



BIODIVERSITY ASSESSMENT VERDOORST KOLK

NORTHERN CAPE PROVINCE

August 2017

REFERENCE

Verdoorst Kolk

CLIENT

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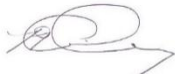

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Report Name	BIODIVERSITY ASSESSMENT VERDOORST KOLK	
Reference	Verdoorst Kolk	
Submitted to	Cabanga	
Report writer	Peter Kimberg	
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EXECUTIVE SUMMARY

The Biodiversity Company (TBC) was appointed by Cabanga Environmental to conduct a specialist biodiversity baseline assessment and impact study for a Prospecting Right Application (PRA) in the Northern Cape.

The client will be applying to prospect Gypsum, which will involve auger drilling on RE, Ptns 1 & 2 Verdoorst Kolk No. 342 Kenhardt Rd, near Brandvlei, Northern Cape. This report comprises the biodiversity baseline and impact assessment study for the activities associated with the prospecting activities.

The following conclusions were reached based on the results of the desktop assessment:

- No plant species of conservation concern are expected to occur in the project area;
- Of the 87 expected bird species:
 - Two (2) species that are listed as Endangered (EN) on a regional basis;
 - Two (2) species that is listed as Vulnerable (VU) on a regional basis;
 - Six (6) species that are listed as Near Threatened (NT) on a regional basis;
 - On a global scale, 1 species is listed as EN, 2 and VU and 3 as NT;
 - Of the 9 bird species of conservation concern, 7 are rated as having a high likelihood of occurrence and 2 as low;
- Of the 46 expected mammal species, 3 (6.5%) are listed as species of conservation concern either regionally or globally;
- The list of potential mammal species includes 1 species that is listed as CR, 1 as VU and 1 as NT on a regional scale. On a global scale, 1 species is listed as CR and 1 as VU;
- Of the 3 mammal species of conservation concern, 2 are rated as moderate to highly likely to occur in the project area;

The following conclusions were reached based on the results of the field survey:

- Vegetation cover within the prospecting focus area was sparse and diversity low;
- No plant species of conservation concern were recorded during the survey;
- Overall bird species diversity was low. This was attributed to the short duration of the survey;
- Mammal diversity was low. This was attributed to the short duration of the survey and the lack of intensive sampling, trapping etc.;
- No mammal species of conservation concern were observed during the survey however Brown Hyaena (*Parahyaena brunnea*) was confirmed to be present in the project area based on conversations with a local landowner;



Potential impacts associated with proposed prospecting activities were identified. These included:

- Introduction and establishment of invasive plant species; and
- Loss and/or displacement of faunal species of conservation concern.

The significance of potential impacts on faunal species of conservation concern were rated as major – negative prior to implementation of mitigation. Post-mitigation the significance of impacts was reduced to moderate - negative and minor – negative respectively;

The significance of the potential impact of the introduction and establishment of alien invasive plant species was rated as moderate – negative prior to mitigation and minor – negative post-mitigation.

An impact statement is required as per the NEMA regulations with regards to the proposed development. Considering the above-mentioned conclusions, it is the opinion of the specialist that the project be favourably considered but that mitigation measures should be strictly adhered to.



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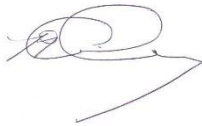
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DECLARATION

I, Peter Karl Kimberg declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Peter Kimberg

B. Sc. Honours Zoology

The Biodiversity Company

6th July 2017



1 INTRODUCTION

The Biodiversity Company (TBC) was appointed by Cabanga Environmental to conduct a specialist biodiversity baseline assessment and impact study for a Prospecting Right Application (PRA) in the Northern Cape.

The client will be applying to prospect Gypsum, which will involve auger drilling on RE, Ptns 1 & 2 Verdoorst Kolk No. 342 Kenhardt Rd, near Brandvlei, Northern Cape. This report comprises the biodiversity baseline and impact assessment study for the activities associated with the prospecting activities.

This report, after taking into consideration the findings and recommendation provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed prospecting.

1.1 Terms of Reference

The aim of the study was to undertake and compile a biodiversity baseline and impact assessment for the proposed prospecting activities.

2 LIMITATIONS

The following limitation should be noted for the study:

- Due to the limited proposed project footprint (auger drilling) intensive sampling and trapping was not implemented for this study; and
- The field survey focussed primarily on the prospecting focus area.

3 KEY LEGISLATIVE REQUIREMENTS

The following legal framework and requirements apply to the study:

- The National Environmental Management: Biodiversity Act (NEM:BA) No. 10 of 2004: specifically, the management and conservation of biological diversity within the RSA and of the components of such biological diversity.
- 2016 Northern Cape Critical Biodiversity Areas

4 PROJECT AREA

The project area is situated in the Northern Cape Province, between Kenhardt and Brandvlei (Figure 1). The site is situated in the Nama Karoo ecoregion, Orange Water Management Area (WMA_06) and the Nama Karoo biome. The entire project area is situated in Quarter Degree Squares (QDS) 3020AB. The Verdoorst Kolk project area is 8145 hectares in size, with the prospecting focus area 1063 hectares in size (Figure 2).



The Nama Karoo is a large, landlocked region on the central plateau of the western half of South Africa and extends into southeastern Namibia (Mucina & Rutherford, 2006).

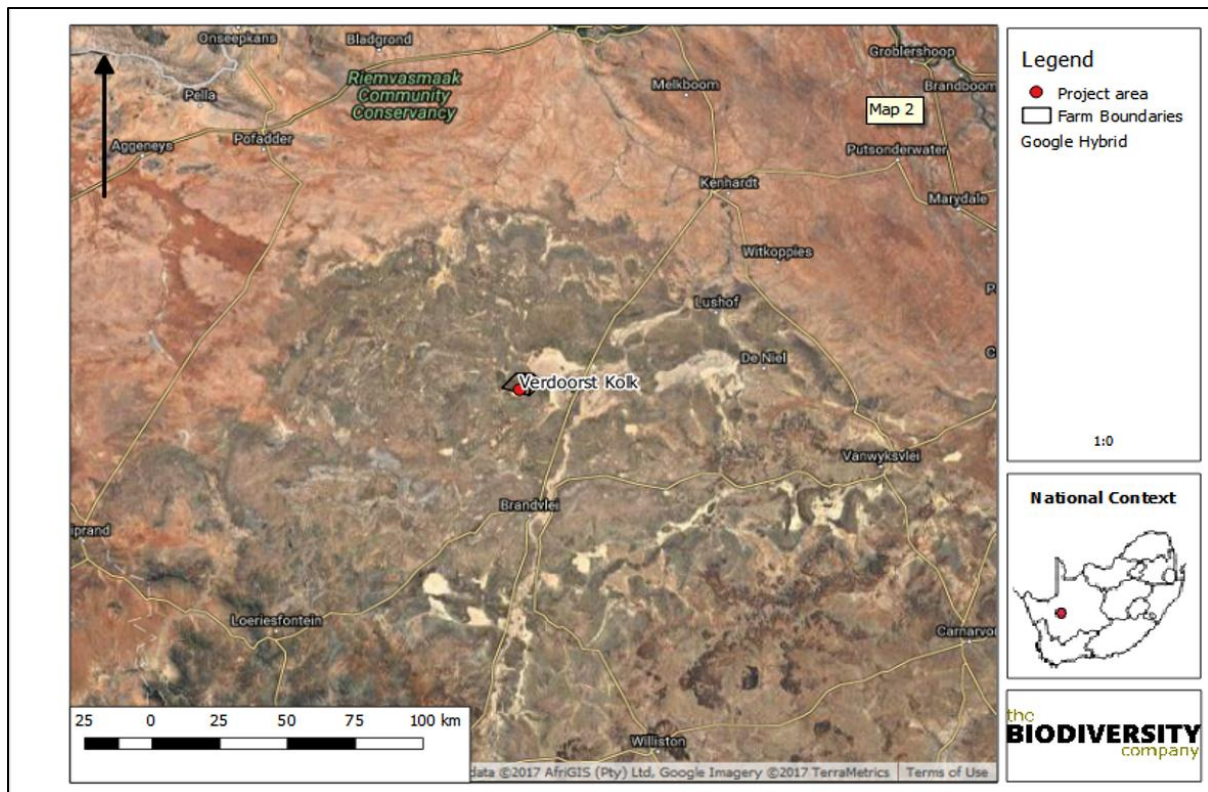


Figure 1: The location of the proposed Verdoorst Kolk prospecting right area between Kenhardt and Brandvlei in the Northern Cape Province



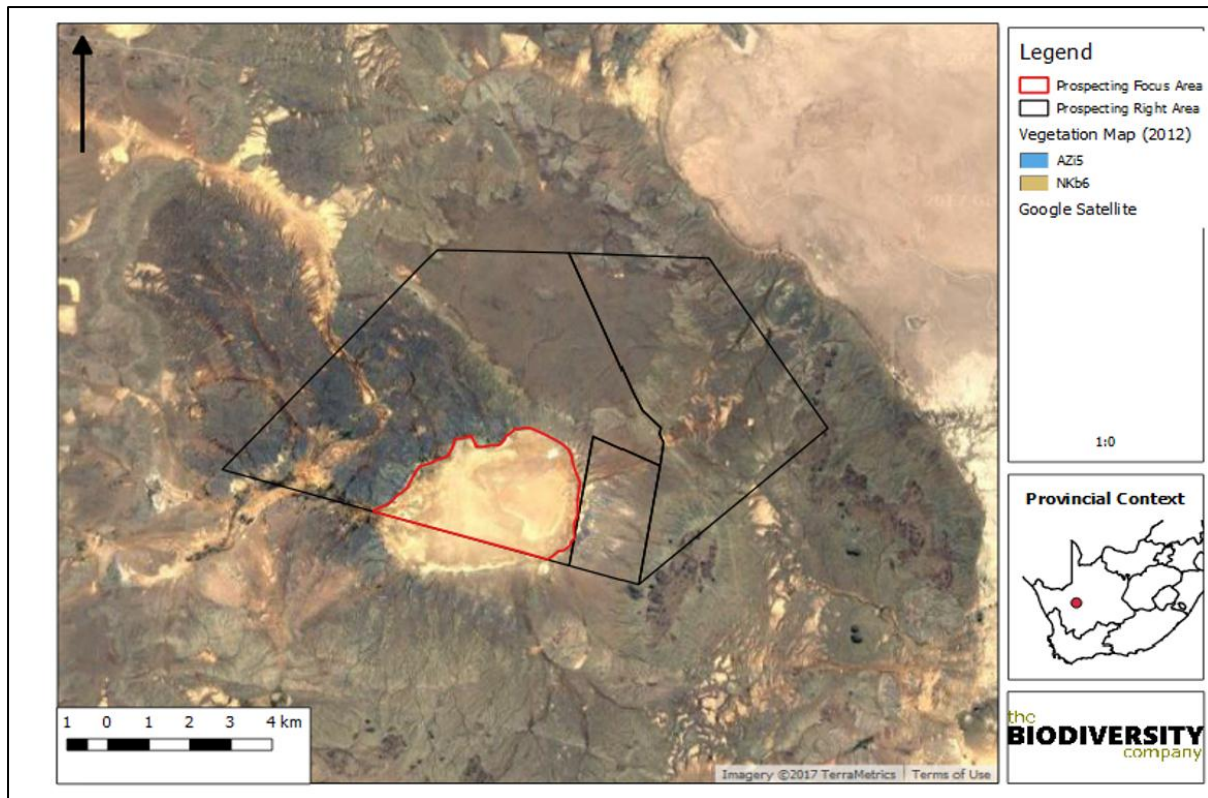


Figure 2: Verdoorst Kolk project area showing the prospecting right area as well as the prospecting focus area

