

Appendix H.6

AVIFAUNAL ASSESSMENT



Avifaunal Environmental Impact Assessment report for the Proposed Tournee Solar PV 1 and Solar PV 2 Energy Facility near Standerton in Mpumalanga, South Africa

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Expertise of Specialist

Justin obtained a BSc in Zoology & Botany, followed by an Honours degree in Biodiversity and Conservation. He is a professional bird guide (over 15 years of experience), who has lead tours across 4 continents (over 20 countries) and is well versed in field identification, ecology and bird calls and has a sound understanding of rigorous scientific data collection. He has served as a bird specialist for Enviro-Insight, EXM as well as Birdlife South Africa. He had lead avifaunal research and atlassing projects both on mainland Africa in the renewable energy sector, as well as conducted data collection out at sea to Antarctica and along the west coast from South Africa to Namibia.



Disclaimer by specialist

I declare that the work presented in this report is my own and has not been influenced in any way by the developer. At no point has the developer asked me as specialist to manipulate the results in order to make it more favourable for the proposed development. I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP) and the EIA Regulations (2014, as amended). I have the necessary qualifications and expertise (*Pr. Sci. Nat. Zoological Science*) in conducting this specialist report.

A handwritten signature in black ink, appearing to read 'J. De Vries', written over a light blue horizontal line.

Low de Vries, PhD Zoology, *Pr. Sci. Nat. Zoological Science*



COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS, AS AMENDED

Requirements of Appendix 6 – GN R326 2014 EIA Regulations, 7 April 2017	Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain	Appendix 3 and 4
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;	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Declaration
c) an indication of the scope of, and the purpose for which, the report was prepared;	1.1 Project Details
cA. an indication of the quality and age of base data used for the specialist report;	2. Methods
cB. a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	4. Impact Assessment
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	2.3 Field Surveys
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	2. Methods
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	3.4 Sensitive Bird Areas
g) an identification of any areas to be avoided, including buffers;	3.4 Sensitive Bird Areas
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	3.4 Sensitive Bird Areas
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	1.3 Assumptions and Limitations
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	4. Impact Assessment
k) any mitigation measures for inclusion in the EMPr;	4. Impact Assessment
l) any conditions for inclusion in the environmental authorisation;	4. Impact Assessment
m) a reasoned opinion	
i. whether the proposed activity, activities or portions thereof should be authorised;	
(iA) regarding the acceptability of the proposed activity or activities and	5. Conclusion



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;	5. Conclusion
n) a description of any consultation process that was undertaken during the course of preparing the specialist report;	NA
o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	NA
p) any other information requested by the competent authority.	NA
2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	NA



Acronyms & Glossary of Terms

AOI: Area of Influence, the area that is affected by the proposed development.

Buffer zone: A zone established around areas that are identified as sensitive for birds.

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Cumulative Impact: Impacts created due to past, present, and future activities and impacts associated with these activities.

EMPr: Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

Endemic: A species that is restricted to a particular area.

EIA (Environmental Impact Assessment): The process of identifying environmental impacts due to activities and assessing and reporting these impacts.

GPS: Global Positioning System device.

IUCN: International Union for Conservation of Nature.

MW: Megawatts.

NEMA: National Environmental Management Act.

Pre-construction phase: The period prior to the construction of a wind energy facility.

Red data species: Species included in the Critically Endangered, Endangered, Vulnerable or Rare categories as defined by the IUCN.

REDZ (Renewable Energy Development Zones): Areas where wind and solar photovoltaic power development can occur in concentrated zones.

S&EIA: Social and Environmental Impact Assessment (EIA): The process of identifying social and environmental impacts due to activities and assessing and reporting these impacts.

SACNASP: South African Council for Natural Scientific Professions.

SANBI: South African National Biodiversity Institute.

Scoping Report: A report contemplated in regulation 21 of the NEMA amended EIA regulations R326 dated 7 April 2017.

ToPS: Threatened or Protected Species.

SEF: Solar Energy Facility

SSV: Site Sensitivity Verification



1. Introduction

1.1 Project Details

Volant Environmental (Pty) Ltd was commissioned by WSP Group Africa (Pty) Ltd to conduct a thorough Pre-Construction Survey to assess the potentially Sensitive Areas of avifauna at the proposed Tournee 1 Solar PV facility and Tournee 2 Solar PV facility. This survey serves as a Pre-Construction assessment of the possible avifaunal present in the Project Area of Influence (PAOI) of the proposed SEF.

1.2 Project Location and Ecoregion

The proposed SEF is located 24.5 km Northeast of the town of Standerton in the Lekwa Local Municipality in the Mpumalanga province of South Africa. The town is known for its large commercial and agricultural output, specializing in cattle, dairy, maize, and poultry farming. The proposed SEF cluster can be accessed off the R39 that runs south of the project area. The SEF cluster is divided into two facilities namely Tournee 1 PV and Tournee 2 PV. Together these facilities cover an area of *ca* 880 ha (PV1 - 306.65 ha; PV2 – 573.78 ha) and is currently used as agricultural land with livestock present across a large section of the PAOI.

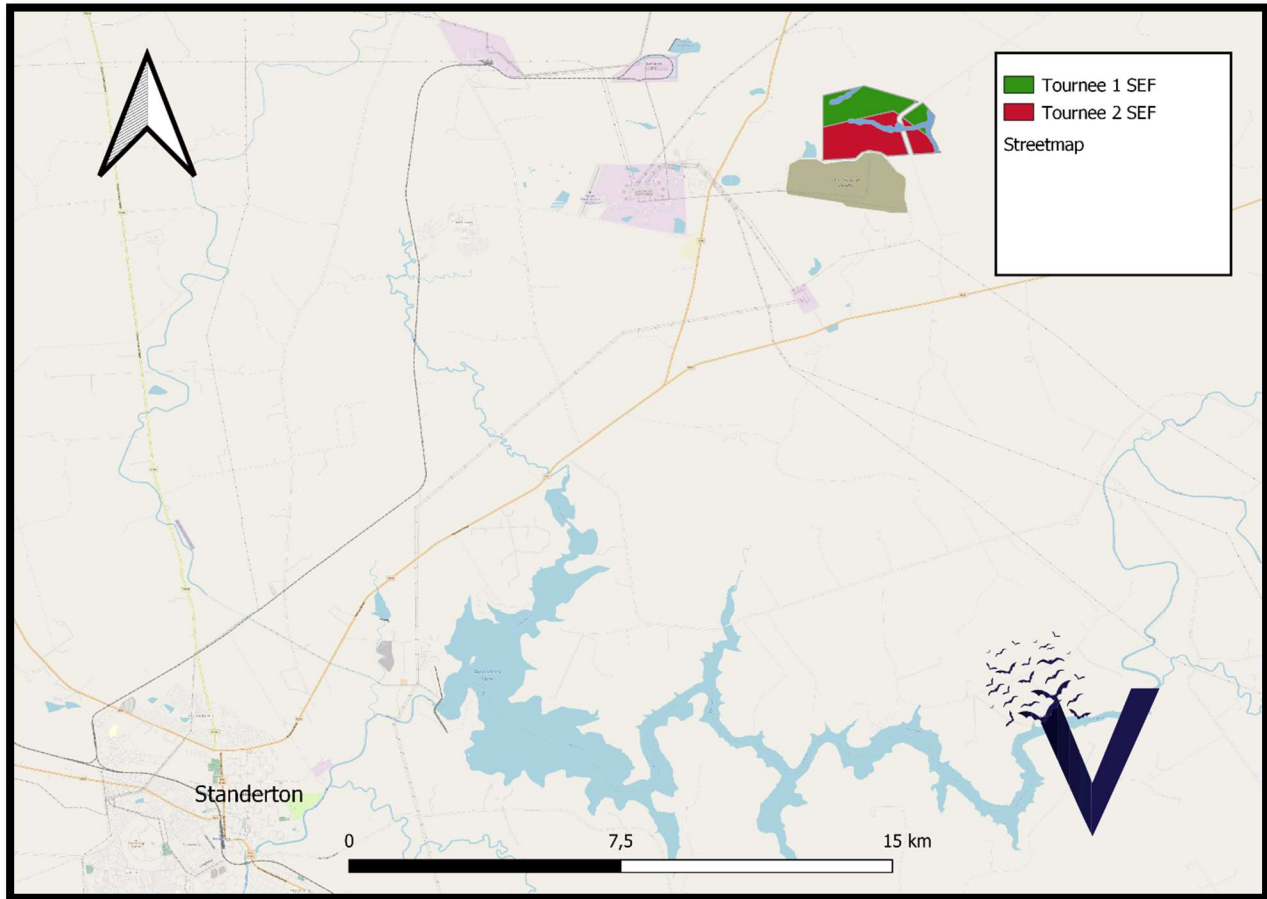


Figure 1. Location of the proposed Tournee Solar Energy Facilities.

The proposed PAOI falls across the Grassland Bioregion with Soweto Highveld Grassland vegetation present across the entire proposed development site (SANBI 2018, Figure 4). The extent of the Grassland Biome is relatively well defined on the basis of the specific known vegetation structure when seen in combination with the amount of rainfall in the summer and the average minimum temperatures in the winter. This biome occurs mainly on the high central plateau (Highveld), as well as the inland areas of the eastern seaboard and the established mountainous areas of KwaZulu-Natal and Eastern Cape. The biome is primarily characterised as flat to rolling, but also includes mountainous regions and escarpments. The effect of this biome



being at a higher altitude result in larger temperature differences at different times of the year. The climate in winter months specifically, can be cold and dry with the occurrence and relative high frequency of frost (Figure 3). The presence of high amounts of moisture allows for grassland regions to be divided into two classes. Moist grassland primarily consists of sour grasses, leached and dystrophic soils and high canopy cover, high plant production and high fire frequency. Dry grasslands are seen as sweet, palatable grasses, where the soils are less leached and are eutrophic and canopy cover, plant production and fire frequency are lower than in moist grasslands. Grasslands are structurally simple and strongly dominated by grasses (*Poaceae*). It is noted that the moisture index effects canopy cover and decreases with lower mean annual rainfall but is influenced by the amount and type of grazing and by the presence of fire. This in turn allows for woody species to occur but are limited to specialised niches/habitats within the grassland biome. Soweto Highveld Grassland specifically is characterised by a moderately undulating landscape on the Highveld plateau. It primarily supports short to medium-high, dense, grassland that is almost entirely dominated *Themeda triandra*. In places that are not disturbed, scattered small wetlands, pans (figure 4) and occasional ridges or rocky outcrops are found that interrupt the continuous grassland cover. These ecoregion characteristics were used when assessing avifaunal habitat as well as species assemblages that could be present on the PAOI.

The warmest month (with the highest average high temperature) is February (28.95°C) while the coldest month (with the lowest average low temperature) is June (8.8°C). The area receives an average of 177 mm of rain during January, which is the wettest month of the year based on averages.

