

Summary of Avifauna Assessment for Phase 3

Reference:

Avifauna Final EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

SITE OVERVIEW

The site visit in March 2022 took place during the rainy season, which means some small manmade dams found within the study area, were filled with water. However, these small dams did show very low signs in terms of waterbird activities. The larger dam found about 1.3 km west outside of the project footprint, had the higher density of birds in terms of waterbodies, with species such as ducks, geese, stilts, stints, and plovers.

The seasonal wetland area permeates the project footprint, where water eventually flows into the big dam after heavy rains. The wetland area was an important attractant in the dry season where it represented the most productive foraging habitat within the project footprint during that time, especially for sensitive species occurring on site such as Blue Cranes and Black Storks.

There is an existing powerline running along the border of the southern section of the study area. The powerline did not have any signs of priority bird species nests but could lead to possible nesting in the future for species such as Martial Eagle or Verreaux's Eagle. Verreaux's Eagle activity was unusually high in the dry season. The species abundance was at its highest during and after the rainy season, as food resources increase more birds will fly in, including water associated bird species which will mostly be found at the larger dam west of the study area.

Platberg-Karoo Conservancy (SA037) Important Bird Area (IBA)

The proposed solar farm occurs in the Platberg-Karoo Conservancy (SA037) Important Bird and Biodiversity Area (IBA). The Platberg-Karoo Conservancy IBA covers c. 1240 000 ha and is located in the Northern Cape Province with a protected status of "Unprotected". The folding process has forged several large peaks and plateaus in this area. The IBA encompasses a continuous chain of mountains and includes several State forests, mountain catchment areas and provincial nature reserves. A total of 289 bird species have been recorded in the IBA during SABAP2. With regards to the conservation, the IBA contributes greatly to the large terrestrial bird and raptor species. The priority species includes Blue Crane (*Anthropoides paradiseus*), Ludwig's Bustard (*Neotis ludwigii*), Kori Bustard (*Ardeotis kori*), Blue Korhaan (*Eupodotis caerulescens*), Black Stork (*Ciconia nigra*), Secretarybird (*Sagittarius serpentarius*), Martial Eagle (*Polemaetus bellicosus*), Verreaux's Eagle (*Aquila verreauxii*) and Tawny Eagle (*Aquila rapax*).

Expected sensitive Avifauna species list

A total of 17 priority species are expected to occur within and surrounding the study area, of which 13 species are listed as threatened and near threatened. Thirteen (13) of the seventeen (17) expected avifauna sensitive species were confirmed within the Project Area of Influence (PAOI) (Phases 1 – 3) with ten (10) being listed as SCC.

Table 1: Priority avifauna species list expected and observed in the study area.

Common name	Taxonomic name	Status (RG/GB)	Southern African Endemic	POC
Bustard, Ludwig's	<i>Neotis ludwigii</i>	EN, EN		Confirmed

Common name	Taxonomic name	Status (RG/GB)	Southern African Endemic	POC
Buzzard, Jackal	<i>Buteo rufofuscus</i>	LC	Yes	Confirmed
Crane, Blue	<i>Anthropoides paradiseus</i>	NT, VU	Yes	Confirmed
Eagle, Booted	<i>Hieraaetus pennatus</i>	LC		Low
Eagle, Martial	<i>Polemaetus bellicosus</i>	EN, EN		Confirmed
Eagle, Tawny	<i>Aquila rapax</i>	EN, VU		Confirmed
Eagle, Verreaux's	<i>Aquila verreauxii</i>	VU, LC		Confirmed
Falcon, Lanner	<i>Falco biarmicus</i>	VU, LC		Confirmed
Goshawk, Pale Chanting	<i>Melierax canorus</i>	LC	Yes	Confirmed
Kestrel, Greater	<i>Falco rupicoloides</i>	LC		Confirmed
Kestrel, Lesser	<i>Falco naumanni</i>	LC/ NT		Confirmed
Korhaan, Blue	<i>Eupodotis caerulescens</i>	LC, NT		Moderate
Korhaan, Karoo	<i>Eupodotis vigorsii</i>	NT, LC	Yes	Confirmed
Korhaan, Northern Black	<i>Afrotis afraoides</i>	LC	Yes	Confirmed
Kori Bustard	<i>Ardeotis kori</i>	NT		Confirmed
Secretarybird	<i>Sagittarius serpentarius</i>	VU/ EN		Confirmed
Stork, Black	<i>Ciconia nigra</i>	VU, LC		Low

Observed Avifauna

84 bird species were observed within and around the Combined Project Area out of an expected total of 104 species, based on previous surveys, the SABAP Pentad analysis and habitat suitability, based on Probability of Occurrences.