4.1 Northern Cape Critical Biodiversity Areas 2016

The Northern Cape CBA Map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

Figure 3 shows the location of the Verdoorst Kolk project area in relation to terrestrial CBAs. The prospecting focus area at Verdoorst Kolk overlaps with a CBA one (Figure 3).

Figure 4 shows the location of the Verdoorst Kolk prospecting right area with a 500 m buffer radius, in relation to aquatic CBAs and ESAs. Based on this assessment there are no aquatic CBAs or ESAs within the project area or within 500 m of the project right area boundary.



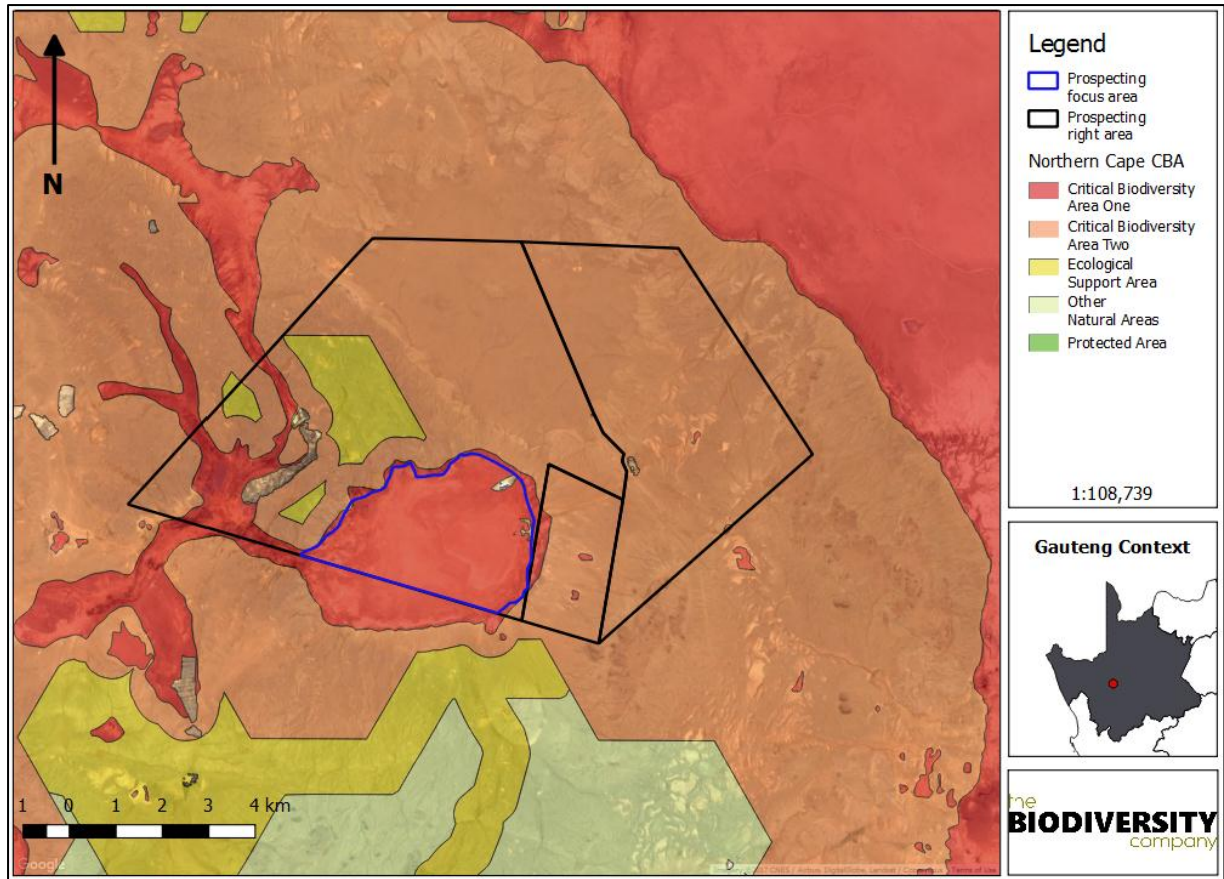


Figure 3: Terrestrial CBA map showing the location of CBA and ESA areas in relation to the Verdoorst Kolk project area

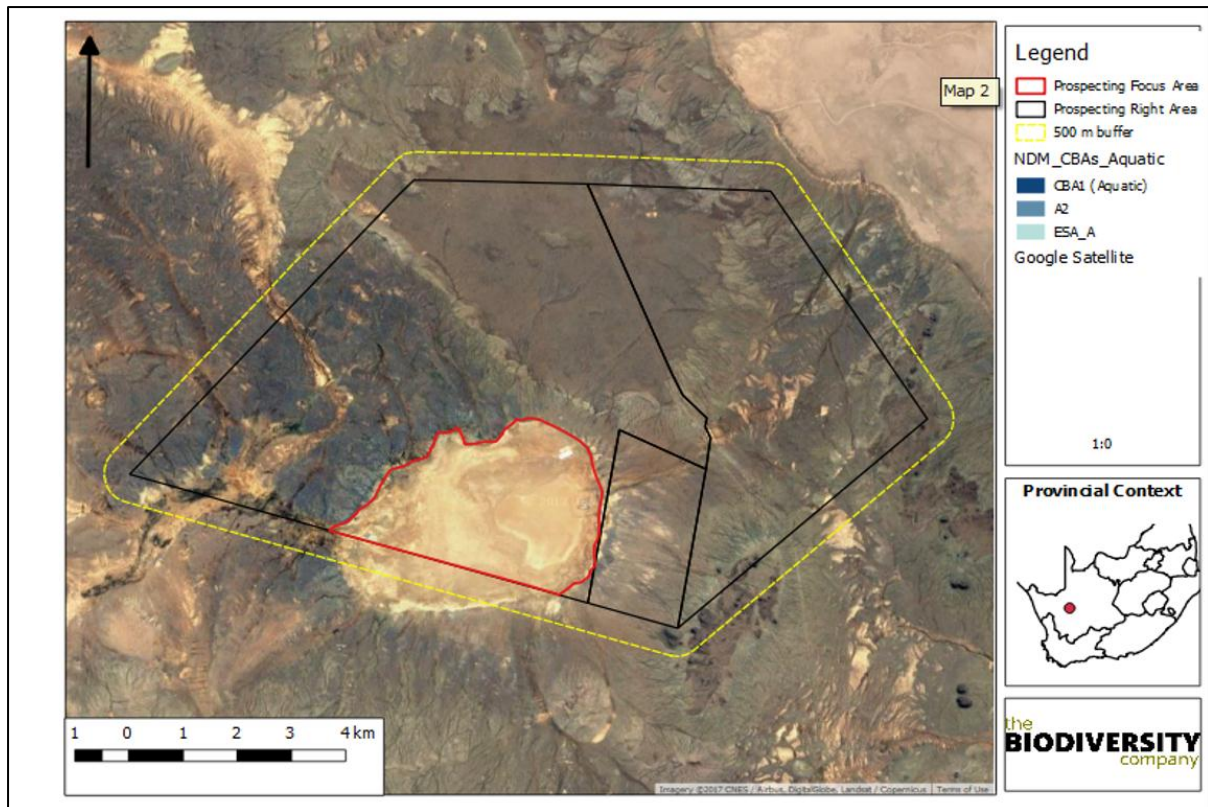


Figure 4: Aquatic CBA map showing the absence of aquatic CBA and ESA areas in relation to the Verdoorst Kolk prospecting right area

4.2 National Biodiversity Assessment (NBA, 2011)

The National Biodiversity Assessment (NBA) was completed as collaboration between the South African National Biodiversity Institute (SANBI), the Department of Environmental Affairs and stakeholders, scientists and biodiversity management experts throughout the country over a three-year period (Driver et al., 2012).

The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors (Driver et al., 2012).

The two headline indicators assessed in the NBA are ecosystem threat status and ecosystem protection level (Driver et al., 2012). The Verdoorst Kolk project area is situated in an environment which is listed as Least Threatened (LT) and not protected (Figure 5, Figure 6).



