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Avifauna Baseline & Environmental Impact Assessment Study

Volspruit Mine

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for

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1 INTRODUCTION AND PROJECT UNDERSTANDING

Enviro-Insight was requested to provide a suitably qualified avifauna specialist to undertake a baseline avifauna study with emphasis on a single expected avifauna species of conservation concern (ASCC) namely the Secretarybird (*Sagittarius serpentarius*), and to perform an environmental impact assessment (EIA) for the proposed opencast Volspruit Mine.

The study area is defined by the amended Volspruit Mining Right area (Figure 1) and its immediate surrounding area. It is comprised predominantly of critical biodiversity areas (CBA1) as indicated by the Limpopo Province Conservation Plan V2 (LCPv2, 2013[1]) which was recently updated in 2018 (Figure 1). The closest major town is Mokopane and the study area falls in the Waterberg District Municipality of the Limpopo Province.

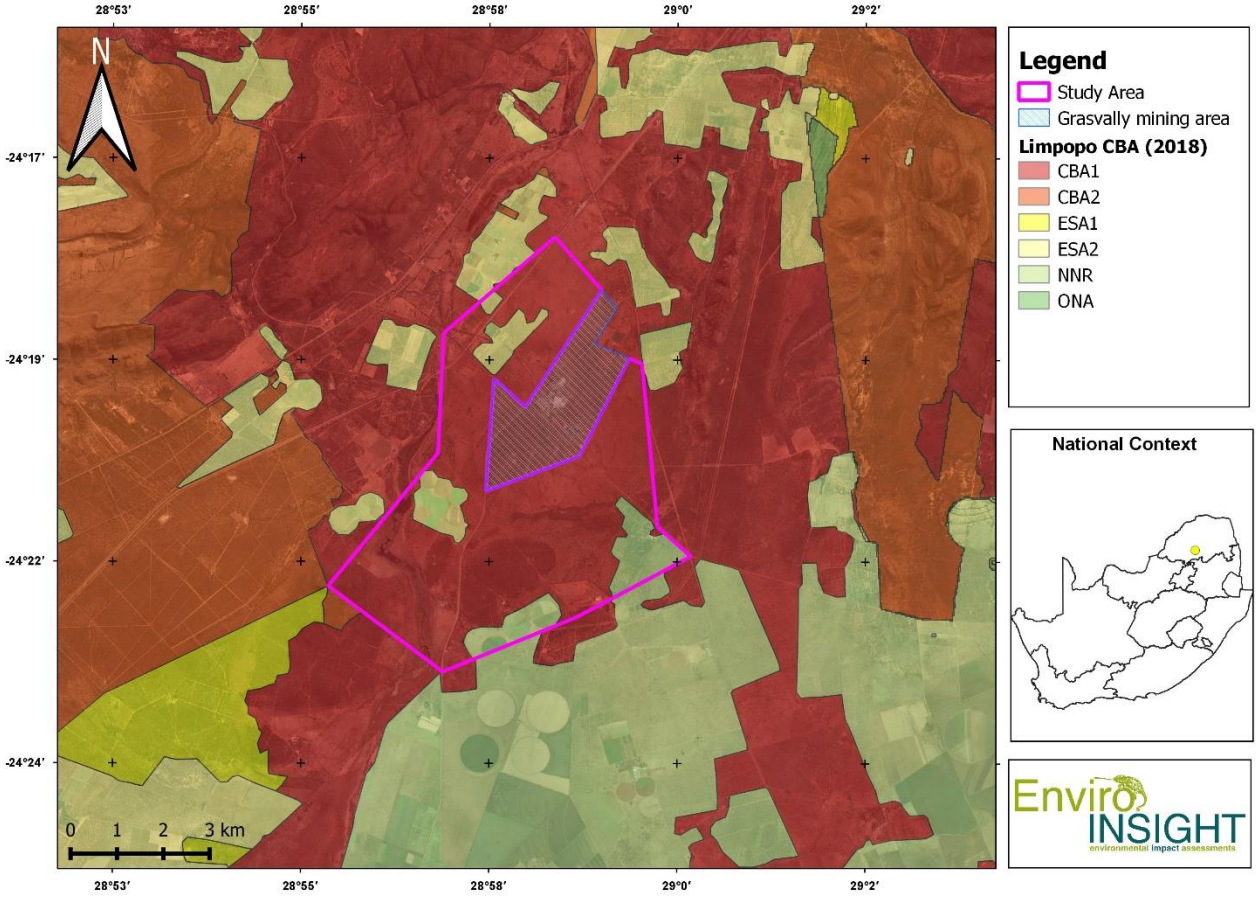


Figure 1: Location of the study area in relation to the Limpopo Province Conservation Plan V2.

The proposed mining infrastructure does not encompass the entire study area as shown in Figure 1 but is mostly restricted to the western and central portion of the study area. The exact location of the proposed infrastructure with labels indicating each component is provided in Figure 2.

1 https://bgis.sanbi.org/Projects/Detail/21

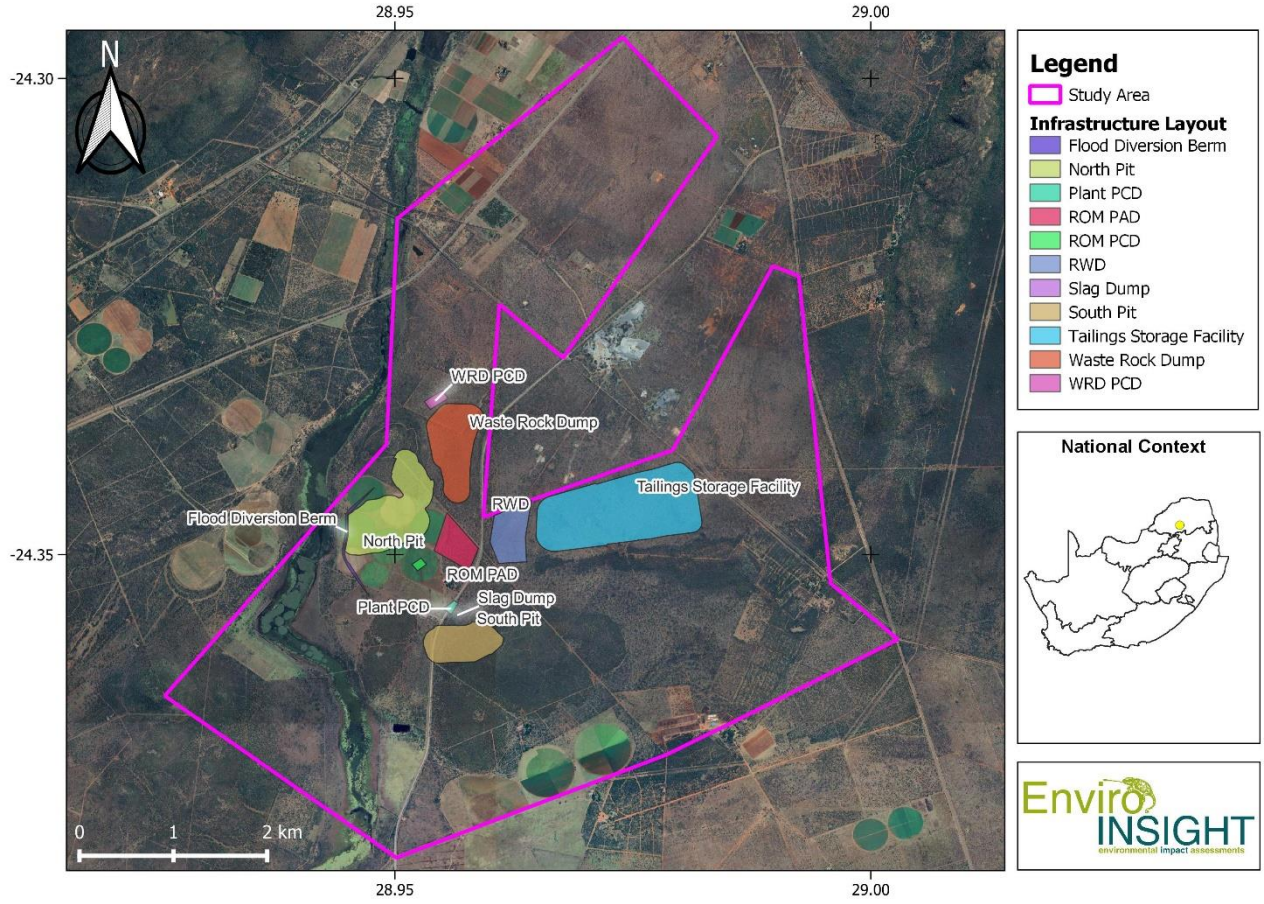


Figure 2: Proposed infrastructure layout within the study area.

2 METHODS

2.1 NATIONAL ENVIRONMENTAL SCREENING TOOL REPORTS

- In accordance with the terrestrial animal species protocol published in Government Notice No. 1150 of 30 October 2020, the National Environmental Screening Tool was consulted to provide a list of avifauna species of conservation concern (ASCC) potentially affected by the proposed development. This was performed during the inception of the project (January 2021) to inform specialist studies and a single ASCC (Secretarybird [*Sagittarius serpentarius*]) was identified. An updated Screening Tool report drawn in December 2021 confirmed no changes to the expected ASCC for the project area.

2.2 LITERATURE REVIEW

- All available books and publications providing information on distribution ranges and/or conservation status of South African avifauna were utilised to review the National Environmental Screening Tool predictions of avifauna

species of conservation concern (ASCC) occurrence in the mining right area.

- A list of potential expected avifauna species was developed from data collected by the second South African Bird Atlas Project (SABAP 2[2]; [SABAP2, 2020]). SABAP 2 records were developed based on records per pentad (i.e., 5' X 5'). A list of species potentially occurring was developed from SABAP 2 data for the pentads within which the study area is situated (2415_2850, 2415_2855, 2415_2900, 2420_2850, 2420_2855 & 2420_2900; see Figure 3);
- Information relating to ASCC was obtained from Taylor *et al.* (2015) and the IUCN Red List of threatened species (IUCN, 2022);
- del Hoyo *et al.* (1992) and Hockey *et al.* (2005) were consulted for general information on the life history attributes of relevant bird species;
- Geographic distribution data of ASCC was sourced from del Hoyo *et al.* (1992), Sinclair & Ryan (2010) and the IUCN Red List of threatened species (IUCN, 2022);
- Nomenclature and taxonomy followed the IOC World Bird Names unless otherwise specified (see www.worldbirdnames.org; Gill & Donsker, 2019);
- Additional observation localities of avifauna were obtained from citizen science projects such as iNaturalist (http://www.inaturalist.org);
- No relevant Biodiversity Management Plans for ASCC were identified;
- Taylor *et al.* (2015) was utilised to provide the most current account of the conservation status of avifauna.

