CHAPTER 3

Supplementary Material: Specialist Report

Fauna: mammal, reptile and amphibian report

Strategic Environmental Assessment (SEA) for the Proposed Boegoebaai Port and SEZ Fauna Desktop Assessment

May 2025

For:
South African National Energy Development Institute (SANEDI), Northern Cape Economic Development Trade and Investment Promotion Agency (NCEDA) and Transnet National Ports Authority (TNPA)

Appointed Consultant: CSIR

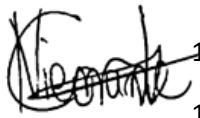
Prepared by
Bios Diversitas Consultants (Pty) Ltd
info@biosgroup.co.za

Author contributions

Company	Author	Qualification	SACNASP	Years Experience
Bios Diversitas Consultants (Pty) Ltd	Corné Niemandt	MSc Plant Science BSc (Hons) Zoology	*Pr. Sci. Nat. Ecological Science* – 116598	10 years

Disclaimer by specialists

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



Corné Niemandt

Executive Summary

The Fauna Desktop Assessment for the Boegoebaai Strategic Environmental Assessment addresses the environmental sensitivities of the proposed Boegoebaai Port and Special Economic Zone in the Northern Cape, South Africa. Covering a project area of approximately 33,500 hectares, the assessment evaluates terrestrial ecological aspects, focusing on fauna. This study aims to guide sustainable planning for the proposed infrastructure development and provides critical reference data for future project-specific Environmental Impact Assessments.

This desktop assessment relies on secondary data sources, including GIS mapping, literature reviews, and biodiversity databases, which inherently present spatial and temporal limitations. Data gaps include the underrepresentation of cryptic or nocturnal species and the limited resolution of habitat maps for site-specific assessments. To address these limitations, targeted field surveys are recommended to validate findings and refine sensitivity maps. These surveys should focus on confirming the presence of species of conservation concern (SCC) and updating ecological data to ensure accuracy and comprehensiveness.

The Boegoebaai project area includes habitats of significant ecological importance, characterised by critical biodiversity features and a diversity of SCC. The area encompasses several vegetation units, including Critically Endangered ecosystems such as the Richtersveld Coastal Duneveld and Namib Seashore Vegetation. These habitats host unique fauna, some of which are highly specialized and endemic to the region. Species like De Winton's Golden Mole (*Cryptochloris wintoni*), Grant's Golden Mole (*Eremitalpa granti granti*), and the Desert Rain Frog (*Breviceps macrops*) rely on specific dune and sandy habitats for survival. In total, the faunal community includes a diverse array of mammals, reptiles, and amphibians, with notable representatives such as the Namaqua Dwarf Adder (*Bitis schneideri*) and the Namib Web-footed Gecko (*Pachydactylus rangei*). These species underscore the ecological significance of the area and highlight the potential risks posed by habitat loss and disturbance.

The proposed development poses various environmental risks that must be carefully managed. Habitat loss and alteration are significant concerns, particularly for species reliant on the specialised dune ecosystems, which are vulnerable to disturbance from construction and operational activities. The ecosystems in the project area provide critical ecological services, including supporting rare and endemic species, stabilising sandy substrates, and maintaining biodiversity corridors. Fragmentation of habitats due to infrastructure development, such as roads, pipelines, and buildings, can restrict species movement, disrupt breeding patterns, and isolate populations. These impacts are especially critical for fossorial species, such as moles and reptiles, that depend on undisturbed sandy habitats.

Disturbance from increased human activities such as noise, light pollution, and dust could have long-term implications for biodiversity. During construction, impacts are expected to be most severe due to the direct transformation of natural ecosystems, specifically, these activities can disturb nocturnal and crepuscular species, reducing their activity and altering natural behaviours. The introduction of invasive plant species, facilitated by soil disturbances and human movement, can outcompete native vegetation, further degrading habitat quality. Additionally, the risk of roadkill from increased traffic on access roads presents a tangible threat to slow-moving species such as tortoises and frogs. The operational phase may see reduced activity, but residual impacts such as wind erosion and alien plant invasions may persist unless mitigated effectively. The risk of inadequate rehabilitation during the decommissioning phase could leave behind a degraded and vulnerable ecosystem.

To address these challenges, this desktop assessment identifies a suite of mitigation measures aimed at minimising ecological harm. Avoiding development in very high-sensitivity areas, such as the remnants of Critically Endangered ecosystems which support fauna SCCs, is a primary recommendation. Strategic site selection can help protect key habitats while maintaining connectivity between biodiversity corridors. During the construction phase, implementing best practices, such as minimising vegetation clearance, species-specific conservation actions and avoiding sensitive periods for breeding and foraging, can reduce impacts. Habitat restoration plans should focus on re-establishing native vegetation and stabilising disturbed soils to prevent erosion.

Specific mitigation measures for fauna include translocating individuals of SCCs, where feasible, to suitable habitats outside the impact zone. For species such as the Desert Rain Frog and Namib Web-footed Gecko, avoiding disturbance of breeding habitats is critical. To reduce roadkill, speed limits and wildlife crossings should be established on access roads. Noise and light pollution can be mitigated by limiting construction hours and using directional lighting to minimise spillover into natural areas. Post-construction monitoring programs are essential to evaluate the effectiveness of these measures and adapt strategies as needed.

Monitoring programs are essential for assessing the effectiveness of mitigation measures and ensuring long-term ecological sustainability. During the construction and operational phases, management plans must prioritise maintaining ecological stability in the area. Ongoing monitoring of invasive species and regular habitat assessments will help ensure that ecological functions are preserved. Mitigation strategies should include training programs for staff to minimise inadvertent impacts on fauna and promoting community involvement in conservation initiatives.

In conclusion, the Boegoebaai Project Area represents a region of high ecological sensitivity with unique and irreplaceable biodiversity features. The findings of this assessment highlight the importance of adopting a precautionary approach to development, balancing economic objectives with the preservation of ecological integrity. With informed planning, avoidance of critical habitat features and robust mitigation strategies, along with ongoing ecological monitoring, it is possible to achieve some form of sustainable development.