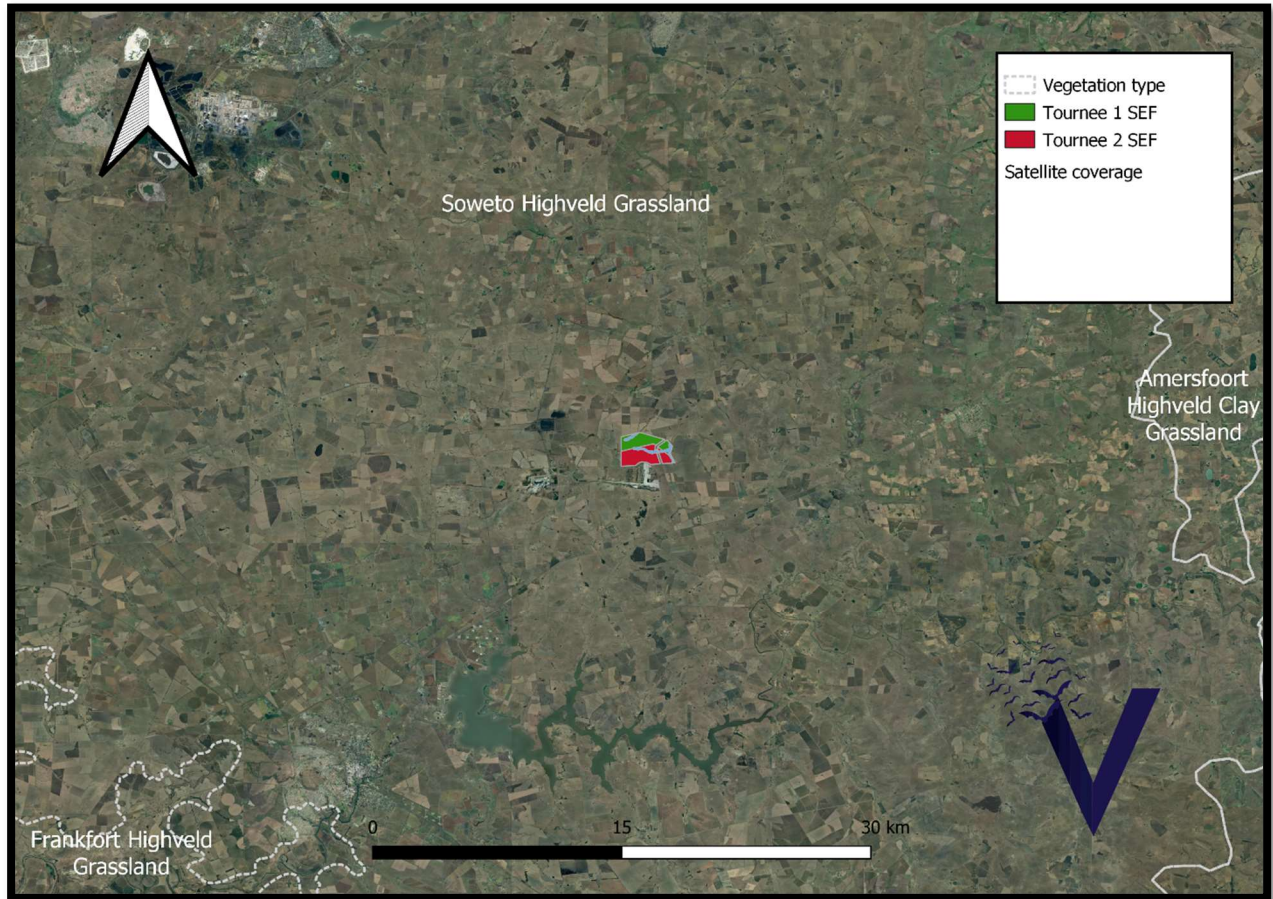


Figure 2. Vegetation types on and around the Project Area of Influence



Figure 3. Examples of winter vegetation found on the Project Area of Influence.



Figure 4. Examples of summer vegetation found on the Project Area of Influence.



The extent of the Grassland Biome is relatively well defined on the basis of the specific known vegetation structure when seen in combination with the amount of rainfall in the summer and the average minimum temperatures in the winter. This biome occurs mainly on the high central plateau (Highveld), as well as the inland areas of the eastern seaboard and the established mountainous areas of KwaZulu-Natal and Eastern Cape. The biome is primarily characterised as flat to rolling, but also includes mountainous regions and escarpments. The effect of this biome being at a higher altitude results in larger temperature differences at different times of the year. The climate in winter months specifically, can be cold and dry with the occurrence and relative high frequency of frost. The presence of high amounts of moisture allows for grassland regions to be divided into two classes. Moist grassland primarily consists of sour grasses, leached and dystrophic soils and high canopy cover, high plant production and high fire frequency. Dry grasslands are seen as sweet, palatable grasses, where the soils are less leached and are eutrophic and canopy cover, plant production and fire frequency are lower than in moist grasslands. Grasslands are structurally simple and strongly dominated by grasses (*Poaceae*).

It is noted that the moisture index affects canopy cover and decreases with lower mean annual rainfall but is influenced by the amount and type of grazing and by the presence of fire. This in turn allows for woody species to occur but are limited to specialised niches/habitats within the grassland biome. Income Sandy Grassland vegetation is known by very flat areas with generally shallow, poorly drained, sandy soils. These soils are known for supporting low, tussock-dominated sourveld forming a mosaic with wooded grasslands and on well-drained sites with the trees.

The warmest month (with the highest average high temperature) is February (29.1°C) while the coldest month (with the lowest average low temperature) is July (17.75°C). The area receives an average of 190.31mm of rain during January, which is the wettest month of the year based on averages.



1.3 Assumptions and Limitations

- The assumption was made that all sources of information used during the completion of this report, are reliable and accurate.
- Transects are only conducted during daylight hours. Therefore, any bird movement occurring at night was recorded under *ad hoc* conditions. Some waterbirds and migrants are known to make regular movements at night.
- Although very useful, the SABAP1 bird data set is more than two decades old. This dataset does however provide an adequate baseline to use when assessing species presence, distribution, and abundance. The use of SABAP2 along with SABAP1 will provide substantial data to be used during initial desktop assessments. This data was, however, mostly obtained by citizen scientists, and accuracy depends on their identification skills.
- Placement and dimensions of solar equipment has not yet been finalized and provided.
- Final layout of the proposed SEF has not yet been provided.

2. Methods

2.1 Regulatory Requirements

The Minister of Environment, Forestry and Fisheries, gave notice that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, will be compulsory from 4 October 2019 when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014.

In addition, a set of protocols that an applicant needs to adhere to in the Environmental Authorisation (EA) process were developed and on 20 March 2020 the Minister of Forestry, Fisheries and the Environment gazetted the Protocols for national implementation purposes. The gazette '*Procedures to be followed for the Assessment and Minimum Criteria for Reporting of*



Identified Environmental Themes in terms of Section 24(5)(a) and (h) of the National Environmental Management Act (1998) when Applying for Environmental Authorisation', has protocols that have been developed for environmental themes which include agriculture, avifauna, biodiversity (Terrestrial and Aquatic Biodiversity), noise, defence, and civil aviation.

The protocols set requirements for the assessment and reporting of environmental impacts of activities requiring EA. The higher the sensitivity rating of the features on the proposed site as identified by the screening tool report, the more rigorous the assessment and reporting requirements.

Based on the screening report generated on 19/10/2022, the Avian Combined Sensitivity Theme is indicated as **Low** sensitivity in the PAOI.

2.1.2 Birds and Solar Energy Best Practice Guidelines

Based on Appendix 2 (Minimum requirements for avifaunal impact assessment) in the Best-Practice Guidelines for assessing and monitoring the impact of solar energy facilities on birds in southern Africa (Jenkins et al., 2017) monitoring at a potential SEF must follow a tiered approach with three stages.

During Stage 1 a preliminary assessment is conducted. This assessment should give an overview of likely impacts and potential red flags. During this stage methodologies for the monitoring phase should be planned.

Stage 2 includes an in-depth study with structured data collection following set methodologies on which to base the Impact Assessment Report.

The final tier is Stage 3 during which an Impact assessment is done based on the data collected during Stage 2.

2.2 Desktop Study

A thorough desktop study was undertaken to determine the likelihood of specific avifauna species being present at the proposed SEF. This included investigations into available literature, including Southern African Bird Atlas Project 1 (Harrison et al, 1997), The Southern African Bird Atlas Project 2 (<http://sabap2.adu.org.za/v1/index.php>), The Important Bird Areas report



(<http://www.birdlife.org.za/conservation/important-bird-areas>), the IUCN 2013 Red List (<http://www.iucnredlist.org/>), Birdlife South Africa Checklist of Birds in South Africa (2014) and any other birds surveys or monitoring reports for nearby WEF, SEF or any facilities which included avifaunal monitoring as determined from the REEA (2022 Q1) information. Lack of public access to existing monitoring reports is a recurring problem in the industry and one that severely hampers pre-construction monitoring studies and the recommendations therein, a problem to be addressed by relevant NGOs and the governmental institutions. A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1).

2.3 Field Surveys

All methods used for field surveys were implemented according to the Best Practice Guidelines for Birds & Solar Energy in South Africa (Jenkins *et al.*, 2017). This document was strictly followed.

2.3.1 Site Visits & Scoping Survey

Three site visits of a minimum of three days each were completed on the Tournee SEF's. The initial screening visit was conducted between the 9th and 12th of January 2023 to obtain data for the summer period. Follow up seasonal visits were completed between the 4th and 6th of June and 4th and 6th of July, where walked transects were replicated.

The initial survey was conducted as a Site Sensitivity Verification (SSV) and to obtain preliminary data on the species present at the site. This initial SSV survey was performed by walking and driving across the project area and investigating areas surrounding the PAOI as a ground truthing exercise. This was done to identify potentially sensitive areas and hotspots for birds and to identify potential nest and roost sites for priority species. No nest or roost sites of priority species were recorded during the duration of the survey period.

2.3.2 Driven and Walked Transects

All accessible roads were driven, and bird species identified based on sight and calls. Additionally, the survey team walked transects across the property where no roads were available to ensure that we obtained adequate coverage of the area. All these incidental observations were noted to construct a species list for the area (Appendix 2). Based on these transects we identified four transects that were walked repeatedly, three times each, during different times of the day across each surveyed season, to obtain an estimate of bird abundance and diversity in each habitat type (Figure 5).



Figure 5. Location of walked transects across the Project Area of Influence.



2.5 Impact assessment

2.5.1 Methodology

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct¹, indirect², secondary³ as well as cumulative⁴ impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (*i.e.*, residual impact). The significance of environmental aspects is determined and ranked by considering the criteria⁵ presented in Table 1.

¹ Impacts that arise directly from activities that form an integral part of the Project.

² Impacts that arise indirectly from activities not explicitly forming part of the Project.

³ Secondary or induced impacts caused by a change in the Project environment.

⁴ Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

⁵ The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.



Table 1. Impact Assessment Criteria and Scoring System

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
Impact Significance Rating					
Total Score	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
Environmental Significance Rating (Negative (-))	Very low	Low	Moderate	High	Very High
Environmental Significance Rating (Positive (+))	Very low	Low	Moderate	High	Very High



2.5.2 Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure 6 below.

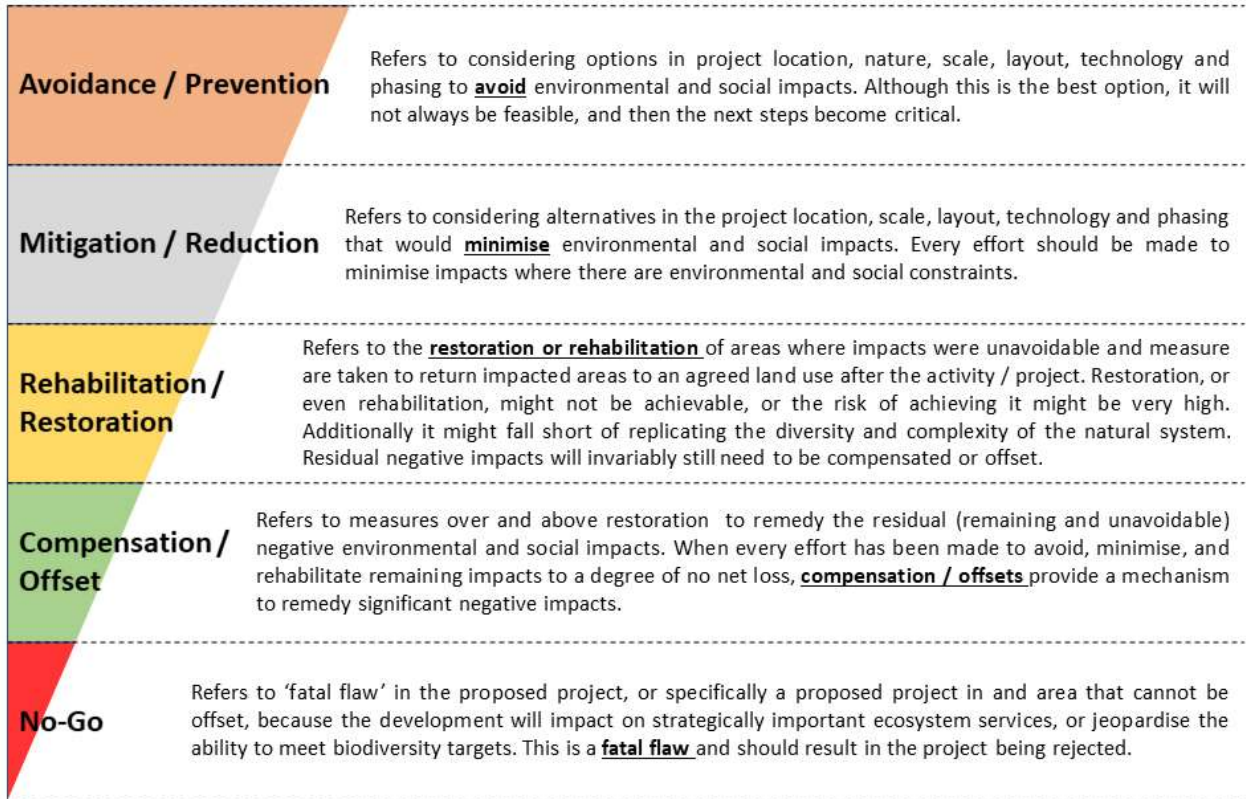


Figure 6. Mitigation Sequence/Hierarchy



3. Results

3.1 Desktop Survey

3.1.1 Previous Studies in the Region

All nearby existing and proposed WEF and SEF facilities were searched for online to find additional data regarding important avifaunal findings that might be of importance to the proposed SEF (Table 2). Investigations into available literature on other bird surveys or monitoring reports nearby (100 km) the proposed SEF application were undertaken as determined from the REEA (2022 Q1) information. These reports identified the potential impact of the proposed energy generating facilities on bird populations present and mitigation strategies followed. An extensive list of bird species that could possibly be present on or near the proposed SEF was also compiled using the previous study data and publicly available bird ecological information.