[2] http://sabap2.birdmap.africa/

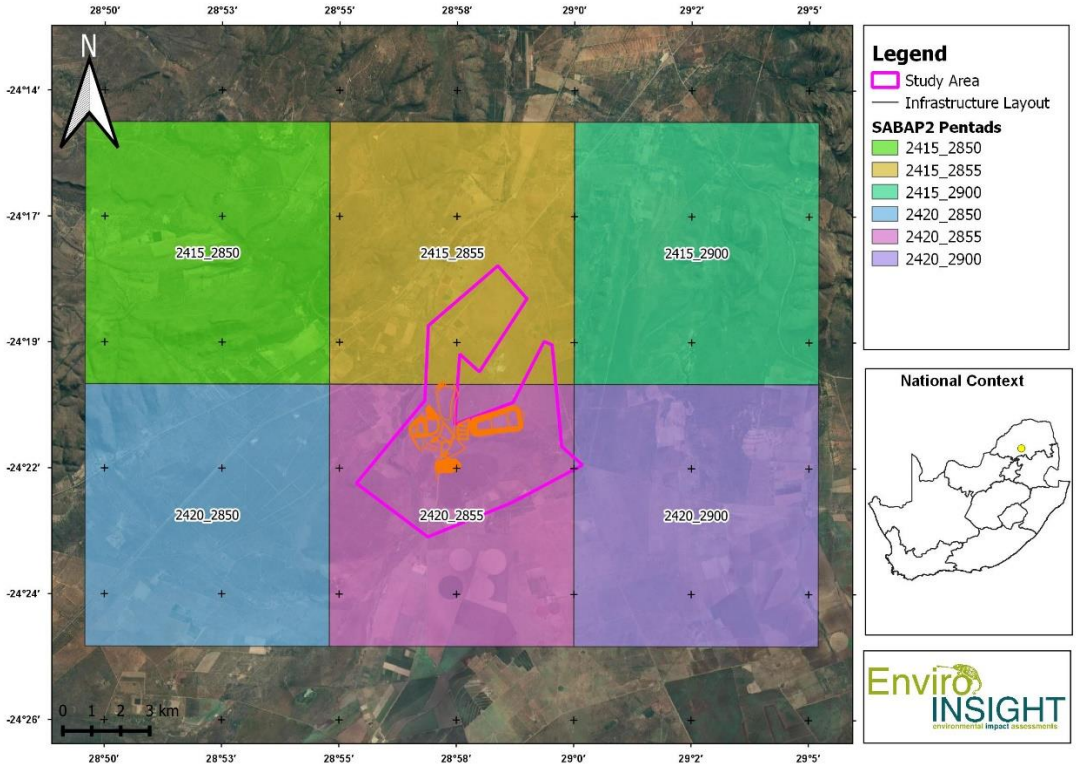


Figure 3: SABAP2 pentads in relation to the study area.

2.3 VISUAL SURVEYS

Visual surveys were conducted by an experienced avifauna specialists (Samuel Laurence) and all habitats of the study area were accessed by 4x4 vehicle or on foot where necessary. Surveys were performed from (and including) 1 to 2 April 2022, totalling 1.5 full survey days. All avifauna species observations were recorded using the BirdLasser[3] and RecForge software was used to record bird vocalisations.

2.4 HABITAT CHARACTERISATION & MAPPING

Habitat descriptions and suitability for avifauna were confirmed during the fieldwork survey. Habitat descriptions and photographs collected during the herpetofauna surveys (performed by Luke Verburgt) are considered sufficient to describe the avifauna habitats and readers are referred the herpetofauna report Appendix for detailed habitat descriptions. Vegetation units were mapped within the study area by Wetland Consulting Services (WCS). These mostly botanical delineations were converted to more structural habitat units of relevance for avifauna, by the combination of certain vegetation units into a single macro-habitat. This process resulted in the identification of five structural habitat types which

[3] www.birdlasser.com

are expected to have distinct avifauna communities.

2.5 ENVIRONMENTAL IMPACT ASSESSMENT

The methodology to assess environmental impacts was provided by Wetland Consulting Services (WCS). Each anticipated impact was evaluated according to its status, magnitude, extent, duration, and probability of occurrence. These evaluations were based on predefined categories associated with numerical scores as shown in Table 1. The impact significance was then calculated from the numerical scores as follows:

Significance = (Magnitude + Duration + Extent) x Probability

The maximum value that can be reached through the described impact evaluation process is 100 SP[4]. The scenarios for each environmental impact were rated as High (SP≥60), Moderate (SP 31-60) and Low (SP<30) significance as shown in Table 2.

Once the significance rating of an impact before mitigation has been determined, the reversibility of the impact, 'replaceability' of the affected resources and the potential of the impact to be further mitigated also need to be determined. These factors are explained in Table 3 below and play an important role in the determination of the level and type of mitigation performed or to be implemented. Table 3 sets out the criteria that should be used to assess the reversibility, loss of resources and potential for further mitigation.

Table 1: Impact assessment considerations and their associated categories and numerical scores

Status		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
Magnitude		
Minor	2	Bio-physical and/or social functions and/or processes will remain unaltered.
Low	4	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced.
Moderate	6	Bio-physical and/or social functions and/or processes might be notably altered or enhanced.

[4]SP: Significant Points.

High	8	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced.
Very high	10	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced.
Extent		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless or in spite of any mitigation measures.

Table 2. Definition of significance rating

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation. Ensure impact remains low through the application of appropriate mitigation measures where applicable.
Medium	31-60	Where the impact can have an influence on the environment and strict mitigation measures should be implemented to lower impacts and manage the project impacts appropriately
High	61-100	Where the impact will definitely influence the environment. Impact should be avoided as far as possible. Implement strict mitigation measures to account for residual impacts and must be mitigated, where possible.
Significance of predicted POSITIVE impacts		
Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall

		neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

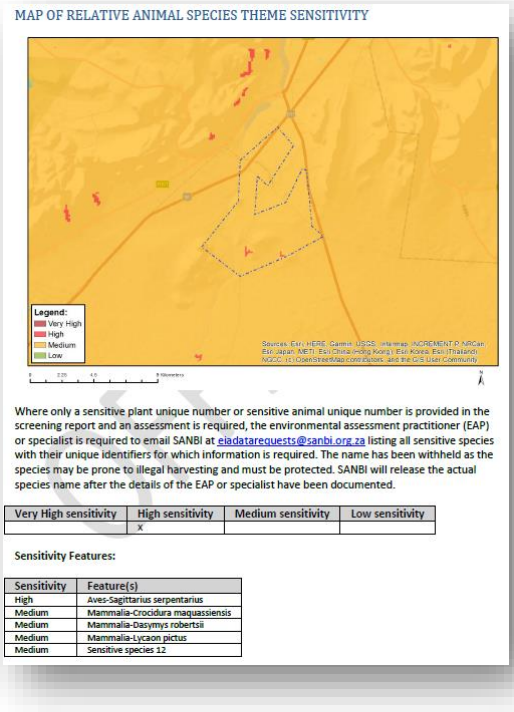
Table 3: Additional considerations of each impact related to the reversibility of impact, irreplaceability of the resource being impacted and the potential for mitigation measures to be effective.

Reversibility of impact		
Reversible	1	The impact on natural, cultural and / or social structures, functions and processes is totally reversible.
Partially	2	The impact on natural, cultural and / or social structures, functions and processes is partially reversible.
Irreversible	3	Where natural, cultural and / or social structures, functions or processes are altered to the extent that it will permanently cease, i.e. impact is irreversible.
Irreplaceable loss of resources		
Replaceable	1	The impact will not result in the irreplaceable loss of resources.
Partially	2	The Impact will result in a partially irreplaceable loss of resources.
Irreplaceable	3	The impact will result in the irreplaceable loss of resources.
Potential of impacts to be mitigated		
High	1	High potential to mitigate negative impacts to the level of insignificant effects, or to improve management to enhance positive impacts.
Medium	2	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
Low	3	Little or no mechanism exists to mitigate negative impacts.

3 RESULTS

3.1 REVIEW OF NATIONAL ENVIRONMENTAL SCREENING TOOL LIST

The list generated (December 2021) by the National Environmental Screening Tool was found to under-report on the ASCC expected for the study area. Only a single ASCC was considered by the screening tool to be present on the study area with a moderate probability (Figure 4). A more thorough analysis revealed that additional ASCC can be present, especially sporadic appearances of raptors (see 3.4 Avifauna Species of Conservation Concern), although none of these species are expected to breed within the study area.


MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

Legend:
Very High
High
Medium
Low

Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Sagittarius serpentarius
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Dasymys robertsii
Medium	Mammalia-Lycaon pictus
Medium	Sensitive species 12

Figure 4:Screening Tool Report on the Animal Species Theme.

3.2 SAMPLING

The avifauna specialist surveyed the study area by following the GPS tracks of the herpetologist (Luke Verburgt) exactly and recording all avifauna species observed during this process as well as the habitat type associated with the observation. Because the main focus of the survey was to observe ASCC and confirm potentially suitable habitats for these species, point count sampling per habitat type to delineate species assemblages was not performed. All observed ASCC were photographed with a telephoto lens. Potential nesting sites of ASCC were scanned for with binoculars from key vantage points.

3.3 AVIFAUNA OBSERVATIONS

A total of 133 avifauna species were observed during the rapid field survey, representing 52% of the 256 avifauna species expected to occur within the study area with a Medium or High probability of occurrence (Appendix 1). Selected photographs of species observed within the study area are presented in Figure 5. Only a single ASCC was observed namely the Secretarybird (*Sagittarius serpentarius*; see Figure 5A).

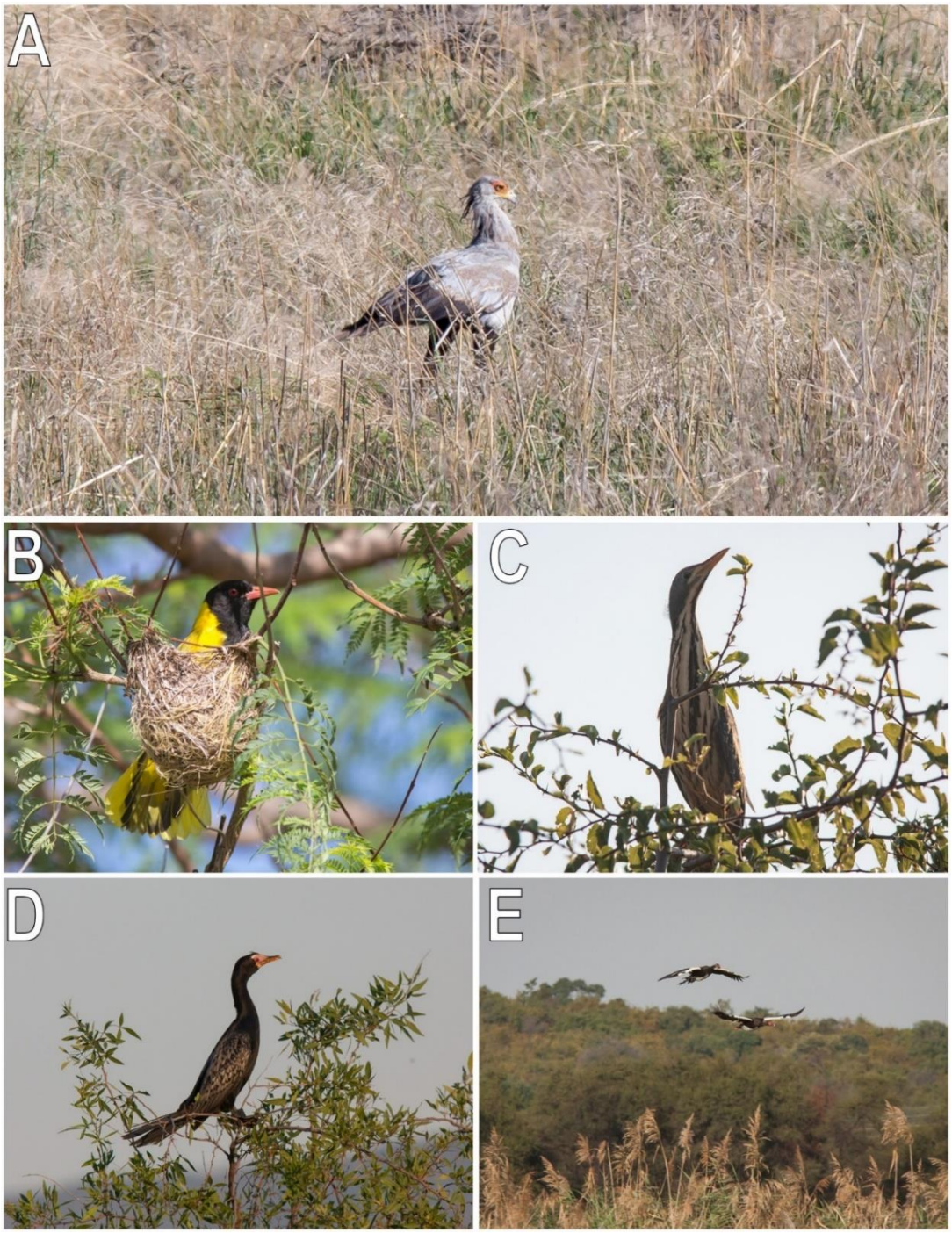


Figure 5: A selection of photographs highlighting some of the avifauna species observed during the fieldwork survey[5].