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Glossary

Critical Biodiversity Area (CBA): an area that must be maintained in a good ecological condition (natural or semi-natural state) in order to meet biodiversity targets. CBAs collectively meet biodiversity targets for all ecosystem types, as well as for species and ecological processes that depend on natural or semi-natural habitat that have not already been met in the protected area network. CBAs are identified through a systematic biodiversity planning process in a configuration that is complementary, efficient and avoids conflict with other land uses where possible.

Cumulative impact: in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Ecosystem: a dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem threat status – A measure of how threatened an ecosystem is, based on how much of the ecosystem's original area remains intact relative to three different thresholds or "tipping points". These thresholds indicate the points at which it is estimated that the ecosystem would undergo fundamental change, either in terms of biodiversity pattern or ecological processes. Ecosystems are categorised as critically endangered, endangered, vulnerable or least threatened.

Endemic: Restricted or exclusive to a particular geographic area, occurring nowhere else. Endemism refers to the occurrence of endemic species.

Extent of occurrence (EOO): the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy; and in short is the species' contemporary distribution range.

Habitat: The area or environment occupied by a species or groups of species, due to the particular set of environmental conditions that prevails there.

IUCN Red List Categories and Criteria: the threatened species categories used in Red Data Books and Red Lists have been in place for almost 30 years. The IUCN Red List Categories and Criteria provide an easily and widely understood system for classifying species at high risks of global extinction, so as to focus attention on conservation measures designed to protect them.

IUCN Red List status: the conservation status of species, based on the IUCN Red List categories and criteria.

Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

Range-restricted species – the presence of terrestrial flora, vertebrate and invertebrate fauna with a global population extent of occurrence (EOO) of 10 000 km^2 or less.

Species of conservation concern (SCC): includes all species that are assessed according to the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare].

Threatened species: species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered, Endangered or Vulnerable is a threatened species. In terms of section 56(1) of NEMBA, 'threatened species' means indigenous species listed under the Act as critically endangered, endangered or vulnerable species.

1. INTRODUCTION AND PROJECT BACKGROUND

This Desktop Fauna Assessment for the **Boegoebaai Strategic Environmental Assessment (SEA)** specifically addresses the terrestrial ecological assessment with a focus on fauna. The SEA is intended to assess the environmental sensitivities of the proposed **Boegoebaai Port and Special Economic Zone (SEZ)** development (hereafter Project Area – PA) over a spatial area of approximately 33 500 ha in Boegoebaai (Figure 1-1). The primary outcome will inform the planning and decision-making processes for the port and SEZ, while also providing reference data for future project-specific Environmental Impact Assessments (EIAs).

As part of South Africa's ambition to become a player in the globally emerging green hydrogen market, a substantial programme of greenfield infrastructure has been proposed in the Northern Cape consisting of three main components:

i. New deepwater port at Boegoebaai, dry and liquid bulk berths, and multi-purpose terminals;

ii. Mixed-use SEZ located in the region adjacent to the proposed Boegoebaai port; and

iii. Expansive regional renewable energy (wind and solar PV) generation and transmission infrastructure.

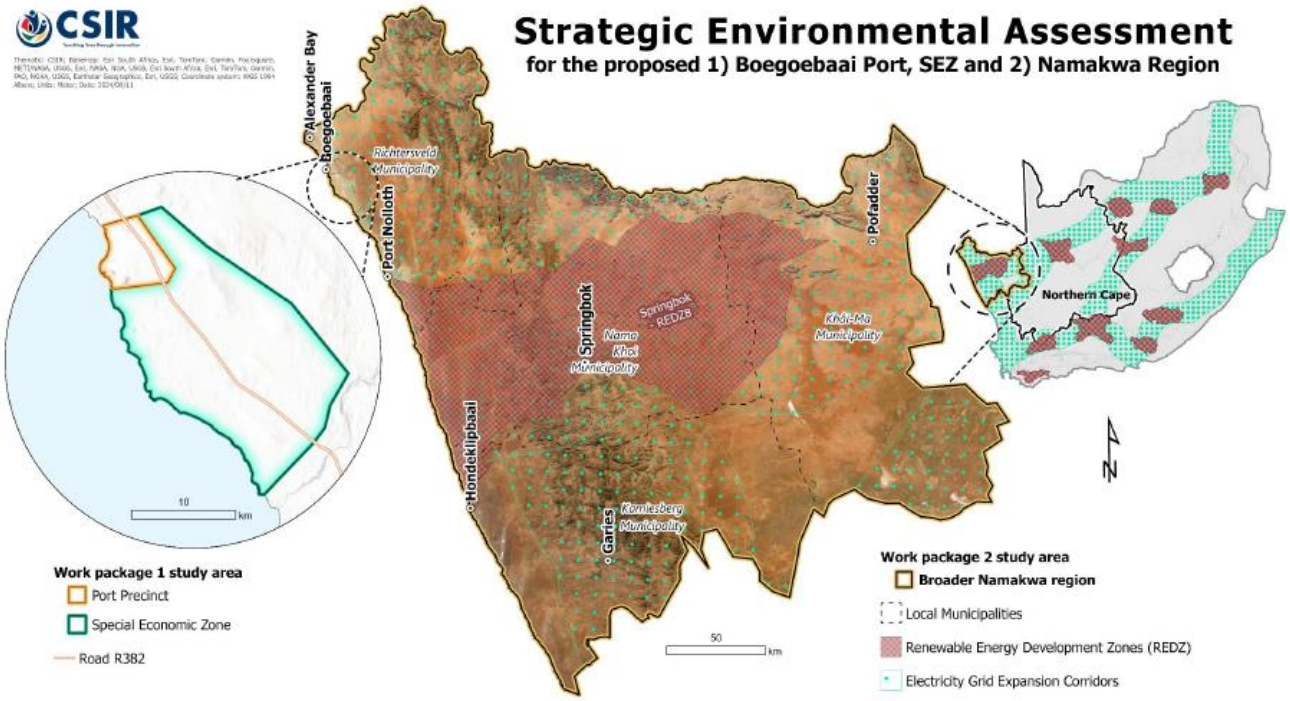


Figure 1-1: The spatial extent of the two SEA Work Packages (source: CSIR briefing note).

