



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

| | |
|------------------------|-------------------------|
| File Reference Number: | (For official use only) |
| NEAS Reference Number: | DEA/EIA/ |
| Date Received: | |

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Ndau 2 Solar Energy Facility

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

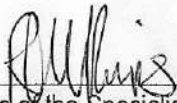
1. SPECIALIST INFORMATION

| | | | | |
|--|---|---------|------------------------------------|-----|
| Specialist Company Name: | Cossypha Ecological | | | |
| B-BBEE | Contribution level (indicate 1 to 8 or non-compliant) | 4 (EME) | Percentage Procurement recognition | N/A |
| Specialist name: | Robyn Phillips | | | |
| Specialist Qualifications: | MSc (Zoology) UNP | | | |
| Professional affiliation/registration: | SACNASP Reg no 400401/12 | | | |
| Physical address: | 16 MacDonald Road Woodside Westville | | | |
| Postal address: | 16 MacDonald Road Woodside Westville | | | |
| Postal code: | 3629 | Cell: | 084 695 1648 | |
| Telephone: | 031 267 2748 | Fax: | | |
| E-mail: | robyn@cossypha.co.za | | | |

2. DECLARATION BY THE SPECIALIST

I, Robyn Phillips, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

Cossypha Ecological

Name of Company:

31 May 2023

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Robyn Phillips, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Phillips
Signature of the Specialist

Cossypha Ecological
Name of Company

31 May 2023
Date

[Signature]
Signature of the Commissioner of Oaths

2023-05-31
Date



Proposed ABO Ndaou Solar Photovoltaic Facility 2 near Polokwane in the Capricorn District, Limpopo Province

Preliminary Avifaunal Assessment & Site Sensitivity Verification

Project Reference: 220707A_Ndaou & Nyala S&EIA



Compiled for



By



June 2023

REPORT PRODUCTION

| Specialist | Role | Project Component | Qualifications and Professional Registration |
|----------------|---|--|---|
| Robyn Phillips | Terrestrial Ecologist (Avifaunal Specialist) | Field work (data collection) and report compilation | MSc (Zoology) UNP SACNASP: <i>Pr.Sci.Nat.</i> 400401/12 Fields: Zoological and Ecological |


CONTACT INFORMATION

Robyn Phillips
16 MacDonald Road
Woodside, Westville
KwaZulu-Natal, 3629
Cell: 084 695 1648
Email: robyn@cosypha.co.za

SPECIALIST DECLARATION OF INDEPENDENCE

I, **Robyn Phillips**, in my capacity as a specialist consultant, hereby declare that I –

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Do not have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the Competent Authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Will provide the Competent Authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
- As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member;
- Based on information provided to me by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional ability;
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field; and
- Undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study for which I am registered.



Robyn Phillips *Pr.Sci.Nat.*
Terrestrial Ecologist
SACNASP Reg. No. 400401/12

19 July 2023

Date

TABLE OF CONTENTS

| | |
|---|-----------|
| Report Production | 2 |
| Contact Information | 2 |
| Specialist Declaration of Independence..... | 2 |
| Table of Contents..... | 3 |
| List of Figures..... | 4 |
| List of Tables..... | 4 |
| Abbreviations | 5 |
| 1. Introduction and Project Description | 6 |
| 1.1. Project Description | 6 |
| 1.2. The Purpose of this Report..... | 7 |
| 1.3. Terms of Reference..... | 7 |
| 2. Methodology | 8 |
| 2.1. Stage 1: Preliminary Assessment | 9 |
| 3. Desktop Assessment Results | 9 |
| 3.1. Study Area..... | 9 |
| 3.1.1. Location | 9 |
| 3.1.2. Climate | 10 |
| 3.1.3. Land Uses of the Greater Study area and Surroundings..... | 10 |
| 3.2. Distribution of Avifauna in the Study Area | 14 |
| 4. Field Results..... | 16 |
| 4.1. Site Description..... | 16 |
| 4.2. Avifaunal Habitats in the Study Area and Surrounds | 17 |
| 4.3. Bird Species Occurrence in the Study Area | 21 |
| 4.3.1. Bird Observations | 21 |
| 4.3.2. Birds of Conservation Concern | 22 |
| 4.3.3. Priority Species | 22 |
| 4.4. Key Habitats and Preliminary Site Sensitivity..... | 24 |
| 5. Preliminary Impacts | 26 |
| 6. Summary and Pre-construction Monitoring Requirements..... | 27 |
| 7. Recommendations | 28 |
| 8. References | 29 |
| 9. Appendices | 31 |

| | |
|---|----|
| APPENDIX A: Species List | 31 |
| APPENDIX B: Abridged CV of the Specialist | 35 |

LIST OF FIGURES

| | |
|---|----|
| Figure 1: Location of the greater study area and the proposed Ndau 2 PV SEF | 11 |
| Figure 2: Aerial overview of the greater study area and surrounds | 12 |
| Figure 3: The greater study area and the Ndau 2 project area in relation to national Protected Areas..... | 13 |
| Figure 4: Habitat features of the Ndau 2 project area..... | 18 |
| Figure 5: Preliminary avifaunal habitat sensitivity of the Ndau 2 project area..... | 25 |

LIST OF TABLES

| | |
|---|----|
| Table 1: Avifaunal priority species occurring within pentad 2400_2910 including Reporting Rate (RR). Birds listed in red are SCC and those in green are endemic to southern Africa..... | 14 |
| Table 2: Priority species recorded in the greater study area listed in taxonomic order. SCC are highlighted in red and endemic species in green | 22 |
| Table 3: Summary of sensitivity categories..... | 24 |
| Table 4: Possible impacts arising from the proposed development..... | 26 |
| Table 5: Recommended avifaunal assessment regimes (Jenkins <i>et al.</i> , 2017) | 28 |

ABBREVIATIONS

| | |
|-------|---|
| BA | Basic Assessment |
| BIRP | Birds in Reserves Project |
| CAR | Co-ordinated Avifaunal Road Counts |
| CR | Critically Endangered |
| CWAC | Co-ordinated Wetland Counts |
| DEA | Department of Environmental Affairs (now DFFE) |
| DFFE | Department of Forestry, Fisheries and the Environment |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| EIA | Environmental Impact Assessment |
| EN | Endangered |
| EWT | Endangered Wildlife Trust |
| GBIF | Global Biodiversity Information Facility |
| GN | General Notice |
| IUCN | International Union for Conservation of Nature |
| kV | Kilovolts |
| LC | Least Concern |
| MW | Megawatt |
| NEMA | National Environmental Management Act 107 of 1998 |
| NT | Near Threatened |
| PV | Photovoltaic |
| QDGC | Quarter Degree Grid Cell |
| SABAP | South African Bird Atlas Project |
| SANBI | South African National Biodiversity Institute |
| SCC | Species of Conservation Concern |
| SEF | Solar Energy Facility |
| VU | Vulnerable |

1. INTRODUCTION AND PROJECT DESCRIPTION

ABO Nda Solar Energy Facility 2 (Pty) Ltd proposes to develop the Nda 2 photovoltaic (PV) solar energy generation facility (SEF), of up to 80 MWac in capacity, and associated infrastructure near Polokwane in Limpopo Province. Praxos 373 (Pty) Ltd (Praxos) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Scoping and Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982, as amended by GN R326). Cossypha Ecological was appointed to conduct an Avifaunal Impact Assessment for the proposed development to inform the S&EIR process.

1.1. PROJECT DESCRIPTION

The Nda 2 PV SEF is located on Portion 5 (Portion of Portion 2) of the Farm Rotterdam No. 12 and the Remaining Extent of Portion 2 of the Farm Rotterdam No. 12, about 27 km south-west of Polokwane in Limpopo Province and will have up to 80 MWac capacity. The site is located within the International Strategic Transmission Corridor. A project area of around 442 ha was identified within a greater study area of ~1 110 ha for the proposed development. Within this a development footprint calculated at ~94 ha will be defined after taking the environmental sensitivities present on the affected property into consideration. The proposed facility would comprise the following:

- Solar Field/Solar Arrays (noting that the foundations, mounting structures, and module types would be confirmed during detail design phase, however would remain within the proposed development footprint and be up to approximately 3.5 m in height)
- Internal access roads (noting that existing farm roads would be used as far as possible, and that the maximum road width would be up to approximately 10 m)
- A main access road (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 10 m)
- Internal electrical reticulation (i.e. low- and medium-voltage lines) to be placed underground where feasible
- An on-site substation hub and associated infrastructure (such as substation, transformation infrastructure, collector infrastructure, step-up infrastructure, battery energy storage system etc.) including auxiliary buildings (such as operation and maintenance buildings, admin buildings, workshops, gatehouse, security building, offices, visitor centre, warehouses, etc.) contained within up to approximately 3 ha footprint; and
- Perimeter fencing.

A temporary laydown area would be established during the construction phase that would remain within the development footprint i.e. within the fenced area allocated for development. The laydown area would move as required while construction is underway. The proposed facility would be accessed from the east via an existing unnamed gravel road. A new road to serve as a second access to the facility is also proposed. This road would extend approximately 2 km southwards to an existing unnamed farm road. The detailed design of the proposed access and road upgrade requirements would be as per the recommendations of the Transport Impact Assessment, which is being undertaken as part of the environmental impact assessment process. Application for grid connection will be made through a separate process and assessed accordingly. An on-site grid connection to integrate into the national network via a 132 kV or 275 kV line is under consideration.

1.2. THE PURPOSE OF THIS REPORT

An environmental site sensitivity report was generated for the project on 06/10/2022 using the Department of Forestry, Fisheries, and the Environment (DFFE) National Web-Based Environmental Screening Tool. Based on the environmental sensitivities of the proposed development footprint, the screening tool suggested the following specialist assessment for inclusion in the EIA report:

- Avian Impact Assessment.

The assessment must be compiled in accordance with the requirements of the *Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes when Applying for EA* (GN R320 of 2020) and comply with the following gazetted protocol, which replaces the requirements of Appendix 6 of the EIA Regulations, 2014 (as amended) in terms of NEMA:

- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species, published in GN 1150 of 30 October 2020.

According to the above-mentioned protocol, the report must follow the Species Environmental Assessment Guidelines (SANBI, 2020), which prescribes the Best Practice Guidelines: Birds & Solar Energy (Jenkins *et al.*, 2017) for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa, established by BirdLife South Africa and the Wildlife and Energy Programme of the Endangered Wildlife Trust (EWT).

This Report covers **Stage 1** of the methodology prescribed by the Guidelines and entails the Preliminary Avifaunal Assessment as well as a Site Sensitivity Verification of the DFFE Environmental Screening Report outcomes.

1.3. TERMS OF REFERENCE

The overall Terms of Reference were to:

- Undertake a field survey of the greater study area (~1 110 ha) to identify and map areas of opportunity and constraint within the property to inform the location and layout of the PV facility.
- Compile a photographic record of the characteristics of the greater study area, including major habitats and sensitive areas.
- Compile a Preliminary Avifaunal Assessment Report (this Report) that provides an overview of the ecological context, likely impacts, and potential red flags to development, from an avifaunal perspective.
- Provide maps and shapefiles based on the findings, to identify a potential development footprint.
- Include a Site Sensitivity Verification of the DFFE Environmental Screening Report outcomes in the Preliminary Report.
- Conduct avifaunal baseline data collection within the greater study area according to the applicable sampling regime for the development site as specified by the Best Practice Guidelines for Birds & Solar Energy (Jenkins *et al.*, 2017).
- Assess the significance of the potential impact of the proposed project alternatives and related activities – with and without mitigation – on avifaunal species and communities (with regards to

potential disturbance, displacement, habitat loss and mortality through collision), including consideration of the spatial and temporal extent of these impacts.

- Compile an Avifaunal Impact Assessment Report according to the Best Practice Guidelines for Birds & Solar Energy (Jenkins *et al.*, 2017).
- Inform actions that should be taken to prevent or, if prevention is not feasible, to mitigate negative impacts during the planning, construction, and operational phases of the development.