Table 2. Bird reports for Wind Energy Facilities and other developments in the region of the proposed SEF.

Project	Report details	Consultant	Location from SEF
Camden 1 Wind Energy Facility	Camden I Wind Energy Facility	WSP Group Africa (Pty) Ltd	57.6 Km Northeast
Camden 2 Wind Energy Facility	Camden 2 Wind Energy Facility	WSP Group Africa (Pty) Ltd	63 Km Northeast
Camden 1 Solar Energy Facility	Camden 1 Solar Energy Facility	WSP Group Africa (Pty) Ltd	62 Km Northeast
Majuba PV Solar Energy Facility	Majuba PV Solar Energy Facility near Amersfoort	Savannah Environmental (Pty) Ltd	39 Km Southeast
Tutuka Solar Photovoltaic Facility	Tutuka Solar Photovoltaic Facility	Savannah Environmental (Pty) Ltd	13 Km Northwest
Volksrust truck stop and Filling Station	Proposed Truck Stop & Filling Station; Volksrust in Mpumalanga Province	SSI Engineers and Environmental Consultants	70 Km Southeast
Waaihoek Wind Energy Facility	Proposed Waaihoek Wind Energy Facility, Utrecht, Kwazulu-Natal	EOH Coastal & Environmental Services	132 Km Southeast

3.1.1.1 Camden I Wind Energy Facility

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 234 bird species could potentially occur within the broader area of the proposed WEF PAOI.
- Of these, 37 species were classified as priority species and 16 of these were identified on the South African Red List species. Of the priority species, 25 were likely to occur regularly in the development area.
- The project site is not located in an Important Bird Area (IBA), but it is located between three IBAs.



- Due to the proximity of the site to the IBAs, it is possible that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be impacted by the project
- Specific environmental sensitivity areas have been identified from an avifaunal perspective indicating where mitigation strategies should be applied.

3.1.1.2 Camden 2 Wind Energy Facility

- The Camden II WEF project area was classified as Medium to High sensitivity when the DFFE Screening Tool was utilized.
- This was determined based on the potential presence of several SCC namely Grey Crowned Crane (Globally and Regionally Endangered), Martial Eagle (Globally and Regionally Endangered), Southern Bald Ibis (Globally and Regionally Vulnerable), White-bellied Korhaan (Regionally Vulnerable), Secretarybird (Globally Endangered and Regionally Vulnerable) and Wattled Crane (Globally Vulnerable and Regionally Critically Endangered).
- This classification was confirmed during on-site visits and field surveys conducted throughout the study period.
- It was stated that the development in the sensitivity grassland must be limited as far as possible.
- It was stated that a 100 m buffer from all infrastructure exclusion zones must be implemented around drainage lines and associated wetlands.
- After the pre-construction survey was completed, the avifauna specialist was informed of a potential Martial Eagle nest located near the Camden II WEF. A 5 km no turbine exclusion zone around this nest was therefore suggested.

3.1.1.3 Camden 1 Solar Energy Facility

- It was determined that the proposed solar energy facility will have a moderate impact on priority avifaunal species which could be reduced to low impact through appropriate mitigation.
- No fatal flaws were discovered during the onsite investigations of the proposed SEF.



- It was stated that the development in the sensitivity grassland must be limited as far as possible.
- It was stated that a 100m all infrastructure exclusion zone must be implemented around drainage lines and associated wetlands.

3.1.1.4 Majuba PV Solar Energy Facility near Amersfoort

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 168 bird species could potentially occur within the broader area of the proposed SEF PAOI.
- Of these, 12 were identified on the South African Red List species.
- The proposed SEF PAOI was located on the boundary of the Grassland Biosphere Reserve IBA.
- This IBA is known to hold a large portion of South Africa's population of the endangered White-winged Flufftail. In addition, Corn Crake, Little Bittern, Baillon's Crake, Red-chested Flufftail, African Rail, and breeding populations of African Marsh Harrier, Grey Crowned Crane and African Grass Owl. It has also been established that a large portion of the global population of Rudd's Lark and Botha's Lark occur inside this IBA. The largest breeding colony of Southern Bald Ibis was also found within this area. However, none of the above-mentioned species were recorded by the specialists during the study period.
- Specific environmental sensitivity areas have been identified from an avifaunal perspective indicating where mitigation strategies should be applied.

3.1.1.5 Tutuka Solar Photovoltaic Facility

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 190 bird species could potentially occur within the broader area of the proposed SEF PAOI.
- Of these, 10 were identified on the South African Red List species.
- It was stated that although most the Red List species could occur on the PAOI, the presence of sufficiently similar habitat around the site will allow for movement of these species and no displacement impact of regional and national significance will occur.



- The proposed SEF does not fall within an established IBA, but the Amersfoort-Bethal-Carolina District IBA lies 27 Km East of the site. Although this IBA is relatively close to the proposed development site, it was stated that it is unlikely that some of the bird species found there will occur on the PAOI site.

3.1.1.6 Proposed truck stop and filling station near Volksrust in Mpumalanga Province

- Twenty-two bird species were recorded during the brief field survey.
- It was mentioned that the species that were recorded are common, widespread and are typical of the grassland environment.
- It was further stated that Southern Bald Ibis may use the site during certain times of the year for foraging purposes especially after fires. Lesser Kestrels may also be present on the proposed site.
- The specialists did not identify any threatened bird species during the brief field survey.

3.1.1.7 Proposed Waaihoek Wind Energy Facility, Utrecht, KwaZulu-Natal

- A total of 92 species were recorded at the study area during the study period.
- Of these, a total of 26 species were priority species.
- It was established that the majority of the proposed PAOI is in an IBA, namely the Grasslands Important Bird and Biodiversity Area (SA125), with the proposed power line alternatives for the grid connection located just outside the IBA.
- Ultimately it was established that the proposed wind farm will constitute a potential impact on grassland avifauna due to fragmentation of the grassland habitat.
- However, the specialist stated that if the habitat is carefully managed to conserve the grassland for the benefit of the birds, many species will benefit in the longer term through this protection and the wind farm should only constitute a moderate cumulative impact.



3.1.2 Protected Areas

A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1). The identified public/private owned protected areas are listed the table below (Table 3). The reserves consist of privately as well as publicly owned land, used for wildlife conservation as well as specific livestock farming.

Table 3. The identified public/private owned protected areas identified close to proposed SEF.

Name	Location from SEF site
Moreson Nature Reserve	98 Km Southwest
Shozaloza Safaris	100 Km Southwest
Lorensa Game Farm	90 Km Southwest
Vaaldam Nature Reserve	90 Km West
S.J. Van Der Merwe Private Nature Reserve	90 Km West
J.N. Van Der Merwe Private Nature Reserve	90 Km West
Daisy Private Nature Reserve	100 Km Northwest
Voortrekker Private Nature Reserve	99 Km Northwest
Nicolaas Private Nature Reserve	99 Km Northwest
Devon Protected Environment	96 Km Northwest
John Cairns Private Nature Reserve	97 Km North
Witbank Nature Reserve	98 Km North
Heyns Private Nature Reserve	98 Km North
Burnside Private Nature Reserve	99 Km North
Chrissiesmeer Protected Environment	90 Km Northeast
Rietvlei Private Nature Reserve	59 Km Northeast
Ahlers Private Nature Reserve	73 Km Northeast
Langcarel Private Nature Reserve (in de-proclamation process)	65 Km East
Jericho Dam Nature Reserve	100 Km East



Name	LOCATION FROM SEF SITE
Majuba Nature Reserve	43 Km Southeast
Afrikan Farms Protected Environment	47 Km Southeast
Mabola Protected Environment	97 Km Southeast
Tafelkop Nature Reserve	97 Km Southeast
Mkhothane Protected Environment	73 Km Southeast
Lotterkrantz Private Nature Reserve	47 Km South
Sneeuberg Protected Environment	85 Km South
Rosedale Private Nature Reserve	98 Km South

3.1.3 Potential Species Present on the PAOI

Based on a list of bird species drawn from the SABAP 2 pentads that both cover and surround the PAOI, a total of 201 potential species have been identified to occur on or around the PAOI via desktop analysis. The desktop study identified 30 Priority Species (Appendix 1 & Table 6).

From this list of potential priority species, eight species have an Overall Priority Score of 290 or higher, placing them in the top 30 priority species as ranked by Birdlife South Africa. These key species include Southern Bald Ibis, Blue Crane, Secretarybird, African Marsh Harrier, Lanner Falcon, African Fish Eagle, Greater Flamingo and, Lesser Flamingo. Only one of these key priority species have been confirmed to occur on the PAOI, with a single observation of Secretarybird in January 2023.

Based on the habitat present, eleven of the 30 listed priority species are very unlikely to utilize the PAOI with any regularity, whilst a further nine species are likely to occur on the PAOI, based on habitat suitability, but were however not located during the survey period. These include Blue Crane, African Marsh Harrier, Lanner Falcon, African Fish Eagle, White Stork, Lesser Kestrel, Montagu's Harrier, Greater Kestrel, and Spotted Eagle Owl.



Table 4. Priority species that could potentially occur on the Project Area of Influence. Priority species recorded on site or within 10 km of site, marked with 'x' and highlighted red.

	Common name	Scientific name	Recorded (x)	Likely (x)	Score
1	Southern Bald Ibis	<i>Geronticus calvus</i>			330
2	Blue Crane	<i>Grus paradisea</i>		x	320
3	Secretarybird	<i>Sagittarius serpentarius</i>	x		320
4	African Marsh Harrier	<i>Circus ranivorus</i>		x	300
5	Lanner Falcon	<i>Falco biarmicus</i>		x	300
6	African Fish Eagle	<i>Haliaeetus vocifer</i>		x	290
7	Lesser Flamingo	<i>Phoenicopterus minor</i>			290
8	Greater Flamingo	<i>Phoenicopterus ruber</i>			290
9	Blue Korhaan	<i>Eupodotis caerulescens</i>	x		270
10	Pallid Harrier	<i>Circus macrourus</i>			260
11	Jackal Buzzard	<i>Buteo rufofuscus</i>	x		270
12	Caspian Tern				240
13	Peregrine Falcon	<i>Falco peregrinus</i>			240
14	Osprey	<i>Pandion haliaetus</i>			230
15	White Stork	<i>Ciconia ciconia</i>		x	220
16	Lesser Kestrel	<i>Falco naumanni</i>		x	214
17	Montagu's Harrier	<i>Circus pygargus</i>		x	210
18	Common Buzzard	<i>Buteo buteo</i>	x		210
19	Amur Falcon	<i>Falco amurensis</i>	x		210
20	Black-winged Pratincole	<i>Glareola nordmanii</i>			202
21	Marsh Owl	<i>Asio capensis</i>	x		190
22	Grey-winged Francolin	<i>Scleroptila africana</i>	x		190
23	Long-crested Eagle	<i>Lophaetus occipitalis</i>			190
24	African Harrier-Hawk	<i>Polyboroides typus</i>	x		190



	Common name	Scientific name	Recorded (x)	Likely (x)	Score
25	Northern Black Korhaan	<i>Afrotis afraoides</i>			180
26	Black-winged Kite	<i>Elanus caeruleus</i>	x		174
27	Greater Kestrel	<i>Falco rupicoloides</i>		x	174
28	Red-footed Falcon	<i>Falco vespertinus</i>			174
29	Spotted Eagle Owl	<i>Bubo africanus</i>		x	170
30	Black Sparrowhawk	<i>Accipiter melanoleucus</i>	x		170
TOTALS			10	9	

3.2. Important Bird and Biodiversity Areas (IBAs)

Important Bird and Biodiversity Areas (IBAs) are defined by Birdlife International, as sites of global significance for bird conservation, identified nationally through multi-stakeholder processes using globally standardized, quantitative, and scientifically agreed criteria. These areas are seen as the most important sites for conservation and must be considered during avifaunal impact assessments.