A SEA has been initiated through a collaboration between the South African National Energy Development Institute (SANEDI), Northern Cape Economic Development Trade and Investment Promotion Agency (NCEDA), and Transnet National Ports Authority (TNPA) (the Project Steering Committee (PSC)). The Council for Scientific and Industrial Research (CSIR) has been appointed to undertake an independent SEA. The overarching purpose of the SEA is to develop an integrated decision-making framework to guide the planning of the proposed Boegoebaai Port, SEZ, and wider Namakwa region in a sustainable manner.

This SEA Fauna report will cover the PA at a local-scale, which will spatially focus on identifying sensitivities around the proposed development covering ~33 500 ha. The outcome will inform the planning of the Port

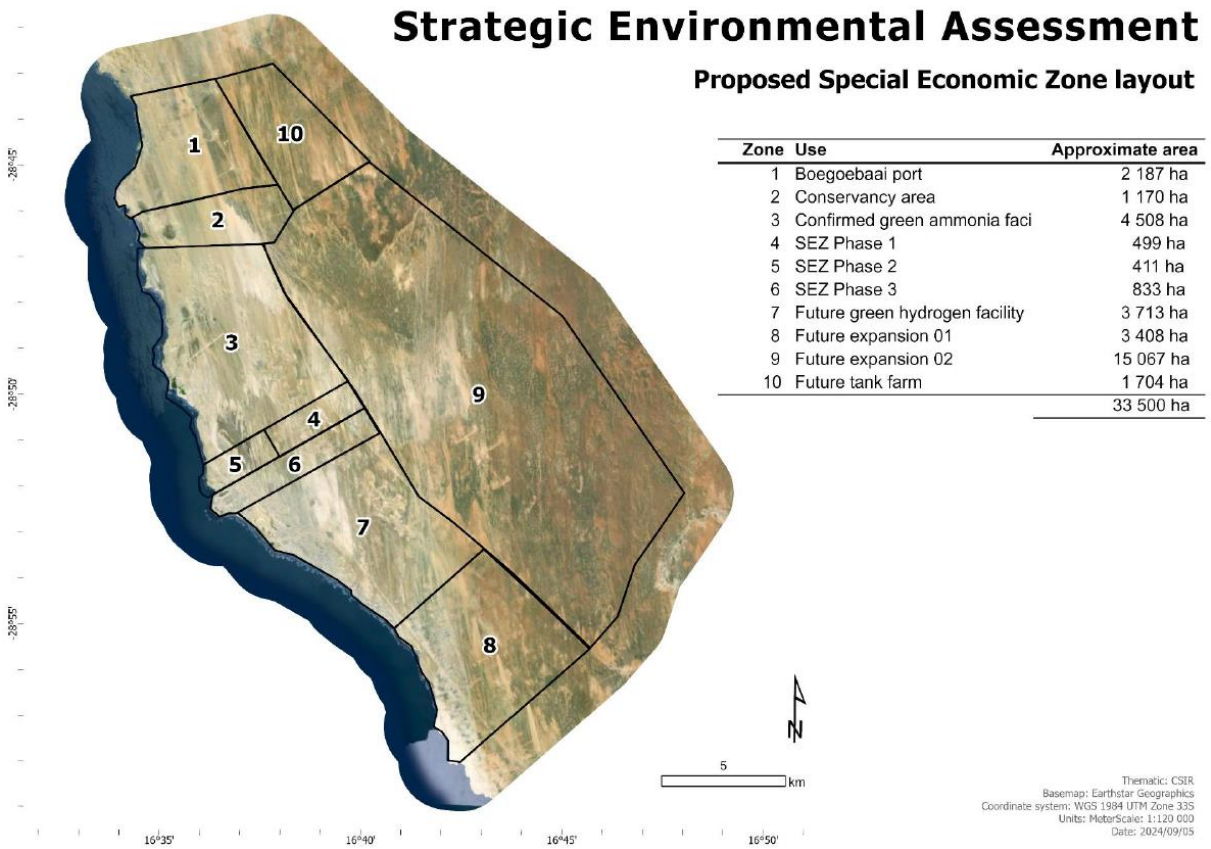
and SEZ, as well as provide references and recommendations for future project-specific Environmental Impact Assessments.

1.1 Proposed Special Economic Zone layout

The proposed Boegoebaai Port and Special Economic Zone (SEZ) consists of:

- Port precinct (3 378 ha), with a focus on the short-term (Phase 1A) port layout. The proposed short-term port layout, indicated within the 2 187 ha port precinct boundary (Figure 1-2), is intended to accommodate bulk liquid items such as green ammonia and diesel oil, dry bulk materials such as manganese and iron ore, and assorted break bulk cargo, which arrives in bulk and is then separated into individual components, such as lead and zinc. A phased approach will be followed for constructing the infrastructure and facilities for the Boegoebaai port development layout. This approach includes a short-term (Phase 1A) and long-term (Phase 1B) development plan for the port. The future expansion is currently envisaged within the confines of the currently proposed port precinct.

- SEZ (30 122 ha), focussing on both shorter term and future development zones.



Zone	Use	Approximate area
1	Boegoebaai port	2 187 ha
2	Conservancy area	1 170 ha
3	Confirmed green ammonia faci	4 508 ha
4	SEZ Phase 1	499 ha
5	SEZ Phase 2	411 ha
6	SEZ Phase 3	833 ha
7	Future green hydrogen facility	3 713 ha
8	Future expansion 01	3 408 ha
9	Future expansion 02	15 067 ha
10	Future tank farm	1 704 ha
		33 500 ha

Figure 1-2: The port footprint and Boegoebaai Special Economic Zone Layout, showing the TNPA Port Precinct, initial phases of the SEZ on the coastal side of the R382 road and commencing from closest to the Port precinct. (Source: NCEDA, 2024).

2. RESEARCH APPROACH AND METHODOLOGY

2.1 Defining the Research Problem

- **Objective**: Identify, describe and map the land use dynamics and change trends of the receiving environment and broader region as it relates to fauna as well as the environmental sensitivities around the Boegoebaai Port and SEZ development.

- **Focus**: Assess the distribution and habitat requirements of fauna species of conservation concern (SCC) and fauna communities. Focus is on mammals, reptiles and amphibians, and will exclude avifauna, bats and water-dependent marine species which are addressed in separate assessments.