This report covers the Preliminary Avifaunal Assessment for the Ndau 2 PV SEF only.

2. METHODOLOGY

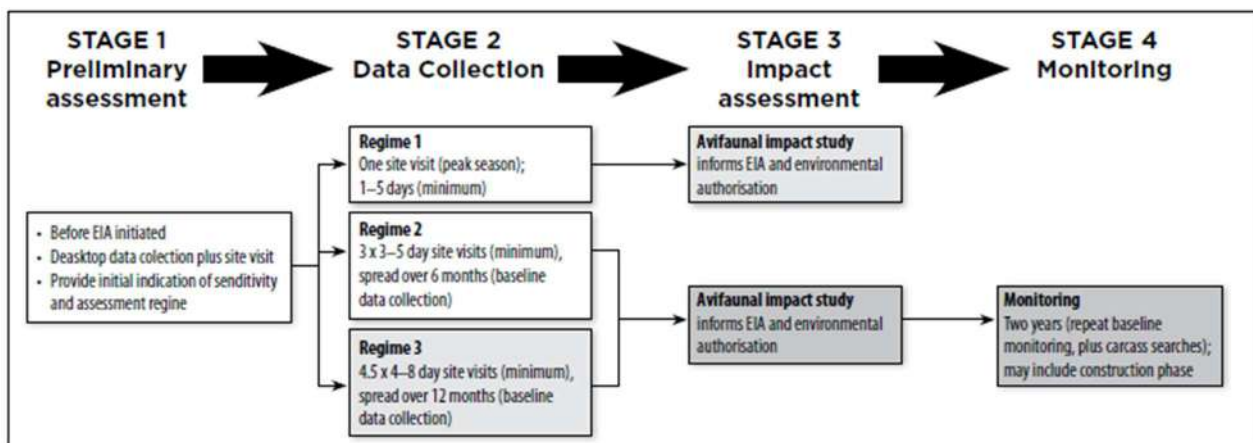
The solar energy industry is expanding rapidly in southern Africa, and the nature and implications of potential negative effects on birds, through the destruction of habitat, the displacement of populations from preferred habitat, and collision and burn mortality associated with the solar infrastructure, are poorly understood. To fully understand and avoid and minimise the possible impacts of solar energy on the region’s birds, it is essential that sufficient, project- and site-specific data are gathered to both inform the avifaunal impact assessment process and build our understanding of the impacts and potential mitigation measures (Jenkins *et al.*, 2017). According to the Best Practice Guidelines: Birds & Solar Energy (Jenkins *et al.*, 2017) for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa, an avifaunal impact assessment for a solar energy facility (SEF) must follow a tiered process that follows pre-determined stages depending on the conditions of the site:

Stage 1 – Preliminary Assessment: part of planning for an EIA application (i.e. pre-application). This provides an overview of the ecological context, likely impacts and potential red flags to development, identify alternatives and determine the appropriate assessment regime.

Stage 2 – Data Collection: an in-depth study including structured and repeated data collection on which to base the impact assessment report and provide a baseline against which post-construction monitoring can be compared.

Stage 3 – Impact Assessment: informed by the data collected during Stage 2.

Stage 4 – Monitoring and Mitigation: during construction and post-construction monitoring to inform mitigation, informed by the data collected during Stage 2 (regime 2 and 3 only).



This document reports information and results for stage 1.

2.1. STAGE 1: PRELIMINARY ASSESSMENT

According to Jenkins *et al.* (2017) the preliminary assessment should yield a preliminary avifaunal assessment report, which describes the relative sensitivity of the study area, highlights any red flags to development, and determines whether additional baseline data collection is necessary to fully inform the Avifaunal Impact Assessment Report. The preliminary assessment is based on desk-top review and a site survey conducted over the entire ~1 110 ha property in the summer season from the 13th to the 16th of December 2022. The findings are incorporated into a report aimed to characterise the greater study area in terms of habitats present, the overall site sensitivity, and delineate areas that are potentially highly sensitive and no-go areas that may need to be avoided by the development. Preliminary assessment of impacts and general recommendations are also provided.

Prior to the site visit, a comprehensive list of bird species occurring in the area was compiled using electronic databases within Roberts VII Multimedia Birds of Southern Africa (SA Birding, 2011) where distribution maps have been interpreted and updated from the Atlas of Southern African Birds (Harrison *et al.*, 1997). The search was confined to the quarter degree grid cell (QDGC) in which the study area falls (i.e. atlas area of 15' × 15' – roughly 24 × 27 km) to get a comprehensive list of species for the region. The data was supplemented with current Southern African Bird Atlas Project 2 (SABAP2, 2022) data, which is recorded per pentad (a 5' × 5' coordinate spatial grid reference – one QDGC comprises of nine pentads). Species of conservation concern (SCC) that could potentially occur in the greater study area were noted and their habitat requirements determined by consulting the relevant literature. Bird names follow Hockey *et al.* (2005) while conservation status follows Taylor *et al.* (2015). Other online databases such as Co-ordinated Wetland Counts (CWAC), Co-ordinated Avifaunal Road Counts (CAR), Birds in Reserves Project (BIRP), Global Biodiversity Information Facility (GBIF), and iNaturalist were searched for avifaunal SCC potentially occurring in the area.

Survey techniques included on-site meander searches, observations for priority species, and focussed counts at habitats such as wetlands, dams, and koppies. During meander searches through the study area, changes in land cover and habitat, as well as avifauna present in the study area were observed and recorded. Landscape features that were considered of high ecological importance were mapped.

3. DESKTOP ASSESSMENT RESULTS

3.1. STUDY AREA

3.1.1. LOCATION

The greater study area is located ~23 km north-east of the town of Mokopane and ~27 km south-west of the city of Polokwane along the N1 highway, within the Polokwane Local Municipality in the Capricorn District of Limpopo Province (**Figure 1**). The greater study area encompasses ~1 110 ha with a preliminary buildable area (Ndau 2 Project Area) selected following a desktop screening assessment calculated at ~442 ha. A proposed development footprint calculated at ~94 ha has been selected within this project area.

The Ndau 2 project area occurs within Portion 5 (Portion of Portion 2) of the Farm Rotterdam No. 12 and the Remaining Extent of Portion 2 of the Farm Rotterdam No. 12. The site falls within Quarter Degree Grid Cell (QDGC) 2429AA and lies between 24°01'05.19" and 24°01'48.16" south and 29°12'37.12" and 29°13'24.42" east. The study area is gently undulating with a range in altitude from around 1445 to 1500 m above mean sea level (a.m.s.l.).

3.1.2. CLIMATE

The study area lies in the north-eastern parts of the country with warm summer rainfall and cool, dry winters. The region receives approximately 600 mm of rain per year, with the highest rainfall occurring in December / January and the lowest falling in July. Maximum temperatures for Polokwane reach around 33°C in summer and minimum temperatures can drop to 5°C in winter (Mucina and Rutherford, 2006).

3.1.3. LAND USES OF THE GREATER STUDY AREA AND SURROUNDINGS

The landscape of the area is rural in nature with the greater study area comprised mostly of natural savanna bushveld vegetation used predominantly for cattle and wildlife grazing. A few drainage lines cross the study area, which are severely eroded in places, and a few farm dams and small impoundments occur on the drainage lines (**Figure 2**). Modified areas within the greater study area are few and include farm buildings, dirt roads, a railway line (which crosses the southern section of the farm in an east-west orientation), a small sub-station, and a high voltage power line servitude, which traverses the land in a north-westerly direction. Another power line servitude occurs on the north-western boundary.

The surrounding areas to the north, east, and south comprise privately owned land with natural bushveld used for cattle and wildlife grazing. The Percy Fyfe Nature Reserve, which is also comprised of natural savanna bushveld and granite outcrops, occurs adjacent to the site on the west side (**Figure 3**). A number of mountainous ridges occur ~2.5 km to the south and ~6.4 km to the east of the study area. The N1 highway, and the R101 regional road occur ~350 m and ~3 km respectively to the south-east of the site.