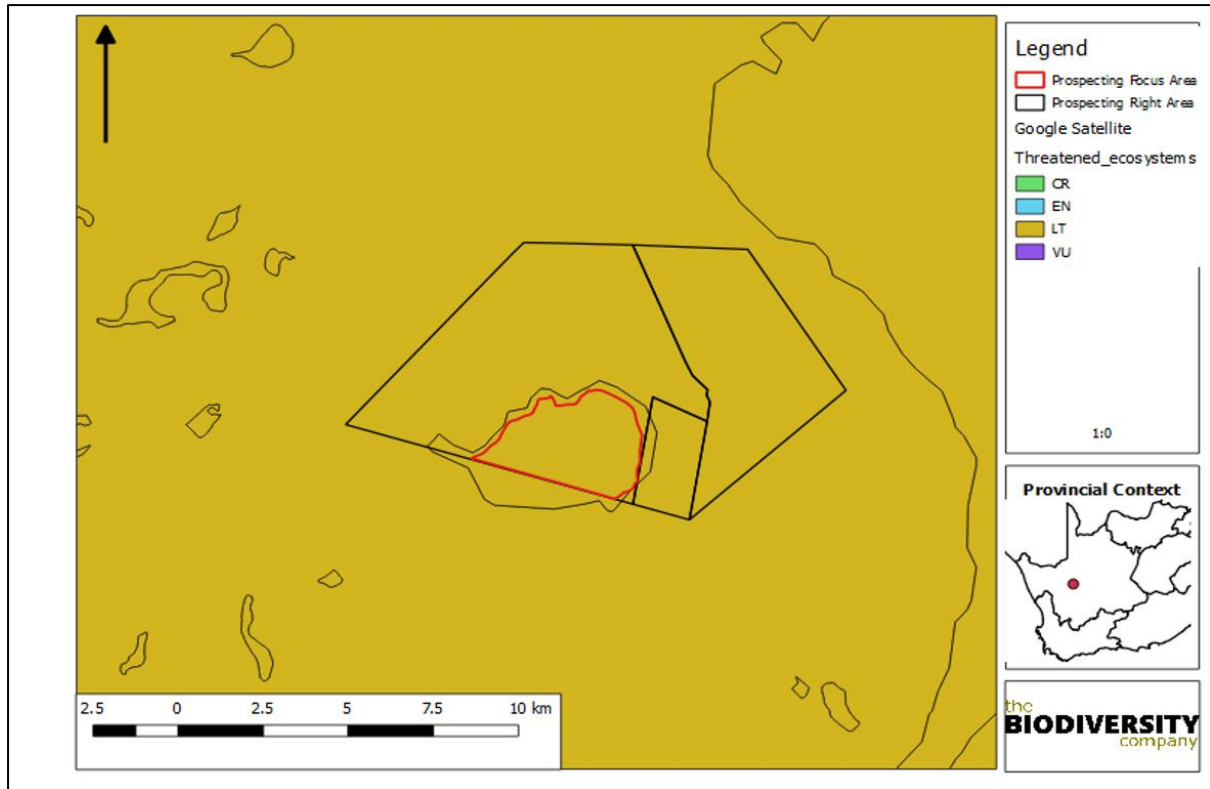


Figure 5: Threat status of the ecosystems associated with Verdoorst Kolk prospecting right area (NBA, 2011)

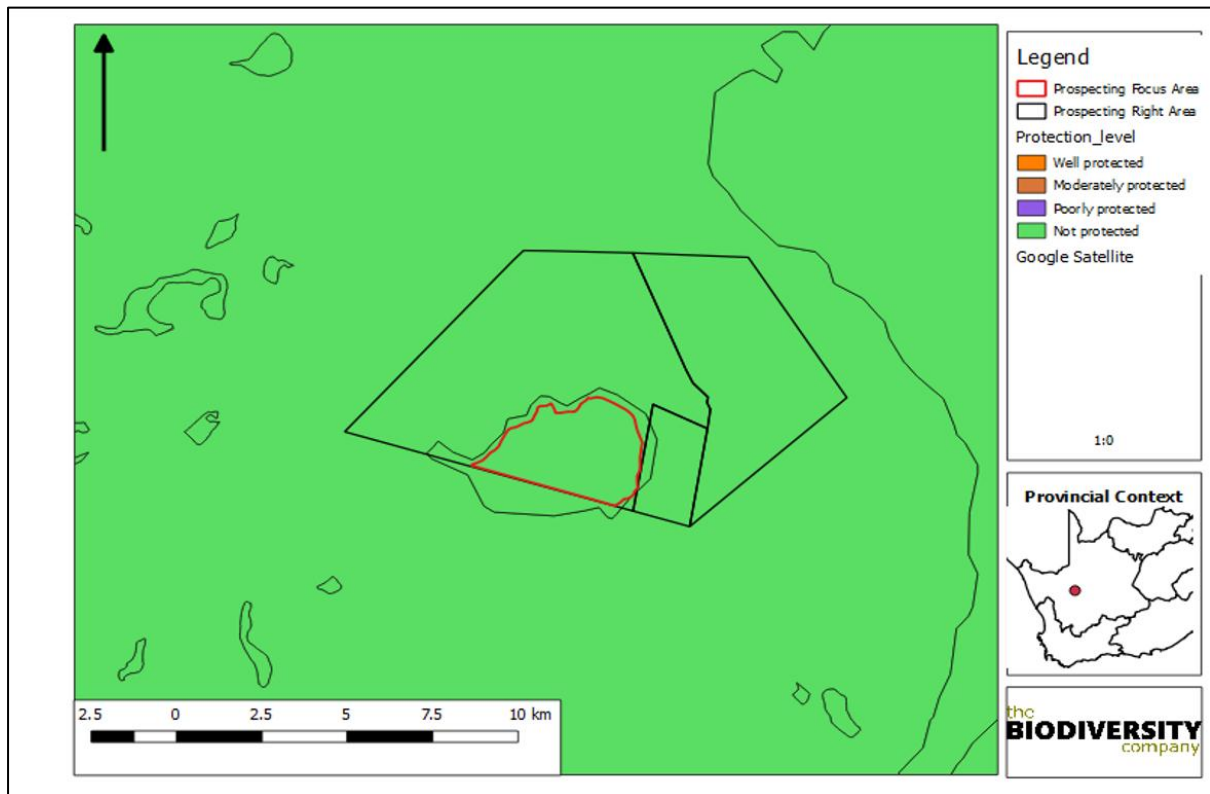


Figure 6: Protection level of the ecosystems associated with the Verdoorst Kolk prospecting right area (NBA, 2011)



4.3 National Freshwater Ecosystem Priority Area (NFEPA) Status

In an attempt to better conserve aquatic ecosystems, South Africa has recently categorised its river systems according to set ecological criteria (i.e. ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al. 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel et al. 2011).

Verdoorst Kolk comprises a large endorheic pan with various non-perennial tributaries that drain into it. Based on the FEPA database, these tributaries are not listed as aquatic FEPAs (Figure 7).

Based on the wetland FEPA map, the entire prospecting focus area, which corresponds to the floor of the pan is classified as a FEPA (Figure 7). A tributary that drains into Verdoorst Kolk from west of the project area is similarly listed as a FEPA (Figure 7). Therefore, the proposed prospecting will impact on a wetland priority area.

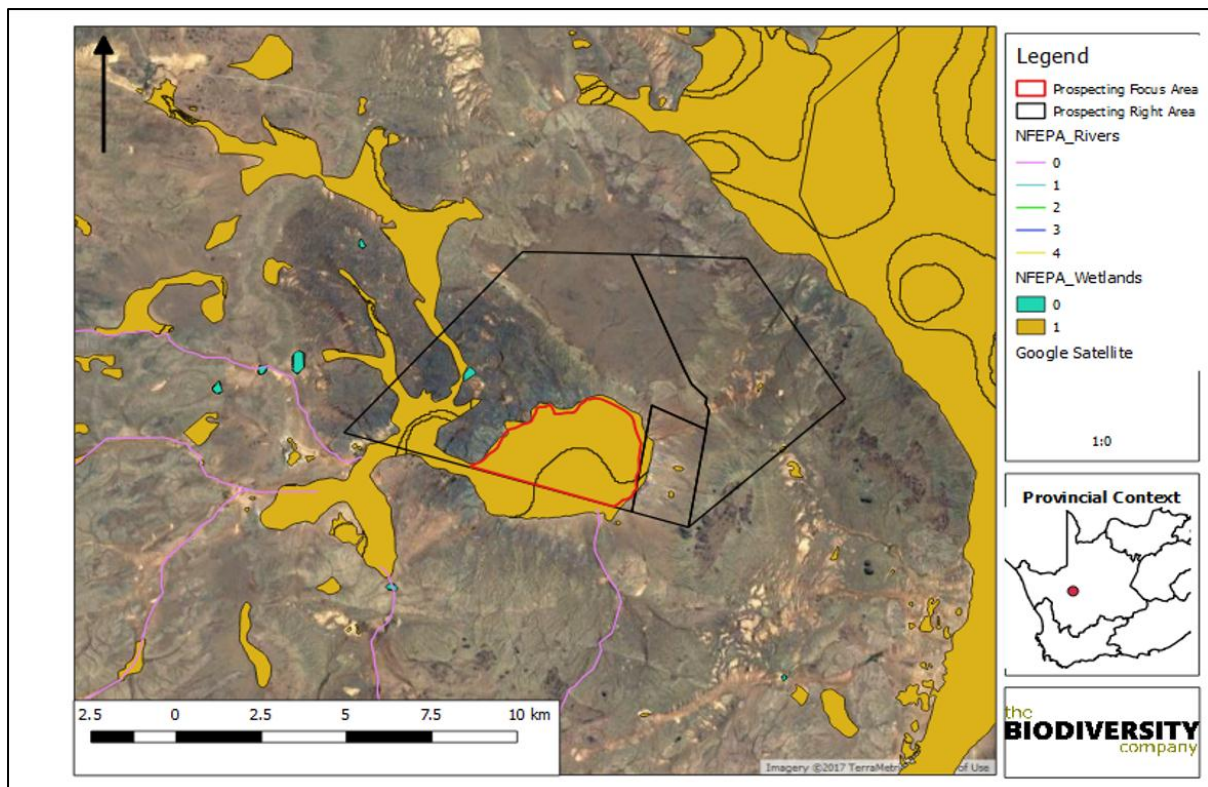


Figure 7: Verdoorst Kolk prospecting right area in relation to river and wetland FEPAs

4.4 Protected Areas

Formally protected areas refer to areas protected either by national or provincial legislation whereas informally protected areas refers to privately owned reserves. No formally or informally protected areas are situated in close proximity to the project area. The nearest protected area is Augrabies Falls National Park which is situated approximately 180 km north of the site. The proposed prospecting is unlikely to impact on any protected areas.