- **Scope**: Fauna component as part of the overall Terrestrial Ecological Assessment within the SEA framework, with a strong focus on desktop and spatial data.

2.2 Research Design

The study will adopt a spatially focused assessment to ensure high-resolution environmental sensitivity mapping. The design will include:

- **GIS Mapping**: Integration of spatial data from existing surveys and secondary sources into a Geographic Information System (GIS).

- **Literature review**: Review of existing fauna assessments and databases.

- **Expert Input**: Collaboration with fauna specialists to validate ecological data and provide key insights on habitat sensitivity and conservation value.

2.3 Data Collection

2.3.1 Primary Data Requirements

No detailed on-site fauna assessments were undertaken but based on the habitat and vegetation descriptions produced by the botanists, key habitats for fauna can be described. Coupled with secondary data collection, sensitive areas were mapped for SCC.

2.3.2 GIS

Existing data layers from various sources were incorporated into QGIS (open source) to establish how the proposed developments and associated activities interact with important terrestrial features. Emphasis was placed on the following spatial datasets:

- Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018 – as amended);

- Northern Cape Critical Biodiversity Areas (Northern Cape Department of Environment and Nature Conservation, 2016);

- National Protected Area Expansion Strategy (NPAES, 2018);

- Red List of Ecosystems (RLE) for terrestrial realm for South Africa - Original extent (SANBI, 2022[a]);

- RLE for terrestrial realm for South Africa – remnants (SANBI, 2022[b]); and
- Protected and Conservation areas of South Africa (South Africa Protected Areas Database-SAPAD; South Africa Conservation Areas Database-SACAD)[1].

2.3.3 Literature Review and Secondary Data

- Review of existing environmental and ecological datasets, biodiversity databases, and scientific literature.
- Relevant books and publications providing information on distribution ranges and/or conservation status of fauna species were consulted to review predictions of SCC occurrence at local scale.
- Review of previous SEA and EIA reports related to the PA.
- Information relating to mammal SCC was obtained from the National Red List (Child *et al.* 2016)[2] for regional conservation status of mammals in South Africa.
- The National Red List[3] was utilised to provide the most current account of the regional conservation status of reptiles and amphibians. **Take note: the National Red List 2025 is due for publication November 2025, and where relevant specific species details and updates have been shared by SANBI, EWT and BLSA.**
- The IUCN Red List of threatened species (IUCN, 2025) for global conservation statuses was consulted[4].
- Spatial data from the South African National Biodiversity Institute (SANBI), provincial biodiversity conservation authorities (Northern Cape Department of Environment and Nature Conservation), and related institutions were consulted.
- iNaturalist, the Global Biodiversity Information Facility (GBIF), the Virtual Museum (VM) of African Mammals, Frog Atlas of Southern Africa and Reptile Atlas of Africa were used to source observation data in the area to generate expected species lists[5].

2.4 Species of Conservation Concern

The Red List of threatened species generated by the IUCN provided the global conservation status of mammals, reptiles and amphibians. However, regional conservation status assessments performed following the IUCN criteria are generally the most relevant and sourced for each group as follows:

- Reptiles: Bates *et al.* (2014, as amended);
- Amphibians: Southern African Frog Re-Assessment Group (SA-FRoG) (2015); Du Preez & Carruthers (2017); and
- Mammals: Child *et al.* (2016).

Take Note: This version of the report represents the final version in terms of recent information being made available on the unpublished 2025 National Red List. The listing of threatened fauna and/ or fauna SCC

[1] http://dea.maps.arcgis.com/apps/MapTools/index.html?appid=2367540dd75148e8b6eaeab178a19d3a
[2] https://www.ewt.org.za/resources/resources-mammal-red-list/
[3] http://speciesstatus.sanbi.org/
[4] https://www.iucnredlist.org/
[5] It must be noted that the VM closed its operations at the end of 2024.

are based on information received up until and including 7 May 2025. Any further changes will not be reflected in this report.

The conservation status categories defined by the IUCN (Figure 2-1), which are considered here to represent species of conservation concern[6] (SCC), are the "threatened" categories defined as follows:

- **Critically Endangered (CR)** - Critically Endangered refers to species facing immediate threat of extinction in the wild.
- **Endangered (EN)** - Endangered species are those facing a very high risk of extinction in the wild within the foreseeable future.
- **Vulnerable (VU)** - Vulnerable species are those facing a high risk of extinction in the wild in the medium-term.

Other measures of conservation status include species listed under the following:

- National listed threatened or protected species (TOPS) in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
- Convention on International Trade in Endangered Species (CITES; International).

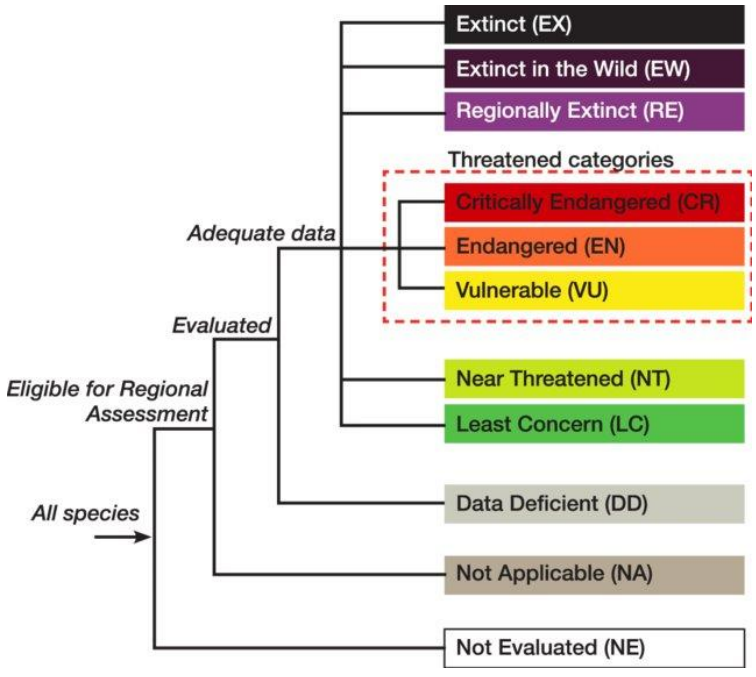


Figure 2-1: Schematic representation of the structure of the IUCN Red List Categories (IUCN 2012).