The closest IBA (17 Km East) from the PAOI is known as Amersfoort–Bethal–Carolina District IBA. This specific IBA stretches throughout Mpumalanga province and covers an area of 343 320 ha (Figure 7). The IBA is classified as an unprotected site which correlates to no official protection under the National Environmental Management: Protected Areas Act (2003). However, the conservation response is not completely absent from unprotected IBAs with input from civil society groups, a degree of monitoring, research and conservation action still taking place at sites of biological significance.

Species found within this IBA that are of conservational concern is the globally threatened Botha's Lark, with 10% of the global population suspected to be present within this area. Other globally threatened species are Blue Crane, Southern Bald Ibis, Black Harrier, Blue Korhaan, Black-winged Pratincole, Secretarybird, Martial Eagle and Denham's Bustard. Regionally threatened species are African Grass Owl, White-bellied Korhaan and Lanner Falcon. Restricted-range and biome-restricted species are the previously mentioned Botha's Lark, and Buff-streaked Chat.

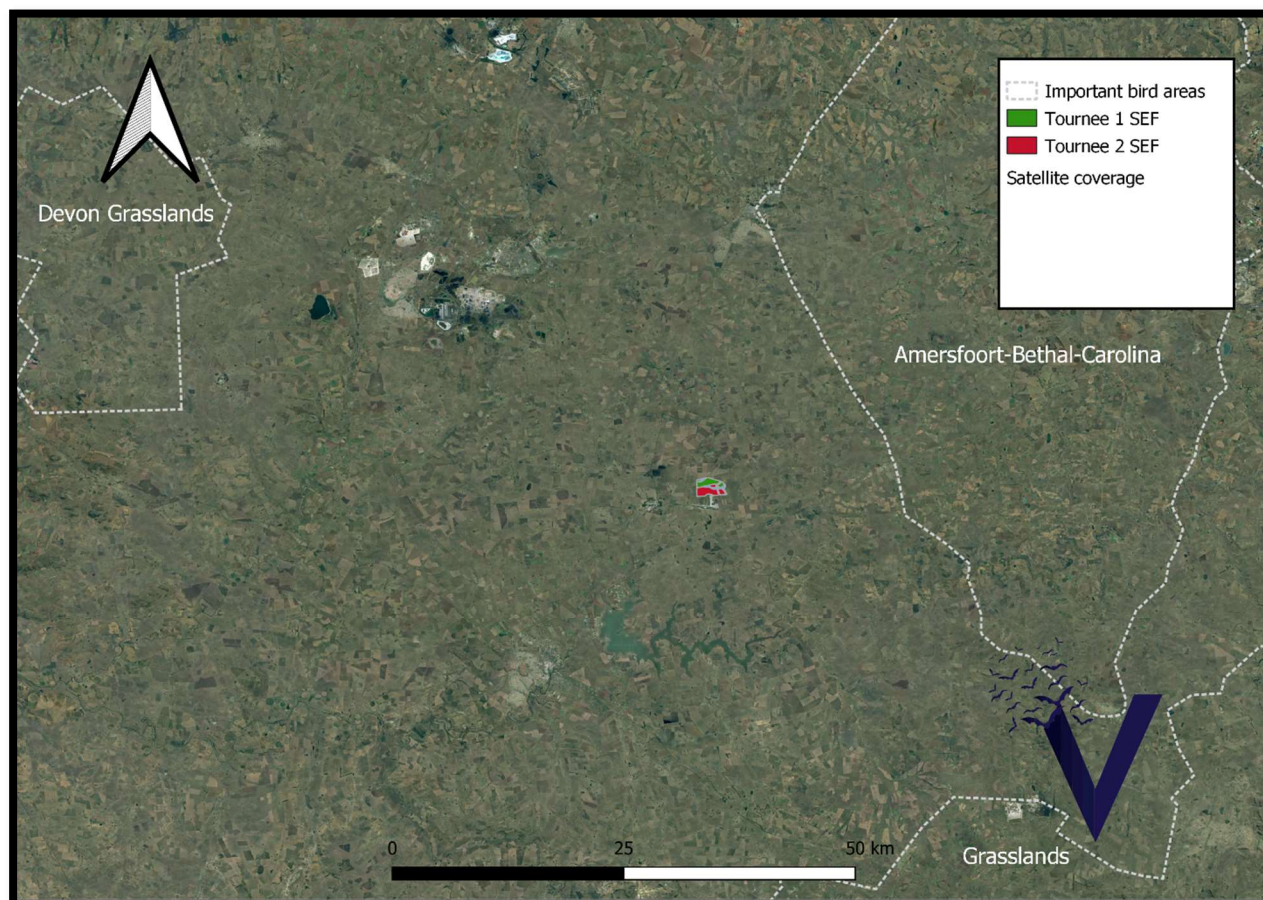


Figure 7. Position of Important Bird Areas (IBAs) in relation to the Tournee 1 and Tournee 2 Solar PV facilities.

3.3 Observed Species

All species that were seen or heard on an *ad hoc* basis, or during both walked transect and driven coverage were recorded. A total of 90 unique species of avifauna were identified on the PAOI and the surrounding area (Appendix 2). Of this list, priority species observed within the PAOI included



Secretarybird, Blue Korhaan, Jackal Buzzard, Common Buzzard, Amur Falcon, Marsh Owl, Grey-winged Francolin, African Harrier Hawk, Black-winged Kite, and, Black Sparrowhawk.

Locality data for all priority species sightings on the PAOI have been mapped and ranked according to their priority scores (Figure 8).

- **Low risk** (green), priority score of 170 – 209.
- **Medium risk** (yellow) priority score of 210 – 289.
- **High risk** (red), priority score of 290 – 405.

These sightings include fly-overs from raptors and other priority species that may not be impacted significantly by the development of the SEF.

Data obtained from the walked transects across the Tournee SEF Cluster, indicated a moderate to low diversity with 50 species recorded across transects in January (Figure 9), 51 species in April (Figure 10), and 32 species recorded in July (Figure 11). As expected, the winter surveys produced lower species counts, and many migrants had returned to the northern hemisphere, and grassland birds were not as vocal outside of the breeding season. The ten most abundant birds recorded in each seasonal survey included few priority species, with the risk for Marsh Owls being mitigated by buffering the wetlands and drainage lines, whilst Black-winged Kite adapt to developed land and will likely remain in the area during and post construction.



Figure 8. Location of priority species across the Tournee SEF.

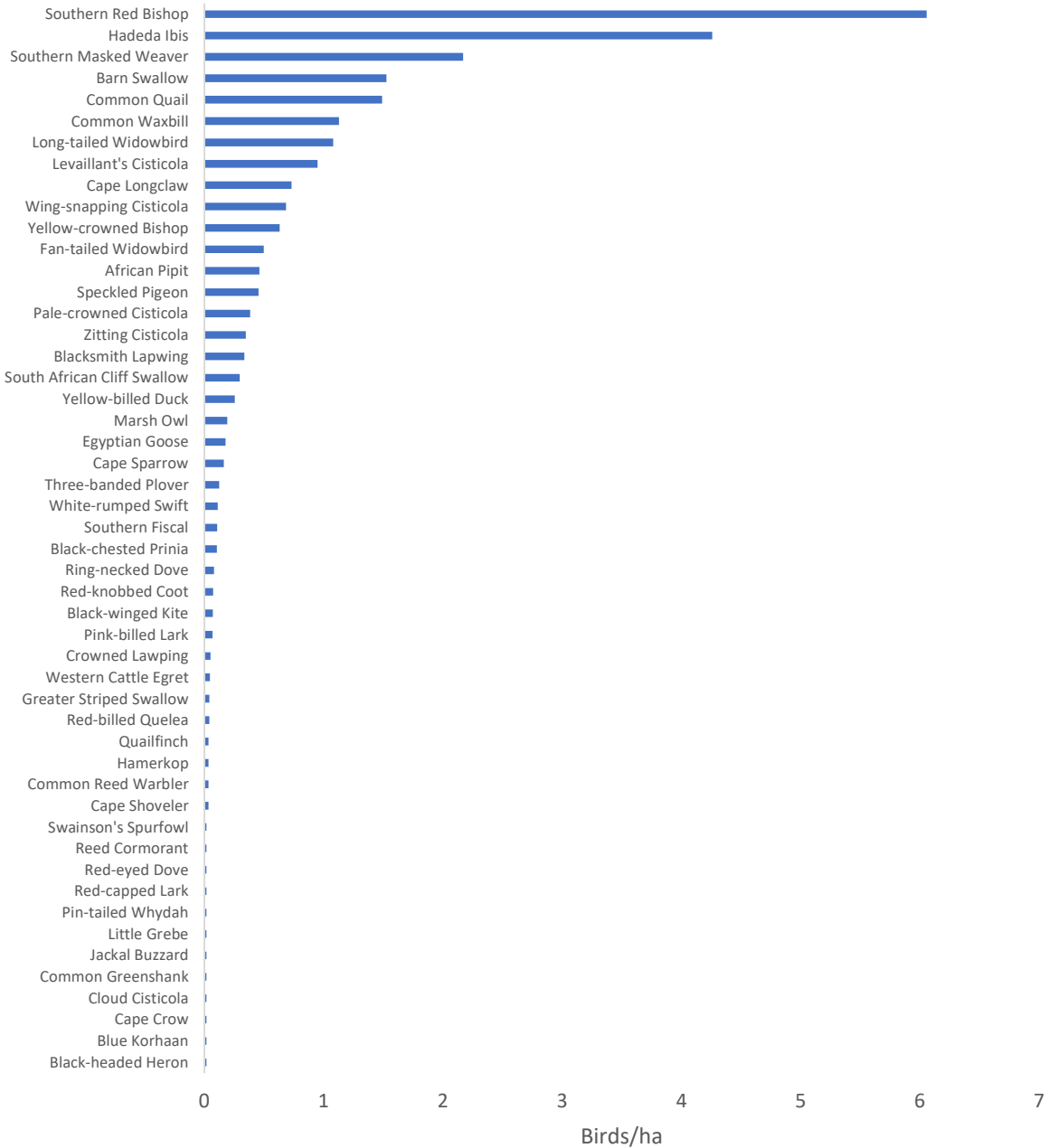


Figure 9. Abundance of bird species recorded on walked transects during January.

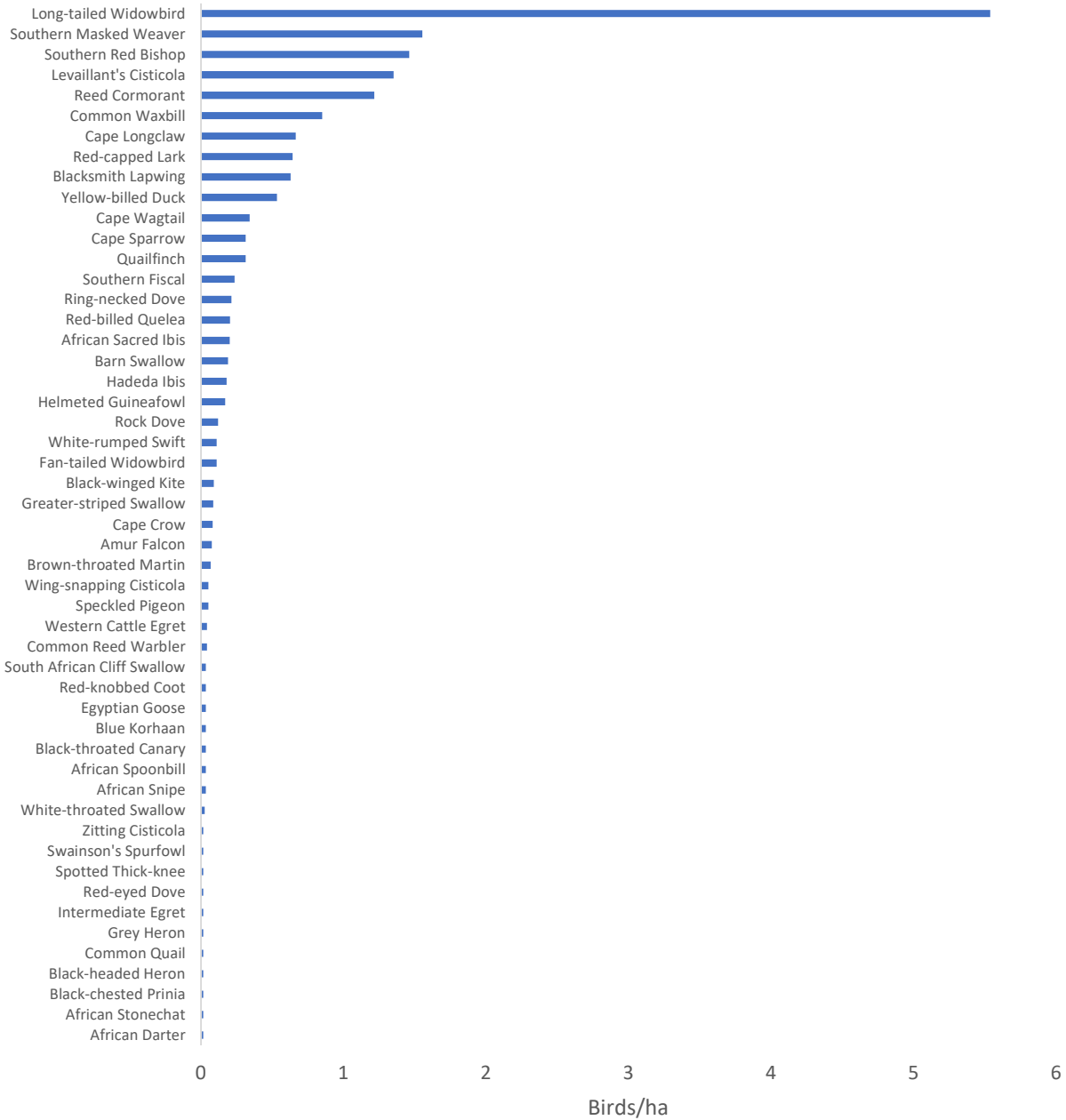


Figure 10. Abundance of bird species recorded on walked transects during April.