5 METHODOLOGY

5.1 Desktop Assessment

The requirements of this assessment served to combine aspects of the regional vegetation community (obtained from Mucina and Rutherford 2006) with the field study in order to formulate a series of conclusions and subsequent recommendations. The following datasets and sources were reviewed for the study:

- The Vegetation of South Africa, Lesotho & Swaziland (Mucina & Rutherford, 2006);
- The Southern Africa Bird Atlas Project (SABAP2, 2017) and BirdLife South Africa website (2017);
- Mammal information was referenced from the Animal Demography Unit (ADU, 2017), Skinner & Chimimba (2005) and the IUCN spatial database (IUCN, 2017); and
- Reptiles and amphibians were referenced from ADU (2017), Bates et al. (2014), Du Preez and Carruthers (2009) and the IUCN spatial database (IUCN, 2017) respectively.

The evaluation of species of concern was considered after the field study which served to identify their potential for occurrence. Therefore, all species identified under the above-mentioned references were not necessarily analysed in detail. Plants were identified using Van Oudtshoorn (2004) and Van Wyk & Van Wyk (1997).

The verification of the presence of red and orange listed plant species was one of the primary ecological requirements of the floral assessment.

5.2 Field Survey

A field survey was conducted on the 22nd March 2017 by an ecologist where the floral and faunal communities in the project area were assessed. The timing of the study represented late wet-season conditions. The project area was ground-truthed in a vehicle and on foot, which included spot checks in pre-selected areas to validate desktop data. Photographs were recorded during the site visit.

The fieldwork attempted to classify the fauna, flora and habitats, with emphasis on recording the actual and potential presence of Red Data species (also referred to as Red-Listed and Orange-Listed species), which are species of conservation concern in South Africa (either classified as threatened by the IUCN (2017), protected by NEMBA (2014) or indeed other legislations applicable provincially or nationally).



5.2.1 Vegetation Assessment

The survey included the following:

- A survey for Red and Orange Data plant species;
- Vegetation units were identified, classified and delineated;
- Habitat types were classified and delineated;
- The survey was conducted in consultation with local authorities who have information to be considered; and
- The survey area included terrestrial ecosystems within 500 m of the proposed development.

5.2.2 Faunal Assessment

The survey included the following:

- Compilation of expected species lists;
- A survey of the terrestrial habitats within the proposed development area (where applicable);
- Compilation of identified species lists;
- Identification of any Red Data or listed species present or potentially occurring in the area;
- A proximity assessment to any protected or ecologically important areas; and
- Emphasis was placed on the probability of occurrence of species of provincial, national and international conservation importance.

6 RESULTS & DISCUSSION

6.1 Desktop Assessment

6.1.1 Vegetation Assessment

The Verdoorst Kolk project area is situated in the Nama Karoo biome (Figure 8). The Nama Karoo is an arid biome, with mostly non-perennial rivers (Mucina & Rutherford, 2006). Most rain falls in late summer and rainfall is low and unpredictable with a large degree of unpredictability (Mucina & Rutherford, 2006).

The floral diversity of the Nama Karoo is not particularly rich, in contrast to the Succulent Karoo biome (Mucina & Rutherford, 2006). The Nama-Karoo biome does not contain any centres of endemism and unlike other South African biomes the local endemism is very low (Mucina & Rutherford, 2006).

The entire prospecting focus area is situated in the Bushmanland Vloere (AZi5) vegetation type whilst the remainder of the project area is situated in the Bushmanland Basin Shrubland (NKb6) vegetation type (Figure 9).



6.1.1.1 Bushmanland Vloere (AZi5)

This vegetation community occurs on the flat and very even surfaces of pans and broad intermittent rivers in the Northern Cape Province (Mucina & Rutherford, 2006). The pans are occasionally filled during the rainy season. This vegetation community comprises scrub dominated by *Rhigozum trichotomum*, and various species of *Salsola* and *Lycium* with a mixture of nonsucculent dwarf shrubs (Mucina & Rutherford, 2006). In places loose thickets of *Parkinsonia africana*, *Lebeckia lineariifolia* and *Vachellia karroo* can be found (Mucina & Rutherford, 2006).

This vegetation community was classified as Least threatened by Mucina & Rutherford (2006) as although none is statutorily conserved it remains largely untransformed.

6.1.1.2 Bushmanland Basin Shrubland (NKb6)

This vegetation community occurs on slightly irregular plains and is characterised by dwarf shrubland dominated by a mixture of low sturdy and spiny shrubs, grasses and in years of high rainfall by abundant annuals (Mucina & Rutherford, 2006).

None of this vegetation community is conserved in statutory conserved areas and although largely untransformed encroachment by alien invasives is a problem in certain areas (Mucina & Rutherford, 2006). This vegetation community was classified as Least threatened by Mucina & Rutherford (2006).



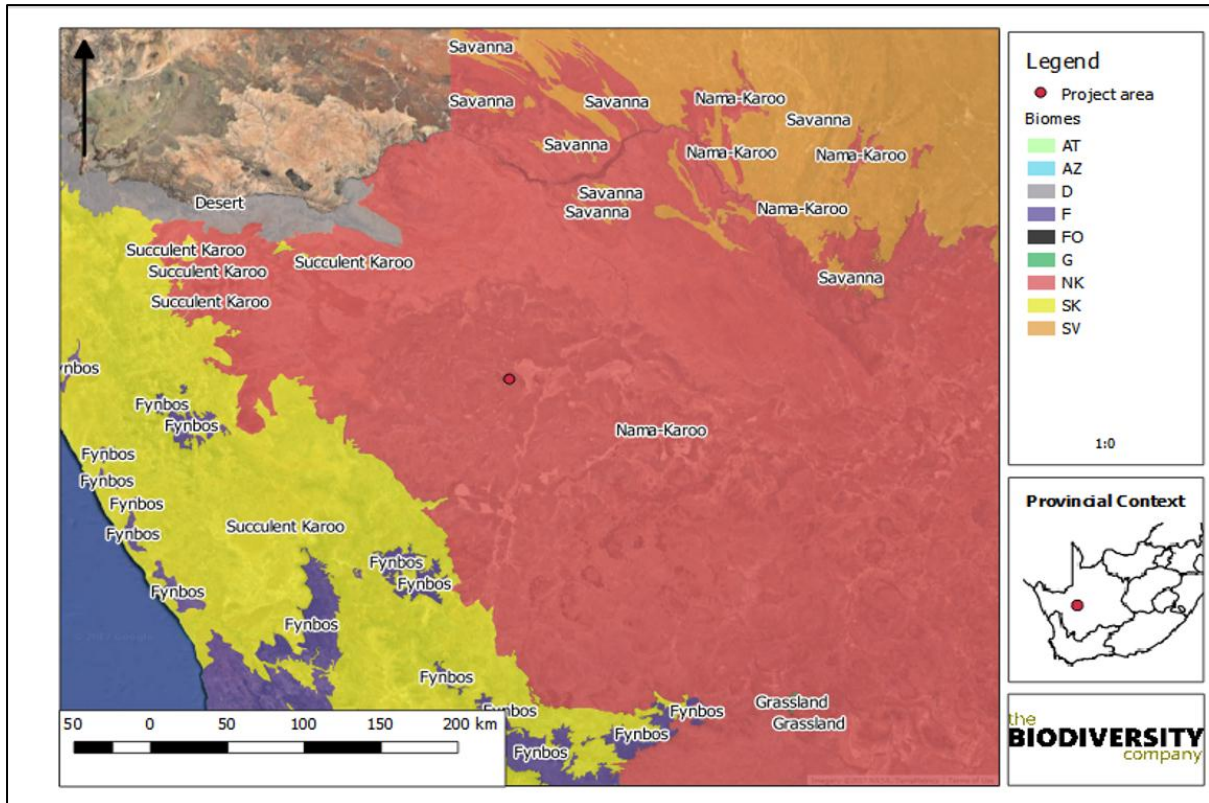


Figure 8: Location of the Verdoorst Kolk project area within the Nama Karoo biome

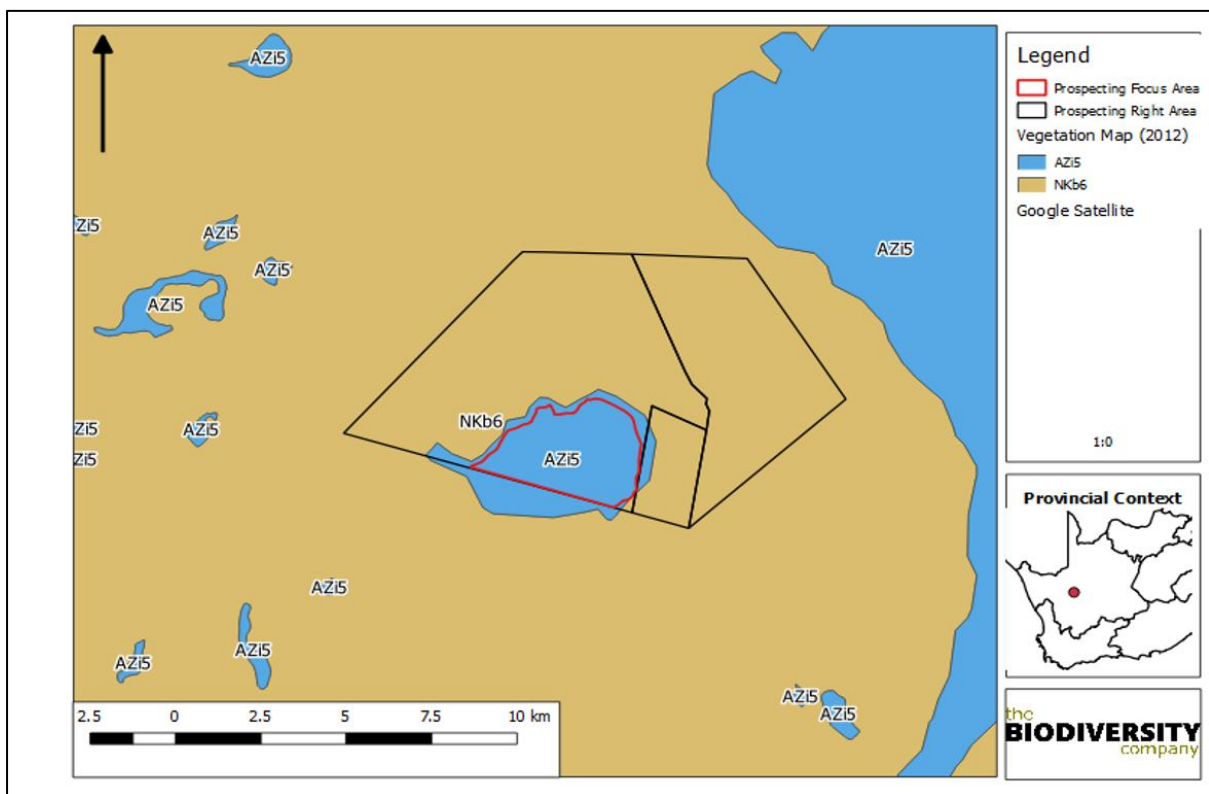


Figure 9: Verdoorst Kolk project area showing the different vegetation communities (Mucina & Rutherford, 2006)

6.1.1.3 Plant Species of Conservation Concern

A list of plant species of conservation concern was compiled based on the POSA database (POSA, 2017). Of the 59 plant species expected to occur in the 7 Quarter Degree Squares overlapping and bordering on the Verdoorst Kolk project area, 10 are listed as South African endemics and only 1 is listed as rare (Table 1). None are listed as Endangered (EN), Vulnerable (VU) or Near Threatened (NT) (Table 1).