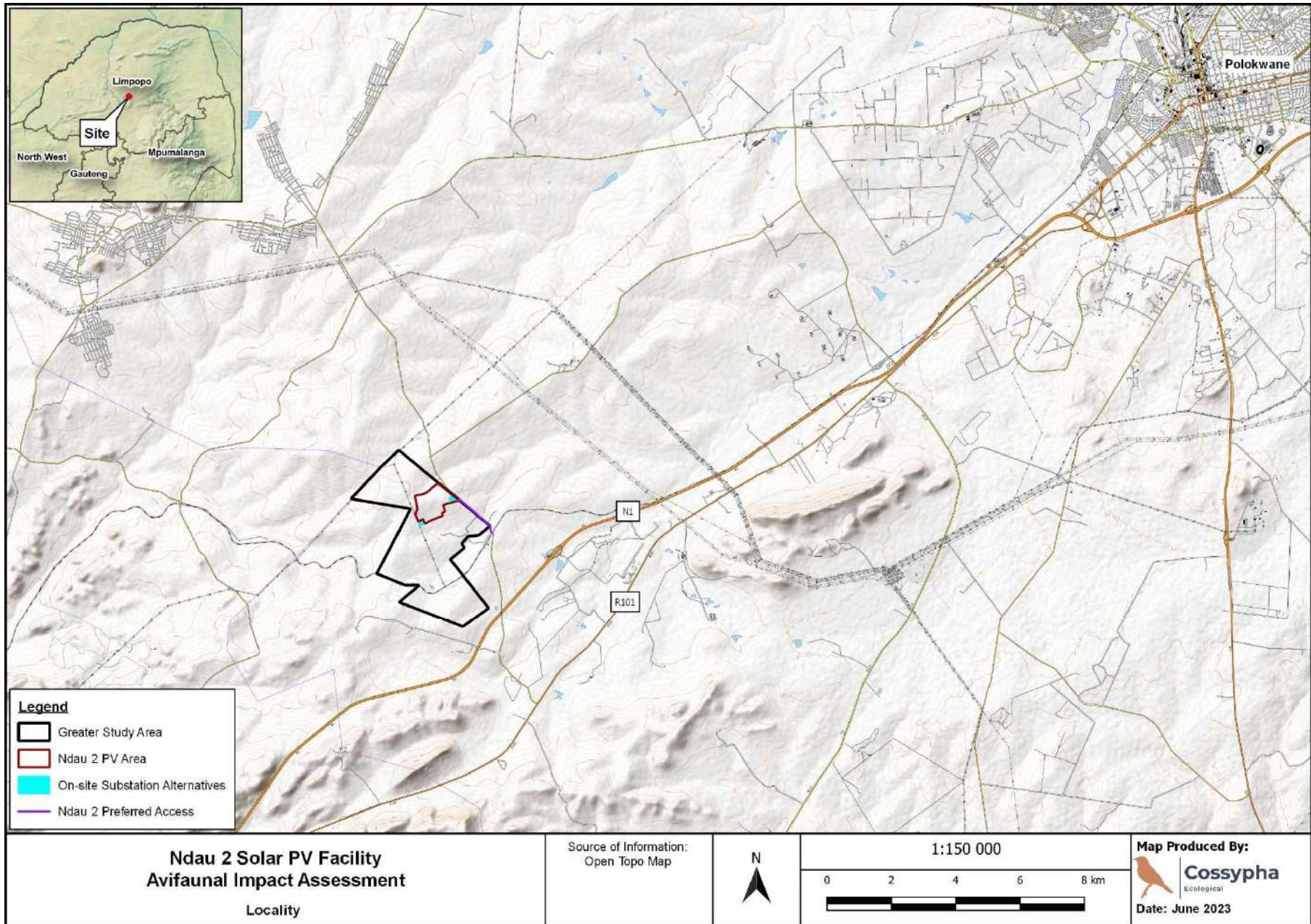


Figure 1: Location of the greater study area and the proposed Ndau 2 PV SEF

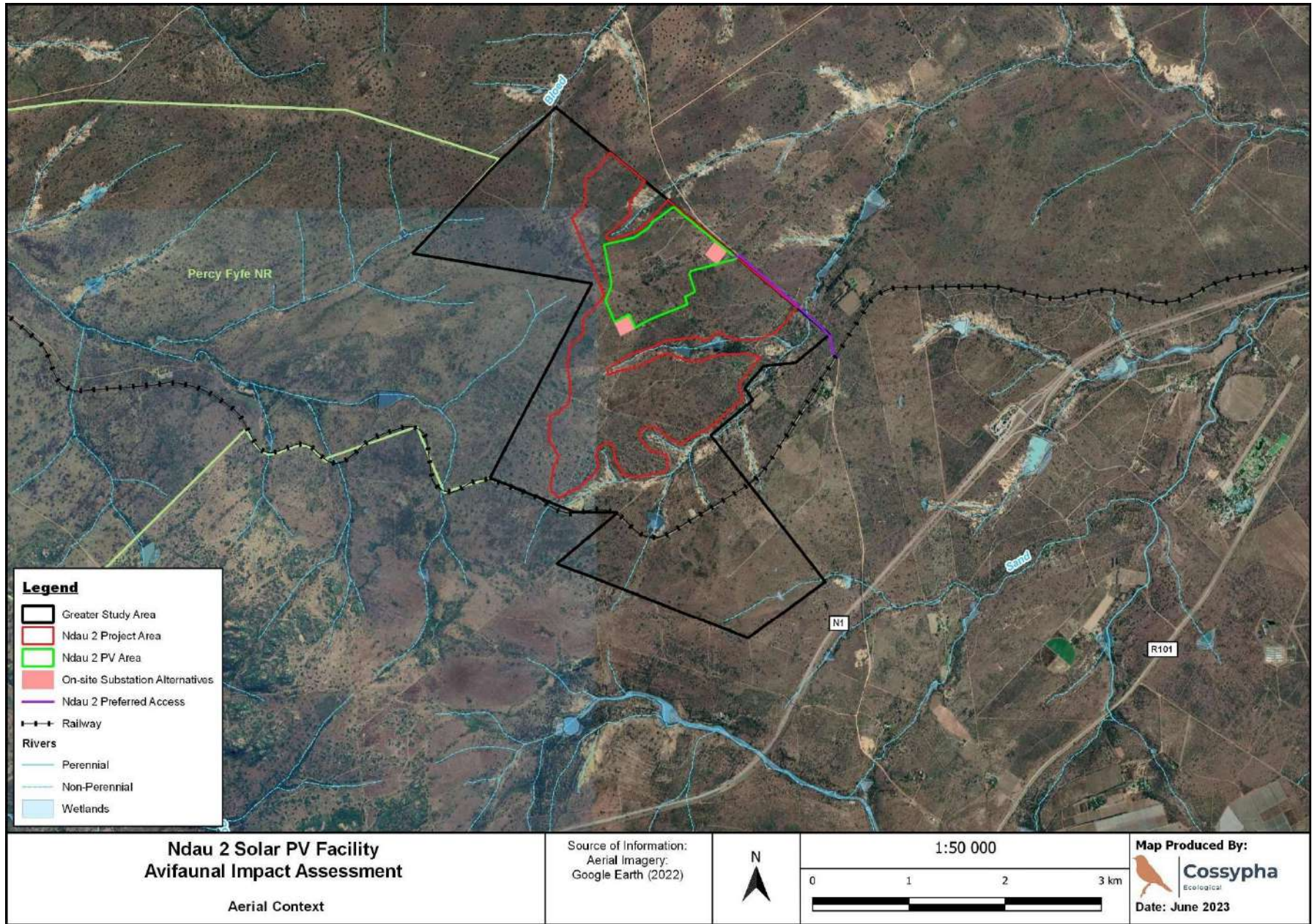


Figure 2: Aerial overview of the greater study area and surrounds

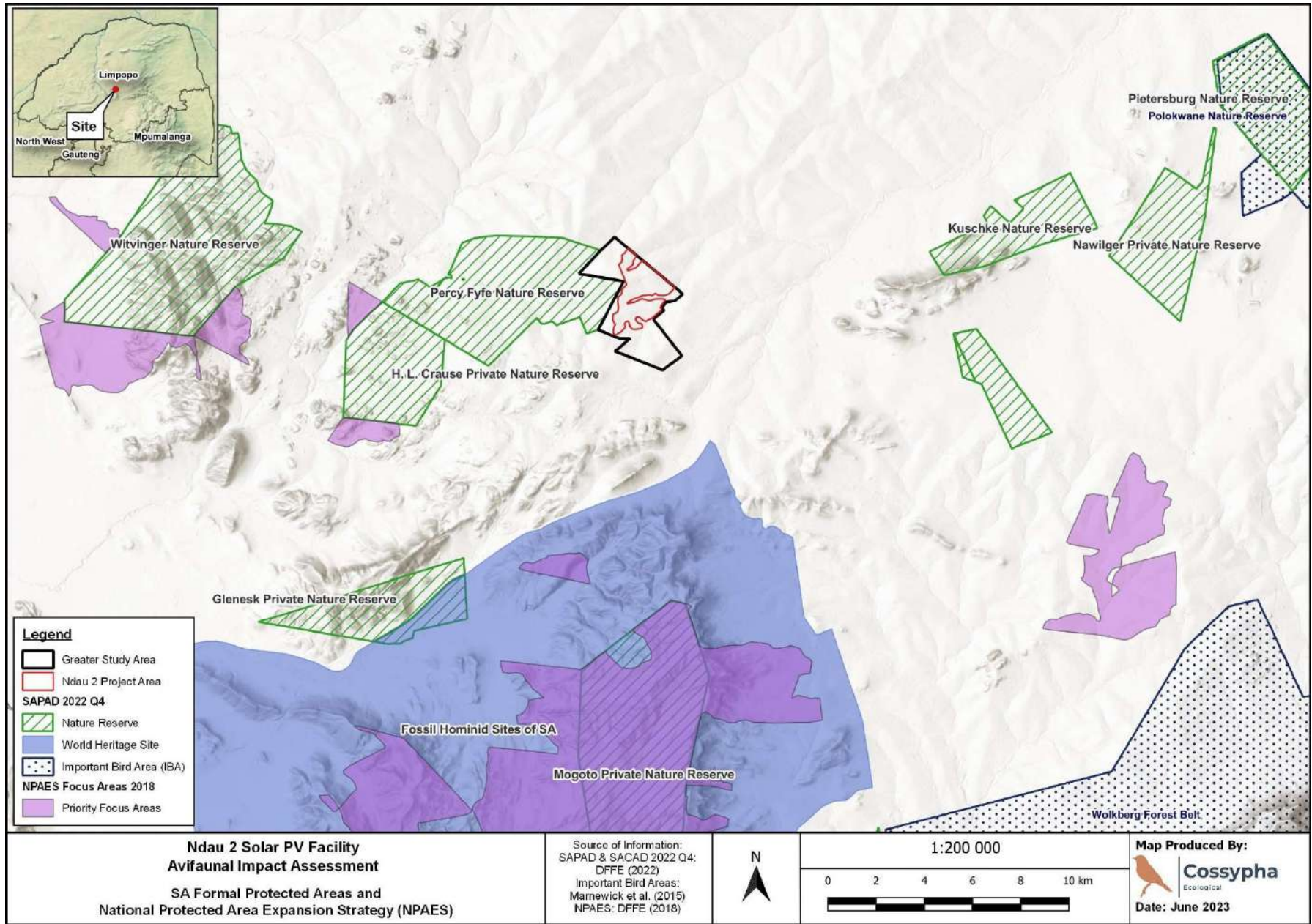


Figure 3: The greater study area and the Ndau 2 project area in relation to national Protected Areas

3.2. DISTRIBUTION OF AVIFAUNA IN THE STUDY AREA

The region is high in avifaunal diversity with around 414 bird species known to occur within the QDGC (an atlas area of 15' × 15' – roughly 24 × 27 km) that the greater study area falls within, according to the distribution maps in Roberts VII Multimedia Birds of Southern Africa (SA Birding, 2011). Approximately 95% of the total species in the QDGCs are associated with a savanna / farmland mosaic, including rocky areas, and inland water habitats, which is the character of the study area. This demonstrates that the available habitats within the greater study area are able to support the majority of bird species found within the QDGC.

The Southern African Bird Atlas Project (SABAP2) has been collecting data since 2007 and includes data from the previous SABAP1 (1987-1991). SABAP2 aims to map the distribution and relative abundance of birds in southern Africa. SABAP2 data is recorded per pentad (a 5' × 5' coordinate spatial grid reference and a subset of the QDGC – one QDGC comprises of nine pentads. 5' × 5' = roughly 8 × 9 km) and therefore represents a more focussed search. Reporting rates are expressed as a percentage of the number of times a species was seen in a pentad divided by the number of times the pentad was surveyed. According to SABAP2 data, 178 species have been recorded in the pentad in which the greater study area falls (pentad 2400_2910), three of which are species of conservation concern (SCC) and 22 are endemic to southern Africa.

Priority species in terms of sensitivity to solar PV energy development impacts include any Red List (SCC) and range-restricted species, small passerines that congregate in large numbers, and large-bodied species such as waterfowl, herons, gamebirds, and raptors (including owls and vultures) (Jenkins *et al.*, 2017). Error! Not a valid bookmark self-reference. lists priority species that have been recorded within the pentad, as well as the SABAP2 reporting rate. The higher the reporting rate, the higher the likelihood of the species occurring in the study area if suitable habitat exists.

Table 1: Avifaunal priority species occurring within pentad 2400_2910 including Reporting Rate (RR). Birds listed in red are SCC and those in green are endemic to southern Africa

| Common Name | Scientific Name | Priority Species | Threat Status (RSA / IUCN) | SABAP2 RR (%) |
|-------------------------|-------------------------------|------------------|----------------------------|---------------|
| Coqui Francolin | <i>Peliperdix coqui</i> | Gamebird | LC / LC | 25 |
| Crested Francolin | <i>Dendroperdix sephaena</i> | Gamebird | LC / LC | 69.8 |
| Natal Spurfowl | <i>Pternistis natalensis</i> | Gamebird | LC / LC | 58.1 |
| Swainson's Spurfowl | <i>Pternistis swainsonii</i> | Gamebird | LC / LC | 79.1 |
| Helmeted Guineafowl | <i>Numida meleagris</i> | Gamebird | LC / LC | 95.3 |
| Egyptian Goose | <i>Alopochen aegyptiaca</i> | Waterfowl | LC / LC | 72.1 |
| Red-billed Teal | <i>Anas erythrorhyncha</i> | Waterfowl | LC / LC | 55.8 |
| European Roller | <i>Coracias garrulus</i> | SCC | NT / LC | 12.5 |
| Common Moorhen | <i>Gallinula chloropus</i> | Waterfowl | LC / LC | 72.1 |
| Lesser Moorhen | <i>Paragallinula angulata</i> | Waterfowl | LC / LC | 12.5 |
| Red-knobbed Coot | <i>Fulica cristata</i> | Waterfowl | LC / LC | 11.6 |
| Spotted Thick-knee | <i>Burhinus capensis</i> | Waterfowl | LC / LC | 14 |
| Blacksmith Lapwing | <i>Vanellus armatus</i> | Waterfowl | LC / LC | 93 |
| African Wattled Lapwing | <i>Vanellus senegallus</i> | Waterfowl | LC / LC | 48.8 |
| Crowned Lapwing | <i>Vanellus coronatus</i> | Waterfowl | LC / LC | 53.5 |
| Black-shouldered Kite | <i>Elanus caeruleus</i> | Raptor | LC / LC | 76.7 |
| Yellow-billed Kite | <i>Milvus aegyptius</i> | Raptor | LC / LC | 12.5 |
| African Fish-Eagle | <i>Haliaeetus vocifer</i> | Raptor | LC / LC | 41.9 |