The observed avian species richness and abundance is considered low to moderate for an area of this size in the South African context although the proportion of observations related to SCC was considered high, as was the overall SCC diversity. Many of the birds observed are generally considered to be common, widespread and adaptable species which were observed within their expected habitats.

Multiple nests of multiple raptor species were located within the project footprint with two SCC nests located within the combined project area. The Combined Project Area was confirmed to support resident and / or breeding populations of SCC.

Generally, small passerine flight activity was surprisingly low and flight paths mainly low, short and local with very few higher-flying commuting individuals observed. However, observations of medium to larger species, including large flocks of commuting waterfowl and cranes were observed, as were ground congregations of species such as Blue Cranes and Northern Black Korhaan. Abundances of powerline collision-prone species such as Ludwig's Bustard and Kori Bustard were moderate.

Notable Priority Species recorded during walked transects included **Blue Cranes, Verreaux's Eagle, Ludwig's Bustards** that were often flushed from foraging positions as well as numerous Northern Black Korhaans and Karoo Korhaans. Raptors and Korhaans were the most frequently recorded priority species during drive transects.

Due to its abundance and conservation status, the Blue Crane and Ludwig's Bustard is a priority species of concern since it may be prone impacts at certain times (e.g., when commuting between roosting and feeding sites, following rainfall events, invertebrate outbreaks (locusts) or commuting after farming activities which increase food availability).

Blue Cranes were observed throughout the study area but especially in association with drainage lines and artificial water points.

Ludwig's Bustards were in frequent in their observations and were mostly observed close to koppies, drainage lines, adjacent to roadsides and in adjacent livestock fields. Larger raptors persisted throughout the survey area but were often congregated near perching habitat (pylons).

Due to the high diversity and density of the above mentioned Red-Listed species recorded during the survey, (including regionally and globally listed Endangered and Vulnerable birds), the region as a whole is considered to be an area of very high avifaunal importance and activities should be managed in a holistic manner at a policy level, prioritising mitigation and monitoring of avifaunal species of conservation concern.

Nest sites

The most significant breeding habitat recorded during the survey were the active Verreaux's Eagle and Tawny Eagle nests. The nesting site is at this stage the highest sensitivity found within proximity of the study area. The nest is found just over 6km from the proposed study area. However, the proposed connecting powerline as per the layout of the study area falls within 1.9 km of the nest. The Tawny Eagle was last observed in September 2022 incubating eggs on the nest. Ludwig's Bustard and Secretary Birds are considered a resident and to be breeding on site although no nests were located.

In summary, the following key findings include:

- A high richness of Red-Listed and species of conservation concern occur within the study areas;
- A total of six SCC were confirmed to be present in the study areas out of 17 possible species with nine being highly likely in total; and
- High frequency of observations for the Vulnerable Verreaux's Eagle, the Near Threatened Blue Crane and Karoo Korhaan as well as the Endangered Ludwig's Bustard.

IMPACTS

Typical potential impacts include (but are not necessarily limited to):

- Habitat loss (including foraging and breeding) and fragmentation due to displacement (avoidance of disturbance). Habitat loss has the tendency to not only destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.
- Collision and electrocution with above-ground power transmission lines. In some cases, collision can be associated with polarised light pollution and waterbird species mistaking large PV panels areas as wetlands or other waterbodies, a case known as the "lake effect" (as per Jenkins et al. 2017). The mitigation of these impacts will be addressed in the final EIA report with operational phase monitoring to be designed in the EMP.

- Disturbance due to noise such as, machinery movements and maintenance operations during the construction and operational phase of the proposed PV solar farm.
- The attraction of some novel bird species due to the development of a solar farm with associated infrastructure such as perches, nest and shade opportunities
- Chemical pollution: Chemicals being used to keep the PV panels clean from dust (suppressants) etc.

Cumulative Impacts

There are a number of existing renewable energy projects (both solar and WEFs) that already have quantified negative impacts on the avifauna community in the region. Therefore, any impacts anticipated from the proposed solar facility will add to these existing impacts and require assessment under a Cumulative Impacts assessment.

Results obtained during this preconstruction survey and from the subsequent impact analysis should be considered in conjunction with the impacts created by the proposed development. The current developments within the region raise the possibility of significant cumulative impacts, especially concerning collision risk, habitat loss and fragmentation and loss of suitable habitat for threatened species.

The following current impacts will be exacerbated through increased solar developments regionally;

- Habitat loss: The destruction of highly sensitive habitat (for example drainage line habitats for Blue Cranes) will potentially increase. Many SCC exist within a narrow ecological and distributional belt and loss of its ecologically specific habitat may be highly significant.
- Road-kills: Many birds are commonly killed on roads and flushed into fences associated with the facility (e.g., Karoo Korhaan).
- Regional saturation of solar facilities: This has implications for several priority species, both in terms of lake effect, collision mortality from additional powerline infrastructure (see below) for some species, especially Bustards and Raptors, and displacement due to transformation of habitats
- Powerlines: Numerous existing and new power lines are significant threats to large terrestrial priority species in the region as powerlines may kill significant numbers of all large terrestrial bird species.