Although endemic to South Africa, all of these plants are considered to be widespread and none are considered to be of conservation concern.

Table 1: South African endemic plant species expected to occur in QDS 2920CD, 2920DC, 3020AB, 3020BA, 3020AC, 3020AD and 3020BC (POSA, 2017; SANBI, 2017)

Species	Threat status	SA Endemic
<i>Athanasia minuta</i> (L.f.) Källersjö subsp. <i>minuta</i>	LC	Yes
<i>Hermannia johanssenii</i> N.E.Br.	LC	Yes
<i>Indigofera meyeriana</i> Eckl. & Zeyh.	LC	Yes
<i>Limeum rhombifolium</i> G.Schellenb.	LC	Yes
<i>Polycarena filiformis</i> Diels	Rare	Yes
<i>Pteronia oblanceolata</i> E.Phillips	LC	Yes
<i>Ruschia intricata</i> (N.E.Br.) H.E.K.Hartmann & Stüber	LC	Yes
<i>Salsola geminiflora</i> Fenzl ex C.H.Wright	LC	Yes
<i>Serruria acrocarpa</i> R.Br.	LC	Yes
<i>Zygophyllum chrysopteron</i> Retief	LC	Yes

6.1.2 Faunal Assessment

6.1.2.1 Avifauna

Based on the SAPAB2 database (2017) 87 bird species are expected to occur in the pentads that overlap the project area (2955_2020, 2955_2025, 3000_2025). The full list of potential bird species is provided in Appendix B. Of the expected bird species 9 (10%) are listed as being of conservation concern either regionally or globally (Table 2) (ESKOM, 2014; IUCN, 2017).

The expected bird species list includes:

- Two (2) species that are listed as Endangered (EN) on a regional basis;
- Two (2) species that is listed as Vulnerable (VU) on a regional basis; and
- Six (6) species that are listed as Near Threatened (NT) on a regional basis (Table 2).

On a global scale, 1 species is listed as EN, 2 and VU and 3 as NT (Table 2).

Of the 9 bird species of conservation concern, 7 are rated as having a high likelihood of occurrence and 2 as low (Table 2).



Table 2: List of bird species of regional or global conservation importance that are expected to occur in pentads 2955_2020, 2955_2025 and 3000_2025 (SABAP2, 2017, ESKOM, 2014; IUCN, 2017)

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (Eskom, 2016)	Global (IUCN, 2017)	
<i>Neotis ludwigii</i>	Bustard, Ludwig's	EN	EN	High
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	VU	Low
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC	High
<i>Sagittarius serpentarius</i>	Secretarybird	VU	VU	High
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT	High
<i>Rhinoptilus africanus</i>	Cursorer, Double-banded	NT	LC	High
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC	High
<i>Certhilauda brevirostris</i>	Lark, Agulhas Long-billed	NT	NT	Low
<i>Spizocorys sclateri</i>	Lark, Sclater's	NT	NT	High

Neotis ludwigii (Ludwig's bustards) has a large distributional range centred on the dry biomes of the Karoo and Namib in southern Africa (IUCN, 2017). This species is classified as Endangered both regionally and globally as the population has undergone a very rapid population decline due to collisions with power lines (IUCN, 2017). This species inhabits open lowland and upland plains with grass and light thornbush, sandy open shrub veld and semi-desert in the arid and semi-arid Namib and Karoo biomes (IUCN, 2017). Although very few (n=1) records exist of this species in pentads, the habitat in the project area are suitable and the likelihood of occurrence is rated as good.

Polemaetus bellicosus (Martial eagle) is listed as EN on a regional scale and VU on a global scale (Table 2). This species has an extensive range across much of sub-Saharan Africa but populations are declining due to deliberate and incidental poisoning, habitat loss, reduction in available prey, pollution and collisions with power lines (IUCN, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thornbush and, in southern Africa, more open country and even subdesert (IUCN, 2017). Based on the expected habitat the likelihood of occurrence of this species is considered to be low, no records exist of this species in any of the pentads over the period July 2007 to May 2017 (SABAP, 2017).

6.1.2.2 Mammals

The IUCN Red List Spatial Data (IUCN, 2017) lists 48 mammal species that could be expected to occur within the project area. Of these, *Diceros bicornis* (Black rhinoceros) and *Ceratotherium simum* (Southern white rhino) are conservation dependant species that in South Africa only occur in protected areas such as game reserves. These species were omitted from the expected species list resulting in an expected mammal list of 46 species (Appendix C). Of the 46 expected mammal species, 3 (6.5%) are listed as species of conservation concern either regionally or globally (Table 3).



The list of potential species includes 1 species that is listed as CR, 1 as VU and 1 as NT on a regional scale (Table 3). On a global scale, 1 species is listed as CR and 1 as VU (Table 3).

Of the 3 mammal species of conservation concern, 2 are rated as moderate to highly likely to occur in the project area (Table 3). The only exception is *Panthera pardus* (Leopard) which, according to the IUCN (2017) is extinct in the project area although it remains extant with close proximity. It was therefore rated as having a low likelihood of occurrence (Table 3).

Table 3: List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2017)

Species	Common name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Bunolagus monticularis</i>	Riverine Rabbit	CR	CR	Moderate
<i>Panthera pardus</i>	Leopard	VU	VU	Low
<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	LC	High

6.1.2.3 Reptiles

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017) 13 reptile species are expected to occur in the project area (Appendix D). This includes 1 species namely Cape Sand snake (*Psammophis leightoni*) which is listed as VU both on a regional and global scale (Appendix D). Based on the distributional range of this species, which is primarily in the south-western Cape, the likelihood of occurrence of the project area is low.

6.1.2.4 Amphibians

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2017) 6 amphibian species are expected to occur in the project area (Appendix E). Of these species 1, namely Giant bullfrog (*Pyxicephalus adspersus*) is listed as NT on a regional basis (Appendix D). The likelihood of occurrence of this species in the project area is rated as good.

6.2 Field Survey

6.2.1 Vegetation Assessment

At the time of the survey, vegetation cover within the prospecting focus area was sparse and diversity low as expected. The central part of the prospecting focus was largely devoid of vegetation (Figure 10).

Further from the centre of the pan, the Bushmanland Vloere (AZi5) vegetation type is replaced by the Bushmanland Basin Shrubland (NKb6) and the vegetation in this area the vegetation community was comprised of a mixture of low sturdy and spiny shrubs and grasses ().





Figure 10: Central portion of Verdoorst Kolk showing the lack of vegetation
On the margin of the pan, vegetation cover was sparse and diversity low (Figure 11).



Figure 11: Sparse vegetation cover along the margin of Verdoorst Kolk



Figure 12: Low sturdy and spiny shrubs and grasses characteristic of the Bushmanland Basin Shrubland (Nkb6) surrounding Verdoorst Kolk

A total of 8 plant species were recorded in the prospecting focus area during the March 2017 survey (Table 4). No indigenous plant species of conservation concern were recorded during the survey (Table 4).

The alien invasive plant species *Prosopis glandulosa* (Honey mesquite) was recorded around the margin of Verdoorst Kolk. This multi-stemmed acacia-like shrub or small tree has paired, straight spines and reddish-brown branchlets. *Prosopis* trees are extravagant users of readily available ground-water and dense stands could seriously affect the hydrology of the ecosystems they invade (Invasives.org, 2017). Dense stands compete with and replace indigenous woody and grassland species (Invasives.org, 2017).

Prosopis glandulosa is listed as a category 3 invasive species in the Northern Cape. This means that the species is regulated by activity meaning that a permit is required to import, possess, grow, breed, move, sell, buy or accept it as a gift. No permits will be issued for Cat 3 plant species to exist in riparian zones.

Table 4: Plant species recorded in the Verdoorst Kolk project area

Species	Threat status	SA Endemic
<i>Salsola aphylla</i>	LC	No

<i>Aizoon schellenbergii</i>	LC	No
<i>Asparagus glaucus</i>	LC	No
<i>Augea capensis</i>	LC	No
<i>Deverra denudata subsp. aphylla</i>	LC	No
<i>Lycium bosciifolium</i> Schinz	LC	No
<i>Prosopis glandulosa</i> *		No
<i>Rhigozum trichotomum</i>	LC	No

* NEMBA Category 3 in Northern Cape

6.2.2 Faunal Assessment

6.2.2.1 Avifaunal Assessment

A total of 10 bird species (11.5% of expected) were recorded during the March 2017 survey (Table 5). Due to the limited duration of the field survey, and the ability of birds to move large distances in a short space of time, relative to most mammals, herpetofauna or insects, bird species that were recorded on the drive from Kenhardt to the site were also included in the assessment. The low species diversity was attributed primarily to the limited duration of the survey. No bird species of conservation concern were recorded during the survey.

Table 5: Bird species recorded during the March 2017 survey

Species	Common Name	Conservation Status	
		Regional (Eskom, 2016)	Global (IUCN, 2017)
<i>Calendulauda sabota</i>	Lark, Sabota	Unlisted	LC
<i>Cercotrichas coryphoeus</i>	Scrub-robin, Karoo	Unlisted	Unlisted
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC
<i>Lanius collaris</i>	Fiscal, Common (Southern)	Unlisted	LC
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC
<i>Passer melanurus</i>	Sparrow, Cape	Unlisted	LC
<i>Prinia flavicans</i>	Prinia, Black-chested	Unlisted	LC
<i>Pterocles namaqua</i>	Sandgrouse, Namaqua	Unlisted	LC
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC
<i>Streptopelia senegalensis</i>	Dove, Laughing	Unlisted	LC

6.2.2.2 Mammals

Due to the similarity of habitat and the relative proximity, mammal species that were observed on the drive between Kenhardt were also included in this assessment. Six (6) mammal species were confirmed to be present in the area based on direct observations, a further 12 species were confirmed to be present in the area based on conversations with local landowners (Table 6).