3.4 AVIFAUNA SPECIES OF CONSERVATION CONCERN (ASCC)

A thorough analysis was performed to identify the potential ASCC likely to occur within the study area (Table 4). ASCC include near threatened (NT) and threatened (CR, EN, VU) species as designated by the regional extinction risk assessments performed by Taylor et al. (2015), although the current global extinction risk is also reported (IUCN, 2022). Of the 17 ASCC evaluated, four- and five species have a high- and medium probability of occurrence in the study area, respectively. Only a single ASCC was confirmed within the study area namely the Secretarybird (*Sagittarius serpentarius*; see Figure 5A), which was predicted by the screening tool (Figure 4). Eight of the initial 17 species included in the analysis are considered unlikely to occur within the study area and consequently labelled as having a low probability of occurrence.

Table 4: Analysis of avifauna species of conservation concern (ASCC) potentially occurring within the study area.

Common Name	Scientific Name	IUCN Status (Regional)	IUCN Status (Global)	Habitat Association	Probability of Occurrence	Justification
Abdim's Stork	*Ciconia abdimii*	NT	LC	Transformed cultivated lands and Savanna Woodlands.	Medium	The species has been recorded in the past in the surrounding cultivated habitat type, which is also a preferred foraging habitat which is present within the study area.
African Marsh Harrier	*Circus ranivorus*	EN	LC	Wetland and associated moist grasslands.	Medium to High	Occurrence probability is Medium to High even though the recording rate for the species is low. Due to records within the greater Nylsvlei region combined with the prevalence of wetlands as well as associated moist grassland found within the study area, the species is expected to occur in the area, mostly for foraging purposes.
Black Stork	*Ciconia nigra*	VU	LC	Associated with mountainous regions for breeding, and flooded plains and grassland, estuaries dams and pans for foraging purposes.	Low	Due to the lack of preferred habitat for the species, the POC is regarded as low. On rare occasions the species might use the cultivated lands for foraging purposes.
Cape Vulture	*Gyps coprotheres*	EN	VU	Associated with cliffs and mountainous area for breeding sites.	Medium	Although the reporting rate for the species is very low within the pentads of the study area, there is a high reporting rate in the Polokwane region. Therefore, there is a medium probability of the species to occur in the area mostly due to fly-by's and possibly

[5] A) Secretarybird B) Black-headed Oriole C) Dwarf Bittern D) Reed Cormorant E) Spur-winged Geese

Common Name	Scientific Name	IUCN Status (Regional)	IUCN Status (Global)	Habitat Association	Probability of Occurrence	Justification
						roosting areas found in the surrounding mountainous area. All records within the study area will however be regarded as incidental.
European Roller	*Coracias garrulus*	NT	LC	Open woodlands and savanna.	High	The species is a very common summer visitor in the area, and would mostly be found within the savanna, surrounding woodland habitat and using powerlines for perching.
Greater Flamingo	*Phoenicopterus roseus*	NT	LC	Favours saline shallow water bodies such as saltpans and large dams.	Low	Occurrence probability is low due to the lack of preferred habitat found within the study area. The species would mostly use the larger dam, 10 km towards to north of the study area, where it was also sporadically recorded as per SABAP.
Greater Painted-snipe	*Rostratula benghalensis*	NT	LC	The side of vegetated waterbodies with some exposed soil.	High	The species has a high occurrence probability due to the preferred habitat found within the study area. The species has been recorded within surrounding waterbodies found just north of the study area.
Lanner Falcon	*Falco biarmicus*	VU	LC	Prefers open grassland or woodlands, and uses pylons, cliffs and trees as breeding sites.	High	The species has been recorded previously and recently within the study area pentads and has a medium POC due to the preferred habitat found within and surrounding the study area.
Maccoa Duck	*Oxyura maccoa*	NT	EN	Large and deep inland waterbodies with some emergent vegetation.	Low	The species has a low probability of occurrence due to its preferred habitat. The species only has been recorded in the waterbodies found in the surrounding pentads of the study area.
Marabou Stork	*Leptoptilos crumenifer*	NT	LC	Prefers semi-arid areas, with more concentrated populations found in nature reserves due to availability of carrion.	Medium	The species was recording within the pentads of the study, with the most recent observation being a month ago. This could mostly be due to fly-by's as they do prefer nature reserves, due to the availability of food resources, which are present in the surrounding area.
Martial Eagle	*Polemaetus bellicosus*	EN	EN	Found mostly in open savanna, woodlands and semi-arid areas. Breeding in large trees or electrical pylons.	Low	The species has a low probability of occurrence and was last recorded more than 7 years ago in the area. Due to the lack of preferred habitat found within the study area it would mostly be found on rare occasions while foraging, perching or flying by.

Common Name	Scientific Name	IUCN Status (Regional)	IUCN Status (Global)	Habitat Association	Probability of Occurrence	Justification
Saddle-billed Stork	*Ephippiorhynchus senegalensis*	EN	LC	Large river systems and wetlands.	Low	The SABAP 2 reporting rate is very low for the species, and therefore it is considered to have a low probability of using the surrounding waterbodies and river system within the study area for foraging.
Secretarybird	*Sagittarius serpentarius*	VU	EN	Favours open grassland, associated with scattered trees and shrubs for breeding purposes. Will utilise artificially cleared habitats e.g. agricultural fallow).	**CONFIRMED**	The species was confirmed on the study area (see Figure 5), utilising agricultural fallow.
Tawny Eagle	*Aquila rapax*	EN	VU	Favours open savanna woodlands.	Medium	This species has a low SABAP2 reporting rate in the area. However, due to the species being recorded within some pentads surrounding the study area and preferred habitat being present on site, this species is expected to be present in the study area, even if only soaring overhead or temporarily perching/ foraging in the area.
Verreaux's Eagle	*Aquila verreauxii*	VU	LC	Found mostly within and close to mountainous, rocky and large cliff areas, which they use for hunting purposes (rock hyrax) and nesting sites.	Low	The species would mostly be found within the surrounding large mountainous areas due to preferred foraging and nesting habitat. However, this species is expected to occasionally be present in the study area, but mostly when flying by. A lack of food supply (hyrax) in very high densities also precludes permanent presence.
White-backed Vulture	*Gyps africanus*	CR	CR	Savanna woodland and bushveld.	Low	The reporting rate for the species is very low for the pentads of the study area. The probability of nesting is low, due to the surrounding transformed habitat. The species could mostly be recorded in the study area as fly-by's due to the multiple recordings found in the surrounding areas.
Yellow-billed Stork	*Mycteria ibis*	EN	LC	Moist inland freshwater bodies.	Medium	The species has a low recording rate within the SABAP pentads situated in the study area and adjacent pentads. They are expected to occasionally use the waterbodies found within and adjacent to the study area for foraging purposes.

3.5 CURRENT IMPACTS

Two negative and two positive current impacts on avifauna and their habitats were observed within and adjacent to the mining right area during the avifauna survey:

Negative

- Habitat loss & degradation - large areas of natural habitat have been transformed and/or degraded, predominantly due to crop agriculture, representing a loss of foraging and breeding habitat for certain species. The adjacent mining operations (Grass Valley Chrome Mine) have also caused some habitat loss in the area. The remaining habitat is generally managed as game farms or used for low density cattle grazing.
- Roads - the mining right area is surrounded by two major national roads namely the N1 and N11. These busy roads almost certainly result in the roadkill of many fauna species. Raptors that scavenge on roadkills are themselves highly susceptible to collisions with vehicles. Nocturnal species such as owls and nightjars often sit on the roads at night or are confused by the headlights of oncoming traffic while in flight and succumb to subsequent collision with vehicles. The carcasses of such species are often observed along busy roads in the region.

Positive

- Damming of river, a positive impact for certain species - artificial damming of the river, typically a negative impact on riverine ecology, promotes the persistence of medium to long-term aquatic habitats and provides important foraging and breeding habitats for aquatic avifauna species which would otherwise not have been able to forage/breed in this area due to the episodic nature and subsurface flows of the river. A good example of this is the observation of the Dwarf Bittern (*Ixobrychus sturmii*; Figure 5C), which under natural river flow conditions would have a low probability of occurrence in the study area. Other highly rare species such as Eurasian Bittern (*Botaurus stellaris*) and Rufous-billed Heron (*Ardeola rufiventris*) will also be attracted to the region with both species having been located in the area and neighbouring Dinokeng Nature Reserve (with similar large wetland impoundments) as of 2022.
- Habitat transformation, a positive impact for certain species - agricultural fields provide important foraging areas for several ASCC. In particular, multiple stork species (e.g. Abdims, White, Black and Yellow-billed storks), forage on newly ploughed or mowed fields as this enhances their foraging success. Such foraging opportunities are usually temporary and short-lived and are tolerated by the farmers. Woodland areas cleared for agriculture and subsequently allowed to return to fallow in-between planting periods, or simply cleared of trees to enhance grazing opportunities for cattle, provide ideal foraging habitat for Secretarybird (*Sagittarius serpentarius*) which prefer foraging in open habitats. Indeed, this species was observed within the study area utilising such disturbed habitat adjacent to active agricultural fields (Figure 6).



Figure 6: A foraging Secretarybird in the study area, showing a preference for disturbed habitats adjacent to active agricultural plots.

3.6 SITE ECOLOGICAL IMPORTANCE (SEI)

As described in the species protocol guidelines (SANBI 2020), Site Ecological Importance (SEI) is a "standardised metric for identifying site-based ecological importance for species, in relation to a proposed project with a specific footprint and suite of anticipated activities". SEI allows for rapid spatial inspection and evaluation of impacts of a proposed development within the context of on-site habitats and SCC, and also facilitates integration of inputs from different specialist studies.

SEI was evaluated for each of the habitats mapped (Figure 7) in the study area, and the detailed evaluation is presented in Table 5 below. The spatial representation of this SEI evaluation, which does not include the application of buffers, is presented in Figure 7, from which can be seen that the proposed project infrastructure has minimal interaction with the High SEI and mostly interacts with the Medium SEI. However, following final design of the infrastructure, an updated map showing the interaction between the finalized flood diversion berm and SEI was produced, WITH the inclusion of the 50 m wetland buffer, showing no overlap with the High SEI area associated with wetlands (and Figure 8)..