| Common Name | Scientific Name | Priority Species | Threat Status (RSA / IUCN) | SABAP2 RR (%) |
|------------------------------|---------------------------------|----------------------|----------------------------|---------------|
| Cape Vulture | <i>Gyps coprotheres</i> | SCC | EN / VU | 72.1 |
| Black-chested Snake-Eagle | <i>Circaetus pectoralis</i> | Raptor | LC / LC | 37.5 |
| Brown Snake-Eagle | <i>Circaetus cinereus</i> | Raptor | LC / LC | 7 |
| Gabar Goshawk | <i>Micronisus gabar</i> | Raptor | LC / LC | 30.2 |
| Steppe Buzzard | <i>Buteo buteo</i> | Raptor | LC / LC | 50 |
| Wahlberg's Eagle | <i>Hieraaetus wahlbergi</i> | Raptor | LC / LC | 2.3 |
| African Hawk-eagle | <i>Aquila spilogaster</i> | Raptor | LC / LC | 7 |
| Long-crested Eagle | <i>Lophaetus occipitalis</i> | Raptor | LC / LC | 27.9 |
| Greater Kestrel | <i>Falco rupicoloides</i> | Raptor | LC / LC | 0 |
| Amur Falcon | <i>Falco amurensis</i> | Raptor | LC / LC | 25 |
| Little Grebe | <i>Tachybaptus ruficollis</i> | Waterfowl | LC / LC | 46.5 |
| Reed Cormorant | <i>Microcarbo africanus</i> | Waterfowl | LC / LC | 37.5 |
| Grey Heron | <i>Ardea cinerea</i> | Waterfowl | LC / LC | 51.2 |
| Black-headed Heron | <i>Ardea melanocephala</i> | Waterfowl | LC / LC | 76.7 |
| Cattle Egret | <i>Bubulcus ibis</i> | Waterfowl | LC / LC | 83.7 |
| Green-backed Heron | <i>Butorides striata</i> | Waterfowl | LC / LC | 12.5 |
| Hamerkop | <i>Scopus umbretta</i> | Waterfowl | LC / LC | 25 |
| Hadeda Ibis | <i>Bostrychia hagedash</i> | Gamebird | LC / LC | 81.4 |
| White Stork | <i>Ciconia ciconia</i> | Gamebird | LC / LC | 12.5 |
| Marabou Stork | <i>Leptoptilos crumenifer</i> | SCC | NT / LC | 83.7 |
| Cape Sparrow | <i>Passer melanurus</i> | Gregarious Passerine | LC / LC | 72.1 |
| Southern Grey-headed Sparrow | <i>Passer diffusus</i> | Gregarious Passerine | LC / LC | 87.5 |
| White-browed Sparrow-Weaver | <i>Plocepasser mahali</i> | Gregarious Passerine | LC / LC | 95.3 |
| Lesser Masked-weaver | <i>Ploceus intermedius</i> | Gregarious Passerine | LC / LC | 12.5 |
| Cape Weaver | <i>Ploceus capensis</i> | Gregarious Passerine | LC / LC | 25 |
| Southern Masked-Weaver | <i>Ploceus velatus</i> | Gregarious Passerine | LC / LC | 87.5 |
| Village Weaver | <i>Ploceus cucullatus</i> | Gregarious Passerine | LC / LC | 32.6 |
| Red-billed Quelea | <i>Quelea quelea</i> | Gregarious Passerine | LC / LC | 69.8 |
| Yellow-crowned Bishop | <i>Euplectes afer</i> | Gregarious Passerine | LC / LC | 12.5 |
| Southern Red Bishop | <i>Euplectes orix</i> | Gregarious Passerine | LC / LC | 53.5 |
| White-winged Widowbird | <i>Euplectes albonotatus</i> | Gregarious Passerine | LC / LC | 50 |
| Red-billed Firefinch | <i>Lagonosticta senegala</i> | Gregarious Passerine | LC / LC | 41.9 |
| African Firefinch | <i>Lagonosticta rubricata</i> | Gregarious Passerine | LC / LC | 12.5 |
| Jameson's Firefinch | <i>Lagonosticta rhodopareia</i> | Gregarious Passerine | LC / LC | 18.6 |
| Blue Waxbill | <i>Uraeginthus angolensis</i> | Gregarious Passerine | LC / LC | 100 |
| Violet-eared Waxbill | <i>Granatina granatina</i> | Gregarious Passerine | LC / LC | 37.5 |
| Common Waxbill | <i>Estrilda astrild</i> | Gregarious Passerine | LC / LC | 62.8 |
| Black-faced Waxbill | <i>Brunhilda erythronotos</i> | Gregarious Passerine | LC / LC | 50 |
| African Quailfinch | <i>Ortygospiza atricollis</i> | Gregarious Passerine | LC / LC | 41.9 |
| Bronze Mannikin | <i>Spermestes cucullata</i> | Gregarious Passerine | LC / LC | 25 |
| Pin-tailed Whydah | <i>Vidua macroura</i> | Gregarious Passerine | LC / LC | 48.8 |
| Black-throated Canary | <i>Crithagra atrogularis</i> | Gregarious Passerine | LC / LC | 65.1 |
| Yellow-fronted Canary | <i>Crithagra mozambica</i> | Gregarious Passerine | LC / LC | 79.1 |

EN = Endangered; NT = Near Threatened; LC = Least Concern

*Non-breeding migrant

4. FIELD RESULTS

4.1. SITE DESCRIPTION

The Ndau 2 project area occurs within the north-eastern portion of the greater study area, which is an active farm comprised of natural bushveld used predominantly for grazing cattle. Stocked wildlife such as Greater Kudu *Tragelaphus strepsiceros*, Impala *Aepyceros melampus*, and Burchell's Zebra *Equus quagga burchellii* also occupy the farm. Less than 1% of the total area has been transformed or modified by activities such as farm buildings, gravel roads, a railway line that crosses the site in the southern section, and a small substation. A high voltage power line servitude traverses the land in a north / north-westerly direction, and another is situated along the north-western boundary. A few watercourses, which are tributaries of the Sand River to the east cross the Ndau 2 project area. These are severely eroded in places. Erosion makes up approximately 2.7% (~30 ha) of the greater study area. Three relatively large farm dams occur on the main drainage lines (tributaries of the Sand River), making up approximately 7.8 ha. One is situated in the southern section of the site near the railway line and two towards the centre of the farm where a small farmstead is situated. A few smaller impoundments and wetlands occur around the greater study area. A number of rocky areas are scattered around the study area, and a few patches of alien trees occur around the farm.



The Witkop Project Area comprised mostly of natural bushveld



Substation and railway line (left) and high-voltage power line servitude (right)



Severe erosion on the watercourse in the south-western section of the site



Large farm dam in the southern section of the site (left) and centre of site (right)



Stands of alien *Eucalyptus* trees (left) and *Jacaranda* trees (right) in the study area

4.2. AVIFAUNAL HABITATS IN THE STUDY AREA AND SURROUNDS

The most important habitat for avifauna occurring in the Ndau 2 project area is the natural bushveld vegetation. The extensive bushveld vegetation on the site and in the surrounding areas supports the terrestrial species found in the region, including priority species such as gamebirds, raptors, and gregarious passerines. The natural bushveld in the greater study area can be split into categories depending on the level of disturbance experienced in the past. Natural bushveld that has been grazed to varying degrees but with no major disturbance such as clearing or ploughing in the recent past (within the last ~30 years) is the most extensive natural habitat in the project area and provides the main habitat for the avifauna found in the area.

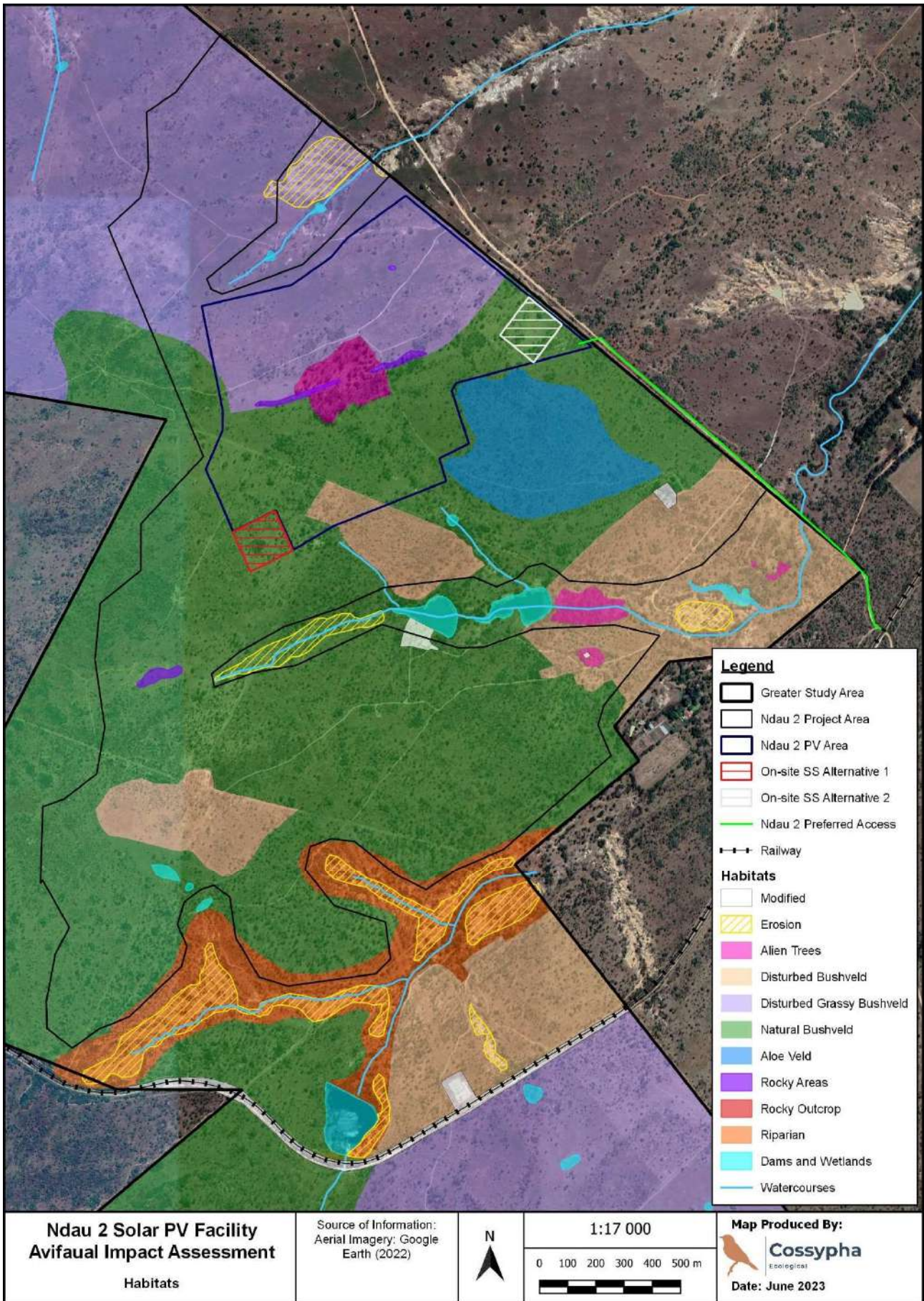


Figure 4: Habitat features of the Ndau 2 project area

More disturbed bushveld, which has been disturbed in the past by bush clearing, or by present farming activities, occurs in the northern section of the project area. These areas are considered natural but disturbed in the past by bush clearing and has been left to regenerate, and are characterised by open bushveld with a more dominant grassy layer (**Figure 4**).