One mammal species of conservation concern was confirmed to be present in the area, namely Brown Hyaena (*Parahyaena brunnea*). Brown hyaenas are typically associated with the South Western Arid Zone and the drier parts of the Southern Savannas (Skinner & Chimimba, 2005). They are solitary foragers, but live in small groups which occupy fixed territories which average at 308 km² in the southwestern Kalahari (Skinner & Chimimba, 2005). Brown hyaenas are primarily scavengers although their diets also include a wide range of small mammals, birds, reptiles, fruit and insects (Skinner & Chimimba, 2005).

The Brown Hyaena is listed as NT on a regional and a global scale (Table 6). They are often shot, poisoned, trapped and hunted with dogs in predator eradication or control programmes, or inadvertently killed in non-selective control programs (Skinner & Chimimba, 2005)

Table 6: Mammal species observed during the March 2017 survey

Species	Common name	Record	Conservation Status	
			Regional (SANBI, 2016)	IUCN (2017)
<i>Antidorcas marsupialis</i>	Springbok	Observed	LC	LC
<i>Canis mesomelas</i>	Black-backed Jackal	Observed	LC	LC
<i>Herpestes pulverulentus</i>	Cape Grey Mongoose	Observed	LC	LC
<i>Orycteropus afer</i>	Aardvark	Observed	LC	LC
<i>Otocyon megalotis</i>	Bat-eared Fox	Observed	LC	LC
<i>Procavia capensis</i>	Rock Hyrax	Observed	LC	LC
<i>Caracal caracal</i>	Caracal	Local knowledge	LC	LC
<i>Cynictis penicillata</i>	Yellow Mongoose	Local knowledge	LC	LC
<i>Felis silvestris</i>	African Wildcat	Local knowledge	LC	LC
<i>Genetta genetta</i>	Small-spotted Genet	Local knowledge	LC	LC
<i>Hystrix africaeaustralis</i>	Cape Porcupine	Local knowledge	LC	LC
<i>Ictonyx striatus</i>	Striped Polecat	Local knowledge	LC	LC
<i>Mellivora capensis</i>	Honey Badger	Local knowledge	LC	LC
<i>Oryx gazella</i>	Gemsbok	Local knowledge	LC	LC
<i>Parahyaena brunnea</i>	Brown Hyaena	Local knowledge	NT	NT
<i>Proteles cristata</i>	Aardwolf	Local knowledge	LC	LC
<i>Raphicerus campestris</i>	Steenbok	Local knowledge	LC	LC
<i>Vulpes chama</i>	Cape Fox	Local knowledge	LC	LC

6.2.2.3 Reptiles

Only 1 reptile species was observed in the project area during the March 2017 survey (Table 7). A further 4 species were confirmed to be present based on conversations with a local landowner (Table 7). No reptile species of conservation concern were recorded during the survey.

The low reptile diversity was attributed to the short duration of the survey. With more detailed and thorough assessments numerous species are expected as listed in Appendix D.



Table 7: Reptile species observed in the project area during the March 2017 survey

Species	Common name	Record	Conservation Status	
			Regional (Bates et al., 2014)	Global (IUCN, 2017)
<i>Trachylepis variegata</i>	Variegated skink	Observed	LC	Unlisted
<i>Naja nivea</i>	Cape cobra	Local knowledge	LC	Unlisted
<i>Bitis arietans arietans</i>	Puffadder	Local knowledge	LC	Unlisted
<i>Bitis caudalis</i>	Horned adder	Local knowledge	LC	Unlisted
<i>Psammophis notostictus</i>	Karoo sand snake	Local knowledge	LC	Unlisted

6.2.2.4 Amphibians

No amphibian species were recorded during the March 2017 survey. This was attributed primarily to the short duration of the survey, as well as the dry conditions recorded during the survey.

7 IMPACT ASSESSMENT

7.1 Methodology

Potential impacts were evaluated against the data captured during the fieldwork to identify relevance to the study area. The relevant impacts were then subjected to a prescribed impact assessment methodology.

Impacts were assessed in terms of the prospecting activities which is assessed as comprising a temporary activity but with a potential long-term impact.

Mitigation measures were only applied to impacts deemed relevant based on the impact analysis. Impacts were assessed in terms of probability and consequence. The probability descriptor is presented in Table 8. The consequence descriptors are presented in Table 8 and Table 9.

Table 8: Probability descriptors

Description	Rating
Certain	7
Highly probable	6
Likely	5
Probable	4
Unlikely	3
Improbable	2
Highly unlikely	1



Table 9: Consequence Descriptors

Duration	Rating
Permanent	7
Beyond project life	6
Project Life	5
Long term	4
Medium term	3
Short term	2
Immediate	1
Extent	Rating
International	7
National	6
District	5
County	4
Local	3
Site-specific	2
Very limited	1
Type x Intensity	Rating
Extremely high - negative	-7
Very high - negative	-6
High - negative	-5
Moderately high - negative	-4
Moderate - negative	-3
Low - negative	-2
Very low - negative	-1
Negligible	0
Very low - positive	1
Low - positive	2
Moderate - positive	3
Moderately high - positive	4
High - positive	5
Very high - positive	6
Extremely high - positive	7

7.2 Identification of Impacts

Impacts associated with proposed prospecting activities were identified. These included:

- Introduction and establishment of invasive plant species; and
- Loss and/or displacement of faunal species of conservation concern.



7.3 Assessment of Significance

7.3.1 Introduction and establishment of invasive plant species

With the exception of *P. glandulosa*, relatively few alien invasive plant species were recorded in the area. This can be attributed to the remoteness of the area and the lack of disturbance. The clearing of existing vegetation for access roads and drill rigs along with heavy machinery entering the area creates the potential for the introduction of alien invasive plant species into the area. Over time, alien invasive plant species may begin to encroach beyond the footprint of the prospecting areas into the surrounding habitats, competing with indigenous vegetation and crowding out indigenous vegetation.

The significance of this impact was rated as moderate – negative prior to implementation of mitigation (Table 10). Implementation of mitigation measures reduced the significance of the impact to minor – negative (Table 10).

Table 10: Assessment of significance of introduction and establishment of alien invasive vegetation into the project area (pre- and post- mitigation)

IMPACT DESCRIPTION: Introduction and establishment of alien invasive plant species				
Predicted for project phase:		Prospecting		
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Once alien invasive species have become established they will be a permanent feature of the landscape without direct intervention	Consequence: Highly detrimental (-15)	Significance: Moderate - negative (-90)
Extent	Local (3)	Alien invasive species will most likely become established in project footprint but may also encroach on surrounding areas		
Intensity x type of impact	High - negative (-5)	Encroachment of alien invasive plant species may result in the disappearance of indigenous plant species of conservation concern		
Probability	Highly probable (6)	Unless mitigation measures are implemented the likelihood of introduction of invasive plant species is highly probable		



MITIGATION:				
<ul style="list-style-type: none"> - Prior to any heavy machinery entering the site it must be thoroughly cleaned and checked to avoid introduction of soil and seeds - Rehabilitation of each site after construction - Monitoring of site to assess rehabilitation success and to manage introduced alien invasives 				
POST-MITIGATION				
Duration	Beyond project life (6)	As for pre-mitigation	Consequence: Moderately detrimental (-11)	Significance: Minor - negative (-44)
Extent	Local (3)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Mitigation will maximise local job creation		
Probability	Probable (4)	Implementation of mitigation measures will reduce the likelihood of establishment of alien invasive species		

7.3.2 Loss of displacement of faunal species of conservation concern

Although no bird species of conservation concern were recorded during the survey, the likelihood of other species of conservation concern occurring on the site was rated as moderate to good (Table 2, Table 3). Prospecting will be a short-term activity, but the potential exists for long-term impacts, particularly the displacement and loss of habitat of species with very limited distributional ranges, catholic habitat requirements and small populations sizes. Species may return to the sites once the disturbance associated with prospecting is removed, but habitats may be altered.

The significance of potential impacts on faunal species of conservation concern was rated as major – negative prior to implementation (Table 11). Implementation of mitigation measures reduced the significance of the impacts to minor – negative (Table 11).

Table 11: Assessment of significance of potential impacts on faunal species of conservation concern (pre- and post- mitigation)

IMPACT DESCRIPTION: Loss and or displacement of faunal species of conservation concern				
Predicted for project phase:		Construction		
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Beyond project life (6)	Any fauna species of conservation concern will likely only return to the site post completion of rehabilitation	Consequence: Extremely detrimental (-19)	Significance: Major - negative (-114)



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Extent	International (7)	Confirmed presence of species of global conservation concern		
Intensity x type of impact	Very high - negative (-6)	Confirmed presence of species of global conservation concern		
Probability	Highly probable (6)	Proposed prospecting activities may result in the loss of habitat of faunal species of national and global conservation concern contributing to further pressure on populations of these species		
MITIGATION:				
<p>- Prior to clearing of each site a detailed faunal survey must be conducted of each proposed prospecting site to assess the presence of faunal species of conservation concern</p> <p>- If any faunal species are present in the project footprint species impact assessments need to be conducted and mitigation measures implemented which may include avoidance</p> <p>- All project staff need to be educated about the potential sensitivity of faunal species on the site</p>				
POST-MITIGATION				
Duration	Long term (4)	Avoidance of key habitats will reduce the period of displacement of faunal species	Consequence: Highly detrimental (-15)	Significance: Minor - negative (-60)
Extent	International (7)	As for pre-mitigation		
Intensity x type of impact	Moderately high - negative (-4)	Mitigation will reduce the significance of potential impacts		
Probability	Probable (4)	Mitigation measures will reduce the likelihood that faunal species of conservation concern will be displaced		

7.4 Potential mitigation measures

The focus of mitigation measures should be to reduce the significance of potential impacts associated with the development and thereby to:

- Prevent the introduction and establishment of alien invasive species; and
- Prevent the loss or displacement of faunal species of conservation concern and to prevent the further reduction of faunal biodiversity.