Buffers

The species protocol guidelines (SANBI 2020) provide recommendation regarding buffers for sensitive ASCC depending on the receptor attribute (e.g. nesting or foraging) and the intensity of the impact. The only ASCC observed on the study

area (Secretarybird) was associated with the transformed habitats for foraging purposes, which does not warrant any buffering. However, the species may be nesting within the study area and while every attempt was made to try and identify a nest location, none were observed. Consequently, no buffers are applied for this habitat but it is recommended that more intensive searches for nesting sites will be required during the pre-construction phase, within 500 m of the proposed infrastructure.

Table 5: Evaluation of Site Ecological Importance (SEI) of avifauna habitats in the study area. BI = Biodiversity Importance.

Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
River/Wetland/Floodplain	**High** – High probability of occurrence for Greater Painted-snipe (VU, C1) and Medium probability of occurrence for Yellow-billed storks (EN, [B2c(I,v); D]). Both threatened species are listed under other criteria besides A (SANBI, 2020).	**Very High**– Very large (> 100 ha) intact area for any conservation status of ecosystem type, high habitat connectivity serving as functional ecological corridors, minimal current negative ecological impacts.	**High**– Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality	**HIGH** **(BI = Very High)**
Savanna	**Low** – Both the Tawny Eagle (EN, [A2bc+3bc; C1]) and Lanner Falcon (VU, [A2bc; C1]) have a medium probability of occurring in this habitat within the study area. Both threatened species are listed under other criteria besides A (SANBI, 2020). However, these species forage widely and cannot be considered to be explicitly reliant on this habitat within the study area. Consequently, the CI is considered to be Low instead of High, because these species are not confirmed for the study area and because they are not reliant on this habitat for survival.	**Very High**– Very large (> 100 ha) intact area for any conservation status of ecosystem type, high habitat connectivity serving as functional ecological corridors, minimal current negative ecological impacts.	**Medium**– Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality.	**MEDIUM** **(BI = Medium)**
Koppie	**Low**– No confirmed or highly likely populations of ASCC or range-restricted species reliant on this habitat.	**High**– Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type, only minor current negative ecological impacts.	**Very Low**– Habitat that is unable to recover from major impacts – complete functionality cannot be restored if excavations take place on the koppie	**HIGH** **(BI = Medium)**

Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
			itself	
Transformed/Degraded	**Low** – Despite the Secretarybird (Global EN [A2acde+3cde+4acde]; Regional: VU, [A4acd; C1]) being observed in this habitat within the study area and being listed under other criteria besides A (SANBI, 2020), the CI of this habitat cannot be assigned as High. This is because individual Secretarybirds forage widely and opportunistically make use of artificial habitats that enhance foraging success in the same way that storks forage on freshly ploughed agricultural fields. Consequently, the CI is considered to be Low instead of High, because this species is not reliant on this specific habitat location for survival and they do not breed in the study area. However, the presence of this species and their preferred foraging habitat in close proximity to the proposed mining operations will require careful mitigation, because this species is prone to collisions with powerlines (see below).	**Very low**– Several major current negative ecological impacts	**Very High**– Habitat that can recover rapidly	**VERY LOW** **(BI = Very Low)**
Dense *Combretum* woodland	**Low**– As for the savanna habitat, both the Tawny Eagle (EN, [A2bc+3bc; C1]) and Lanner Falcon (VU, [A2bc; C1]) have a medium probability of occurring in this habitat within the study area. In addition, Abdi''s Stork (NT [A2bc]) and European Roller (NT [A2bcd+3bcd+4bcd]) also have a medium probability of occurring in this habitat within the study area. However, as described for the savanna habitat, these species forage widely and cannot be considered to be explicitly reliant on this habitat within the study area. Consequently, the CI is considered to be Low instead of High, because these species are not confirmed for the study area and because they are not reliant on this habitat for survival.	**Very High**– Very large (> 100 ha) intact area for any conservation status of ecosystem type, high habitat connectivity serving as functional ecological corridors, minimal current negative ecological impacts	**High**– Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor.	**LOW** **(BI = Medium)**

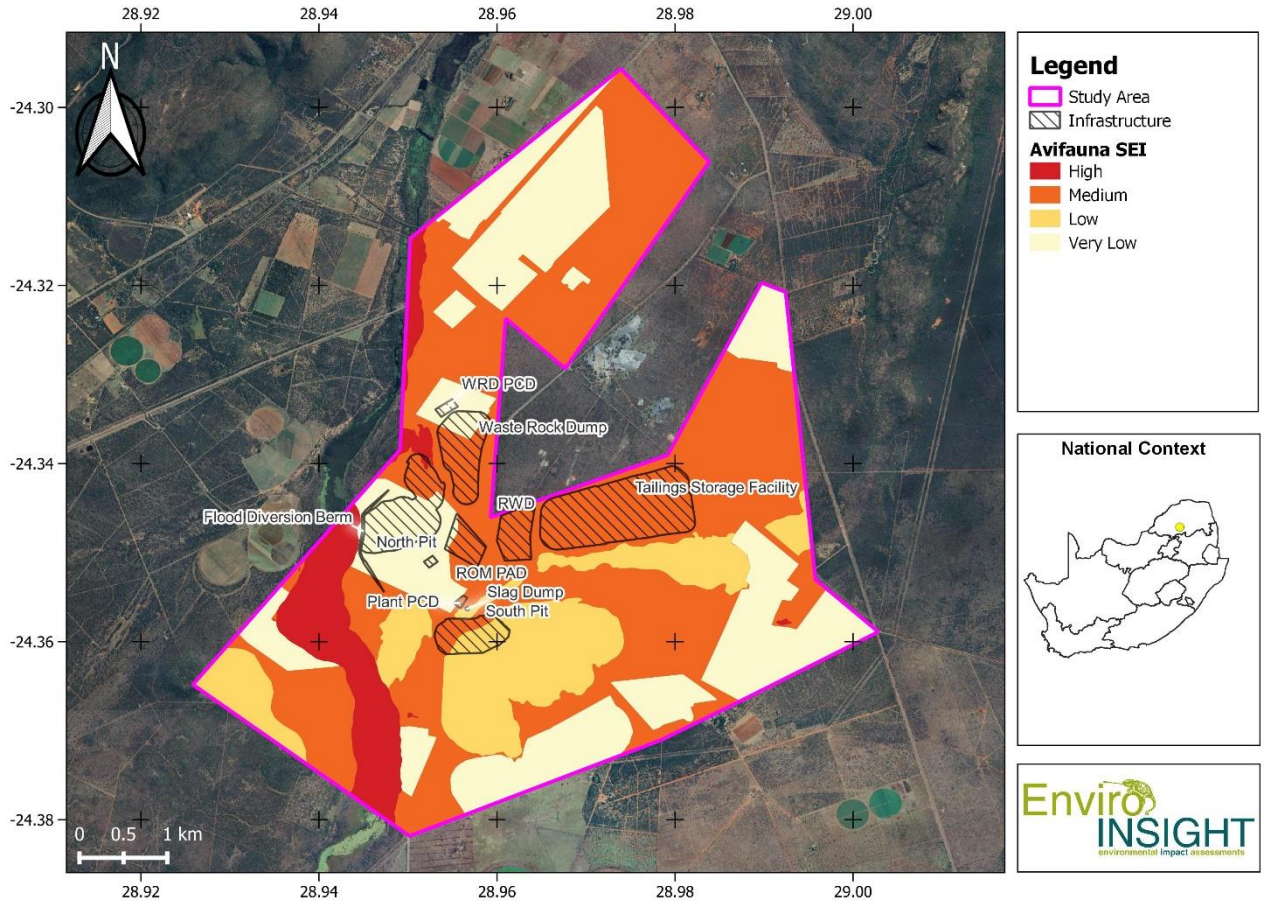


Figure 7: Avifauna Site Ecological Importance (SEI) of the study area.

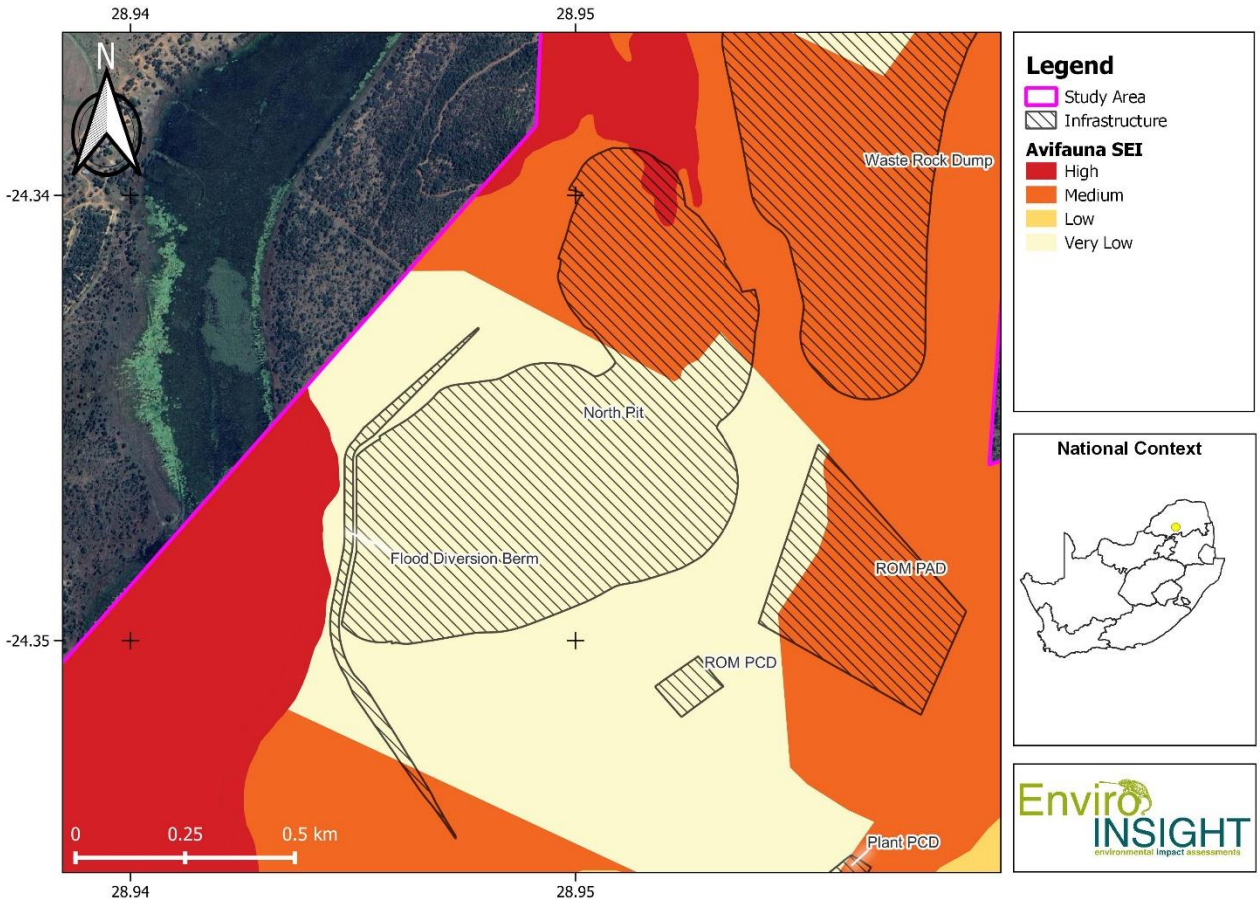


Figure 8: The northern pit and flood protection berm in relation to the avifauna Site Ecological Importance (SEI).

3.7 MAJOR ANTICIPATED IMPACTS TO ASCC

A comprehensive environmental impact assessment (EIA) following the methodology set out in 2.5 Environmental Impact Assessment has been compiled and is presented in 3.8 Environmental Impact Assessment. The following represents a short discussion on the potential major impacts to ASCC in relation to the site ecological importance evaluated above.