MITIGATION MEASURES

Management Category: Layout and Design – access road alignment

Impact:

Habitat loss and fragmentation due to displacement because of infrastructure installation (roads, fences, and sub surface pipes).

Consequences:

Destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.

Assumption:

Reference:

Avifauna Final EIA report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

Mitigation:

As far as possible utilize or upgrade existing farm roads as opposed to constructing new roads in undisturbed areas.

Where possible, avoid the construction of new roads in avifaunal-specific highly sensitive areas and their associated buffers, such as nesting or roosting sites (1 km), flood plains, watercourses (e.g., drainage lines and wetlands), large impoundments, borehole pans and rocky kopjes.

Management Outcome:

Sensitive avifauna habitats are protected and maintained.

Management Category: Linear Infrastructure Crossings - Underground Pipelines

Impact:

Habitat loss and fragmentation of watercourse areas due to displacement because of infrastructure installation (panels, powerlines, roads, fences and sub surface cables).

Consequences:

Destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.

Reference:

Avifauna Final EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

Assumption:

Mitigation:

All underground pipelines bisecting sensitive habitats must be placed below the subsurface flow of the ephemeral wetlands with the linear construction pits subjected to full rehabilitation to maintain normal subsurface flow.

All pipeline crossings must be engineered not to impede surface or subsurface flow in any way.

Schedule pipeline construction during the season least damaging to the stream or wetland system (e.g., dry season).

All pipeline corridors should be implemented to a maximum width of 5 metres through wetlands during construction.

During construction, laydown areas must be a minimum of 35 metres from the wetland edge.

Construction equipment used while working in wetlands is limited to only those pieces that are essential and non-essential equipment is allowed to travel through wetlands only once during deployment and once during extraction.

During vegetation clearing, sediment barriers such as silt fences must be installed and maintained adjacent to wetlands.

The method of pipeline construction used in wetlands depends on the stability of the soils. Overall, topsoil is first removed and stored separately from the subsoil as well as topsoil from adjacent terrestrial habitats. All topsoil harvesting must take place in the dry season (late dry season). Where wetland soils are saturated, segregating topsoil is not possible. Large timber mats placed ahead of the construction equipment can provide a stable working platform and protect wetland soils by spreading the weight of the construction equipment over a broad area.

If topsoil is segregated from subsoil, then subsoil is backfilled first. The trench is backfilled to the proper grade to maintain wetland hydrology and grades are restored to the original elevation.

Management Outcome:

Sensitive avifauna habitats are protected and maintained.

Management Category: Linear Infrastructure Crossings - Roads

Impact:

Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines).

Consequences:

Destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.

Reference:

Avifauna Final EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

Assumption:

Mitigation:

As far as possible utilize or upgrade existing farm roads as opposed to constructing new roads in undisturbed areas.

All road crossings must be engineered not to impede surface or subsurface flow in any way.

Schedule road construction during the season least damaging to the stream or wetland system (e.g., dry season).

Limit or restrict the construction of fill roads. All fill roads must use a permeable fill material (such as gravel or crushed rock) for at least the first layer of fill to maintain the natural flow regimes of subsurface water.

It is preferable to eliminate fill roads and utilise raised bridges and culverts with adequate sizing and spacing of water crossing structures, proper choice of the type of crossing structure, and installation of drainage structures at a depth adequate to pass subsurface flow.

During construction, laydown areas must be a minimum of 35 metres from the wetland edge.

Construction equipment used while working in wetlands is limited to only those pieces that are essential and non-essential equipment is allowed to travel through wetlands only once during deployment and once during extraction.

During vegetation clearing, sediment barriers such as silt fences must be installed and maintained adjacent to wetlands.

Overall, topsoil is first removed and stored separately from the subsoil as well as topsoil from adjacent terrestrial habitats. All topsoil harvesting must take place in the dry season (late dry season). Where wetland soils are saturated, segregating topsoil is not possible. Large timber mats placed ahead of the construction equipment can provide a stable working platform and protect wetland soils by

spreading the weight of the construction equipment over a broad area.

Management Outcome:

Sensitive avifauna habitats are protected and maintained.

Management Category: Construction – timing

Impact:

Disturbance to breeding or destruction of bird nesting sites and roosts.

Consequences: Decrease in avifauna population due to loss of offspring/breeding pairs for generation

Reference:

Avifauna Final EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

Assumption:

Bird nesting sites and roosts varied from artificial structures such as pylons and windmills to some trees. Infrastructure development can cause the destruction or disturbance of such nests and roosts.