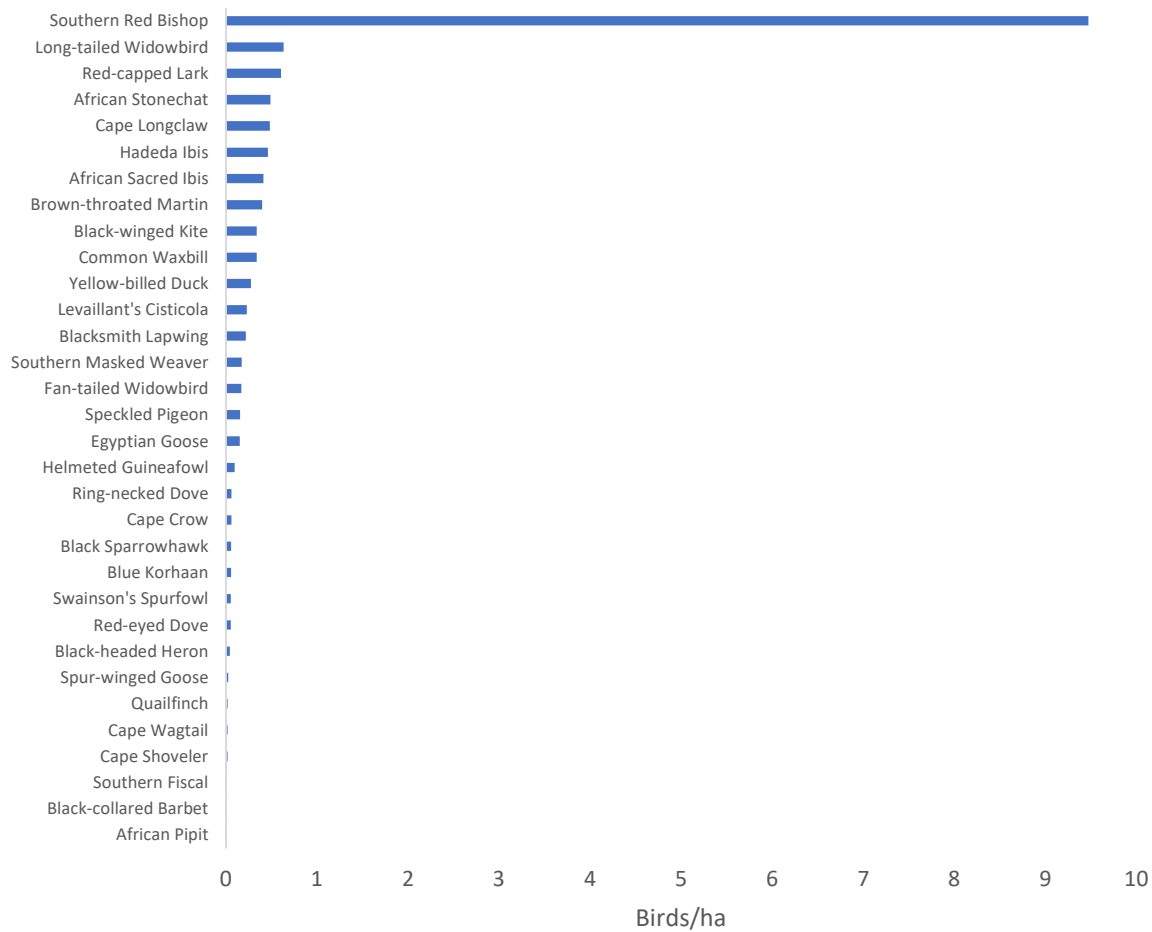


Figure 11. Abundance of bird species recorded on walked transects during July.

3.4 Sensitive Bird Areas

Large farm dams, wetlands, and any of their drainage lines were walked to survey for Priority Species and ascertain whether they could serve as breeding or roosting sites for Priority Species. No nests or active roost sites were located in these sensitive areas during either of the two survey periods. However, due to the presence of numerous priority species which would utilize these habitats, we include a 100-meter solar-panel free buffer around the wetlands, and waterbodies (Figure 12).



Figure 12. Sensitive bird areas located on the Project Area of Influence.



3.5 Site Sensitivity Verification

Based on the screening report generated on 19/10/2022, the Avian Combined Sensitivity Theme is indicated as **Low sensitivity** in areas covering both the Tournee 1 and Tournee 2 Solar PV facilities, which aligns with our findings compiled after our three seasonal surveys.

4. Impact assessment

4.1 Impacts Identified

The main impacts of PV plants on avifauna which have emerged from previous studies include:

- **Displacement due to disturbance**, created by the construction of the solar PV plant and associated infrastructure.
- **Displacement due to habitat destruction and transformation**, created by the construction of the solar PV plant and associated infrastructure.
- **Mortality and injury**, caused by collisions with solar PV panels and associated infrastructure.
- **Entrapment** within perimeter fencing.
- **Chemical pollution**, usually linked to dust suppressants.
- **Electrocution** on power lines, and associated infrastructure.

These main impacts are outlined below across the construction, operational and decommissioning phases of the project.



4.2 Evaluation of Impacts

4.2.1 Construction Phase

Table 5. Displacement of priority species due to disturbance associated with construction of Tournee SEF cluster and associated infrastructure.

Nature: Displacement of Priority Species due to disturbance associated with construction of Tournee SEF Cluster and associated infrastructure.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	High	4	Without mitigation	Local	2
With mitigation	Medium	3	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Reversible	1	Without mitigation	Short term	2
With mitigation	Reversible	1	With mitigation	Immediate	1
Probability		Score	Rating		Score
Without mitigation	Definite	5	Without mitigation	Moderate	45
With mitigation	Definite	5	With mitigation	Moderate	35
Mitigation:					
<ul style="list-style-type: none"> • Construction activity should be restricted as far as possible to the immediate footprint of the required infrastructure. • Access to the surrounding site outside of the footprint should be controlled and limited to reduce unnecessary disturbance to priority species. • Best practice guidelines should be followed to control noise and dust. • Existing roads should be used and construction of new roads kept to a minimum. • Areas deemed most sensitive, should be avoided altogether to limit disturbance. • Recommendations of the ecological specialist studies should be strictly followed. 					
Residual Risks:					
<p>The residual risk of displacement will be reduced in the development, but will remain at a moderate level after mitigation, if proposed mitigation measures are implemented. Avoiding the areas deemed too sensitive, would reduce the disturbance risk to priority species to low and potentially provide areas of respite for those priorities in the areas where construction is approved.</p>					

Table 6. Displacement of priority species due to habitat transformation associated with construction of Tournee SEF Cluster and associated infrastructure.



Nature: Displacement of priority species due to habitat transformation associated with construction of Tournee SEF Cluster and associated infrastructure.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	High	4	Without mitigation	Local	2
With mitigation	Medium	3	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Recoverable	3	With mitigation	Long term	4
With mitigation	Recoverable	3	Without mitigation	Long term	4
Probability		Score	Rating		Score
Without mitigation	Definite	5	Without mitigation	High	65
With mitigation	Highly probability	4	With mitigation	Moderate	48
Mitigation:					
<ul style="list-style-type: none"> • A 100m solar panel free buffer zone should be implemented around dams, wetlands, and drainage lines. • Sensitive grasslands and habitats where breeding and roosting occurs should be avoided. • Existing roads should be used and construction of new roads kept to a minimum. • Recommendations of the ecological specialist studies should be strictly followed. 					
Residual Risks:					
The residual risk of displacement will be reduced, but will change to a moderate level after mitigation, if proposed mitigation measures are implemented. For some species this may remain due to the change in habitat.					



4.2.2 Operational Phase

Table 7. Mortality of priority species due to collisions with solar panels.

Nature: Mortality of priority species due to collisions with solar panels.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	Low	2	Without mitigation	Local	2
With mitigation	Low	2	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Reversible	1	Without mitigation	Long term	4
With mitigation	Reversible	1	With mitigation	Long term	4
Probability		Score	Rating		Score
Without mitigation	Probable	3	Without mitigation	Low	27
With mitigation	Probable	3	With mitigation	Low	27
Mitigation:					
Water dependant Priority Species were not prevalent on site in large numbers. These species are known to confuse PV solar panel arrays with waterbodies, but due to their low numbers the expected significance of this impact on the PAOI is low and no mitigation measures are currently recommended.					
Residual Risks:					
Not applicable.					



Table 8. Entrapment of large-bodied birds in the perimeter fence lines of Tournee SEF Cluster.

Nature: Entrapment of large-bodied birds in the perimeter fence lines of Tournee SEF Cluster.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	Medium	3	Without mitigation	Local	2
With mitigation	Low	2	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Reversible	1	Without mitigation	Long term	4
With mitigation	Reversible	1	With mitigation	Long term	4
Probability		Score	Rating		Score
Without mitigation	Probable	3	Without mitigation	Low	30
With mitigation	Low probability	2	With mitigation	Low	18
Mitigation:					
<ul style="list-style-type: none"> • A single perimeter fence is recommended to reduce entrapment of priority species. • Increasing the spacing between the two top wires (minimum of 30cm) and ensuring wires are barbless and correctly tensioned, will reduce snaring risk of birds (Especially the Marsh Owls present on site) 					
Residual Risks:					
The residual risk of entrapment will remain low if mitigation measures are followed.					



Table 9. Mortality of priority species due to electrocution with reticulation networks.

Nature: Mortality of priority species due to electrocution with reticulation networks.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	Medium	3	Without mitigation	Local	2
With mitigation	Low	2	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Reversible	1	With mitigation	Long term	4
With mitigation	Reversible	1	Without mitigation	Long term	4
Probability		Score	Rating		Score
Without mitigation	Probable	3	Without mitigation	Low	30
With mitigation	Low probability	1	With mitigation	Very Low	9
Mitigation:					
<ul style="list-style-type: none"> • Use underground cables as much as possible. • Use raptor friendly pole designs, approved by an avifaunal specialist. 					
Residual Risks:					
The residual risk of entrapment will be reduced to very low if mitigation measures are followed.					



Table 10. Mortality of priority species due to collisions with reticulation networks.

Nature: Mortality of priority species due to collisions with reticulation networks.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	Medium	3	Without mitigation	Local	2
With mitigation	Low	2	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Reversible	1	With mitigation	Long term	4
With mitigation	Reversible	1	Without mitigation	Long term	4
Probability		Score	Rating		Score
Without mitigation	Probable	3	Without mitigation	Low	30
With mitigation	Low probability	2	With mitigation	Low	18
Mitigation: <ul style="list-style-type: none"> • Use underground cables as much as possible. • All overhead lines must be marked with Eskom approved flight diverters/flappers according to the latest official Eskom Engineering Instruction. 					
Residual Risks: The residual risk of collision will still be present for Blue Korhaan and Blue Crane, but should be significantly reduced for other species.					