- Habitat loss & degradation - the northern pit overlaps with the High SEI habitats (Figure 8). SANBI (2020) recommends avoidance mitigation wherever possible for High SEI areas. If avoidance mitigation is not possible for the northern pit as per the current design, SANBI (2020) recommends offset mitigation for high impact activities within High SEI. . Any spills or unmitigated stormwater runoff into the riverine ecosystem can be expected to cause extensive significant negative impacts due to the transportation of sediment or other pollutants downstream, which will have knock-on effect on the riparian habitats that the ASCC depend on. A large proportion of the proposed infrastructure resides on habitat that is considered to be Medium SEI. SANBI (2020) recommends minimisation and restorative mitigation.

- Roads & roadkill - several roads will be constructed within the mining right area which are expected to carry heavy traffic. Such additional high traffic volumes by large machinery can be expected to significantly increase the likelihood of avifauna fatalities, especially for nocturnal species. Appropriate mitigation measures should be put in place to minimise any potential road mortalities, which must be coupled with an appropriate monitoring program to rapidly detect mortalities and initiate corrective measures to the mitigation approach.
- Disturbance (breeding, migration, foraging) due to mining activities and infrastructure - Noise, dust and lighting generated from blasting, moving vehicles operating on access roads and from machinery on site can disrupt avifauna populations by interfering with their movements, foraging and breeding activities. Lighting at night may disrupt flight paths of migrating birds which could cause collisions with infrastructure such as stabilising cables for tall infrastructure, objects with reflective surfaces etc.
- Collision & electrocution with electrical infrastructure – large terrestrial birds such as bustards and cranes are particularly vulnerable to collisions with overhead electricity lines and Secretarybirds are also known to be prone to such collisions (Taylor et al. 2015). Since it has been confirmed that Secretarybirds are present on site and that the transformed habitats are ideally suited for the foraging preferences of the species, there is the potential negative impact from the required infrastructure for the proposed mining development in conjunction with the attractive foraging habitat for this species leading to fatal collisions, if not mitigated appropriately. Raptors and other large birds with large wing spans that frequently sit on electrical poles/pylons and cables are at risk of electrocution when their wings touch two wires or when they defecate and create a short circuit between two wires.

3.8 ENVIRONMENTAL IMPACT ASSESSMENT

The major anticipated impact to ASCC described above was evaluated according to the impact assessment methodology set out in 2.5 Environmental Impact Assessment and is presented in Table 6 along with proposed mitigation measures to avoid or minimise the anticipated impacts. From the context provided by Table 2, impacts are not considered to be of High significance following appropriate mitigation.

Table 6: Environmental impact assessment for potential impacts related to mammal species of conservation concern.

No.	Environmental Component	Potential Impact	Rating (prior to mitigation)									Proposed Mitigation Measures	Rating (post-mitigation)				
			Status	Magnitude	Extent	Duration	Probability	Significance	Reversibility	Irreplaceable loss of resources	Potential of impacts to be mitigated		Magnitude	Extent	Duration	Probability	Significance
CONSTRUCTION PHASE																	
1	**Avifauna**	Habitat loss & degradation of High SEI habitats	-	6	1	4	3	33	1	2	1	High SEI Habitat destruction cannot be avoided by northern pit. All stromwater runoff into riverine ecosystem to be managed with silt traps and/or decontamination processes.	5	2	4	2	22
2	**Avifauna**	Roads & roadkill	-	6	2	4	4	48	1	1	2	Speed restrictions on all roads within the study area. Drivers to be educated to respond accordingly to avifauna sitting on the road. Increased speed restrictions where road mortalities have been observed (monitoring)	4	1	4	2	18
3	**Avifauna**	Disturbance due to mining activities and infrastructure	-	6	2	4	4	48	1	1	1	Perform a pre-construction nest survey for ASCC and buffer any active nests from development activities. Equipment with low noise emissions must be used. Water or dust control agents should be used in working areas and roads will be sprayed for dust suppression on a regular basis in designated susceptible areas during heavy usage. Reduce exterior lighting to that necessary for safe operation, and implement operational strategies to reduce spill light. Use down-lighting from non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators. Do not unnecessarily disturb faunal species, especially during the breeding season and those with juveniles. Where possible restrict blasting to daylight hours. All staff to be educated regarding respect for biodiversity on site. No staff members allowed to hunt, capture or remove any fauna from site.	4	1	4	1	9
4	**Avifauna**	Collision & electrocution with electrical infrastructure	-	8	3	4	4	60	1	1	1	Minimise overhead cabling and electrical lines. All necessary overhead cabling and electrical lines to be fitted with bird diverters/bird flappers to allow avifauna to see the lines and avoid them in flight. All electrical pylons/poles to be fitted with appropriate perches that prevent electrocution of large birds.	4	1	4	2	18
OPERATIONAL PHASE																	
1	**Avifauna**	Habitat loss & degradation of High SEI habitats	-	6	1	4	3	33	1	2	1	High SEI Habitat destruction cannot be avoided by northern pit. All stromwater runoff into riverine ecosystem to be managed with silt traps and/or decontamination processes.	5	2	4	2	22
2	**Avifauna**	Roads & roadkill	-	6	2	4	4	48	1	1	2	Speed restrictions on all roads within the study area. Drivers to be educated to respond accordingly to avifauna sitting on the road. Increased speed restrictions where road mortalities have been observed (monitoring)	4	1	4	2	18
3	**Avifauna**	Disturbance due to mining activities and infrastructure	-	6	2	4	4	48	1	1	1	Continue to enforce ASCC buffers around any active nests from development activities. Equipment with low noise emissions must be used. Water or dust control agents should be used in working areas and roads will be sprayed for dust suppression on a regular basis in designated susceptible areas during heavy usage. Reduce exterior lighting to that necessary for safe operation, and implement operational strategies to reduce spill light. Use down-lighting from non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators. Do not unnecessarily disturb faunal species, especially during the breeding season and those with juveniles. Where possible restrict blasting to daylight hours. All staff to be educated regarding respect for biodiversity on site. No staff members allowed to hunt, capture or remove any fauna from site.	4	1	4	1	9
4	**Avifauna**	Collision & electrocution with electrical infrastructure	-	8	3	4	4	60	1	1	1	Minimise overhead cabling and electrical lines. All necessary overhead cabling and electrical lines to be fitted with bird diverters/bird flappers to allow avifauna to see the lines and avoid them in flight. All electrical pylons/poles to be fitted with appropriate perches that prevent electrocution of large birds.	4	1	4	2	18
DECOMMISSIONING PHASE																	
1	**Avifauna**	Habitat loss & degradation of High SEI habitats	-	6	2	3	2	22	1	2	1	High SEI Habitat destruction cannot be avoided by northern pit. All stromwater runoff into riverine ecosystem to be managed with silt traps and/or decontamination processes.	5	2	4	2	22
2	**Avifauna**	Roads & roadkill	-	6	2	4	4	48	1	1	2	Speed restrictions on all roads within the study area. Drivers to be educated to respond accordingly to avifauna sitting on the road. Increased speed restrictions where road mortalities have been observed (monitoring)	4	1	4	2	18
3	**Avifauna**	Disturbance due to mining activities and infrastructure	-	4	2	4	4	40	1	1	1	Continue to enforce ASCC buffers around any active nests from development activities. Equipment with low noise emissions must be used. Water or dust control agents should be used in working areas and roads will be sprayed for dust suppression on a regular basis in designated susceptible areas during heavy usage. Do not unnecessarily disturb faunal species, especially during the breeding season and those with juveniles. All staff to be educated regarding respect for biodiversity on site. No staff members allowed to hunt, capture or remove any fauna from site. Regular Toolbox talks to reaffirm importance of biodiversity and prohibition of collection thereof.	2	1	4	1	7

3.9 CUMULATIVE IMPACTS

The proposed development will create additional roads and increase vehicle traffic on site and in the immediate area. Additional roads and higher traffic volumes are expected to result in increased roadkill incidence for avifauna, even with mitigation measures in place. It can be postulated that habitat destruction from infrastructure placement and mining activities are expected to further reduce the potential foraging and breeding habitat for ASCC in the area, because the current agricultural fields will need to relocate elsewhere (if food production is to remain unaffected) and will result in indirect negative impacts to the environment. This however will have a greater effect on individual birds given that migrating and widely foraging birds often return to the same locations year after year, rather than entire groups, congregations or species.

4 CONCLUSION

The confirmed and likely presence of several ASCC within the study area elevates the site ecological importance (SEI) of the riparian/wetland habitats to HIGH (Figure 7). Habitats with a High SEI should be avoided by development infrastructure and activities (SANBI 2020). Unfortunately, the northern pit intersects with these habitats (~ 1 ha). Since appropriate avoidance will not be possible due to the location of the resource, extra care will be required to ensure that no impacts occur to the remainder of the High SEI habitats outside of the pit areas and this will have to be monitored constantly to ensure compliance. It is not necessary to monitor the avifauna specifically but rather the habitat quality and other habitat parameters should serve as guidance for when mitigation measures must be implemented and/or the calculation of habitat loss due to an operational error/accident. The loss of approximately 1 ha of this habitat is minimal and not likely to be of major significance to avifauna. However, any pollution and degradation to the wetland habitat west of the flood diversion berm could be of significance, as it has the potential to influence a very large area downstream and hence the added care and increased frequency of monitoring that must be implemented to avoid this scenario. With minimisation mitigation applied as discussed above (Table 6), all impacts on ASCC are expected to be of low significance.

Avifaunal assessments are carried out sporadically and thus certain key aspects must be captured. Migratory and widely foraging species may rapidly colonise a given area based upon stochastic climatic factors (such as abnormally high or low rainfall) and some ASCC will be included within these ecological events. For example, hyper flood events occurring late in the rainy season (La Nina Year) may cause large influxes of Abdin, Black and White Storks, events that have been personally observed by the author in Dinokeng Nature Reserve and Thabazimbi agricultural fields. These species may negatively interact with mine infrastructure (especially powerlines) which can cause significant (albeit rare) mortality events. Therefore, it is strongly recommended that continued monitoring and reporting of both presence of ASCC and impacts to ASCC, particularly road kills and collisions with infrastructure occur throughout the life of project, so that adaptive mitigation can be applied where necessary. A monitoring plan should therefore be developed as part of the environmental authorisation process which specifically addresses monitoring aspects for the described major anticipated impacts to ASCC.

5 REFERENCES

- Del Hoyo, J., Elliott, A. AND Sargatal, J. 1992. Handbook of the birds of the world. 1992 – 2011 editions, Lynx Editions, Barcelona.
- Gill, F. & Donsker, D. (Eds). 2019. IOC World Bird List (v9.2). doi: 10.14344/IOC.ML.9.2.
- Hockey P., Dean, W., Ryan, P., Maree S. & Brickman, B. (2005). Roberts - Birds of Southern Africa 7th ed. Trustees of the John Voelcker Bird Book Fun/ Africa Geographic Books.
- IUCN. 2022. The IUCN Red List of Threatened Species. http://www.iucnredlist.org.
- Sinclair, I. & Ryan, P. 2010. Birds of Africa south of the Sahara: a comprehensive illustrative field guide. 2nd Ed. Struik Publishers. Cape Town.
- South African Bird Atlas Project (SABAP2). Visited April 2022. http://vmus.adu.org.za/
- 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 1.
- Taylor, M.R., Peacock, F. & Wanless, R.M. (eds). (2015). The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg, South Africa.

