrocephalus baeticatus* | | | 16.70% |
| African Sacred Ibis | *Threskiornis aethiopicus* | | 50.00% | 16.70% |
| African Stonechat | *Saxicola torquatus* | | | 83.30% |
| Amethyst Sunbird | *Chalcomitra amethystina* | 100.00% | 50.00% | 16.70% |
| Banded Martin | *Riparia cincta* | | | 16.70% |
| Barn Swallow | *Hirundo rustica* | 100.00% | 50.00% | 66.70% |
| Bar-throated Apalis | *Apalis thoracica* | 100.00% | 100.00% | 83.30% |
| Black Crake | *Amaurornis flavirostris* | 100.00% | | |
| Black Cuckoo | *Cuculus clamosus* | | | 33.30% |
| Black Cuckooshrike | *Campephaga flava* | | | 16.70% |
| Black Harrier | *Circus maurus* | | | 16.70% |
| Black Saw-wing | *Psalidoprocne holomelaena* | 100.00% | | 16.70% |
| Black-collared Barbet | *Lybius torquatus* | | 50.00% | 66.70% |
| Black-headed Heron | *Ardea melanocephala* | 100.00% | | 50.00% |
| Black-headed Oriole | *Oriolus larvatus* | 100.00% | 50.00% | 66.70% |
| Black-shouldered Kite | *Elanus caeruleus* | | | 33.30% |
| Blacksmith Lapwing | *Vanellus armatus* | | 50.00% | 33.30% |
| Black-winged Stilt | *Himantopus himantopus* | | 50.00% | |
| Blue Crane | *Anthropoides paradiseus* | | 50.00% | 50.00% |
| Bokmakierie | *Telophorus zeylonus* | 100.00% | 100.00% | 83.30% |
| Brimstone Canary | *Crithagra sulphuratus* | 100.00% | | 66.70% |
| Brown-hooded Kingfisher | *Halcyon albiventris* | 100.00% | | 50.00% |
| Brown-throated Martin | *Riparia paludicola* | | 50.00% | |
| Burchell's Coucal | *Centropus burchellii* | 100.00% | | 50.00% |
| Cape Batis | *Batis capensis* | | | 50.00% |
| Cape Bulbul | *Pycnonotus capensis* | | 100.00% | 66.70% |
| Cape Canary | *Serinus canicollis* | | | 33.30% |
| Cape Clapper Lark | *Mirafra apiata* | | | 16.70% |
| Cape Crow | *Corvus capensis* | | 100.00% | 83.30% |
| Cape Glossy Starling | *Lamprotornis nitens* | | 100.00% | 33.30% |
| Cape Grassbird | *Sphenoeacus afer* | | | 66.70% |
| Cape Longclaw | *Macronyx capensis* | | 50.00% | 83.30% |
| Cape Robin-Chat | *Cossypha caffra* | 100.00% | 50.00% | 83.30% |
| Cape Sugarbird | *Promerops cafer* | | | 16.70% |
| Cape Teal | *Anas capensis* | | 50.00% | |
| Cape Turtle-Dove | *Streptopelia capicola* | 100.00% | 100.00% | 100.00% |
| Cape Wagtail | *Motacilla capensis* | 100.00% | 50.00% | 83.30% |

| | | | | |
|---|---|---|---|---|
| Cape Weaver | *Ploceus capensis* | 100.00% | 100.00% | 50.00% |
| Cape White-eye | *Zosterops virens* | 100.00% | 50.00% | 66.70% |
| Cattle Egret | *Bubulcus ibis* | | 100.00% | 33.30% |
| Cloud Cisticola | *Cisticola textrix* | | | 33.30% |
| Common Fiscal | *Lanius collaris* | 100.00% | 100.00% | 100.00% |
| Common Moorhen | *Gallinula chloropus* | 100.00% | | 50.00% |
| Common Sandpiper | *Actitis hypoleucos* | | | 16.70% |
| Common Starling | *Sturnus vulgaris* | 100.00% | 50.00% | 33.30% |