Relatively undisturbed natural bushveld in the project area



Disturbed, open, grassy bushveld in the north of the project area



Areas disturbed by past and present farming activities

Certain features within the bushveld vegetation provide habitat heterogeneity and variation within the vegetation structure. These include rocky patches scattered around the farm and an area of relatively undisturbed bushveld with high numbers of *Aloe marlothii* (**Figure 4**). These features represent important natural habitat for birds in the study area and provide habitat heterogeneity to the landscape facilitating species diversity.



Examples of rocky patches scattered around the study area



Relatively undisturbed Aloe veld in the eastern portion of the project area

The farm dams and wetlands provide important habitat for waterfowl and other wetland associated species. The wet areas provide surface water and hygrophilous vegetation such as sedges and restios that attract birds such as egrets, herons, and ducks etc., as well as tall, dense vegetation for wetland nesting species such as bishops and widowbirds.



The farm dams provide habitat for wetland and aquatic species



Examples of smaller wetlands and impoundments providing habitat for wetland and aquatic species

4.3. BIRD SPECIES OCCURRENCE IN THE STUDY AREA

4.3.1. BIRD OBSERVATIONS

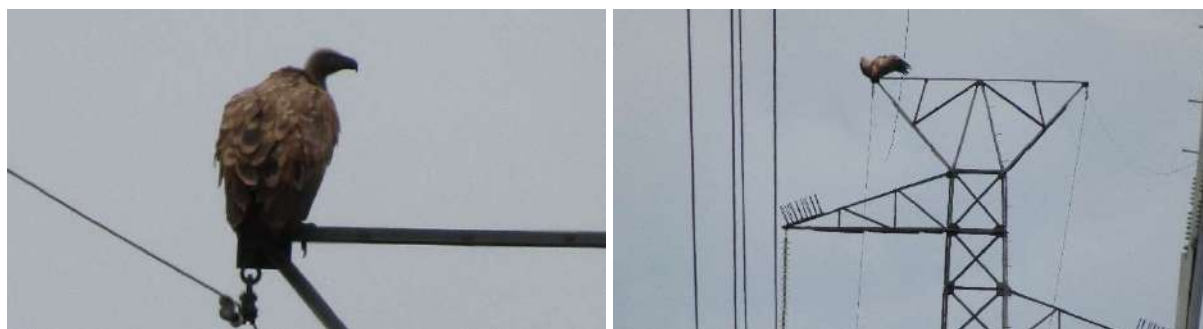
The area diverse with bird life with 131 species recorded in the greater study area and surroundings during the preliminary field survey. Birds were identified either by direct observation (sighting and/or call) or by field signs such as tracks or feathers. These are listed in **Appendix A** along with their national (Taylor *et al.*, 2015) and global (IUCN Red List of Threatened Species, 2022) conservation status. Bird species observed in the study area included mainly typical bushveld savanna species such as francolin, barbets, hornbills, shrikes, tchagras, robin-chats, babblers, prinias, waxbills, and many raptors. A few species more typical of grassland habitats such as cisticolas, pipits, longclaw, quelea, and widowbirds were observed in the northern parts of the farm where the habitat is more open and grass dominated. Many generalist species such as doves, guineafowl, lapwings, canaries, and sparrows were also recorded in and around the study area. Birds recorded at the dams and wetlands included ducks, teals, geese, grebe, coot, moorhen, cormorants, herons, and egrets.



Some of the bird species recorded in the study area (top left to bottom right) Southern Yellow-billed Hornbill (*Tockus leucomelas*), Sabota Lark (*Calendulauda sabota*), European Roller (*Coracias garrulus*), Bushveld Pipit (*Anthus caffer*), White-faced Whistling Duck (*Dendrocygna viduata*), and Zitting Cisticola (*Cisticola juncidis*)

4.3.2. BIRDS OF CONSERVATION CONCERN

Bird SCC observed during the preliminary field survey included White-backed Vulture *Gyps africanus*, which is currently listed as Critically Endangered (CR) at the national level and global level, and Lanner Falcon *Falco biarmicus*, which is currently listed as Vulnerable (VU) at a national level. White-backed Vulture were recorded circling over-head and one was observed sitting on a power line on the northern boundary of the greater study area. European Roller *Coracias garrulus*, which is a non-breeding migrant to the area that is currently listed as Near Threatened (NT) at a national level and global level was also recorded in the greater study area. In addition, 17 species that are endemic to the southern African region were recorded in and around the study area.



White-backed Vulture *Gyps africanus* recorded on a power line on the northern border of the greater study area

4.3.3. PRIORITY SPECIES

Preliminary assessment of species recorded during the field surveys show that there are numerous bird species that may be susceptible to the impacts of solar PV development occurring in the greater study area and surrounds. These include large-bodied and ground-welling species such as francolin, spurfowl, waterfowl and other species that are attracted to waterbodies such as ducks, lapwings, and cormorants, and raptors such as kites, falcons, sparrowhawks, eagles, and vultures; and gregarious passerines such as finches, bishop, queleas, and widowbirds. These and other priority species recorded in the study area are listed in **Table 2** along with their national and global (IUCN) conservation status, and the type of species. Gamebirds, waterfowl, and raptors appear to make up the majority of the priority species recorded in the study area during the preliminary survey.



Some raptor species recorded in the study area (left to right) Black-shouldered Kite (*Elanus caeruleus*), Gabar Goshawk (*Micronisus gabar*), and African Hawk-Eagle (*Aquila spilogaster*)

Table 2: Priority species recorded in the greater study area listed in taxonomic order. SCC are highlighted in red and endemic species in green

| Scientific Name | Common Name | National Status | Global Status | Type of Species |
|------------------------------|---------------------|-----------------|---------------|-----------------|
| <i>Peliperdix coqui</i> | Coqui Francolin | LC | LC | Gamebird |
| <i>Dendroperdix sephaena</i> | Crested Francolin | LC | LC | Gamebird |
| <i>Scleroptila shelleyi</i> | Shelley's Francolin | LC | LC | Gamebird |

| Scientific Name | Common Name | National Status | Global Status | Type of Species |
|--------------------------------|-----------------------------|-----------------|---------------|----------------------|
| <i>Pternistis natalensis</i> | Natal Spurfowl | LC; En | LC | Gamebird |
| <i>Pternistis swainsonii</i> | Swainson's Spurfowl | LC; En | LC | Gamebird |
| <i>Coturnix coturnix</i> | Common Quail | LC | LC | Gamebird |
| <i>Numida meleagris</i> | Helmeted Guineafowl | LC | LC | Gamebird |
| <i>Dendrocygna viduata</i> | White-faced Duck | LC | LC | Waterfowl |
| <i>Alopochen aegyptiaca</i> | Egyptian Goose | LC | LC | Waterfowl |
| <i>Plectropterus gambensis</i> | Spur-winged Goose | LC | LC | Waterfowl |
| <i>Sarkidiornis melanotos</i> | Comb Duck | LC | LC | Waterfowl |
| <i>Anas undulata</i> | Yellow-billed Duck | LC | LC | Waterfowl |
| <i>Anas erythrorhyncha</i> | Red-billed Teal | LC | LC | Waterfowl |
| <i>Coracias garrulus</i> | European Roller | NT; NBM | NT | SCC |
| <i>Gallinula angulata</i> | Lesser Moorhen | LC | LC | Waterfowl |
| <i>Fulica cristata</i> | Red-knobbed Coot | LC | LC | Waterfowl |
| <i>Burhinus capensis</i> | Spotted Thick-Knee | LC | LC | Waterfowl |
| <i>Vanellus armatus</i> | Blacksmith Lapwing | LC | LC | Waterfowl |
| <i>Vanellus senegallus</i> | African Wattled Lapwing | LC | LC | Waterfowl |
| <i>Vanellus coronatus</i> | Crowned Lapwing | LC | LC | Waterfowl |
| <i>Elanus caeruleus</i> | Black-shouldered Kite | LC | LC | Raptor |
| <i>Milvus parasitus</i> | Yellow-billed Kite | LC | LC | Raptor |
| <i>Gyps africanus</i> | White-backed Vulture | CR | CR | SCC |
| <i>Polyboroides typus</i> | African Harrier-Hawk | LC | LC | Raptor |
| <i>Micronisus gabar</i> | Gabar Goshawk | LC | LC | Raptor |
| <i>Accipiter melanoleucus</i> | Black Sparrowhawk | LC | LC | Raptor |
| <i>Buteo buteo</i> | Steppe Buzzard | LC | LC | Raptor |
| <i>Hieraetus wahlbergi</i> | Wahlberg's Eagle | LC | LC | Raptor |
| <i>Aquila spilogaster</i> | African Hawk-Eagle | LC | LC | Raptor |
| <i>Hieraetus pennatus</i> | Booted Eagle | LC | LC | Raptor |
| <i>Falco biarmicus</i> | Lanner Falcon | VU | LC | SCC |
| <i>Tachybaptus ruficollis</i> | Little Grebe | LC | LC | Waterfowl |
| <i>Microcarbo africanus</i> | Reed Cormorant | LC | LC | Waterfowl |
| <i>Ardea cinerea</i> | Grey Heron | LC | LC | Waterfowl |
| <i>Scopus umbretta</i> | Hamerkop | LC | LC | Waterfowl |
| <i>Bostrychia hagedash</i> | Hadedda Ibis | LC | LC | Gamebird |
| <i>Passer melanurus</i> | Cape Sparrow | LC; En | LC | Gregarious Passerine |
| <i>Sporopipes squamifrons</i> | Scaly-feathered Finch | LC; En | LC | Gregarious Passerine |
| <i>Plocepasser mahali</i> | White-browed Sparrow-Weaver | LC | LC | Gregarious Passerine |
| <i>Ploceus intermedius</i> | Lesser Masked-Weaver | LC | LC | Gregarious Passerine |
| <i>Ploceus velatus</i> | Southern Masked-Weaver | LC | LC | Gregarious Passerine |
| <i>Quelea quelea</i> | Red-billed Quelea | LC | LC | Gregarious Passerine |
| <i>Euplectes orix</i> | Southern Red Bishop | LC | LC | Gregarious Passerine |
| <i>Lagonosticta senegala</i> | Red-billed Firefinch | LC | LC | Gregarious Passerine |
| <i>Uraeginthus angolensis</i> | Blue Waxbill | LC | LC | Gregarious Passerine |
| <i>Uraeginthus granatinus</i> | Violet-eared Waxbill | LC | LC | Gregarious Passerine |
| <i>Estrilda astrild</i> | Common Waxbill | LC | LC | Gregarious Passerine |
| <i>Ortygospiza fuscocrissa</i> | African Quailfinch | LC | LC | Gregarious Passerine |
| <i>Vidua macroura</i> | Pin-tailed Whydah | LC | LC | Gregarious Passerine |
| <i>Crithagra atrogularis</i> | Black-throated Canary | LC | LC | Gregarious Passerine |
| <i>Crithagra mozambica</i> | Yellow-fronted Canary | LC | LC | Gregarious Passerine |
| <i>Crithagra flaviventris</i> | Yellow Canary | LC; En | LC | Gregarious Passerine |

CR = Critically Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; En = Endemic; NBM = Non-breeding Migrant

4.4. KEY HABITATS AND PRELIMINARY SITE SENSITIVITY

The extensive natural bushveld vegetation in greater study area and in the surrounding areas supports the terrestrial species found in the region, including priority species such as gamebirds, raptors, and gregarious passerines. This vegetation is considered to be of medium sensitivity, with features that provide habitat heterogeneity and variation within the vegetation structure, such as rocky areas and high density of Aloes, being highly sensitive. These relatively undisturbed areas should be avoided by the proposed development. The more disturbed, open bushveld in the northern section of the project area is considered to be of low sensitivity and although provide habitat for some avifauna, are preferred sites for the development compared to natural bushveld (**Figure 5**). Natural wetland areas and farm dams provide suitable habitat for waterfowl and other wetland associated species and are considered to be highly sensitive habitats that must also be avoided by the proposed development. The buffer specified by the wetland specialist must be applied in this case. Eroded riparian areas are highly sensitive to development and need rehabilitation, however are degraded habitat for birds. Clumps of alien trees are not favourable and should be cleared, however provide roosting and nesting sites for birds. These are considered to be of low sensitivity. The adjacent Percy Fyfe Nature Reserve provides protected habitat for many priority species such as Cape Vulture *Gyps coprotheres* and it is recommended that a suitable buffer that remains undeveloped be applied along the western boundary of the greater study area. The Species Environmental Assessment Guidelines (SANBI, 2020) recommend that for developments that produce low intensity disturbance, such as renewable energy projects (other than wind turbines and concentrated solar towers), a minimum buffer of 200 m should be applied for species such as breeding raptors within formally proclaimed conservation areas.