Mitigation:

As far as possible, limit construction within sensitive flood plains, watercourses and associated buffers to May, June, July, and August to avoid breeding periods of Avian species.

If work is to be undertaken in the vicinity of nests or roosts of species of conservation concern the scheduling of work must be planned outside of the breeding season of the nesting bird; construction of that portion of the preferred Alternative Route No. 1 that is within the 1.5 km buffer of the Verreaux Eagle's nest must be completed outside its breeding season, which is from April to July, and preferably August as well.

Except for the designated staging area and construction camp, all other construction activities are restricted to within the fenced road servitude and pipeline corridor.

Drivers must adhere to the speed limit (30 or 40 km/hr).

Construction plant, machinery and equipment must be regularly serviced and well maintained to reduce noise levels.

Keep noise levels as low as practically possible when working, e.g., no unnecessary shouting, loud music or revving of engines.

Management Outcome:

Bird roosts and nests are not disturbed.

Management Category: Construction plant management (noise)

Impact:

Disturbance (including of nesting SCC) due to noise, such as machinery movements and maintenance operations, causing active mammals and birds to temporarily evade or emigrate from the area.

Consequence:

Forced redistribution out of home ranges or territories can cause stress and conflict, leading to injury or death of individuals (indirect), and

Decrease in avifauna population due to loss of offspring/breeding pairs for generation.

Reference:

Avifauna EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

Assumption:

Mitigation:

Drivers must adhere to the speed limit (30 km/hr).

Construction plant, machinery and equipment must be regularly serviced and well maintained to reduce noise levels.

Keep noise levels as low as practically possible when working, e.g., no unnecessary shouting, loud music or revving of engines.

Management Outcome:

Bird roosts and nests are not disturbed.

Management Category:

Layout and Design – Installing perimeter fence.

Construction – Plant Management (driving)

Impact:

Bird mortalities during the operational phase due to vehicle collisions (directly) or vulnerable species foraging on verge side vegetation and passing vehicles causing subsequent fence collisions and/or entanglement (indirect).

Consequence:

Decrease in avifauna population.

The loss of threatened (Red Data) species may result in a loss of biodiversity and ecosystem resilience to climate change (direct), and

The loss of threatened keystone species may alter the functioning of an ecosystem (direct)

Reference:

Avifauna Specialist Assessment (Final) prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.

Assumption:

Impacts due to bird mortalities during the operational phase are practically unavoidable for any large facility, but with the appropriate mitigation measures these impacts can be minimised. It is likely that most of the avifaunal populations will be largely displaced from the majority of the project infrastructure, although significant risks are associated with the likelihood of project vehicles flushing birds into fencing infrastructure as well as collisions of large bodied species with powerlines. Although the current overall bird activity qualifies the proposed solar development boundary as a high-density area, there are certain times of the year (and day) when it appears that large flocks of birds (such as cranes bustards and large birds of prey) are far more prevalent.

Significant risks are associated with the likelihood of project vehicles flushing birds into fencing infrastructure. However, the servitude fence will be a low cattle fence not unlike the existing servitude and farm boundary fences within the area, typically 1.2 m high. Consequently, no mitigation, such as defined fence line setbacks from the shoulder of the access road and side/cut-off drain is required to limit any chance of fence collisions and/or entanglement.

Mitigation:

A log should be kept detailing all fauna-related incidences or mortalities that occur on site, including roadkill, fence collisions etc. during construction.

Except for the designated staging area and construction camp, all other construction activities are restricted to within the fenced road servitude.

Drivers must adhere to the speed limit (30 km/hr).

Drivers must be vigilant, that is on the lookout for animals and birds, and slow down when approaching animals or birds. This is to be included in the induction.

Management Outcome:

Minimal bird mortalities recorded.

Post Construction Rehabilitation of watercourse crossings

- A rehabilitation plan must be commissioned before construction commences.
- All topsoil harvesting must take place in the dry season (late dry season).
- Returning the wetlands to their original grade must take place as minor differences in the final surface elevation can produce significant impacts on the type of vegetation that re-establishes itself (alien invasive species).
- When topsoil is salvaged and returned, it is anticipated without reseeding so that dense vegetative communities of native species can regenerate within two growing seasons.
- As emergent wetlands will recover more quickly than others, artificial seeding is not advised as it creates competition for reestablishment of native facultative and obligate wetland vegetation.

Assumptions

Owing to the heavy rain occurring during the reconnaissance site visit in March 2022, certain areas of the property were not accessible.

Reasoned Opinion

Overall, the author sees no reason why an Environmental Authorisation (EA) should not be granted on the following conditions:

- All recommended buffering be strictly adhered to.
- All recommended mitigation measures be applied preconstruction, post construction and operations.