4.2.3 Decommissioning Phase

Table 11. Impact due to the habitat transformation during the decommissioning phase

Nature: Displacement of priority species due to habitat transformation associated with construction of Tournee SEF Cluster and associated infrastructure.					
Impact Magnitude		Score	Impact Extent		Score
Without mitigation	High	4	Without mitigation	Local	2
With mitigation	Medium	3	With mitigation	Local	2
Impact Reversibility		Score	Impact Duration		Score
Without mitigation	Reversible	1	With mitigation	Short term	2
With mitigation	Reversible	1	Without mitigation	Short term	2
Probability		Score	Rating		Score
Without mitigation	Definite	5	Without mitigation	Moderate	45
With mitigation	Definite	5	With mitigation	Moderate	40
Mitigation:					
<ul style="list-style-type: none"> • Activity should be restricted as far as possible to the immediate footprint of the developed site. • Access to the surrounding site outside of the footprint should be controlled and limited to reduce unnecessary disturbance to priority species. • Decommissioning should take place outside of key breeding seasons for any priority species. • Best practice guidelines should be followed to control noise and dust. • Existing roads should be used and any construction of new roads kept to a minimum. • Recommendations of the ecological specialist studies should be strictly followed. 					
Residual Risks:					
The residual risk of displacement will be reduced, but will remain at a moderate level after mitigation, if proposed mitigation measures are implemented.					



5. Conclusion

Large sections of the PAOI have already been transformed and consists of agricultural land, used for crops and cattle grazing, with the most sensitive areas for birds identified as the wetlands and farm dams. These damp areas serve as potential roosting areas for Black Harrier, African Marsh Harrier, Montagu's Harrier, Pallid Harrier, and Blue Crane. They are also likely to attract large raptors, storks and bustards which may use these to both bath and drink. Blue Cranes regularly enter farm dams to protect their chicks from terrestrial predators in the evenings.

The more natural grasslands on the PAOI seemed to hold a greater number of priority species such as Blue Korhaan, Secretarybird, and although these species would all be affected by the permanent removal of these grasslands for the construction of the proposed SEF, the surrounding grasslands neighbouring the PAOI should be sufficient to allow for the feeding and breeding of these species. Currently, with only thirty percent of the potential Priority Species being recorded on both the Tournee 1 Solar PV and Tournee 2 Solar PV facilities, the overall impact on birds based off the seasonal surveys is considered **LOW**, and we have identified no fatal flaws and all likely risks can be mitigated.



6. References

EOH Coastal & Environmental Services, (2015). Proposed Waaihoek Wind Energy Facility, Final Amended Environmental Impact Assessment Report, CES, East London.

Jenkins, A.R. , Ralston-Paton, S., Smit-Robinson, H.A.. 2017. Best Practise guidelines for birds and solar facilities.

Ladislav, M., Rutherford, M.C., (2006). The vegetation of South Africa, Lesotho and Swaziland, South African National Biodiversity Institute.

WSP Group Africa (Pty) Ltd (2022). Camden I Wind Energy Facility Environmental Impact Assessment report.

WSP Group Africa (Pty) Ltd (2022). Camden I Solar Energy Facility Final Environmental Impact Assessment Report.

WSP Group Africa (Pty) Ltd (2022). Camden II Wind Energy Facility Final Environmental Impact Assessment Report.



Appendix 1: Potential species present on PAOI.

Common name	Scientific name
Ostriches (Struthionidae)	
Common Ostrich	<i>Struthio camelus</i>
Ducks, Geese, Swans (Anatidae)	
White-faced Whistling Duck	<i>Dendrocygna viduata</i>
Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>
White-backed Duck	<i>Thalassornis leuconotus</i>
Spur-winged Goose	<i>Plectropterus gambensis</i>
Egyptian Goose	<i>Alopochen aegyptiaca</i>
South African Shelduck	<i>Tadorna cana</i>
Blue-billed Teal	<i>Spatula hottentota</i>
Cape Shoveler	<i>Spatula smithii</i>
African Black Duck	<i>Anas sparsa</i>
Yellow-billed Duck	<i>Anas undulata</i>
Mallard	<i>Anas platyrhynchos</i>
Cape Teal	<i>Anas capensis</i>
Red-billed Teal	<i>Anas erythrorhyncha</i>
Southern Pochard	<i>Netta erythrophthalma</i>
Maccoa Duck	<i>Oxyura maccoa</i>
Guineafowl (Numididae)	
Helmeted Guineafowl	<i>Numida meleagris</i>
Pheasants & Allies (Phasianidae)	
Grey-winged Francolin	<i>Scleroptila afra</i>
Orange River Francolin	<i>Scleroptila gutturalis</i>
Common Quail	<i>Coturnix coturnix</i>
Swainson's Spurfowl	<i>Pternistis swainsonii</i>
Swifts (Apodidae)	
African Palm Swift	<i>Cypsiurus parvus</i>
Common Swift	<i>Apus apus</i>
African Black Swift	<i>Apus barbatus</i>
Little Swift	<i>Apus affinis</i>
White-rumped Swift	<i>Apus caffer</i>



Common name	Scientific name
Bustards (Otididae)	
Blue Korhaan	<i>Eupodotis caerulescens</i>
Northern Black Korhaan	<i>Afrotis afraoides</i>
Cuckoos (Cuculidae)	
Diederik Cuckoo	<i>Chrysococcyx caprius</i>
Pigeons, Doves (Columbidae)	
Rock Dove	<i>Columba livia</i>
Speckled Pigeon	<i>Columba guinea</i>
Red-eyed Dove	<i>Streptopelia semitorquata</i>
Ring-necked Dove	<i>Streptopelia capicola</i>
Laughing Dove	<i>Spilopelia senegalensis</i>
Namaqua Dove	<i>Oena capensis</i>
Rails, Crakes & Coots (Rallidae)	
African Crake	<i>Crecopsis egregia</i>
Common Moorhen	<i>Gallinula chloropus</i>
Red-knobbed Coot	<i>Fulica cristata</i>
African Swamphen	<i>Porphyrio madagascariensis</i>
Black Crake	<i>Zapornia flavirostra</i>
Cranes (Gruidae)	
Blue Crane	<i>Grus paradisea</i>
Grebes (Podicipedidae)	
Little Grebe	<i>Tachybaptus ruficollis</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Flamingos (Phoenicopteridae)	
Greater Flamingo	<i>Phoenicopterus roseus</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Stone-curlews, Thick-knees (Burhinidae)	
Spotted Thick-knee	<i>Burhinus capensis</i>



Common name	Scientific name
Stilts, Avocets (Recurvirostridae)	
Black-winged Stilt	<i>Himantopus himantopus</i>
Pied Avocet	<i>Recurvirostra avosetta</i>
Plovers (Charadriidae)	
Blacksmith Lapwing	<i>Vanellus armatus</i>
Crowned Lapwing	<i>Vanellus coronatus</i>
African Wattled Lapwing	<i>Vanellus senegallus</i>
Kittlitz's Plover	<i>Charadrius pecuarius</i>
Three-banded Plover	<i>Charadrius tricollaris</i>
Sandpipers, Snipes (Scolopacidae)	
Ruff	<i>Calidris pugnax</i>
Curlew Sandpiper	<i>Calidris ferruginea</i>
Little Stint	<i>Calidris minuta</i>
African Snipe	<i>Gallinago nigripennis</i>
Common Sandpiper	<i>Actitis hypoleucos</i>
Marsh Sandpiper	<i>Tringa stagnatilis</i>
Wood Sandpiper	<i>Tringa glareola</i>
Common Greenshank	<i>Tringa nebularia</i>
Couriers, Pratincoles (Glareolidae)	
Black-winged Pratincole	<i>Glareola nordmanni</i>
Gulls, Terns, Skimmers (Laridae)	
Grey-headed Gull	<i>Chroicocephalus cirrocephalus</i>
Caspian Tern	<i>Hydroprogne caspia</i>
Whiskered Tern	<i>Chlidonias hybrida</i>
White-winged Tern	<i>Chlidonias leucopterus</i>
Storks (Ciconiidae)	
African Openbill	<i>Anastomus lamelligerus</i>
White Stork	<i>Ciconia ciconia</i>
Anhingas, Darters (Anhingidae)	
African Darter	<i>Anhinga rufa</i>



Common name	Scientific name
Cormorants, Shags (Phalacrocoracidae)	
Reed Cormorant	<i>Microcarbo africanus</i>
White-breasted Cormorant	<i>Phalacrocorax lucidus</i>
Ibises, Spoonbills (Threskiornithidae)	
African Sacred Ibis	<i>Threskiornis aethiopicus</i>
Southern Bald Ibis	<i>Geronticus calvus</i>
Hadada Ibis	<i>Bostrychia hagedash</i>
Glossy Ibis	<i>Plegadis falcinellus</i>
African Spoonbill	<i>Platalea alba</i>
Hérons, Bitterns (Ardeidae)	
Little Bittern	<i>Ixobrychus minutus</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
Squacco Heron	<i>Ardeola ralloides</i>
Western Cattle Egret	<i>Bubulcus ibis</i>
Grey Heron	<i>Ardea cinerea</i>
Black-headed Heron	<i>Ardea melanocephala</i>
Goliath Heron	<i>Ardea goliath</i>
Purple Heron	<i>Ardea purpurea</i>
Great Egret	<i>Ardea alba</i>
Intermediate Egret	<i>Ardea intermedia</i>
Black Heron	<i>Egretta ardesiaca</i>
Little Egret	<i>Egretta garzetta</i>
Hamerkop (Scopidae)	
Hamerkop	<i>Scopus umbretta</i>
Secretarybird (Sagittariidae)	
Secretarybird	<i>Sagittarius serpentarius</i>
Ospreys (Pandionidae)	
Osprey	<i>Pandion haliaetus</i>
Kites, Hawks, Eagles (Accipitridae)	
Black-winged Kite	<i>Elanus caeruleus</i>
African Harrier-Hawk	<i>Polyboroides typus</i>
Long-crested Eagle	<i>Lophaetus occipitalis</i>
Black Sparrowhawk	<i>Accipiter melanoleucus</i>



Common name	Scientific name
African Marsh Harrier	<i>Circus ranivorus</i>
Black Harrier	<i>Circus maurus</i>
Pallid Harrier	<i>Circus macrourus</i>
Montagu's Harrier	<i>Circus pygargus</i>
Yellow-billed Kite	<i>Milvus aegyptius</i>
African Fish Eagle	<i>Haliaeetus vocifer</i>
Common Buzzard	<i>Buteo buteo</i>
Jackal Buzzard	<i>Buteo rufofuscus</i>
Barn Owls (Tytonidae)	
Western Barn Owl	<i>Tyto alba</i>
Owls (Strigidae)	
Marsh Owl	<i>Asio capensis</i>
Spotted Eagle-Owl	<i>Bubo africanus</i>
Mousebirds (Coliidae)	
Speckled Mousebird	<i>Colius striatus</i>
Hoopoes (Upupidae)	
African Hoopoe	<i>Upupa africana</i>
Wood Hoopoes (Phoeniculidae)	
Green Wood Hoopoe	<i>Phoeniculus purpureus</i>
Rollers (Coraciidae)	
European Roller	<i>Coracias garrulus</i>
Kingfishers (Alcedinidae)	
Malachite Kingfisher	<i>Corythornis cristatus</i>
Giant Kingfisher	<i>Megaceryle maxima</i>
Pied Kingfisher	<i>Ceryle rudis</i>
African Barbets (Lybiidae)	
Black-collared Barbet	<i>Lybius torquatus</i>
Crested Barbet	<i>Trachyphonus vaillantii</i>



Common name	Scientific name
Woodpeckers (Picidae)	
Red-throated Wryneck	<i>Jynx ruficollis</i>
Caracaras, Falcons (Falconidae)	
Lesser Kestrel	<i>Falco naumanni</i>
Rock Kestrel	<i>Falco rupicolus</i>
Greater Kestrel	<i>Falco rupicoloides</i>
Red-footed Falcon	<i>Falco vespertinus</i>
Amur Falcon	<i>Falco amurensis</i>
Lanner Falcon	<i>Falco biarmicus</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Old World Parrots (Psittaculidae)	
Rose-ringed Parakeet	<i>Psittacula krameri</i>
Bushshrikes (Malaconotidae)	
Bokmakierie	<i>Telophorus zeylonus</i>
Shrikes (Laniidae)	
Red-backed Shrike	<i>Lanius collurio</i>
Lesser Grey Shrike	<i>Lanius minor</i>
Southern Fiscal	<i>Lanius collaris</i>
Figbirds, Old World Orioles, Piopios (Oriolidae)	
Black-headed Oriole	<i>Oriolus larvatus</i>
Crows, Jays (Corvidae)	
Cape Crow	<i>Corvus capensis</i>
Pied Crow	<i>Corvus albus</i>
Larks (Alaudidae)	
Spike-heeled Lark	<i>Chersomanes albofasciata</i>
Chestnut-backed Sparrow-Lark	<i>Eremopterix leucotis</i>
Eastern Clapper Lark	<i>Mirafrfa fasciolata</i>
Rufous-naped Lark	<i>Mirafrfa africana</i>
Pink-billed Lark	<i>Spizocorys conirostris</i>
Red-capped Lark	<i>Calandrella cinerea</i>