6 APPENDIX

Appendix 1: Expected and observed avifauna species within the study area.

	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
1	**Abdim's Stork**	***Ciconia abdimii***	**NT**	**Medium**					
2	Acacia Pied Barbet	*Tricholaema leucomelas*	LC	Confirmed			x	x	
3	African Black Duck	*Anas sparsa*	LC	Confirmed	x				
4	African Black Swift	*Apus barbatus*	LC	Low					
5	African Crake	*Crecopsis egregia*	LC	Low					
6	African Cuckoo	*Cuculus gularis*	LC	Low					
7	African Cuckoo-Hawk	*Aviceda cuculoides*	LC	Low					
8	African Darter	*Anhinga rufa*	LC	Confirmed	x				
9	African Firefinch	*Lagonosticta rubricata*	LC	Confirmed	x				
10	African Fish Eagle	*Haliaeetus vocifer*	LC	Confirmed	x				
11	African Goshawk	*Accipiter tachiro*	LC	Medium					
12	African Green Pigeon	*Treron calvus*	LC	Low					
13	African Grey Hornbill	*Lophoceros nasutus*	LC	Confirmed			x	x	
14	African Harrier-Hawk	*Polyboroides typus*	LC	Confirmed	x			x	
15	African Hawk-eagle	*Aquila spilogaster*	LC	Medium					
16	African Hoopoe	*Upupa africana*	LC	Confirmed					x
17	African Jacana	*Actophilornis africanus*	LC	Confirmed	x				
18	**African Marsh Harrier**	***Circus ranivorus***	**EN**	**Low**					
19	African Olive Pigeon	*Columba arquatrix*	LC	Low					
20	African Palm Swift	*Cypsiurus parvus*	LC	Confirmed	x				
21	African Paradise Flycatcher	*Terpsiphone viridis*	LC	Medium					
22	African Pied Wagtail	*Motacilla aguimp*	LC	Medium					
23	African Pipit	*Anthus cinnamomeus*	LC	Medium					
24	African Pygmy Goose	*Nettapus auritus*	LC	Low					
25	African Pygmy Kingfisher	*Ispidina picta*	LC	Low					
26	African Rail	*Rallus caerulescens*	LC	Medium					
27	African Reed Warbler	*Acrocephalus baeticatus*	LC	Confirmed	x				

	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
28	African Sacred Ibis	*Threskiornis aethiopicus*	LC	Confirmed	x				
29	African Scops Owl	*Otus senegalensis*	LC	Confirmed			x		
30	African Snipe	*Gallinago nigripennis*	LC	Confirmed	x				
31	African Spoonbill	*Platalea alba*	LC	Medium					
32	African Stonechat	*Saxicola torquatus*	LC	High					
33	African Swamphen	*Porphyrio madagascariensis*	LC	Confirmed	x				
34	African Wattled Lapwing	*Vanellus senegallus*	LC	Confirmed					x
35	Alpine Swift	*Tachymarptis melba*	LC	Low					
36	Amethyst Sunbird	*Chalcomitra amethystina*	LC	Confirmed				x	
37	Amur Falcon	*Falco amurensis*	LC	Medium					
38	Ant-eating Chat	*Myrmecocichla formicivora*	LC	Medium					
39	Arrow-marked Babbler	*Turdoides jardineii*	LC	Confirmed	x	x			
40	Ashy Flycatcher	*Muscicapa caerulescens*	LC	Low					
41	Ashy Tit	*Melaniparus cinerascens*	LC	Medium					
42	Banded Martin	*Riparia cincta*	LC	Low					
43	Barn Swallow	*Hirundo rustica*	LC	Confirmed	x				
44	Barred Wren-Warbler	*Calamonastes fasciolatus*	LC	Medium					
45	Bar-throated Apalis	*Apalis thoracica*	LC	Medium					
46	Bearded Woodpecker	*Chloropicus namaquus*	LC	Confirmed				x	
47	Bennett's Woodpecker	*Campethera bennettii*	LC	Low					
48	Black Crake	*Zapornia flavirostra*	LC	Confirmed	x				
49	Black Cuckoo	*Cuculus clamosus*	LC	Medium					
50	Black Cuckooshrike	*Campephaga flava*	LC	Medium					
51	Black Heron	*Egretta ardesiaca*	LC	Medium					
52	Black Kite	*Milvus migrans*	LC	Low					
53	Black Sparrowhawk	*Accipiter melanoleucus*	LC	Medium					
54	**Black Stork**	***Ciconia nigra***	**VU**	**Low**					
55	Black-backed Puffback	*Dryoscopus cubla*	LC	Confirmed		x	x	x	
56	Black-chested Prinia	*Prinia flavicans*	LC	Confirmed	x				
57	Black-chested Snake Eagle	*Circaetus pectoralis*	LC	Medium					

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	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
58	Black-collared Barbet	*Lybius torquatus*	LC	Confirmed		x		x	
59	Black-crowned Night Heron	*Nycticorax nycticorax*	LC	Medium					
60	Black-crowned Tchagra	*Tchagra senegalus*	LC	Medium					
61	Black-faced Waxbill	*Brunhilda erythronotos*	LC	Medium					
62	Black-headed Heron	*Ardea melanocephala*	LC	Confirmed	x				
63	Black-headed Oriole	*Oriolus larvatus*	LC	Confirmed				x	
64	Blacksmith Lapwing	*Vanellus armatus*	LC	Confirmed	x				x
65	Black-throated Canary	*Crithagra atrogularis*	LC	Confirmed	x				
66	Black-winged Kite	*Elanus caeruleus*	LC	Confirmed					x
67	Black-winged Pratincole	*Glareola nordmanni*	LC	Low					
68	Black-winged Stilt	*Himantopus himantopus*	LC	Confirmed	x				
69	Blue Waxbill	*Uraeginthus angolensis*	LC	Confirmed	x		x	x	
70	Blue-billed Teal	*Spatula hottentota*	LC	Low					
71	Blue-cheeked Bee-eater	*Merops persicus*	LC	Low					
72	Bronze Mannikin	*Spermestes cucullata*	LC	Confirmed	x				x
73	Brown Snake Eagle	*Circaetus cinereus*	LC	Medium					
74	Brown-backed Honeybird	*Prodotiscus regulus*	LC	Low					
75	Brown-crowned Tchagra	*Tchagra australis*	LC	Confirmed				x	
76	Brown-hooded Kingfisher	*Halcyon albiventris*	LC	Medium					
77	Brown-throated Martin	*Riparia paludicola*	LC	Medium					
78	Brubru	*Nilaus afer*	LC	Medium					
79	Buffy Pipit	*Anthus vaalensis*	LC	Low					
80	Burchell's Coucal	*Centropus burchellii*	LC	Confirmed	x				
81	Burchell's Starling	*Lamprotornis australis*	LC	Confirmed		x	x	x	
82	Burnt-necked Eremomela	*Eremomela usticollis*	LC	Medium					
83	Bushveld Pipit	*Anthus caffer*	LC	Medium					
84	Cape Longclaw	*Macronyx capensis*	LC	Confirmed					x
85	Cape Penduline Tit	*Anthoscopus minutus*	LC	Low					
86	Cape Robin-Chat	*Cossypha caffra*	LC	High					
87	Cape Shoveler	*Spatula smithii*	LC	Confirmed	x				

	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
88	Cape Sparrow	*Passer melanurus*	LC	Confirmed			x	x	x
89	Cape Starling	*Lamprotornis nitens*	LC	Confirmed		x	x	x	
90	Cape Teal	*Anas capensis*	LC	Confirmed	x				
91	Cape Turtle Dove	*Streptopelia capicola*	LC	Confirmed	x	x	x	x	x
92	**Cape Vulture**	***Gyps coprotheres***	**EN**	**Medium**					
93	Cape Wagtail	*Motacilla capensis*	LC	Confirmed	x				
94	Cape Weaver	*Ploceus capensis*	LC	Low					
95	Cape White-eye	*Zosterops virens*	LC	High					
96	Capped Wheatear	*Oenanthe pileata*	LC	Medium					
97	Cardinal Woodpecker	*Dendropicos fuscescens*	LC	Confirmed			x		
98	Chestnut-backed Sparrow-Lark	*Eremopterix leucotis*	LC	Medium					
99	Chestnut-vented Warbler	*Curruca subcoerulea*	LC	Confirmed		x			
100	Chinspot Batis	*Batis molitor*	LC	High					
101	Cinnamon-breasted Bunting	*Emberiza tahapisi*	LC	Medium					
102	Cloud Cisticola	*Cisticola textrix*	LC	Low					
103	Common Buttonquail	*Turnix sylvaticus*	LC	Medium					
104	Common Buzzard	*Buteo buteo*	LC	Medium					
105	Common Greenshank	*Tringa nebularia*	LC	Medium					
106	Common House Martin	*Delichon urbicum*	LC	Low					
107	Common Moorhen	*Gallinula chloropus*	LC	Confirmed	x				
108	Common Myna	*Acridotheres tristis*	LC	Confirmed					x
109	Common Ostrich	*Struthio camelus*	LC	Low					
110	Common Quail	*Coturnix coturnix*	LC	Low					
111	Common Sandpiper	*Actitis hypoleucos*	LC	Medium					
112	Common Scimitarbill	*Rhinopomastus cyanomelas*	LC	Confirmed		x			
113	Common Waxbill	*Estrilda astrild*	LC	Confirmed	x	x			x
114	Coqui Francolin	*Peliperdix coqui*	LC	Medium					
115	Crested Barbet	*Trachyphonus vaillantii*	LC	High					
116	Crested Francolin	*Dendroperdix sephaena*	LC	Confirmed	x	x	x	x	x
117	Crimson-breasted Shrike	*Laniarius atrococcineus*	LC	Medium					

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	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
118	Crowned Lapwing	*Vanellus coronatus*	LC	Confirmed	x				x
119	Cut-throat Finch	*Amadina fasciata*	LC	Medium					
120	Dark-capped Bulbul	*Pycnonotus tricolor*	LC	Confirmed	x	x	x	x	x
121	Desert Cisticola	*Cisticola aridulus*	LC	Medium					
122	Diederik Cuckoo	*Chrysococcyx caprius*	LC	Confirmed				x	
123	Double-banded Sandgrouse	*Pterocles bicinctus*	LC	Low					
124	Dusky Indigobird	*Vidua funerea*	LC	Confirmed	x				
125	Dwarf Bittern	*Ixobrychus sturmii*	LC	Confirmed	x				
126	Egyptian Goose	*Alopochen aegyptiaca*	LC	Confirmed	x				
127	Emerald-spotted Wood Dove	*Turtur chalcospilos*	LC	Medium					
128	Eurasian Hobby	*Falco subbuteo*	LC	Low					
129	European Bee-eater	*Merops apiaster*	LC	Medium					
130	**European Roller**	***Coracias garrulus***	**NT**	**High**					
131	Familiar Chat	*Oenanthe familiaris*	LC	Medium					
132	Fawn-colored Lark	*Calendulauda africanoides*	LC	Low					
133	Fiery-necked Nightjar	*Caprimulgus pectoralis*	LC	Medium					
134	Fiscal Flycatcher	*Melaenornis silens*	LC	Confirmed		x			x
135	Flappet Lark	*Mirafra rufocinnamomea*	LC	Low					
136	Fork-tailed Drongo	*Dicrurus adsimilis*	LC	Confirmed		x	x	x	x
137	Freckled Nightjar	*Caprimulgus tristigma*	LC	Confirmed			x		
138	Fulvous Whistling Duck	*Dendrocygna bicolor*	LC	Low					
139	Gabar Goshawk	*Micronisus gabar*	LC	Medium					
140	Garden Warbler	*Sylvia borin*	LC	Low					
141	Giant Kingfisher	*Megaceryle maxima*	LC	Confirmed	x				
142	Glossy Ibis	*Plegadis falcinellus*	LC	Confirmed					x
143	Golden-breasted Bunting	*Emberiza flaviventris*	LC	Medium					
144	Golden-tailed Woodpecker	*Campethera abingoni*	LC	Medium					
145	Goliath Heron	*Ardea goliath*	LC	Medium					
146	Great Crested Grebe	*Podiceps cristatus*	LC	Low					
147	Great Egret	*Ardea alba*	LC	Confirmed	x				x