[6] Species of conservation concern have a high conservation importance in terms of preserving South Africa's high diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD).

2.5 Data Analysis and Interpretation

- Analyse habitat preferences and conservation status of ecosystems and species.
- Identify and map high-priority areas for conservation, habitat corridors, and zones of potential conflict with the proposed port and SEZ development.
- Provide key findings on fauna sensitivities and offer recommendations for future EIAs and project-specific mitigation strategies for the proposed development.

2.6 Assumptions and Limitations

Using secondary data for a fauna desktop assessment, especially in a remote region like the west coast of the Northern Cape where the proposed development is located, involves several limitations and assumptions. These can impact the reliability and applicability of the assessment findings:

General Project Details

- It is assumed that all third-party information acquired is correct (e.g., GIS data and scope of work).
- Focus is on mammals, reptiles and amphibians, and will exclude avifauna, bats and water-dependent marine mammals which are addressed in separate assessments.
- It is assumed the proposed development's scale and scope are unlikely to shift significantly during the study period.

Data Gaps and Incompleteness:

- Access to reliable secondary data sources in the absence of field surveys;
- Available secondary data might not cover all species or habitats in the area, especially lesser-studied or cryptic species;
- Historical data may lack recent trends or population dynamics due to environmental changes or human activities; and
- Potential lack of up-to-date or detailed secondary data, particularly for less-studied species or habitats in the region.

Spatial Resolution Issues:

- Full coverage of the 33 500-ha area is constrained in the databases, particularly in remote areas. Accordingly, there may be gaps in the secondary data.
- Secondary data may have broad spatial scales that do not align with the finer resolution required for site-specific assessments.
- Habitat or species distribution maps may not accurately reflect microhabitats present in the area.

Temporal Limitations:

- Older datasets may not reflect current conditions due to climate change, habitat destruction, or ecological shifts.

- Migration or seasonal variations in species distribution may not be captured in static datasets.

Bias in Data Sources:

- Secondary data may overrepresent certain areas or species due to researcher interest or accessibility.
- Surveys may exclude nocturnal, fossorial, or migratory species, leading to underrepresentation.

Lack of Contextual Information:

- Secondary data often lack behavioural, ecological, or physiological context needed to assess the specific impacts on fauna.

Inconsistency in Data Quality:

- Differences in data collection methods, accuracy, and sampling effort across studies can lead to inconsistencies.

Static Conditions:

- It is assumed ecological and environmental conditions have remained relatively stable since the data were collected.

Species-Habitat Relationships:

- Documented species-habitat relationships are valid for the region at the time of the assessment, despite potential variations in habitat quality or connectivity.

To mitigate against these limitations, it is recommended that the desktop review be complemented with targeted field surveys for site-specific validation. In addition, cross-check findings with taxa experts with local knowledge as well as recent regional studies. Furthermore, a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.

3. DESKTOP RESULTS

3.1 Regional Vegetation

Five vegetation units occur within the PA (Figure 3-1) of which two are listed as Critically Endangered (CR) under the revised Red List of Ecosystems (2022): Namib Seashore Vegetation (CR) – AZd 1, Richtersveld Coastal Duneveld (CR) – SKs 1, Northern Richtersveld Yellow Duneveld – SKs 2, Richtersveld Sandy Coastal Scorpionstailveld – SKs 4, Western Gariep Plains Desert – Dn 3.

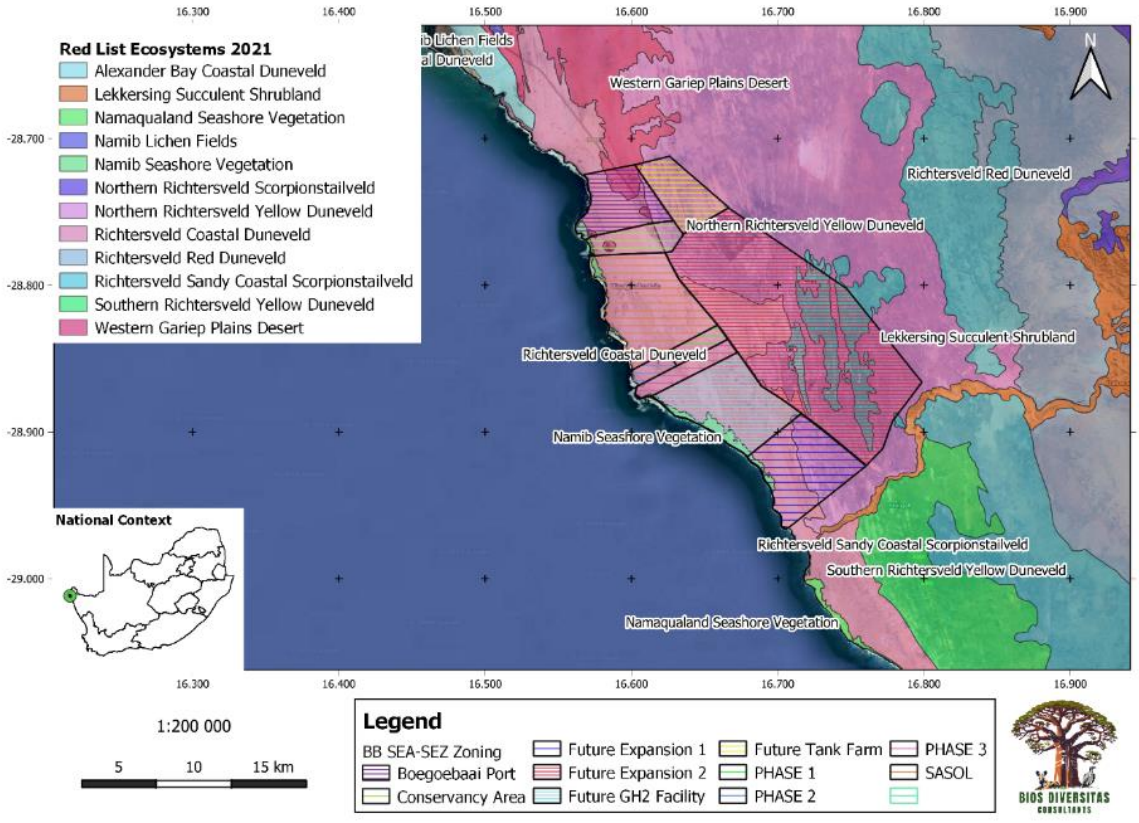


Figure 3-1: The Project Area in relation to regional vegetation and terrestrial Red List Ecosystems (RLE, 2022).