Common name	Scientific name
Bulbuls (Pycnonotidae)	
Dark-capped Bulbul	<i>Pycnonotus tricolor</i>
Swallows, Martins (Hirundinidae)	
Banded Martin	<i>Neophedina cincta</i>
Brown-throated Martin	<i>Riparia paludicola</i>
Rock Martin	<i>Ptyonoprogne fuligula</i>
White-throated Swallow	<i>Hirundo albigularis</i>
Barn Swallow	<i>Hirundo rustica</i>
Common House Martin	<i>Delichon urbicum</i>
Lesser Striped Swallow	<i>Cecropis abyssinica</i>
Greater Striped Swallow	<i>Cecropis cucullata</i>
South African Cliff Swallow	<i>Petrochelidon spilodera</i>
Leaf Warblers (Phylloscopidae)	
Willow Warbler	<i>Phylloscopus trochilus</i>
Reed Warblers & Allies (Acrocephalidae)	
Lesser Swamp Warbler	<i>Acrocephalus gracilirostris</i>
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>
Common Reed Warbler	<i>Acrocephalus scirpaceus</i>
Grassbirds & Allies (Locustellidae)	
Little Rush Warbler	<i>Bradypterus baboecala</i>
Cisticolas & Allies (Cisticolidae)	
Levaillant's Cisticola	<i>Cisticola tinniens</i>
Neddicky	<i>Cisticola fulvicapilla</i>
Zitting Cisticola	<i>Cisticola juncidis</i>
Cloud Cisticola	<i>Cisticola textrix</i>
Pale-crowned Cisticola	<i>Cisticola cinnamomeus</i>
Wing-snapping Cisticola	<i>Cisticola ayresii</i>
Tawny-flanked Prinia	<i>Prinia subflava</i>
Black-chested Prinia	<i>Prinia flavicans</i>
White-eyes (Zosteropidae)	
Cape White-eye	<i>Zosterops virens</i>



Common name	Scientific name
Starlings, Rhabdornises (Sturnidae)	
Common Myna	<i>Acridotheres tristis</i>
Wattled Starling	<i>Creatophora cinerea</i>
Cape Starling	<i>Lamprotornis nitens</i>
Pied Starling	<i>Lamprotornis bicolor</i>
Thrushes (Turdidae)	
Karoo Thrush	<i>Turdus smithi</i>
Chats, Old World Flycatchers (Muscicapidae)	
Spotted Flycatcher	<i>Muscicapa striata</i>
Cape Robin-Chat	<i>Cossypha caffra</i>
African Stonechat	<i>Saxicola torquatus</i>
Ant-eating Chat	<i>Myrmecocichla formicivora</i>
Mountain Wheatear	<i>Myrmecocichla monticola</i>
Capped Wheatear	<i>Oenanthe pileata</i>
Old World Sparrows, Snowfinches (Passeridae)	
Cape Sparrow	<i>Passer melanurus</i>
Southern Grey-headed Sparrow	<i>Passer diffusus</i>
House Sparrow	<i>Passer domesticus</i>
Weavers, Widowbirds (Ploceidae)	
White-browed Sparrow-Weaver	<i>Plocepasser mahali</i>
Southern Masked Weaver	<i>Ploceus velatus</i>
Red-billed Quelea	<i>Quelea quelea</i>
Yellow-crowned Bishop	<i>Euplectes afer</i>
Southern Red Bishop	<i>Euplectes orix</i>
Yellow Bishop	<i>Euplectes capensis</i>
Fan-tailed Widowbird	<i>Euplectes axillaris</i>
White-winged Widowbird	<i>Euplectes albonotatus</i>
Long-tailed Widowbird	<i>Euplectes progne</i>
Waxbills, Munias & Allies (Estrildidae)	
Common Waxbill	<i>Estrilda astrild</i>
Quailfinch	<i>Ortygospiza atricollis</i>
Red-headed Finch	<i>Amadina erythrocephala</i>
Orange-breasted Waxbill	<i>Amandava subflava</i>



Common name	Scientific name
Indigobirds, Whydahs (Viduidae)	
Pin-tailed Whydah	<i>Vidua macroura</i>
Wagtails, Pipits (Motacillidae)	
Cape Wagtail	<i>Motacilla capensis</i>
Cape Longclaw	<i>Macronyx capensis</i>
African Pipit	<i>Anthus cinnamomeus</i>
Nicholson's Pipit	<i>Anthus nicholsoni</i>
Finches, Euphonias (Fringillidae)	
Black-throated Canary	<i>Crithagra atrogularis</i>
Yellow-fronted Canary	<i>Crithagra mozambica</i>
Yellow Canary	<i>Crithagra flaviventris</i>
Streaky-headed Seedeater	<i>Crithagra gularis</i>
Cape Canary	<i>Serinus canicollis</i>
Buntings (Emberizidae)	
Lark-like Bunting	<i>Emberiza impetuani</i>
Cinnamon-breasted Bunting	<i>Emberiza tahapisi</i>
Species: 201	
IOC World Bird List 13.1 (January 2023)	



Appendix 2: Bird species found on the PAOI.

Common name	Scientific name
Ducks, Geese, Swans (Anatidae)	
Spur-winged Goose	<i>Plectropterus gambensis</i>
Egyptian Goose	<i>Alopochen aegyptiaca</i>
Cape Shoveler	<i>Spatula smithii</i>
Yellow-billed Duck	<i>Anas undulata</i>
Guineafowl (Numididae)	
Helmeted Guineafowl	<i>Numida meleagris</i>
Pheasants & Allies (Phasianidae)	
Grey-winged Francolin	<i>Scleroptila afra</i>
Common Quail	<i>Coturnix coturnix</i>
Swainson's Spurfowl	<i>Pternistis swainsonii</i>
Swifts (Apodidae)	
African Palm Swift	<i>Cypsiurus parvus</i>
Little Swift	<i>Apus affinis</i>
White-rumped Swift	<i>Apus caffer</i>
Bustards (Otididae)	
Blue Korhaan	<i>Eupodotis caerulescens</i>
Cuckoos (Cuculidae)	
Diederik Cuckoo	<i>Chrysococcyx caprius</i>
Pigeons, Doves (Columbidae)	
Rock Dove	<i>Columba livia</i>
Speckled Pigeon	<i>Columba guinea</i>
Red-eyed Dove	<i>Streptopelia semitorquata</i>
Ring-necked Dove	<i>Streptopelia capicola</i>
Rails, Crakes & Coots (Rallidae)	
Corn Crake	<i>Crex crex</i>
Red-knobbed Coot	<i>Fulica cristata</i>



Common name	Scientific name
Grebes (Podicipedidae)	
Little Grebe	<i>Tachybaptus ruficollis</i>
Stone-curlews, Thick-knees (Burhinidae)	
Spotted Thick-knee	<i>Burhinus capensis</i>
Plovers (Charadriidae)	
Blacksmith Lapwing	<i>Vanellus armatus</i>
Crowned Lapwing	<i>Vanellus coronatus</i>
African Wattled Lapwing	<i>Vanellus senegallus</i>
Three-banded Plover	<i>Charadrius tricollaris</i>
Sandpipers, Snipes (Scolopacidae)	
African Snipe	<i>Gallinago nigripennis</i>
Common Greenshank	<i>Tringa nebularia</i>
Anhingas, Darters (Anhingidae)	
African Darter	<i>Anhinga rufa</i>
Cormorants, Shags (Phalacrocoracidae)	
Reed Cormorant	<i>Microcarbo africanus</i>
Ibises, Spoonbills (Threskiornithidae)	
African Sacred Ibis	<i>Threskiornis aethiopicus</i>
Hadada Ibis	<i>Bostrychia hagedash</i>
Glossy Ibis	<i>Plegadis falcinellus</i>
African Spoonbill	<i>Platalea alba</i>
Hérons, Bitterns (Ardeidae)	
Western Cattle Egret	<i>Bubulcus ibis</i>
Grey Heron	<i>Ardea cinerea</i>
Black-headed Heron	<i>Ardea melanocephala</i>
Purple Heron	<i>Ardea purpurea</i>
Intermediate Egret	<i>Ardea intermedia</i>
Hamerkop (Scopidae)	
Hamerkop	<i>Scopus umbretta</i>



Common name	Scientific name
Secretarybird (Sagittariidae)	
Secretarybird	<i>Sagittarius serpentarius</i>
Kites, Hawks, Eagles (Accipitridae)	
Black-winged Kite	<i>Elanus caeruleus</i>
African Harrier-Hawk	<i>Polyboroides typus</i>
Black Sparrowhawk	<i>Accipiter melanoleucus</i>
Yellow-billed Kite	<i>Milvus aegyptius</i>
Common Buzzard	<i>Buteo buteo</i>
Jackal Buzzard	<i>Buteo rufofuscus</i>
Barn Owls (Tytonidae)	
Western Barn Owl	<i>Tyto alba</i>
Owls (Strigidae)	
Marsh Owl	<i>Asio capensis</i>
Mousebirds (Coliidae)	
Red-faced Mousebird	<i>Urocolius indicus</i>
African Barbets (Lybiidae)	
Black-collared Barbet	<i>Lybius torquatus</i>
Caracaras, Falcons (Falconidae)	
Amur Falcon	<i>Falco amurensis</i>
Shrikes (Laniidae)	
Southern Fiscal	<i>Lanius collaris</i>
Crows, Jays (Corvidae)	
Cape Crow	<i>Corvus capensis</i>
Larks (Alaudidae)	
Pink-billed Lark	<i>Spizocorys conirostris</i>
Red-capped Lark	<i>Calandrella cinerea</i>
Bulbuls (Pycnonotidae)	
Dark-capped Bulbul	<i>Pycnonotus tricolor</i>