| Common Swift | *Apus apus* | | | 16.70% |
| Common Waxbill | *Estrilda astrild* | 100.00% | 50.00% | 83.30% |
| Crowned Lapwing | *Vanellus coronatus* | | | 50.00% |
| Diderick Cuckoo | *Chrysococcyx caprius* | 100.00% | | 16.70% |
| Dusky Indigobird | *Vidua funerea* | 100.00% | | |
| Eastern Clapper Lark | *Mirafra fasciolata* | | | 16.70% |
| Egyptian Goose | *Alopochen aegyptiacus* | 100.00% | 100.00% | 83.30% |
| Emerald-spotted Wood-Dove | *Turtur chalcospilos* | 100.00% | | 16.70% |
| Familiar Chat | *Cercomela familiaris* | | | 16.70% |
| Fiery-necked Nightjar | *Caprimulgus pectoralis* | | | 16.70% |
| Fiscal Flycatcher | *Sigelus silens* | | 50.00% | 16.70% |
| Forest Canary | *Crithagra scotops* | 100.00% | | |
| Fork-tailed Drongo | *Dicrurus adsimilis* | 100.00% | 100.00% | 100.00% |
| Greater Double-collared Sunbird | *Cinnyris afer* | 100.00% | 50.00% | 16.70% |
| Greater Honeyguide | *Indicator indicator* | | | 16.70% |
| Greater Striped Swallow | *Hirundo cucullata* | 100.00% | 50.00% | 66.70% |
| Grey Heron | *Ardea cinerea* | | 50.00% | 33.30% |
| Grey-backed Cisticola | *Cisticola subruficapilla* | | | 66.70% |
| Hadeda Ibis | *Bostrychia hagedash* | 100.00% | 100.00% | 83.30% |
| Helmeted Guineafowl | *Numida meleagris* | | | 50.00% |
| House Sparrow | *Passer domesticus* | 100.00% | | |
| Jackal Buzzard | *Buteo rufofuscus* | | 50.00% | 50.00% |
| Karoo Prinia | *Prinia maculosa* | 100.00% | 100.00% | 50.00% |
| Karoo Scrub-Robin | *Cercotrichas coryphoeus* | | 50.00% | 33.30% |
| Kelp Gull | *Larus dominicanus* | | 50.00% | 16.70% |
| Klaas's Cuckoo | *Chrysococcyx klaas* | | | 16.70% |
| Knysna Turaco Turaco | *Tauraco corythaix* | 100.00% | 50.00% | |
| Knysna Warbler | *Bradypterus sylvaticus* | | 50.00% | |
| Laughing Dove | *Streptopelia senegalensis* | 100.00% | 50.00% | 33.30% |
| Lazy Cisticola | *Cisticola aberrans* | | | 33.30% |
| Lesser Striped Swallow | *Hirundo abyssinica* | 100.00% | | 33.30% |
| Lesser Swamp-Warbler | *Acrocephalus gracilirostris* | 100.00% | 50.00% | 16.70% |
| Levaillant's Cisticola | *Cisticola tinniens* | 100.00% | 100.00% | 50.00% |
| Little Bittern | *Ixobrychus minutus* | 100.00% | | |
| Little Grebe | *Tachybaptus ruficollis* | | 50.00% | |

| | | | | |
|---|---|---|---|---|
| Little Rush-Warbler | *Bradypterus baboecala* | 100.00% | 50.00% | 33.30% |
| Little Swift | *Apus affinis* | 100.00% | | 33.30% |
| Long-billed Pipit | *Anthus similis* | | | 16.70% |
| Long-tailed Widowbird | *Euplectes progne* | | | 33.30% |
| Malachite Sunbird | *Nectarinia famosa* | | 50.00% | 50.00% |
| Neddicky | *Cisticola fulvicapilla* | 100.00% | 100.00% | 66.70% |
| Olive Bush-Shrike | *Telophorus olivaceus* | 100.00% | | 16.70% |
| Orange-breasted Sunbird | *Anthobaphes violacea* | | | 50.00% |