Table 3: Summary of sensitivity categories

| Site Feature | Description and Recommendation | Sensitivity Rating |
|--|--|--------------------|
| 200 m Protected Area buffer | Preliminary recommended buffer for the neighbouring Percy Fyfe Nature Reserve. This buffer needs to be discussed with the Conservation Authority and may be revised. White-backed Vulture (Critically Endangered) were seen in the area and may influence the decision | |
| Wetlands, dams, watercourses, and riparian areas | Natural wetland areas and small farm dams that provide important habitat for fauna. No-go. Must be avoided by the development by the buffer specified by the wetland specialist | Very High |
| Aloe veld and rocky areas | Natural areas that support high biodiversity and provide important habitat for birds such as rocky areas and <i>Aloe marlothii</i> veld must be avoided by the development | High |
| Eroded riparian areas | Eroded riparian areas are highly sensitive to development and need rehabilitation, however are degraded habitat for birds | High |
| Natural / Near-natural Bushveld | Natural bushveld that has been grazed to varying degrees but with no recent past (within the last ~30 years) disturbance such as clearing or ploughing. This extensive natural bushveld provides the main habitat for the avifauna found in the area | Medium |
| Disturbed Bushveld | Areas of natural bushveld that have been disturbed in the past by bush clearing or ploughing. These areas provide habitat for some avifauna, however, are preferred sites for the development compared to natural bushveld | Low |
| Alien Trees | Alien trees are not favourable and should be cleared, however provide roosting and nesting sites for birds | Low |
| Modified – farm buildings, roads, railway line, substation | Habitat that has been modified or transformed by farm activities, roads, and railway line. No natural vegetation occurs in such areas | Very Low |

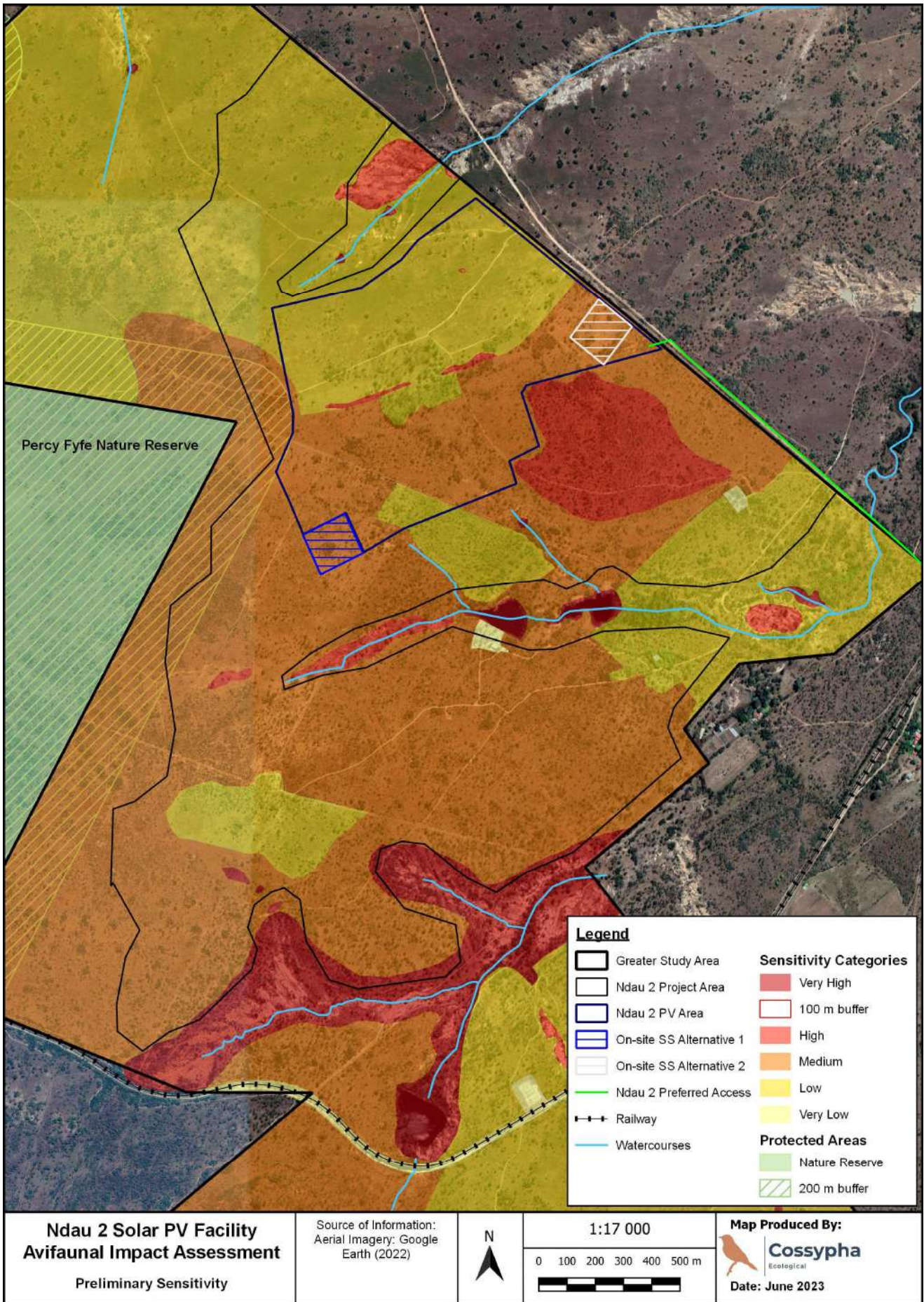


Figure 5: Preliminary avifaunal habitat sensitivity of the Ndau 2 project area

5. PRELIMINARY IMPACTS

The overall environmental impacts of solar energy developments are poorly understood globally. Unlike wind energy developments, there is presently no clear pattern in the types of birds negatively affected by solar plants, and collision casualties recorded to date include a wide variety of avian guilds (Jenkins *et al.*, 2017). Widely accepted impacts of solar PV include permanent habitat destruction, fragmentation, and the associated bird displacement (particularly for range restricted species), as well as collision with reflective panels as birds mistake large panel arrays for wetlands, otherwise known as the “lake effect” (Lovich and Ennen, 2011; Smit, 2012; DeVault *et al.*, 2014; Visser, 2016; Kosciuch *et al.*, 2020; Chock *et al.*, 2021). Other general impacts documented to date include noise and disturbance caused by construction activities, attraction of novel species through the creation of artificial nest sites and shade, and chemical pollution from panel cleaning (Lovich and Ennen, 2011; DeVault *et al.*, 2014; Chock *et al.*, 2021). The impacts of additional infrastructure associated with solar energy developments, such as roads, power lines, and substations, must also be considered. These include, habitat destruction, fragmentation, threat of collision, and electrocution (Jenkins *et al.*, 2017).

Possible impacts on avifauna during the construction and operational phases and their sources associated with the proposed development are provided in **Table 4**. The installation of the solar PV facility and ancillary infrastructure will require clearance of natural bushveld during the construction phase. The main impact relating to avifauna will therefore be loss of natural habitat and displacement of many terrestrial species including small passerines and larger game species. Ideally this habitat should be avoided by the development, and the more disturbed, open bushveld in the northern section is preferred for the development compared to natural bushveld. Impacts on highly sensitive habitats can be avoided or minimised by the project layout avoiding areas classified as High and Very High sensitivity. Other possible direct impacts include possible collisions with panels and power lines during the operational phase. Possible indirect impacts include spread of invasive alien vegetation due to disturbance to the soil, and contamination of the soil from chemicals used in cleaning of the panels.

Table 4: Possible impacts arising from the proposed development

| Possible Impact | Source of Impact | Area and Species to be Affected | Development Phase | Nature of Impact |
|---|---|---|----------------------------|------------------|
| Loss of vegetation and avifaunal habitat | Clearing vegetation for installation of solar panels, roads, and buildings | Natural bushveld; Terrestrial savanna species; Large-bodied, ground-dwelling gamebirds, raptors | Construction | Direct |
| Collision of avifauna with reflective surfaces of solar panels leading to injury or death | Solar panels perceived to be water body by avifauna | Solar PV development site; Gamebirds, waterfowl; raptors | Operation | Direct |
| Collision and/or electrocution of avifauna with associated power lines | Power lines | Power line route; Gamebirds, waterfowl; raptors | Operation | Direct |
| Contamination of the environment by hazardous materials | Cleaning of solar panels during operation | Solar PV development site; All species | Construction and Operation | Indirect |
| Spread of invasive alien plant species | Disturbance to soil and clearing of vegetation | Study area and surroundings | Construction | Indirect |
| Disturbance and displacement of resident bird species | Clearing of site and construction activities; Operational and maintenance activities; attraction of novel species | Site and immediate surroundings; Small terrestrial species; Common ground-dwelling gamebirds | Construction and Operation | Indirect |

| Possible Impact | Source of Impact | Area and Species to be Affected | Development Phase | Nature of Impact |
|--|--|--|-------------------|------------------|
| Habitat fragmentation | Clearing vegetation and installation of solar panels, roads, and buildings | Study area | Operation | Indirect |
| Increased human disturbance; Gradual environmental degradation | <ul style="list-style-type: none"> Disturbance to the study area, adding to existing pressures in the landscape (farming) Adding to cumulative pressures in the landscape caused by other approved or proposed renewable energy projects | Study area and surrounding natural areas | Operation | Cumulative |

6. SUMMARY AND PRE-CONSTRUCTION MONITORING REQUIREMENTS

The greater study area is mostly comprised of natural bushveld that represents the most important habitat for birds in the study area and is considered to be of medium sensitivity (according to the preliminary assessment). The site for the proposed Ndau 2 PV SEF is located partially within natural bushveld and partially within more disturbed, open bushveld that is considered to be of low sensitivity. Most of the key habitats that are considered highly sensitive such as dams and riparian areas have been avoided, however a few rocky areas fall within the proposed site.

The preliminary assessment has confirmed that the landscape supports many priority species (bird species that may be susceptible to the impacts of solar PV development). It is therefore important to conduct pre-construction monitoring according to the Best Practice Guidelines: Birds & Solar Energy (Jenkins *et al.*, 2017) for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. This will take the avifaunal assessment to **Stage 2 – Data Collection**, which includes structured and repeated data collection on which to base the impact assessment report and provide a baseline against which post-construction monitoring can be compared. The duration and scope of data collection is guided by the size of the proposed development (> 150 ha / >50 MW) and the results of the preliminary assessment, which verifies the sensitivity of avifauna potentially affected by the proposed development. For the Ndau 2 site assessment **Regime 2** is appropriate (refer to **Table 5** for large solar facilities), and sampling over a minimum of two seasons must be conducted, with one survey falling within the peak (summer) season.

Based on the habitats observed in the project area and surrounds, the following sampling must be incorporated into the data collection for each season:

- Abundance estimates for small terrestrial birds through point count or walked linear transect surveys.
- Counts for large terrestrial birds and raptors, through driven road transects and vantage point monitoring.
- Flight behaviour of priority species flying over or near the proposed development area and associated risk of collision.
- Bird numbers at focal wetlands such as the farm dams and local movements between waterbodies.
- Details of any incidental sightings of priority species.