Namib Seashore Vegetation AZd 1 – Critically Endangered [A3, B1(i), B2(i)]

The Namib Seashore Vegetation occupies a narrow strip along the southern Namib Desert (one of the oldest and most arid deserts of the world), extending into the Northern Cape province of South Africa only marginally where it reaches its southernmost distribution limit on the Holgat River (just south of the PA). This ecoregion is characterised by its unique adaptations to a harsh coastal environment, where the Atlantic Ocean meets one of the driest terrestrial ecosystems on Earth.

The landscape is dominated by slightly sloping sandy beaches and adjacent moving and fixed coastal dunes (Strandveld Formation) and occasional coastal cliffs. Vegetation is dominated by dwarf shrubs up to 1 m tall and spiny grasses on the windblown dunes and small succulent dwarf shrubs dominating exposed rocky cliffs on the seafront. Adaptations such as to obtain moisture from the frequent coastal fogs rather than from rainfall are key in this environment.

The Namib seashore vegetation supports a variety of wildlife adapted to extreme conditions, potentially including:

- Grant's Golden Mole (*Eremitalpa granti granti*): A rare and highly specialised burrowing mammal that navigates through sandy dunes.
- Cape Fur Seals (*Arctocephalus pusillus pusillus*): Found along the coast, especially near rocky outcrops and beaches.
- Reptiles: Fog-dependent geckos and lizards, including the Web-footed Gecko (*Pachydactylus rangei*), a desert specialist.

National land cover data show that Namib Seashore Vegetation has experienced extensive spatial declines of approximately 95% since 1750. Namib Seashore Vegetation is narrowly distributed with high rates of habitat loss in the past 28 years (1990-2018), mainly due to diamond mining and coastal development, placing the ecosystem type at risk of collapse.

Richtersveld Coastal Duneveld SKs 1 – Critically Endangered [B1(i)]

The Richtersveld Coastal Duneveld (SKs 1) is a unique and ecologically significant landscape along the Atlantic Ocean coast from a point between the Boegoe (Buchu) Twins and Alexander Bay to about halfway between Port Nolloth and Kleinzee along a broad belt of 1–12 km within the Northern Cape province of South Africa. The north-south extension is 104 km. It forms part of the globally recognised Succulent Karoo Biome, a biodiversity hotspot known for its remarkable array of endemic species. It is characterised as generally flat with some large, gently rolling coastal dunes. On the active dunes, depending on the aspects of the slopes and on the phase of deflation and sedimentation, different plant communities occur.

Despite its arid conditions, the Richtersveld Coastal Duneveld supports an array of fauna uniquely adapted to its challenging environment:

- Namaqua Chameleon (*Chamaeleo namaquensis*): A desert-adapted chameleon that thrives in sandy habitats.
- Brown Hyena (*Parahyaena brunnea*): An elusive predator that roams the coastal areas, scavenging for food.
- Cape Fur Seals (*Arctocephalus pusillus pusillus*): Found along the coastal edge, particularly in rocky zones and sand dunes.
- Geckos and lizards: Fog-dependent reptiles like the Web-footed Gecko (*Pachydactylus rangei*) and desert-adapted skinks inhabit the sandy dunes.

Diamond mining is a key pressure on this ecosystem type, with 176.68 km^2 of the ecosystem directly impacted by mining activity. The vegetation unit is narrowly distributed with high rates of habitat loss in the past 28 years (1990-2018), placing the ecosystem type at risk of collapse. Sustained conservation efforts are essential to protect its unique landscapes and species for future generations.

Northern Richtersveld Yellow Duneveld SKs 2 – Least Concern

The Northern Richtersveld Yellow Duneveld forms a band approximately 5–25 km wide, running parallel to the coastline. It extends over 45 km, from south of Brandkaros in the north to the Holgat River in the south. The unit's altitude ranges from about 50 to 300 meters. At present no major threat to the unit has been identified and it is only slightly transformed by mining.

The landscape is predominantly composed of flat sand shields, occasionally interrupted by dunes that typically take the form of broad, flat "whale-back" structures. Steep dune crests and valleys are rare, but where they occur, the vegetation reflects the variation in topography.

The sands in this region are primarily yellow, wind-blown sediments of coastal origin, predating the white dune sands found further west. These sands are remnants of an ancient mobile dune field that stabilised over time due to climatic improvements and increased vegetation cover following the last glaciation. Despite stabilisation, the structure of the south-north-oriented dune ridges and associated valley systems remains discernible. Local erosion and sedimentation processes have created saline valleys with silty or loamy soils, enhancing habitat diversity. Currently, wind erosion occurs only minimally.

This region experiences a high frequency of coastal fog, which provides vital moisture to sustain life in this arid environment. Extreme wind speeds and sand-blasting winds from the south are common, with frequent storms shaping the landscape and influencing ecological dynamics. The unit is characterised by high beta diversity due to dune structures, especially high differences between mobile and fixed sand areas (the latter are partly covered by heuweltjies). It has experienced minimal transformation, only slightly transformed by mining.

Richtersveld Sandy Coastal Scorpionstailveld SKs 4 – Least Concern

This vegetation unit is a fragmented band that runs parallel to the coast, 8 to 28 km inland. Its northern boundary lies at the southwestern corner of the Annisvlakte, extending southward along the Holgat River and for approximately 30 km further south. The unit also stretches from just north of the Alexander Bay and Oograbies road in a southern direction to a point halfway between Port Nolloth and Kleinzee. Covering a length of 103 km along its north-south axis, the unit spans altitudes of 100–400 m.