| Pearl-breasted Swallow | *Hirundo dimidiata* | | | 16.70% |
| Pied Crow | *Corvus albus* | 100.00% | | 33.30% |
| Pin-tailed Whydah | *Vidua macroura* | | 50.00% | 33.30% |
| Plain-backed Pipit | *Anthus leucophrys* | | | 33.30% |
| Red-chested Cuckoo | *Cuculus solitarius* | | | 16.70% |
| Red-eyed Dove | *Streptopelia semitorquata* | 100.00% | | 66.70% |
| Red-faced Mousebird | *Urocolius indicus* | 100.00% | | 33.30% |
| Red-knobbed Coot | *Fulica cristata* | | 50.00% | 50.00% |
| Red-necked Spurfowl | *Pternistis afer* | 100.00% | 50.00% | 33.30% |
| Reed Cormorant | *Phalacrocorax africanus* | 100.00% | | 16.70% |
| Rock Martin | *Hirundo fuligula* | 100.00% | 50.00% | 16.70% |
| Rufous-naped Lark | *Mirafra africana* | | | 50.00% |
| Secretarybird | *Sagittarius serpentarius* | | | 16.70% |
| Sombre Greenbul | *Andropadus importunus* | 100.00% | 100.00% | 100.00% |
| Southern Boubou | *Laniarius ferrugineus* | 100.00% | 50.00% | 100.00% |
| Southern Double-collared Sunbird | *Cinnyris chalybeus* | | 50.00% | |
| Southern Red Bishop | *Euplectes orix* | 100.00% | | 16.70% |
| Southern Tchagra | *Tchagra tchagra* | 100.00% | | 16.70% |
| Speckled Mousebird | *Colius striatus* | 100.00% | 100.00% | 66.70% |
| Speckled Pigeon | *Columba guinea* | | | 33.30% |
| Spectacled Weaver | *Ploceus ocularis* | 100.00% | 50.00% | |
| Spotted Thick-knee | *Burhinus capensis* | | | 16.70% |
| Spur-winged Goose | *Plectropterus gambensis* | 100.00% | | 33.30% |
| Steppe Buzzard | *Buteo vulpinus* | 100.00% | 50.00% | 33.30% |
| Streaky-headed Seedeater | *Crithagra gularis* | | 50.00% | 16.70% |
| Swee Waxbill | *Coccopygia melanotis* | | 50.00% | 16.70% |
| Tambourine Dove | *Turtur tympanistria* | 100.00% | | |
| Terrestrial Brownbul | *Phyllastrephus terrestris* | 100.00% | | 33.30% |
| Three-banded Plover | *Charadrius tricollaris* | | 50.00% | |
| Village Weaver | *Ploceus cucullatus* | 100.00% | | |
| White Stork | *Ciconia ciconia* | | | 16.70% |
| White-backed Duck | *Thalassornis leuconotus* | | | 16.70% |
| White-breasted Cormorant | *Phalacrocorax carbo* | | 50.00% | |
| White-necked Raven | *Corvus albicollis* | 100.00% | 100.00% | 66.70% |
| White-rumped Swift | *Apus caffer* | 100.00% | | 50.00% |
| White-throated Swallow | *Hirundo albigularis* | 100.00% | 100.00% | |

| | | | | |
|---|---|---|---|---|
| Willow Warbler | *Phylloscopus trochilus* | 100.00% | | 33.30% |
| Yellow Bishop | *Euplectes capensis* | | 50.00% | 66.70% |
| Yellow Canary | *Crithagra flaviventris* | | 50.00% | 16.70% |
| Yellow-billed Duck | *Anas undulata* | 100.00% | | 50.00% |
| Yellow-breasted Apalis | *Apalis flavida* | | 50.00% | |
| Yellow-fronted Canary | *Crithagra mozambicus* | | 50.00% | |
| Zitting Cisticola | *Cisticola juncidis* | | | 16.70% |