Table 5: Recommended avifaunal assessment regimes (Jenkins *et al.*, 2017)

| Type | Size | Avifaunal Sensitivity* | | |
|--|----------------------------------|---|--|---|
| | | Low | Medium | High |
| All solar technologies except Concentrated Solar Power (CSP) | Small (<30 ha / <10 MW) | Regime 1 One site visit of 1-5 days | Regime 1 One site visit of 1-5 days | Regime 2 2-3 seasonal visits of 3-5 days over 6 months Pre- & post-con monitoring mortality searches |
| | Medium (30-150 ha / 10-50 MW) | Regime 1 One site visit of 1-5 days | Regime 2 2-3 seasonal visits of 3-5 days over 6 months Pre- & post-con monitoring mortality searches | Regime 2 2-3 seasonal visits of 3-5 days over 6 months Pre- & post-con monitoring mortality searches |
| | Large (>150 ha / >50 MW) | Regime 2 2-3 seasonal visits of 3-5 days over 6 months Pre- & post-con monitoring mortality searches | Regime 2 2-3 seasonal visits of 3-5 days over 6 months Pre- & post-con monitoring mortality searches | Regime 3 4-5 seasonal visits of 4-8 days over 12 months Pre- & post-con monitoring mortality searches |
| CSP | All | Regime 3 4-5 seasonal visits of 4-8 days over 12 months Pre- & post-con monitoring mortality searches | | |

* The avifaunal sensitivity is based on the number of priority species present, or potentially present, the regional, national, or global importance of the affected area for these species (both individually and collectively), and the perceived susceptibility of these species (both individually and collectively) to the anticipated impacts of development

7. RECOMMENDATIONS

The following recommendations are intended to guide the preliminary positioning of the proposed infrastructure and layout:

- A suitable buffer for the Percy Fyfe Nature Reserve must be applied with no infrastructure being placed within a certain distance of the border of the site. As no information regarding a buffer zone is contained within the management plan for the reserve, this will need to be discussed with the Conservation Authorities. The Species Environmental Assessment Guidelines (SANBI, 2020) recommend that for developments that produce low intensity disturbance, such as renewable energy projects (other than wind turbines and concentrated solar towers), a minimum buffer of 200 m should be applied for species such as breeding raptors within formally proclaimed conservation areas. The proposed site for the Ndau 2 PV SEF does avoid the 200 m buffer for the Nature Reserve.
- All drainage lines, wetlands, and dams must be avoided, including the buffer recommended by the aquatic and/or wetland specialist.
- All rocky areas should be avoided by the proposed development as far as possible.
- The northern section of the project area appears to be the most suitable for placement of the proposed infrastructure.

8. REFERENCES

- Chock, R.Y., Clucas, B., Peterson, E.K., *et al.* (2021): Evaluating potential effects of solar power facilities on wildlife from an animal behavior perspective, *Conservation Science and Practice*, 2021;3:e319. <https://doi.org/10.1111/csp2.319>
- Coordinated Waterbird Counts (CWAC): <https://cwac.birdmap.africa/sites.php?sitecode=31421812>
- DEA (2018): National Protected Areas Expansion Strategy (NPAES) for South Africa, Pretoria: Department of Environmental Affairs.
- Department of Environmental Affairs (2015): NEMBA 2004 (Act 10 of 2004): Threatened or Protected Species Regulations, *Government Gazette No. 38600*, 31 March 2015, Pretoria: DEA.
- Desmet, P. G., Holness, S., Skowno, A. and Egan, V.T. (2013): *Limpopo Conservation Plan v.2: Technical Report*. Contract Number EDET/2216/2012. Report for Limpopo Department of Economic Development, Environment & Tourism (LEDET) by ECOSOL GIS.
- DeVault, T.L., Seamans, T.W., Schmidt, J.A., Belant, J.L., Blackwell, B.F., Mooers, N., Tyson, L.A. and Van Pelt, L. (2014): Bird use of solar photovoltaic installations at US airports: implications for aviation safety, *Landscape and Urban Planning* 122: 122-128.
- DFFE (2022a): South African Protected Area Database (SAPAD), Pretoria: Department of Forestry, Fisheries and the Environment, https://egis.environment.gov.za/protected_areas_register
- DFFE (2022b): South African Conservation Area Database (SACAD), Pretoria: Department of Forestry, Fisheries and the Environment, https://egis.environment.gov.za/protected_areas_register
- Global Biodiversity Information Facility (GBIF): Free and open access to biodiversity data: <https://www.gbif.org/>
- Harrison, J.A., Allan D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. and Brown, C.J. (1997): *The Atlas of Southern African Birds*, Johannesburg: BirdLife South Africa.
- Hockey, P.A.R., Dean, W.R.J. and Ryan P.G. (2005): *Roberts Birds of Southern Africa, 7th Edition*, Cape Town: John Voelcker Bird Book Fund.
- iNaturalist (California Academy of Sciences and the National Geographic Society) Online Database: <https://www.inaturalist.org/>
- IUCN (2022): IUCN Red List of Threatened Species, Version 2022-1: <http://www.iucnredlist.org>
- Jenkins, A.R., Ralston, S. and Smit-Robinson, H.A. (2017): *Birds and Solar Energy Best Practice Guidelines: Best Practice Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa*, Johannesburg: BirdLife South Africa.
- Kosciuch, K., Riser-Espinoza, D., Geringer, M., Erickson, W. (2020): A summary of bird mortality at photovoltaic utility scale solar facilities in the Southwestern U.S., *PLoS ONE* 15(4): e0232034.
- LEDET (2019): *Capricorn District Bioregional Plan*, Polokwane: Limpopo Department of Economic Development, Environment and Tourism.
- Lovich, J.E. and Ennen, J.R. (2011): Wildlife conservation and solar energy development in the desert southwest, United States, *BioScience* 61: 982-992.
- Marnewick, M.D., Retief, E.F., Theron, N.T., Wright, D.R., and Anderson, T.A. (2015): *Important Bird and Biodiversity Areas of South Africa*, Johannesburg: BirdLife South Africa.
- Mucina, L. and Rutherford, M.C. (2006): The vegetation of South Africa, Lesotho and Swaziland, *Strelitzia* 19, Pretoria: South African National Biodiversity Institute.
- South African Bird Atlas Project 2 (SABAP2) (2023): <http://sabap2.adu.org.za/index.php/>
- South African National Biodiversity Institute (SANBI). 2020. *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa*. South African National Biodiversity Institute, Pretoria. Version 3.1 2022.
- Southern African Birding cc. (2011): Roberts VII Multimedia, Birds of Southern Africa, Computer Software.

Taylor, M.R., Peacock, F. and Wanless, R.M. (eds.) (2015): *Eskom Red Data Book of Birds of South Africa Lesotho and Swaziland*, Johannesburg: BirdLife South Africa.

Visser, E. (2016): *The impact of South Africa's largest photovoltaic solar energy facility on birds in the Northern Cape, South Africa*, Masters Dissertation, University of Cape Town.

9. APPENDICES

APPENDIX A: SPECIES LIST

| # | Scientific Name | Common Name | Conservation Status | |
|----|----------------------------------|---------------------------------|---------------------|--------|
| | | | National | Global |
| | | | RSA | IUCN |
| 1 | <i>Peliperdix coqui</i> | Coqui Francolin | LC | LC |
| 2 | <i>Dendroperdix sephaena</i> | Crested Francolin | LC | LC |
| 3 | <i>Scleroptila shelleyi</i> | Shelley's Francolin | LC | LC |
| 4 | <i>Pternistis natalensis</i> | Natal Spurfowl | LC; En | LC |
| 5 | <i>Pternistis swainsonii</i> | Swainson's Spurfowl | LC; En | LC |
| 6 | <i>Coturnix coturnix</i> | Common Quail | LC | LC |
| 7 | <i>Numida meleagris</i> | Helmeted Guineafowl | LC | LC |
| 8 | <i>Dendrocygna viduata</i> | White-faced Duck | LC | LC |
| 9 | <i>Alopochen aegyptiaca</i> | Egyptian Goose | LC | LC |
| 10 | <i>Plectropterus gambensis</i> | Spur-winged Goose | LC | LC |
| 11 | <i>Sarkidiornis melanotos</i> | Comb Duck | LC | LC |
| 12 | <i>Anas undulata</i> | Yellow-billed Duck | LC | LC |
| 13 | <i>Anas erythrorhyncha</i> | Red-billed Teal | LC | LC |
| 14 | <i>Indicator indicator</i> | Greater Honeyguide | LC | LC |
| 15 | <i>Campethera abingoni</i> | Golden-tailed Woodpecker | LC | LC |
| 16 | <i>Tricholaema leucomelas</i> | Acacia Pied Barbet | LC; En | LC |
| 17 | <i>Lybius torquatus</i> | Black-collared Barbet | LC | LC |
| 18 | <i>Trachyphonus vaillantii</i> | Crested Barbet | LC | LC |
| 19 | <i>Tockus leucomelas</i> | Southern Yellow-billed Hornbill | LC; En | LC |
| 20 | <i>Upupa africana</i> | African Hoopoe | LC | LC |
| 21 | <i>Phoeniculus purpureus</i> | Green Wood-Hoopoe | LC | LC |
| 22 | <i>Coracias garrulus</i> | European Roller | NT; NBM | NT |
| 23 | <i>Halcyon senegalensis</i> | Woodland Kingfisher | LC | LC |
| 24 | <i>Halcyon albiventris</i> | Brown-hooded Kingfisher | LC | LC |
| 25 | <i>Merops apiaster</i> | European Bee-Eater | LC | LC |
| 26 | <i>Urocolius indicus</i> | Red-faced Mousebird | LC | LC |
| 27 | <i>Clamator jacobinus</i> | Jacobin Cuckoo | LC | LC |
| 28 | <i>Clamator levallantii</i> | Levallant's Cuckoo | LC | LC |
| 29 | <i>Cuculus solitarius</i> | Red-chested Cuckoo | LC | LC |
| 30 | <i>Cuculus clamosus</i> | Black Cuckoo | LC | LC |
| 31 | <i>Chrysococcyx caprius</i> | Diederik Cuckoo | LC | LC |
| 32 | <i>Centropus burchellii</i> | Burchell's Coucal | LC | LC |
| 33 | <i>Cypsiurus parvus</i> | African Palm-Swift | LC | LC |
| 34 | <i>Apus caffer</i> | White-rumped Swift | LC | LC |
| 35 | <i>Corythaixoides concolor</i> | Grey Go-Away-Bird | LC | LC |
| 36 | <i>Spilopelia senegalensis</i> | Laughing dove | LC | LC |
| 37 | <i>Streptopelia capicola</i> | Cape Turtle-Dove | LC | LC |
| 38 | <i>Streptopelia semitorquata</i> | Red-eyed Dove | LC | LC |
| 39 | <i>Turtur chalcospilos</i> | Emerald-Spotted Wood-Dove | LC | LC |