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	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
148	Great Reed Warbler	*Acrocephalus arundinaceus*	LC	Low					
149	Great Sparrow	*Passer motitensis*	LC	Medium					
150	Greater Double-collared Sunbird	*Cinnyris afer*	LC	Confirmed				x	
151	**Greater Flamingo**	***Phoenicopterus roseus***	**NT**	**Low**					
152	Greater Honeyguide	*Indicator indicator*	LC	Confirmed			x		
153	Greater Kestrel	*Falco rupicoloides*	LC	Medium					
154	**Greater Painted-snipe**	***Rostratula benghalensis***	**NT**	**High**					
155	Greater Striped Swallow	*Cecropis cucullata*	LC	Medium					
156	Green Wood Hoopoe	*Phoeniculus purpureus*	LC	Confirmed		x	x		
157	Green-capped Eremomela	*Eremomela scotops*	LC	Low					
158	Green-winged Pytilia	*Pytilia melba*	LC	Confirmed	x				
159	Grey Go-away-bird	*Crinifer concolor*	LC	Confirmed		x	x	x	x
160	Grey Heron	*Ardea cinerea*	LC	Confirmed	x				
161	Grey Penduline Tit	*Anthoscopus caroli*	LC	Low					
162	Grey Tit-Flycatcher	*Myioparus plumbeus*	LC	Low					
163	Grey-backed Camaroptera	*Camaroptera brevicaudata*	LC	Confirmed			x		
164	Grey-headed Bushshrike	*Malaconotus blanchoti*	LC	Confirmed		x			
165	Grey-headed Gull	*Chroicocephalus cirrocephalus*	LC	Low					
166	Grey-headed Kingfisher	*Halcyon leucocephala*	LC	Low					
167	Groundscraper Thrush	*Turdus litsitsirupa*	LC	Confirmed					x
168	Hadada Ibis	*Bostrychia hagedash*	LC	Confirmed	x				x
169	Hamerkop	*Scopus umbretta*	LC	Confirmed	x				
170	Harlequin Quail	*Coturnix delegorguei*	LC	Low					
171	Helmeted Guineafowl	*Numida meleagris*	LC	Confirmed	x	x	x		x
172	Horus Swift	*Apus horus*	LC	Low					
173	House Sparrow	*Passer domesticus*	LC	Confirmed			x	x	x
174	Icterine Warbler	*Hippolais icterina*	LC	Low					
175	Intermediate Egret	*Ardea intermedia*	LC	Medium					
176	Jackal Buzzard	*Buteo rufofuscus*	LC	Medium					
177	Jacobin Cuckoo	*Clamator jacobinus*	LC	Medium					

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	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
178	Jameson's Firefinch	*Lagonosticta rhodopareia*	LC	Medium					
179	Kalahari Scrub Robin	*Cercotrichas paena*	LC	Medium					
180	Karoo Thrush	*Turdus smithi*	LC	Confirmed					x
181	Kittlitz's Plover	*Charadrius pecuarius*	LC	Medium					
182	Klaas's Cuckoo	*Chrysococcyx klaas*	LC	Medium					
183	Knob-billed Duck	*Sarkidiornis melanotos*	LC	Confirmed	x				
184	Kurrichane Thrush	*Turdus libonyana*	LC	High					
185	**Lanner Falcon**	***Falco biarmicus***	**VU**	**High**					
186	Laughing Dove	*Spilopelia senegalensis*	LC	Confirmed	x	x	x	x	x
187	Lazy Cisticola	*Cisticola aberrans*	LC	Medium					
188	Lesser Grey Shrike	*Lanius minor*	LC	Medium					
189	Lesser Honeyguide	*Indicator minor*	LC	Low					
190	Lesser Kestrel	*Falco naumanni*	LC	Low					
191	Lesser Masked-weaver	*Ploceus intermedius*	LC	Medium					
192	Lesser Striped Swallow	*Cecropis abyssinica*	LC	Confirmed	x				
193	Lesser Swamp Warbler	*Acrocephalus gracilirostris*	LC	Medium					
194	Levaillant's Cisticola	*Cisticola tinniens*	LC	Medium					
195	Levaillant's Cuckoo	*Clamator levaillantii*	LC	Medium					
196	Lilac-breasted Roller	*Coracias caudatus*	LC	Confirmed		x		x	
197	Little Bee-eater	*Merops pusillus*	LC	Confirmed			x		
198	Little Bittern	*Ixobrychus minutus*	LC	Low					
199	Little Egret	*Egretta garzetta*	LC	Confirmed	x				x
200	Little Grebe	*Tachybaptus ruficollis*	LC	Medium					
201	Little Rush Warbler	*Bradypterus baboecala*	LC	Medium					
202	Little Sparrowhawk	*Accipiter minullus*	LC	Medium					
203	Little Stint	*Calidris minuta*	LC	Low					
204	Little Swift	*Apus affinis*	LC	Confirmed	x				
205	Lizard Buzzard	*Kaupifalco monogrammicus*	LC	Medium					
206	Long-billed Crombec	*Sylvietta rufescens*	LC	Confirmed			x	x	
207	Long-crested Eagle	*Lophaetus occipitalis*	LC	Low					

	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
208	Long-tailed Paradise Whydah	*Vidua paradisaea*	LC	Confirmed				x	
209	Long-tailed Widowbird	*Euplectes progne*	LC	Confirmed	x				
210	**Maccoa Duck**	***Oxyura maccoa***	**NT**	**Low**					
211	Magpie Shrike	*Urolestes melanoleucus*	LC	Confirmed			x		
212	Malachite Kingfisher	*Corythornis cristatus*	LC	Confirmed	x				
213	Malachite Sunbird	*Nectarinia famosa*	LC	Low					
214	Mallard	*Anas platyrhynchos*	LC	Low					
215	**Marabou Stork**	***Leptoptilos crumenifer***	**NT**	**Medium**					
216	Marico Flycatcher	*Melaenornis mariquensis*	LC	Medium					
217	Marico Sunbird	*Cinnyris mariquensis*	LC	Medium					
218	Marsh Owl	*Asio capensis*	LC	Medium					
219	Marsh Sandpiper	*Tringa stagnatilis*	LC	Low					
220	Marsh Warbler	*Acrocephalus palustris*	LC	Confirmed	x				
221	**Martial Eagle**	***Polemaetus bellicosus***	**EN**	**Low**					
222	Meyer's Parrot	*Poicephalus meyeri*	LC	Low					
223	Mocking Cliff Chat	*Thamnolaea cinnamomeiventris*	LC	Medium					
224	Monotonous Lark	*Mirafra passerina*	LC	Low					
225	Mountain Wagtail	*Motacilla clara*	LC	Low					
226	Namaqua Dove	*Oena capensis*	LC	Confirmed					x
227	Natal Spurfowl	*Pternistis natalensis*	LC	Confirmed			x		x
228	Neddicky	*Cisticola fulvicapilla*	LC	Medium					
229	Nicholson's Pipit	*Anthus nicholsoni*	LC	Low					
230	Northern Black Korhaan	*Afrotis afraoides*	LC	Medium					
231	Olive-tree Warbler	*Hippolais olivetorum*	LC	Low					
232	Orange-breasted Bushshrike	*Chlorophoneus sulfureopectus*	LC	Medium					
233	Orange-breasted Waxbill	*Amandava subflava*	LC	Medium					
234	Pale Flycatcher	*Melaenornis pallidus*	LC	Medium					
235	Pearl-breasted Swallow	*Hirundo dimidiata*	LC	Medium					
236	Pearl-spotted Owlet	*Glaucidium perlatum*	LC	Confirmed		x			
237	Pied Avocet	*Recurvirostra avosetta*	LC	Low					

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238	Pied Crow	*Corvus albus*	LC	High					
239	Pied Kingfisher	*Ceryle rudis*	LC	Confirmed				x	x
240	Pin-tailed Whydah	*Vidua macroura*	LC	Medium					
241	Plain-backed Pipit	*Anthus leucophrys*	LC	Low					
242	Purple Heron	*Ardea purpurea*	LC	Medium					
243	Purple Indigobird	*Vidua purpurascens*	LC	Confirmed	x				
244	Purple Roller	*Coracias naevius*	LC	Medium					
245	Purple-crested Turaco	*Gallirex porphyreolophus*	LC	Low					
246	Quailfinch	*Ortygospiza atricollis*	LC	Medium					
247	Rattling Cisticola	*Cisticola chiniana*	LC	Confirmed					x
248	Red-backed Shrike	*Lanius collurio*	LC	Medium					
249	Red-billed Buffalo Weaver	*Bubalornis niger*	LC	Low					
250	Red-billed Firefinch	*Lagonosticta senegala*	LC	Medium					
251	Red-billed Oxpecker	*Buphagus erythrorynchus*	LC	Low					
252	Red-billed Quelea	*Quelea quelea*	LC	Confirmed					x
253	Red-billed Teal	*Anas erythrorhyncha*	LC	Medium					
254	Red-breasted Swallow	*Cecropis semirufa*	LC	Medium					
255	Red-capped Lark	*Calandrella cinerea*	LC	Medium					
256	Red-chested Cuckoo	*Cuculus solitarius*	LC	Medium					
257	Red-collared Widowbird	*Euplectes ardens*	LC	Confirmed	x				
258	Red-crested Korhaan	*Lophotis ruficrista*	LC	Medium					
259	Red-eyed Dove	*Streptopelia semitorquata*	LC	Confirmed	x		x		x
260	Red-faced Mousebird	*Urocolius indicus*	LC	Confirmed		x		x	x
261	Red-headed Finch	*Amadina erythrocephala*	LC	Low					
262	Red-headed Weaver	*Anaplectes rubriceps*	LC	Low					
263	Red-knobbed Coot	*Fulica cristata*	LC	Confirmed	x				
264	Red-throated Wryneck	*Jynx ruficollis*	LC	Low					
265	Red-winged Starling	*Onychognathus morio*	LC	Medium					
266	Reed Cormorant	*Microcarbo africanus*	LC	Confirmed	x				
267	Rock Dove	*Columba livia*	LC	Confirmed		x			