The terrain is slightly flatter compared to the SKr 7 Northern Richtersveld Scorpionstailveld, with distinct boundaries that are evident in satellite and aerial imagery. These boundaries are marked by darker coloration caused by the presence of dense biological soil crusts. Habitat variability within this unit is driven primarily by differences in soil types and vegetation age, which are in turn influenced by the proportion of wind-blown sands. Additionally, grazing and mining activities contribute to local variability.

The area experiences coastal fog, which provides essential moisture for vegetation and biological processes, alongside high wind speeds. However, the winds are less frequent and weaker compared to the SKs 2 Northern Richtersveld Yellow Duneveld. This unique combination of factors shapes the ecological dynamics and visual characteristics of the region. Very little of the area has been transformed and there is no information available allowing for an estimation of the past and present role of small stock grazing.

Western Gariep Plains Desert Dn 3 – Least Concern

On the plains from east of Alexander Bay and south of Grootderm, extending about 15 km to the east and south. The unit borders on Succulent Karoo Biome to the south. The landscape is primarily flat to undulating, consisting of expansive plains interspersed with occasional rocky outcrops and low hills. The soils are typically shallow, sandy to gravelly, and often alkaline, reflecting the arid conditions. The sparse vegetation plays a critical role in stabilising the soil and providing food and shelter for desert-adapted fauna.

It is hardly transformed, almost half of it by road networks. The unit is highly sensitive to mechanical destruction of the soil surface. From a South African perspective, this vegetation has a high conservation value as it houses the main populations of some near-endemic species that are more frequently found in Namibia.

The sparse yet diverse vegetation supports a variety of desert-adapted fauna, including:

- Mammals: Herbivores like *Oryx gazella* (Gemsbok) and rodents such as *Gerbillurus spp.*
- Reptiles: A rich diversity of reptiles, including geckos, skinks, and snakes like the *Bitis schneideri* (Namaqua Dwarf Adder).

3.2 Northern Cape Critical Biodiversity Areas

The Northern Cape CBA Map (2016) 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 (Holness & Oosthuysen, 2016). Priorities from existing plans such as the Namakwa District Biodiversity Plan, the Succulent Karoo Ecosystem Plan, National Estuary Priorities, and the National Freshwater Ecosystem Priority Areas (NFEPA) were incorporated.

CBA's and ESA's are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. The primary purpose of CBAs is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. Biodiversity priority areas are described as follows:

- CBA's are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBAs the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat). All FEPA prioritised wetlands and rivers have a minimum category of CBA1, while all FEPA prioritised wetland clusters have a minimum category of CBA2.

- ESAs are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas. For ESAs a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor result in a population going extinct elsewhere). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

According to the CBA Map, the study area is located mainly in CBA 1 (irreplaceable) and CBA 2 (optimal) (Figure 3-2). The sensitivity features evaluated include the Namib Seashore Vegetation, Northern Richtersveld Yellow Duneveld, Richtersveld Coastal Duneveld, Richtersveld Sandy Coastal Scorpionstailveld, Namaqualand Salt Pans, Western Gariep Plains Desert, Conservation Areas, Threatened species, Namakwa CBA 1 and CBA 2 and associated, NPAES PA and Focus, Skep expert areas, all rivers and natural wetlands, and Large high value climate resilience areas.

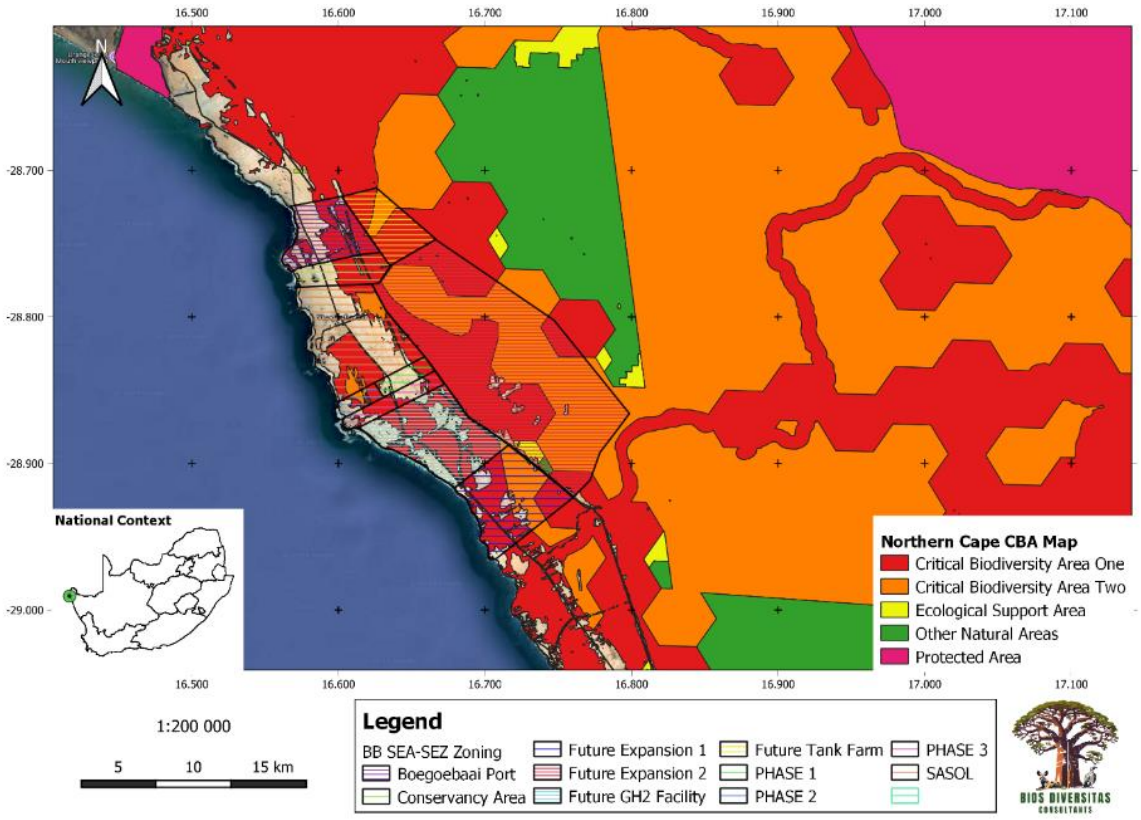


Figure 3-2: The Project Area in relation to Northern Cape CBA MAP (2016).