| # | Scientific Name | Common Name | Conservation Status | |
|----|-------------------------------------|-----------------------------|---------------------|--------|
| | | | National | Global |
| | | | RSA | IUCN |
| 40 | <i>Gallinula angulata</i> | Lesser Moorhen | LC | LC |
| 41 | <i>Fulica cristata</i> | Red-knobbed Coot | LC | LC |
| 42 | <i>Burhinus capensis</i> | Spotted Thick-Knee | LC | LC |
| 43 | <i>Vanellus armatus</i> | Blacksmith Lapwing | LC | LC |
| 44 | <i>Vanellus senegallus</i> | African Wattled Lapwing | LC | LC |
| 45 | <i>Vanellus coronatus</i> | Crowned Lapwing | LC | LC |
| 46 | <i>Elanus caeruleus</i> | Black-shouldered Kite | LC | LC |
| 47 | <i>Milvus parasitus</i> | Yellow-billed Kite | LC | LC |
| 48 | <i>Gyps africanus</i> | White-backed Vulture | CR | CR |
| 49 | <i>Polyboroides typus</i> | African Harrier-Hawk | LC | LC |
| 50 | <i>Micronisus gabar</i> | Gabar Goshawk | LC | LC |
| 51 | <i>Accipiter melanoleucus</i> | Black Sparrowhawk | LC | LC |
| 52 | <i>Buteo buteo</i> | Steppe Buzzard | LC | LC |
| 53 | <i>Hieraetus wahlbergi</i> | Wahlberg's Eagle | LC | LC |
| 54 | <i>Aquila spilogaster</i> | African Hawk-Eagle | LC | LC |
| 55 | <i>Hieraetus pennatus</i> | Booted Eagle | LC | LC |
| 56 | <i>Falco biarmicus</i> | Lanner Falcon | VU | LC |
| 57 | <i>Tachybaptus ruficollis</i> | Little Grebe | LC | LC |
| 58 | <i>Microcarbo africanus</i> | Reed Cormorant | LC | LC |
| 59 | <i>Ardea cinerea</i> | Grey Heron | LC | LC |
| 60 | <i>Scopus umbretta</i> | Hamerkop | LC | LC |
| 61 | <i>Bostrychia hagedash</i> | Hadeda Ibis | LC | LC |
| 62 | <i>Lanius collurio</i> | Red-backed Shrike | LC | LC |
| 63 | <i>Lanius collaris</i> | Common Fiscal | LC | LC |
| 64 | <i>Urolestes melanoleucus</i> | Magpie Shrike | LC | LC |
| 65 | <i>Corvus albus</i> | Pied Crow | LC | LC |
| 66 | <i>Oriolus larvatus</i> | Black-headed Oriole | LC | LC |
| 67 | <i>Campephaga flava</i> | Black Cuckooshrike | LC | LC |
| 68 | <i>Dicrurus adsimilis</i> | Fork-tailed Drongo | LC | LC |
| 69 | <i>Nilaus afer</i> | Brubru | LC | LC |
| 70 | <i>Dryoscopus cubla</i> | Black-backed Puffback | LC | LC |
| 71 | <i>Tchagra senegalus</i> | Black-crowned Tchagra | LC | LC |
| 72 | <i>Laniarius ferrugineus</i> | Southern Boubou | LC; En | LC |
| 73 | <i>Laniarius atrococcineus</i> | Crimson-breasted Shrike | LC; En | LC |
| 74 | <i>Chlorophoneus sulfureopectus</i> | Orange-breasted Bush-Shrike | LC | LC |
| 75 | <i>Malaconotus blanchoti</i> | Grey-headed Bush-Shrike | LC | LC |
| 76 | <i>Batis molitor</i> | Chin-spot Batis | LC | LC |
| 77 | <i>Psophocichla litsitsirupa</i> | Groundscraper Thrush | LC | LC |
| 78 | <i>Bradornis mariquensis</i> | Marico Flycatcher | LC; En | LC |
| 79 | <i>Melaenornis pammelaina</i> | Southern Black Flycatcher | LC | LC |
| 80 | <i>Muscicapa striata</i> | Spotted Flycatcher | LC | LC |
| 81 | <i>Cossypha caffra</i> | Cape Robin-Chat | LC | LC |

| # | Scientific Name | Common Name | Conservation Status | |
|-----|---------------------------------|-----------------------------|---------------------|--------|
| | | | National | Global |
| | | | RSA | IUCN |
| 82 | <i>Cossypha humeralis</i> | White-throated Robin-Chat | LC; En | LC |
| 83 | <i>Erythropygia leucophrys</i> | White-browed Scrub-Robin | LC | LC |
| 84 | <i>Onychognathus morio</i> | Red-winged Starling | LC | LC |
| 85 | <i>Lamprotornis nitens</i> | Cape Glossy Starling | LC | LC |
| 86 | <i>Parus niger</i> | Southern Black Tit | LC | LC |
| 87 | <i>Parus cinerascens</i> | Ashy Tit | LC; En | LC |
| 88 | <i>Hirundo rustica</i> | Barn Swallow | LC | LC |
| 89 | <i>Hirundo albigularis</i> | White-throated Swallow | LC | LC |
| 90 | <i>Cecropis semirufa</i> | Red-breasted Swallow | LC | LC |
| 91 | <i>Pycnonotus tricolor</i> | Dark-capped Bulbul | LC | LC |
| 92 | <i>Andropadus importunus</i> | Sombre Greenbul | LC | LC |
| 93 | <i>Cisticola chiniana</i> | Rattling Cisticola | LC | LC |
| 94 | <i>Cisticola fulvicapilla</i> | Neddicky | LC | LC |
| 95 | <i>Cisticola juncidis</i> | Zitting Cisticola | LC | LC |
| 96 | <i>Cisticola aridulus</i> | Desert Cisticola | LC | LC |
| 97 | <i>Prinia subflava</i> | Tawny-flanked Prinia | LC | LC |
| 98 | <i>Prinia flavicans</i> | Black-chested Prinia | LC; En | LC |
| 99 | <i>Apalis flavida</i> | Yellow-breasted Apalis | LC | LC |
| 100 | <i>Camaroptera brevicaudata</i> | Grey-backed Camaroptera | LC | LC |
| 101 | <i>Zosterops capensis</i> | Cape White-eye | LC; En | LC |
| 102 | <i>Eremomela icteropygialis</i> | Yellow-bellied Eremomela | LC | LC |
| 103 | <i>Sylvietta rufescens</i> | Long-billed Crombec | LC | LC |
| 104 | <i>Phylloscopus trochilus</i> | Willow Warbler | LC | LC |
| 105 | <i>Turdoides jardineii</i> | Arrow-marked Babbler | LC | LC |
| 106 | <i>Curruca subcoerulea</i> | Chestnut-vented Tit-Babbler | LC; En | LC |
| 107 | <i>Mirafraga africana</i> | Rufous-naped Lark | LC | LC |
| 108 | <i>Calendulauda sabota</i> | Sabota Lark | LC; En | LC |
| 109 | <i>Cinnyris talatala</i> | White-bellied Sunbird | LC | LC |
| 110 | <i>Cinnyris mariquensis</i> | Marico Sunbird | LC | LC |
| 111 | <i>Passer melanurus</i> | Cape Sparrow | LC; En | LC |
| 112 | <i>Macronyx capensis</i> | Cape Longclaw | LC; En | LC |
| 113 | <i>Anthus cinnamomeus</i> | African Pipit | LC | LC |
| 114 | <i>Anthus caffer</i> | Bushveld Pipit | LC | LC |
| 115 | <i>Sporopipes squamifrons</i> | Scaly-feathered Finch | LC; En | LC |
| 116 | <i>Plocepasser mahali</i> | White-browed Sparrow-Weaver | LC | LC |
| 117 | <i>Ploceus intermedius</i> | Lesser Masked-Weaver | LC | LC |
| 118 | <i>Ploceus velatus</i> | Southern Masked-Weaver | LC | LC |
| 119 | <i>Quelea quelea</i> | Red-billed Quelea | LC | LC |
| 120 | <i>Euplectes orix</i> | Southern Red Bishop | LC | LC |
| 121 | <i>Pytilia melba</i> | Green-winged Pytilia | LC | LC |
| 122 | <i>Lagonosticta senegala</i> | Red-billed Firefinch | LC | LC |
| 123 | <i>Uraeginthus angolensis</i> | Blue Waxbill | LC | LC |

| # | Scientific Name | Common Name | Conservation Status | |
|-----|--------------------------------|-------------------------|---------------------|--------|
| | | | National | Global |
| | | | RSA | IUCN |
| 124 | <i>Uraeginthus granatinus</i> | Violet-eared Waxbill | LC | LC |
| 125 | <i>Estrilda astrild</i> | Common Waxbill | LC | LC |
| 126 | <i>Ortygospiza fuscocrissa</i> | African Quailfinch | LC | LC |
| 127 | <i>Vidua macroura</i> | Pin-tailed Whydah | LC | LC |
| 128 | <i>Crithagra atrogularis</i> | Black-throated Canary | LC | LC |
| 129 | <i>Crithagra mozambica</i> | Yellow-fronted Canary | LC | LC |
| 130 | <i>Crithagra flaviventris</i> | Yellow Canary | LC; En | LC |
| 131 | <i>Emberiza flaviventris</i> | Golden-breasted Bunting | LC | LC |

CR = Critically Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; En = Endemic; NBM = Non-breeding Migrant

APPENDIX B: ABRIDGED CV OF THE SPECIALIST

| | | |
|-----------------------|---|---|
| Name and Surname | : | Robyn Phillips |
| Date of Birth | : | 28 08 1975 |
| Company Name | : | Cossypha Ecological |
| Field of Expertise | : | Terrestrial Ecologist and Avifaunal Specialist |
| SACNASP Registration | : | <i>Pr.Sci.Nat.</i> 400401/12 (Zoological and Ecological Sciences) |
| Highest Qualification | : | MSc (Zoology) <i>cum laude</i> |
| Years of Experience | : | 21 |
| Contact Number | : | 084 695 1648 |
| Email | : | robyn@cossypha.co.za |

The first half of my professional career was spent working in ecological research at the University of KwaZulu-Natal. Since starting in consulting in 2011, I have been involved in many projects requiring biodiversity surveys and ecological assessments as part of the legislated requirements for the Environmental Impact Assessment (EIA) process. These studies include field assessment of habitat, species occurrence (especially those of conservation concern), assessment of ecological importance and sensitivity of floral and faunal communities and habitat, as well as assessment of impacts. Tasks also include making recommendations and prescribing mitigation measures after applying the mitigation hierarchy, aimed at minimising impacts.

Following is a selection of similar projects undertaken:

- Terrestrial Biodiversity and Faunal Assessment for the proposed Springhaas Solar Cluster Development and Grid Connection near Dealesville, Free State (GIBB Environmental) – 2021 to present
- Avifaunal Impact Assessment, Terrestrial Fauna Compliance Statement, and Terrestrial Biodiversity Impact Assessment for the proposed Oceana 10 MW Solar PV Facility near St Helena Bay, Western Cape (SRK) – 2021 to present.
- Terrestrial Biodiversity (including fauna and flora) and Avifaunal Impact Assessment for the Waterkloof Solar IPP Programme, North West (GIBB Environmental) – 2020 to 2021.
- Avifaunal Assessment for the Proposed Development of a Battery Energy Storage System (BESS) and Associated Infrastructure at the Cuprum Substation located at Copperton, near the town of Prieska, Northern Cape Province (AECOM) – 2021.
- Terrestrial Biodiversity Assessment (including flora and fauna) for the KwaZulu-Natal Automotive Supplier Park (ASP) and Township Establishment, including power lines, Illovo South, Durban, KwaZulu-Natal (Dube TradePort) – 2018 to 2021.
- Terrestrial Biodiversity Assessment (including flora, fauna, and avifauna) for the Askham Solar Energy Facility, Northern Cape (Komani San) – 2018 to 2019.
- Avifaunal Assessment for the Westgate and Randfontein Power lines, Gauteng (Eskom) – 2017.
- Terrestrial Biodiversity (fauna) and Avifaunal Assessment for the Teebus Hydroscheme: Bulhoek Power Line, Eastern Cape (Eskom) – 2016 to 2017
- Terrestrial Biodiversity (fauna) and Avifaunal Assessment for the Ngqeleni Rural Electrification Project, Eastern Cape (Eskom) – 2016.
- Faunal and Avifaunal Assessments for various solar farms in the Northern Cape (SEF) – 2011 to 2012.
- Strategic Environmental Assessments (avifaunal sensitivity) of the Polokwane, Tzaneen, and Nelspruit-Kanyamazane Eskom Field Service Areas Networks, Limpopo and Mpumalanga (Eskom) – 2011.