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	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
268	Rock Kestrel	*Falco rupicolus*	LC	Low					
269	Rock Martin	*Ptyonoprogne fuligula*	LC	Medium					
270	Ruff	*Calidris pugnax*	LC	Low					
271	Rufous-cheeked Nightjar	*Caprimulgus rufigena*	LC	Low					
272	Rufous-naped Lark	*Mirafra africana*	LC	Medium					
273	Sabota Lark	*Calendulauda sabota*	LC	Medium					
274	**Saddle-billed Stork**	***Ephippiorhynchus senegalensis***	**EN**	**Low**					
275	Scaly-feathered Weaver	*Sporopipes squamifrons*	LC	High					
276	Scarlet-chested Sunbird	*Chalcomitra senegalensis*	LC	Medium					
277	**Secretarybird**	***Sagittarius serpentarius***	**VU**	**Confirmed**					x
278	Sedge Warbler	*Acrocephalus schoenobaenus*	LC	Low					
279	Shaft-tailed Whydah	*Vidua regia*	LC	Medium					
280	Shelley's Francolin	*Scleroptila shelleyi*	LC	Medium					
281	Shikra	*Accipiter badius*	LC	Low					
282	Sombre Greenbul	*Andropadus importunus*	LC	Medium					
283	Southern Black Flycatcher	*Melaenornis pammelaina*	LC	Medium					
284	Southern Black Tit	*Melaniparus niger*	LC	Medium					
285	Southern Boubou	*Laniarius ferrugineus*	LC	Confirmed			x		
286	Southern Fiscal	*Lanius collaris*	LC	Confirmed			x		x
287	Southern Grey-headed Sparrow	*Passer diffusus*	LC	High					
288	Southern Masked Weaver	*Ploceus velatus*	LC	Confirmed	x				
289	Southern Pied Babbler	*Turdoides bicolor*	LC	Confirmed			x		
290	Southern Pochard	*Netta erythrophthalma*	LC	Low					
291	Southern Red Bishop	*Euplectes orix*	LC	Confirmed	x				
292	Southern Red-billed Hornbill	*Tockus rufirostris*	LC	Medium					
293	Southern White-crowned Shrike	*Eurocephalus anguitimens*	LC	Confirmed				x	
294	Southern White-faced Owl	*Ptilopsis granti*	LC	Medium					
295	Southern Yellow-billed Hornbill	*Tockus leucomelas*	LC	Confirmed			x		
296	Speckled Mousebird	*Colius striatus*	LC	High					
297	Speckled Pigeon	*Columba guinea*	LC	High					

	Common Name	Scientific Name	IUCN Status (Regional)	Probability of Occurrence	River/ Wetland	Koppie	Savanna	Woodland	Transformed agriculture
298	Spectacled Weaver	*Ploceus ocularis*	LC	Medium					
299	Spotted Eagle-Owl	*Bubo africanus*	LC	Confirmed			x		
300	Spotted Flycatcher	*Muscicapa striata*	LC	Medium					
301	Spotted Thick-knee	*Burhinus capensis*	LC	Confirmed					x
302	Spur-winged Goose	*Plectropterus gambensis*	LC	Confirmed	x				
303	Squacco Heron	*Ardeola ralloides*	LC	Medium					
304	Steppe Eagle	*Aquila nipalensis*	LC	Low					
305	Streaky-headed Seedeater	*Crithagra gularis*	LC	Medium					
306	Striated Heron	*Butorides striata*	LC	Medium					
307	Striped Kingfisher	*Halcyon chelicuti*	LC	Medium					
308	Striped Pipit	*Anthus lineiventris*	LC	Low					
309	Swainson's Spurfowl	*Pternistis swainsonii*	LC	Confirmed	x	x	x	x	x
310	Swee Waxbill	*Coccopygia melanotis*	LC	Low					
311	**Tawny Eagle**	***Aquila rapax***	**EN**	**Medium**					
312	Tawny-flanked Prinia	*Prinia subflava*	LC	Confirmed	x				
313	Temminck's Courser	*Cursorius temminckii*	LC	Confirmed					x
314	Terrestrial Brownbul	*Phyllastrephus terrestris*	LC	Medium					
315	Thick-billed Weaver	*Amblyospiza albifrons*	LC	Confirmed			x		
316	Three-banded Plover	*Charadrius tricollaris*	LC	Confirmed	x				
317	Tinkling Cisticola	*Cisticola rufilatus*	LC	Low					
318	**Verreaux's Eagle**	***Aquila verreauxii***	**VU**	**Low**					
319	Verreaux's Eagle-Owl	*Bubo lacteus*	LC	Confirmed					x
320	Village Indigobird	*Vidua chalybeata*	LC	Confirmed					x
321	Village Weaver	*Ploceus cucullatus*	LC	Confirmed	x				
322	Violet-backed Starling	*Cinnyricinclus leucogaster*	LC	Medium					
323	Violet-eared Waxbill	*Granatina granatina*	LC	Confirmed			x	x	
324	Wahlberg's Eagle	*Hieraaetus wahlbergi*	LC	Medium					
325	Wattled Starling	*Creatophora cinerea*	LC	Medium					
326	Western Barn Owl	*Tyto alba*	LC	Confirmed					x
327	Western Cattle Egret	*Bubulcus ibis*	LC	Confirmed					x

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328	Western Osprey	*Pandion haliaetus*	LC	Low					
329	Western Yellow Wagtail	*Motacilla flava*	LC	Low					
330	Whiskered Tern	*Chlidonias hybrida*	LC	Low					
331	White Stork	*Ciconia ciconia*	LC	Medium					
332	White-backed Duck	*Thalassornis leuconotus*	LC	Low					
333	**White-backed Vulture**	***Gyps africanus***	**CR**	**Low**					
334	White-bellied Sunbird	*Cinnyris talatala*	LC	Confirmed		x			
335	White-breasted Cormorant	*Phalacrocorax lucidus*	LC	Confirmed	x				
336	White-browed Scrub Robin	*Cercotrichas leucophrys*	LC	Confirmed		x			
337	White-browed Sparrow-Weaver	*Plocepasser mahali*	LC	High					
338	White-crested Helmetshrike	*Prionops plumatus*	LC	Confirmed			x		
339	White-faced Whistling Duck	*Dendrocygna viduata*	LC	Medium					
340	White-fronted Bee-eater	*Merops bullockoides*	LC	Confirmed		x			
341	White-rumped Swift	*Apus caffer*	LC	Medium					
342	White-throated Robin-Chat	*Cossypha humeralis*	LC	Medium					
343	White-throated Swallow	*Hirundo albigularis*	LC	Medium					
344	White-winged Tern	*Chlidonias leucopterus*	LC	Low					
345	White-winged Widowbird	*Euplectes albonotatus*	LC	Confirmed	x				
346	Willow Warbler	*Phylloscopus trochilus*	LC	Medium					
347	Wood Sandpiper	*Tringa glareola*	LC	Medium					
348	Woodland Kingfisher	*Halcyon senegalensis*	LC	Confirmed			x		
349	Yellow Canary	*Crithagra flaviventris*	LC	Low					
350	Yellow-bellied Eremomela	*Eremomela icteropygialis*	LC	Medium					
351	Yellow-bellied Greenbul	*Chlorocichla flaviventris*	LC	Low					
352	Yellow-billed Duck	*Anas undulata*	LC	Confirmed	x				
353	Yellow-billed Kite	*Milvus aegyptius*	LC	Medium					
354	**Yellow-billed Stork**	***Mycteria ibis***	**EN**	**Low**					
355	Yellow-breasted Apalis	*Apalis flavida*	LC	Medium					
356	Yellow-crowned Bishop	*Euplectes afer*	LC	Medium					
357	Yellow-fronted Canary	*Crithagra mozambica*	LC	Confirmed	x				

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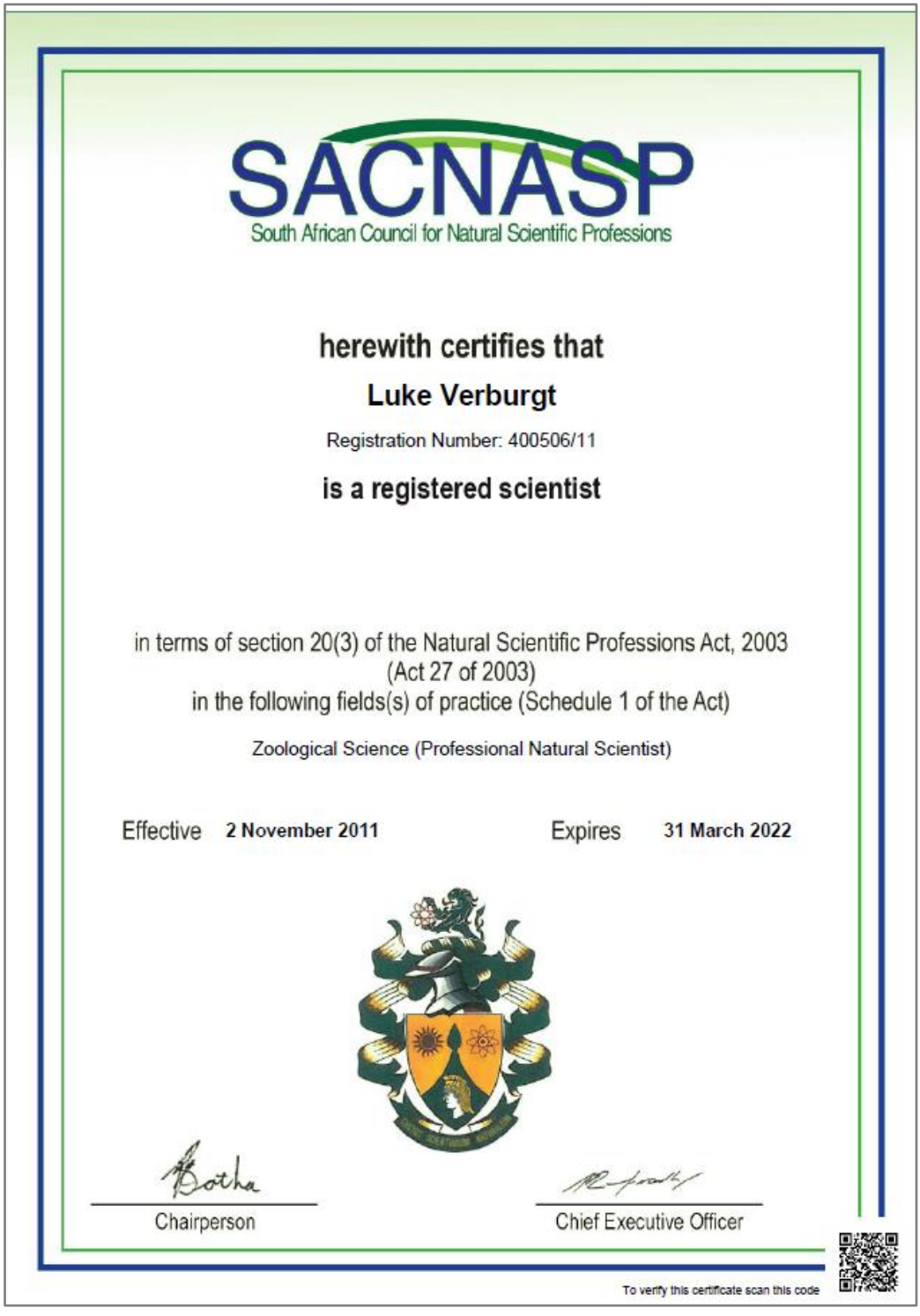
358	Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*	LC	High					
359	Yellow-throated Bush Sparrow	*Gymnoris superciliaris*	LC	Medium					
360	Zitting Cisticola	*Cisticola juncidis*	LC	Confirmed			x		

7 QUALIFICATIONS

7.1 LUKE VERBURGT



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Luke Verburgt

Registration Number: 400506/11

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Zoological Science (Professional Natural Scientist)

Effective **2 November 2011** Expires **31 March 2022**

Botha
Chairperson

Chief Executive Officer

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7.2 SAMUEL LAURENCE

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Samuel David Laurence

Registration number: 400450/13

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule I of the Act)

Zoological Science	20 November 2013
Ecological Science	20 November 2013

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President

Executive Director