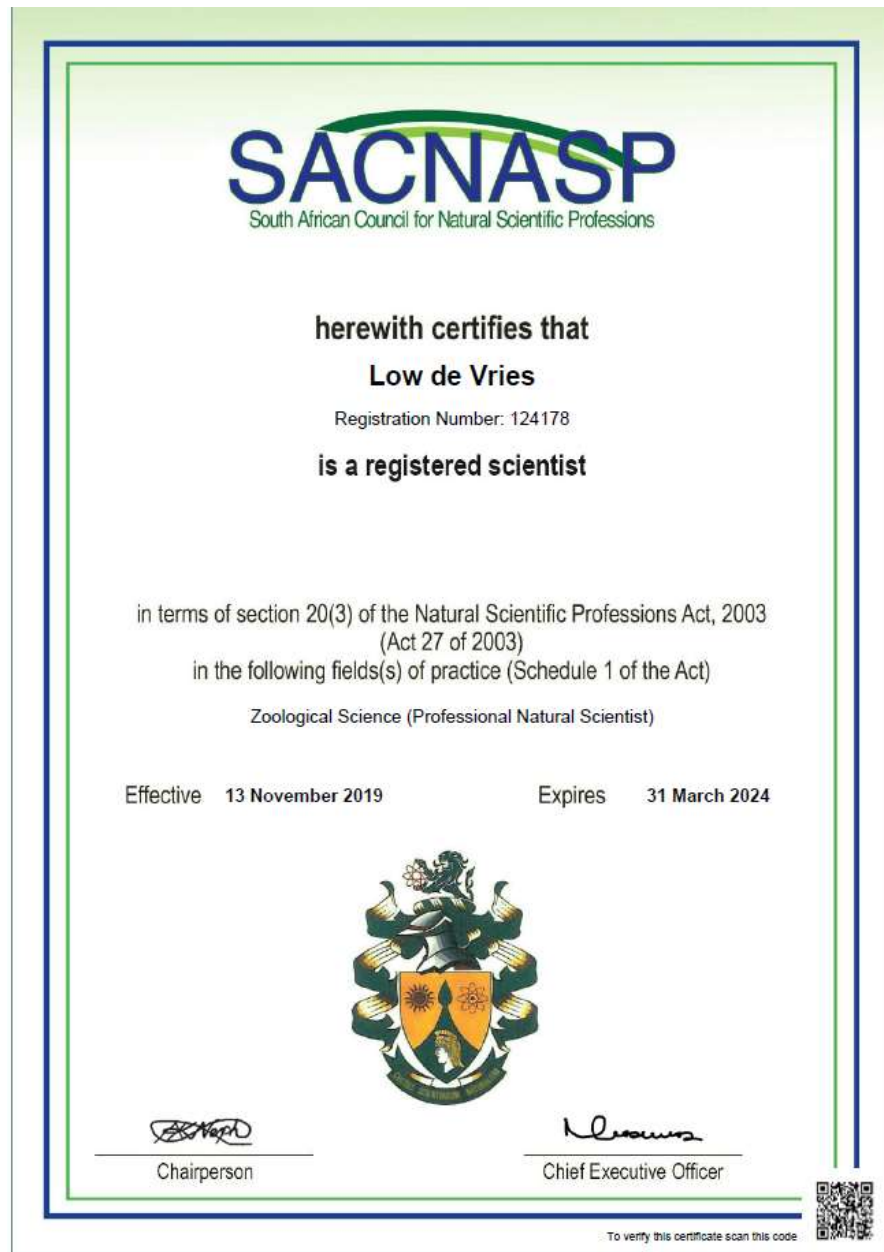
Common name	Scientific name
Swallows, Martins (Hirundinidae)	
Banded Martin	<i>Neophedina cincta</i>
Brown-throated Martin	<i>Riparia paludicola</i>
White-throated Swallow	<i>Hirundo albigularis</i>
Barn Swallow	<i>Hirundo rustica</i>
Greater Striped Swallow	<i>Cecropis cucullata</i>
South African Cliff Swallow	<i>Petrochelidon spilodera</i>
Reed Warblers & Allies (Acrocephalidae)	
Common Reed Warbler	<i>Acrocephalus scirpaceus</i>
Cisticolas & Allies (Cisticolidae)	
Levaillant's Cisticola	<i>Cisticola tinniens</i>
Zitting Cisticola	<i>Cisticola juncidis</i>
Cloud Cisticola	<i>Cisticola textrix</i>
Pale-crowned Cisticola	<i>Cisticola cinnamomeus</i>
Wing-snapping Cisticola	<i>Cisticola ayresii</i>
Black-chested Prinia	<i>Prinia flavicans</i>
Starlings, Rhabdornises (Sturnidae)	
Wattled Starling	<i>Creatophora cinerea</i>
Cape Starling	<i>Lamprotornis nitens</i>
Pied Starling	<i>Lamprotornis bicolor</i>
Chats, Old World Flycatchers (Muscicapidae)	
Cape Robin-Chat	<i>Cossypha caffra</i>
African Stonechat	<i>Saxicola torquatus</i>
Old World Sparrows, Snowfinches (Passeridae)	
Cape Sparrow	<i>Passer melanurus</i>
Southern Grey-headed Sparrow	<i>Passer diffusus</i>
Weavers, Widowbirds (Ploceidae)	
Southern Masked Weaver	<i>Ploceus velatus</i>
Red-billed Quelea	<i>Quelea quelea</i>
Yellow-crowned Bishop	<i>Euplectes afer</i>
Southern Red Bishop	<i>Euplectes orix</i>
Fan-tailed Widowbird	<i>Euplectes axillaris</i>
White-winged Widowbird	<i>Euplectes albonotatus</i>



Common name	Scientific name
Long-tailed Widowbird	<i>Euplectes progne</i>
Waxbills, Munias & Allies (Estrildidae)	
Common Waxbill	<i>Estrilda astrild</i>
Quailfinch	<i>Ortygospiza atricollis</i>
Indigobirds, Whydahs (Viduidae)	
Pin-tailed Whydah	<i>Vidua macroura</i>
Wagtails, Pipits (Motacillidae)	
Cape Wagtail	<i>Motacilla capensis</i>
Cape Longclaw	<i>Macronyx capensis</i>
African Pipit	<i>Anthus cinnamomeus</i>
Finches, Euphonias (Fringillidae)	
Black-throated Canary	<i>Crithagra atrogularis</i>
Species: 90	
IOC World Bird List 13.1 (January 2023)	



Appendix 3: Specialist qualifications





04290887



University of Pretoria

The Council and Senate hereby declare that
at a congregation of the University the degree

Doctor of Philosophy in Zoology

with all the associated rights and privileges
was conferred on

John Low de Vries

in terms of the Higher Education Act, 1997 and the Statute of the University

On behalf of the Council and Senate

Vice-Chancellor and Principal

On behalf of the Faculty of
Natural and Agricultural Sciences

Dean (Acting)



Ek sertifiseer dat hierdie is 'n ware en juiste afskrif van die
oorspronklike dokument.
I certify that this is a true and correct copy of the original
document.

Kommissaris van die Oorwagter van Oordele
Kommissaris van die Oorwagter van Oordele

Kliëntediensentrum / Client Service Centre
Universiteit van Pretoria / University of Pretoria

Datum 18.09.2015 Date

Registrar

2014-09-04



Appendix 4: Curriculum Vitae of specialist

Personal details

Full Name	John Low de Vries
DOB	7 November 1984
Nationality	South African
Marital Status	Married
Email	low@volantenvironmental.com
Phone	+27 82 323 5475
ID number	841107 5188087

Education

Completed	Degree and Institution
2002	Matric, Hoërskool Jeugland, Kempton Park, South Africa
2006	B. Sc Zoology, University of Pretoria, Pretoria, South Africa
2007	B. Sc (Hons) Zoology, University of Pretoria, Pretoria, South Africa
2014	PhD Zoology, University of Pretoria, Pretoria, South Africa

Key areas of expertise

- **Bat Specialist** Conducting surveys on bat diversity and abundance and research on bat ecology.
- **Environmental Assessment Practitioner** Writing and collating Basic Assessment (BA) for proposed Wind Energy Facilities

Memberships & Certificates

- SACNASP Registered Professional Natural Scientist in the field of Zoological Science - Registration Number: 124178
- Bat Assessment Specialist with South African Bat Assessment Association (SABAA)

Other Training

- Multivariate statistical modelling (Cape Town, South Africa)
- Bat handling and identification course (AfricanBats)
- Snake handling (Chameleon Village (South Africa))



- ArcGis online course
- First Aid level 2 (Johannesburg, South Africa)

Focal Experience relevant to current project

2022-current - Bat specialist for a wind energy facility and associated grid connection Free State, South Africa
2022-current - Bat specialist for a wind energy facility and associated grid connection near Doringbaai, Western Province, South Africa
2021 -current – Bat specialist for three wind energy facilities and associated grid connection near Dordrecht, Eastern Cape Province, South Africa
2021-current – Bat specialist for wind energy facility and associated grid connection near Belfast, Northern Cape Province, South Africa
2021-current – Bat specialist for wind energy facility and associated grid connection near Aggeneys, Northern Cape Province, South Africa
2021-current – Bat specialist for wind energy facility and associated grid connection near Pofadder, Northern Cape Province, South Africa
2020-2021– Bat specialist for wind energy facility and associated grid connection near Loeriesfontein, Northern Cape Province, South Africa
2020-2021 – Bat specialist for wind energy facility and associated grid connection near Gouda, Northern Cape Province, South Africa
2017 - Biodiversity survey of Bats in Gorongosa National Park, Mozambique
2016-current – Bat Ecologist for the Centre for Viral Zoonoses at the University of Pretoria

Publications

Wood, M., **de Vries, J.L.**, Monadjem, A., Markotter, W. A critical review of factors influencing interspecific variation in home range size of bats. *Mammal Review. In submission*

Markotter W, **de Vries, J.L.**, Paweska, J. 2022. Wing tattoos: A cost-effective and permanent method for marking bats. *In review*

Geldenhuis, M., **de Vries, J.L.**, Dietrich, M., Mortlock, M., Epstein, J. H., Weyer, J., Paweska, J T., Markotter, W. Longitudinal surveillance of diverse coronaviruses within a *Rousettus aegyptiacus* maternal colony towards understanding viral maintenance and excretion dynamics. *In submission*

Markotter, W., Coertse, J., **de Vries, J.L.**, Geldenhuis, M., Mortlock, M. 2020. Bat-borne viruses in Africa: A critical review. *Journal of Zoology.* 311:2. 77-98



de Vries JL, Marneweck D, Dalerum F, Page-Nicholson S, Mills MGL, Yarnell RW, Sliwa A, Do Linh San E. 2016. A conservation assessment of *Proteles cristata*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland, and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Dalerum F, Le Roux A, **de Vries JL**, Kamler JF, Page-Nicholson S, Stuart C, Stuart M, Wilson B, Do Linh San E. 2016. A conservation assessment of *Otocyon megalotis*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland, and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Dalerum, F., **de Vries, J.L.**, Pirk, C.W.W., Cameron, E.Z. 2016. Spatial and temporal dimensions to the taxonomic diversity of arthropods in an arid grassland savannah. *Journal of Arid Environments*. 144. 21-30

Kotze, R., Bennett, N., Cameron, E.Z., **de Vries, J.L.**, Marneweck, D.G., Pirk, C.W.W., Dalerum, F. 2012. Temporal patterns of den use suggest polygamous mating patterns in an obligate monogamous mammal. *Animal Behaviour*. 84. 1573-1578

de Vries, J.L., Pirk, C.W.W., Bateman, P.W., Cameron, E.Z., Dalerum, F. 2011. Extension of the diet of an extreme foraging specialist, the aardwolf (*Proteles cristata*). *African Zoology*. 6:1 194-196.

de Vries, J. L., Oosthuizen, M. K., Sichilima, A. M., Bennett, N. C. 2008. Circadian rhythms of locomotor activity in Ansell's mole-rat: are mole-rat's clocks ticking? *Journal of Zoology*.

Conference Contributions

Markotter W, **de Vries, J.L.**, Wood, M. 2022. Small scale movement of *Rousettus aegyptiacus*. International Bat Research Conference. Austin, Texas

Infectious Diseases of Bats Symposium. Fort Collins, Colorado 2017. Body mass index of the Egyptian fruit bat, *Rousettus aegyptiacus*: An indicator of infection status. **de Vries, J.L.**, Dietrich, M., Paweska, J., Markotter, W.

SASAS 2016. **de Vries, J.L.**, Jonker, M.L., Kriel, D., Kotze, A.K. The Tankwa goat: Phenotypically that different?



De Beers Diamond Route Conference, 2010. **de Vries, J.L.**, Pirk, C.W.W., Bennett, N.C. Is the aardwolf a seasonally influenced optimal forager?

Kimberley biodiversity research symposium, 2009. **de Vries, J.L.**, Bennett, N.C., Pirk, C.W.W., Dalerum, F., Cameron, E.Z. Den, and home range use of the aardwolf, *Proteles cristatus*

Employment & work-related experiences

2020 - present	Director and founder of Volant Environmental
2016 - present	Postdoctoral fellow, University of Pretoria
2015 - 2016	Postdoctoral fellow, NZG
2014 - 2015	Marion Island field assistant, University of Pretoria
2013	Documentary presenter, Oxford Scientific Films
2010 - 2011	Wildlife Education Trainer, Enviro- Insight
2010 - 2011	Game Ranging Lecturer, Damelin Centurion
2009 - 2018	Lecturer and tutor, University of Pretoria



Recent Project Experience

For further details please contact me directly under low@volantenvironmental.com

Time span	Nature of project	Capacity	Industry / Sector	Client / Developer	Country (Province)
2023	Kareedouw Impact Assessment	Bat and Bird Specialist	Renewable Energy / Onshore Wind	Energy team (Pty) Ltd	South Africa (Eastern Cape)
2023	Varsputs and Brakputs Impact assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2023	Hartebees skeur Impact assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2023	Daggakraal Impact assessment	Bat and Bird Specialist	Renewable Energy / Onshore Wind	EDF Renewables	South Africa (Mpumalanga)
2022	Thand Tau Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Free State)
2022	Camden Bird Impact Assessment	Bird Specialist	Renewable Energy / Onshore Wind	EDF Renewables	South Africa (Mpumalanga)
2022	Castle Wind Energy walkthrough	Bat Specialist	Renewable Energy / Onshore Wind	Savannah Environmental	South Africa (Northern Cape)
2022	Doringbaai Wind Energy Facility	Bat Specialist	Renewable Energy / Onshore Wind	WKN-Windcurrent	South Africa (Western Cape)
2022	Aggeneys Bat Impact Assessment Review	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2021	Dordrecht Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Indwe Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)



2021	Waschbank Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Gorachouqua Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021	Khoemana Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021-2022	Dalmanutha Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Mpumalanga)
2020-2021	Bergrivier Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Western Cape)
2020-2021	Botterblom Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2012	Dangerous snake removal	Herpetologist	Mining (Coal)	Anadarko	Mocimboa da Paia, Mozambique