7.4.1 Mitigation Measures for Impacts on Vegetation Communities

Recommended mitigation and rehabilitation measures include the following:

- Areas that are denuded during prospecting need to be re-vegetated with indigenous vegetation to avoid creating an entry point for invasive plant species;
- Prior to any heavy machinery entering the site they need to be thoroughly cleaned in order to prevent the introduction of the foreign organic matter including the seeds of alien invasive plant species

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- Compilation of and implementation of an alien vegetation management plan for the entire site.

7.4.2 Mitigation Measures for Impacts on Faunal Communities

Recommended mitigation and rehabilitation measures include the following:

- Once proposed prospecting areas have been identified these areas, along with the surrounding habitats need to be thoroughly assessed for the presence of sensitive faunal species. If faunal species of conservation importance are recorded on the site then a species-specific impact assessment must be undertaken and appropriate mitigation measures identified;
- If any faunal species of conservation importance are recorded during prospecting, activities should temporarily cease and an appropriate specialist should be consulted to identify the correct course of action;
- Staff should be educated about the sensitivity of faunal species. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited.

8 CONCLUSIONS

The following conclusions were reached based on the results of the desktop assessment:

- No plant species of conservation concern are expected to occur in the project area;
- Of the 87 expected bird species:
 - Two (2) species that are listed as Endangered (EN) on a regional basis;
 - Two (2) species that is listed as Vulnerable (VU) on a regional basis;
 - Six (6) species that are listed as Near Threatened (NT) on a regional basis;
 - On a global scale, 1 species is listed as EN, 2 and VU and 3 as NT;
 - Of the 9 bird species of conservation concern, 7 are rated as having a high likelihood of occurrence and 2 as low;
- Of the 46 expected mammal species, 3 (6.5%) are listed as species of conservation concern either regionally or globally;
- The list of potential mammal species includes 1 species that is listed as CR, 1 as VU and 1 as NT on a regional scale. On a global scale, 1 species is listed as CR and 1 as VU;
- Of the 3 mammal species of conservation concern, 2 are rated as moderate to highly likely to occur in the project area;

The following conclusions were reached based on the results of the field survey:

- Vegetation cover within the prospecting focus area was sparse and diversity low;
- No plant species of conservation concern were recorded during the survey;



- Overall bird species diversity was low. This was attributed to the short duration of the survey;
- Mammal diversity was low. This was attributed to the short duration of the survey and the lack of intensive sampling, trapping etc.;
- No mammal species of conservation concern were observed during the survey however Brown Hyaena (*Parahyaena brunnea*) was confirmed to be present in the project area based on conversations with a local landowner;

Potential impacts associated with proposed prospecting activities were identified. These included:

- Introduction and establishment of invasive plant species; and
- Loss and/or displacement of faunal species of conservation concern.

The significance of potential impacts on faunal species of conservation concern were rated as major – negative prior to implementation of mitigation. Post-mitigation the significance of impacts was reduced to moderate - negative and minor – negative respectively;

The significance of the potential impact of the introduction and establishment of alien invasive plant species was rated as moderate – negative prior to mitigation and minor – negative post-mitigation.

9 IMPACT STATEMENT

An impact statement is required as per the NEMA regulations with regards to the proposed development.

Considering the above-mentioned conclusions, it is the opinion of the specialist that the project be favourably considered but that all mitigation measures should be strictly adhered to.

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APPENDIX A: EXPECTED PLANT SPECIES

Species	Threat status	SA Endemic
<i>Aizoon schellenbergii</i> Adamson	LC	No
<i>Amaranthus schinzianus</i> Thell.	LC	No
<i>Aptenia geniculiflora</i> (L.) Bittrich ex Gerbaulet	LC	No
<i>Aptosimum spinescens</i> (Thunb.) Emil Weber	LC	No
<i>Aristida adscensionis</i> L.	LC	No
<i>Athanasia minuta</i> (L.f.) Källersjö subsp. <i>minuta</i>	LC	Yes
<i>Atriplex cinerea</i> Poir. subsp. <i>bolusii</i> (C.H.Wright) Aellen var. <i>adamsonii</i> Aellen	Not Evaluated	No
<i>Augea capensis</i> Thunb.	LC	No
<i>Bolboschoenus glaucus</i> (Lam.) S.G.Sm.	LC	No
<i>Calobota spinescens</i> (Harv.) Boatwr. & B.-E.van Wyk	LC	No
<i>Chascanum garipense</i> E.Mey.	LC	No
<i>Cullen tomentosum</i> (Thunb.) J.W.Grimes	LC	No
<i>Deverra denudata</i> (Viv.) Pfisterer & Podlech subsp. <i>aphylla</i> (Cham. & Schtdl.) Pfisterer & Podlech	LC	No
<i>Enneapogon desvauxii</i> P.Beauv.	LC	No
<i>Eragrostis bicolor</i> Nees	LC	No
<i>Eragrostis homomalla</i> Nees	LC	No
<i>Eriospermum porphyrium</i> Archibald	LC	No
<i>Felicia clavipilosa</i> Grau subsp. <i>clavipilosa</i>	LC	No
<i>Galenia secunda</i> (L.f.) Sond.	LC	No
<i>Gazania lichtensteinii</i> Less.	LC	No
<i>Gomphocarpus filiformis</i> (E.Mey.) D.Dietr.	LC	No
<i>Heliotropium curassavicum</i> L.	Not Evaluated	No
<i>Hermannia johanssenii</i> N.E.Br.	LC	Yes
<i>Hermannia paucifolia</i> Turcz.	LC	No
<i>Hermannia spinosa</i> E.Mey. ex Harv.	LC	No
<i>Hoodia gordonii</i> (Masson) Sweet ex Decne.	DDD	No
<i>Indigofera meyeriana</i> Eckl. & Zeyh.	LC	Yes
<i>Laggera decurrens</i> (Vahl) Hepper & J.R.I.Wood	LC	No
<i>Larryleachia dinteri</i> (A.Berger) Plowes	LC	No
<i>Leptochloa fusca</i> (L.) Kunth	LC	No
<i>Limeum aethiopicum</i> Burm.f. var. <i>lanceolatum</i> Friedrich	Not Evaluated	No
<i>Limeum argute-carinatum</i> Wawra ex Wawra & Peyr. var. <i>argute-carinatum</i>	LC	No
<i>Limeum rhombifolium</i> G.Schellenb.	LC	Yes
<i>Lycium bosciifolium</i> Schinz	LC	No



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<i>Lycium horridum</i> Thunb.	LC	No
<i>Mesembryanthemum nodiflorum</i> L.	LC	No
<i>Microloma longitubum</i> Schltr.	LC	No
<i>Osteospermum spinescens</i> Thunb.	LC	No
<i>Panicum gilvum</i> Launert	LC	No
<i>Polycarena filiformis</i> Diels	Rare	Yes
<i>Polygala seminuda</i> Harv.	LC	No
<i>Prosopis velutina</i> Wooton	Not Evaluated	No
<i>Psilocaulon coriarium</i> (Burch. ex N.E.Br.) N.E.Br.	LC	No
<i>Pteronia leucoclada</i> Turcz.	LC	No
<i>Pteronia oblanceolata</i> E.Phillips	LC	Yes
<i>Ruschia divaricata</i> L.Bolus	LC	No
<i>Ruschia intricata</i> (N.E.Br.) H.E.K.Hartmann & Stüber	LC	Yes
<i>Salsola aphylla</i> L.f.	LC	No
<i>Salsola geminiflora</i> Fenzl ex C.H.Wright	LC	Yes
<i>Salsola zeyheri</i> (Moq.) Bunge	LC	No
<i>Sericocoma avolans</i> Fenzl	LC	No
<i>Serruria acrocarpa</i> R.Br.	LC	Yes
<i>Stipagrostis brevifolia</i> (Nees) De Winter	LC	No
<i>Stipagrostis ciliata</i> (Desf.) De Winter var. <i>capensis</i> (Trin. & Rupr.) De Winter	LC	No
<i>Stipagrostis obtusa</i> (Delile) Nees	LC	No
<i>Tetragonia reduplicata</i> Welw. ex Oliv.	LC	No
<i>Tragus berteronianus</i> Schult.	LC	No
<i>Trianthema parvifolia</i> E.Mey. ex Sond. var. <i>parvifolia</i>	LC	No
<i>Zygophyllum chrysopteron</i> Retief	LC	Yes



APPENDIX B: EXPECTED AVIFAUNAL SPECIES

Species	Common Name	Conservation Status	
		Regional (Eskom, 2016)	Global (IUCN, 2017)
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC
<i>Recurvirostra avosetta</i>	Avocet, Pied	Unlisted	LC
<i>Tricholaema leucomelas</i>	Barbet, Acacia Pied	Unlisted	LC
<i>Batis pririt</i>	Batis, Pririt	Unlisted	LC
<i>Telophorus zeylonus</i>	Bokmakierie, Bokmakierie	Unlisted	LC
<i>Pycnonotus nigricans</i>	Bulbul, African Red-eyed	Unlisted	LC
<i>Emberiza capensis</i>	Bunting, Cape	Unlisted	LC
<i>Emberiza impetuani</i>	Bunting, Lark-like	Unlisted	LC
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT
<i>Neotis ludwigii</i>	Bustard, Ludwig's	EN	EN
<i>Buteo rufofuscus</i>	Buzzard, Jackal	Unlisted	LC
<i>Serinus alario</i>	Canary, Black-headed	Unlisted	LC
<i>Crithagra albogularis</i>	Canary, White-throated	Unlisted	LC
<i>Crithagra flaviventris</i>	Canary, Yellow	Unlisted	LC
<i>Myrmecocichla formicivora</i>	Chat, Anteating	Unlisted	LC
<i>Cercomela familiaris</i>	Chat, Familiar	Unlisted	LC
<i>Cercomela schlegelii</i>	Chat, Karoo	Unlisted	LC
<i>Cercomela sinuata</i>	Chat, Sickle-winged	Unlisted	LC
<i>Cercomela tracterac</i>	Chat, Tracterac	Unlisted	LC
<i>Cisticola subruficapilla</i>	Cisticola, Grey-backed	Unlisted	LC
<i>Rhinoptilus africanus</i>	Courser, Double-banded	NT	LC
<i>Sylvietta rufescens</i>	Crombec, Long-billed	Unlisted	LC
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC
<i>Streptopelia senegalensis</i>	Dove, Laughing	Unlisted	LC
<i>Oena capensis</i>	Dove, Namaqua	Unlisted	LC
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	VU
<i>Bubo africanus</i>	Eagle-owl, Spotted	Unlisted	LC
<i>Eremomela icteropygialis</i>	Eremomela, Yellow-bellied	Unlisted	LC
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC
<i>Amadina erythrocephala</i>	Finch, Red-headed	Unlisted	LC
<i>Sporopipes squamifrons</i>	Finch, Scaly-feathered	Unlisted	LC
<i>Lanius collaris</i>	Fiscal, Common (Southern)	Unlisted	LC
<i>Bradornis infuscatus</i>	Flycatcher, Chat	Unlisted	LC
<i>Stenostira scita</i>	Flycatcher, Fairy	Unlisted	LC
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC



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<i>Tringa nebularia</i>	Greenshank, Common	Unlisted	LC
<i>Bostrychia hagedash</i>	Ibis, Hadedea	Unlisted	LC
<i>Falco rupicolus</i>	Kestrel, Rock	Unlisted	Unlisted
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC
<i>Vanellus coronatus</i>	Lapwing, Crowned	Unlisted	LC
<i>Certhilauda brevirostris</i>	Lark, Agulhas Long-billed	NT	NT
<i>Certhilauda benguelensis</i>	Lark, Benguela Long-billed	Unlisted	Unlisted
<i>Certhilauda curvirostris</i>	Lark, Cape Long-billed	Unlisted	LC
<i>Certhilauda semitorquata</i>	Lark, Eastern Long-billed	Unlisted	LC
<i>Calendulauda africanoides</i>	Lark, Fawn-coloured	Unlisted	LC
<i>Certhilauda subcoronata</i>	Lark, Karoo Long-billed	Unlisted	LC
<i>Galerida magnirostris</i>	Lark, Large-billed	Unlisted	LC
<i>Calandrella cinerea</i>	Lark, Red-capped	Unlisted	LC
<i>Calendulauda sabota</i>	Lark, Sabota	Unlisted	LC
<i>Spizocorys sclateri</i>	Lark, Sclater's	NT	NT
<i>Chersomanes albofasciata</i>	Lark, Spike-heeled	Unlisted	LC
<i>Spizocorys starki</i>	Lark, Stark's	Unlisted	LC
<i>Hirundo fuligula</i>	Martin, Rock	Unlisted	LC
<i>Ploceus velatus</i>	Masked-weaver, Southern	Unlisted	LC
<i>Urocolius indicus</i>	Mousebird, Red-faced	Unlisted	LC
<i>Colius colius</i>	Mousebird, White-backed	Unlisted	LC
<i>Columba guinea</i>	Pigeon, Speckled	Unlisted	LC
<i>Anthus cinnamomeus</i>	Pipit, African	Unlisted	LC
<i>Charadrius pecuarius</i>	Plover, Kittlitz's	Unlisted	LC
<i>Charadrius tricollaris</i>	Plover, Three-banded	Unlisted	LC
<i>Prinia flavicans</i>	Prinia, Black-chested	Unlisted	LC
<i>Prinia hypoxantha</i>	Prinia, Drakensberg	Unlisted	LC
<i>Prinia maculosa</i>	Prinia, Karoo	Unlisted	LC
<i>Pterocles namaqua</i>	Sandgrouse, Namaqua	Unlisted	LC
<i>Cercotrichas coryphoeus</i>	Scrub-robin, Karoo	Unlisted	Unlisted
<i>Sagittarius serpentarius</i>	Secretarybird, Secretarybird	VU	VU
<i>Tadorna cana</i>	Shelduck, South African	Unlisted	LC
<i>Passer melanurus</i>	Sparrow, Cape	Unlisted	LC
<i>Passer domesticus</i>	Sparrow, House	Unlisted	LC
<i>Eremopterix australis</i>	Sparrowlark, Black-eared	Unlisted	LC
<i>Eremopterix verticalis</i>	Sparrowlark, Grey-backed	Unlisted	LC
<i>Himantopus himantopus</i>	Stilt, Black-winged	Unlisted	LC



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<i>Cinnyris fuscus</i>	Sunbird, Dusky	Unlisted	LC
<i>Hirundo rustica</i>	Swallow, Barn	Unlisted	LC
<i>Apus apus</i>	Swift, Common	Unlisted	LC
<i>Apus affinis</i>	Swift, Little	Unlisted	LC
<i>Anas capensis</i>	Teal, Cape	Unlisted	LC
<i>Parisoma subcaeruleum</i>	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
<i>Parisoma layardi</i>	Tit-babbler, Layard's	Unlisted	Unlisted
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC
<i>Motacilla capensis</i>	Wagtail, Cape	Unlisted	LC
<i>Malcorus pectoralis</i>	Warbler, Rufous-eared	Unlisted	LC
<i>Oenanthe pileata</i>	Wheatear, Capped	Unlisted	LC
<i>Oenanthe monticola</i>	Wheatear, Mountain	Unlisted	LC
<i>Zosterops virens</i>	White-eye, Cape	Unlisted	LC
<i>Zosterops pallidus</i>	White-eye, Orange River	Unlisted	LC



APPENDIX C: EXPECTED MAMMAL SPECIES

Species	Common name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Aethomys namaquensis</i>	Namaqua Rock Rat	Unlisted	LC
<i>Antidorcas marsupialis</i>	Springbok	LC	LC
<i>Bunolagus monticularis</i>	Riverine Rabbit	CR	CR
<i>Canis mesomelas</i>	Black-backed Jackal	LC	LC
<i>Caracal caracal</i>	Caracal	LC	LC
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC
<i>Desmodillus auricularis</i>	Short-tailed Gerbil	LC	LC
<i>Elephantulus rupestris</i>	Western Rock Sengi	LC	LC
<i>Eptesicus hottentotus</i>	Long-tailed Serotine Bat	LC	LC
<i>Felis nigripes</i>	Black-footed Cat	VU	VU
<i>Felis silvestris</i>	African Wildcat	LC	LC
<i>Genetta genetta</i>	Small-spotted Genet	LC	LC
<i>Gerbillurus paeaba</i>	Hairy-footed Gerbil	Unlisted	LC
<i>Gerbillurus vullinus</i>	Bushy-tailed Gerbil	Unlisted	LC
<i>Herpestes pulverulentus</i>	Cape Grey Mongoose	LC	LC
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC
<i>Ictonyx striatus</i>	Striped Polecat	LC	LC
<i>Lepus capensis</i>	Cape Hare	LC	LC
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC
<i>Malacothrix typica</i>	Large-eared Mouse	LC	LC
<i>Mellivora capensis</i>	Honey Badger	LC	LC
<i>Mus musculus</i>	House Mouse	Unlisted	LC
<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	LC	LC
<i>Orycteropus afer</i>	Aardvark	LC	LC
<i>Oryx gazella</i>	Gemsbok	LC	LC
<i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC
<i>Panthera pardus</i>	Leopard	VU	VU
<i>Papio ursinus</i>	Chacma Baboon	LC	LC
<i>Parotomys brantsii</i>	Brants Whistling Rat	LC	LC
<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	LC
<i>Petromyscus collinus</i>	Pygmy Rock Mouse	LC	LC
<i>Petromyscus monticularis</i>	Brukkaros Pygmy Rock Mouse	LC	LC
<i>Procapra capensis</i>	Rock Hyrax	LC	LC
<i>Pronolagus rupestris</i>	Smith's Red Rock Rabbit	LC	LC
<i>Proteles cristata</i>	Aardwolf	LC	LC



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<i>Raphicerus campestris</i>	Steenbok	LC	LC
<i>Rhabdomys pumilio</i>	Xeric Four-striped Mouse	LC	LC
<i>Sauromys petrophilus</i>	Flat-headed	LC	LC
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	LC
<i>Suricata suricatta</i>	Suricate	LC	LC
<i>Sylvicapra grimmia</i>	Common Duiker	LC	LC
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC	LC
<i>Thallomys shortridgei</i>	Shortridge's Rat	DD	DD
<i>Tragelaphus oryx</i>	Eland	LC	LC
<i>Vulpes chama</i>	Cape Fox	LC	LC
<i>Xerus inauris</i>	Cape Ground Squirrel	LC	LC



APPENDIX D: EXPECTED REPTILE SPECIES

Species	Common name	Conservation Status	
		Regional (Bates et al., 2014)	Global (IUCN, 2017)
<i>Acontias lineatus</i>	Striped Dwarf Legless Skink	Unlisted	LC
<i>Bitis arietans arietans</i>	Puffadder	LC	Unlisted
<i>Bitis caudalis</i>	Horned adder	LC	Unlisted
<i>Chondrodactylus angulifer angulifer</i>	Common Giant Gecko	LC	LC
<i>Dasypeltis scabra</i>	Rhombic Egg-Eater	LC	LC
<i>Dipsina multimaculata</i>	Dwarf beaked snake	LC	Unlisted
<i>Mabuya occidentalis</i>	Western three-striped skink	Unlisted	Unlisted
<i>Naja nivea</i>	Cape cobra	LC	Unlisted
<i>Pedioplanis laticeps</i>	Karoo sand Lizard	Unlisted	LC
<i>Psammobates tentorius verroxii</i>	Verrox's Tent Tortoise	Unlisted	Unlisted
<i>Psammophis leightoni</i>	Cape Sand snake	VU	VU
<i>Psammophis notostictus</i>	Karoo sand snake	LC	Unlisted
<i>Trachylepis variegata</i>	Variiegated skink	LC	Unlisted



APPENDIX E: EXPECTED AMPHIBIAN SPECIES

Species	Common name	Conservation Status	
		Regional (Bates et al., 2014)	IUCN (2017)
<i>Cacosternum boettgeri</i>	Boettger's Caco	LC	LC
<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad	LC	LC
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	NT	LC
<i>Tomopterna tandyi</i>	Tandy's Sand Frog	LC	LC
<i>Vandijkophrynus gariensis</i>	Karoo Toad	LC	LC
<i>Xenopus laevis</i>	Common Platanna	LC	LC