CBA 1: Irreplaceable are areas required to meet targets and with irreplaceability values of more than 80%, critical linkages or pinch-points in the landscape that must remain natural and Critically Endangered Ecosystems.

CBA 2: Optimal are areas selected to optimally meet biodiversity targets. Although these areas have a lower irreplaceability value than the CBA 1: Irreplaceable category, collectively they reflect the smallest area required to meet biodiversity conservation targets.

3.3 Fauna Habitats / Plant Communities

The botanists appointed for this project identified several habitats / plant communities after completing a site visit in August 2024. Overall, soil depth, texture and sand mobility appear to be the dominant drivers of vegetation composition at the site. For fauna habitats, these will be simplified into utilisation of habitat features.

3.3.1 Rocky outcrops

This habitat occurs where the basement geology is exposed, most notably on the outcrops such as the Boegoeberg (Buchu)Twins (Figure 3-3a), Namakwakop (note this is the Namakwakop on site, there is another Namakwakop to the north of the site on the topocadastral map) and around the telecommunications tower (Figure 3-3b). Parts of the lower slopes are covered by wind-blown sand and the vegetation of these areas resembles the sandy dunes. The rocky outcrop is considered a sensitive environment owing to the novel habitat it provides in a generally flat, sandy landscape and the unique vegetation associated with it.

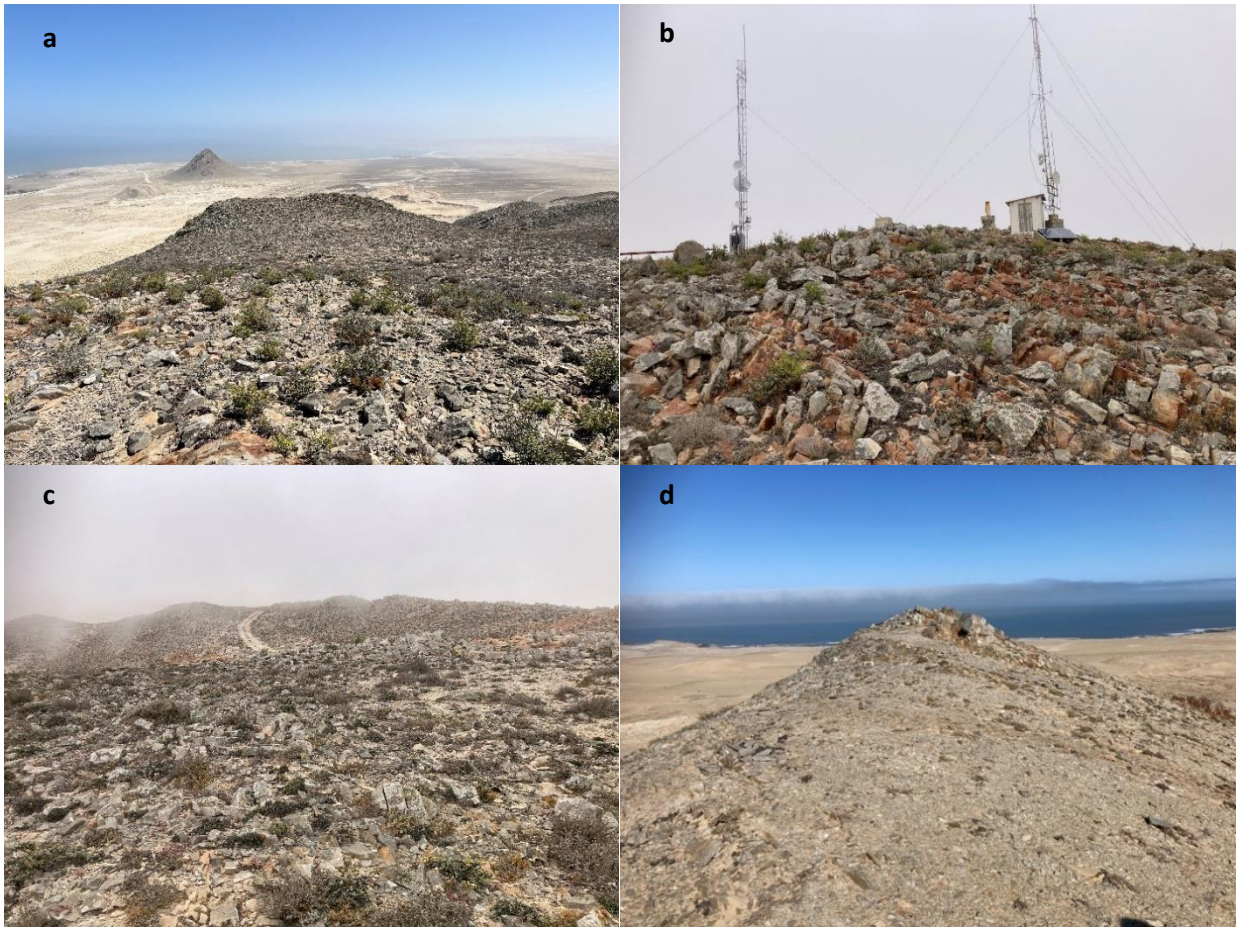


Figure 3-3: Rocky outcrop habitat at the Project Area. Photographic record of a. Boegoeberg North and South; b. telecommunications towers; c. on top of Boegoeberg South; d. Namakwakop.

3.3.2 Coastal Duneveld

The species composition recorded in this unit during the site visit agrees well with the description of the Richtersveld Coastal Duneveld provided in Mucina & Rutherford (2006). It consists of plains with low hills and rocky ridges. The sand dunes consist of both tall relatively steep dunes and low flat dunes which are well vegetated and are not mobile.

Species associated with sandy habitats are likely to occur in the dunes while those which require a firmer substrate are likely to occur in the granitic outcrops as well as on the plains. Several listed species potentially occur in the PA, these include Grant's golden mole *Eremitalpa granti granti* which is likely to occur in the dunes on the site and De Winton's golden mole *Cryptochloris wintoni* which occurs in sandy areas of the Namaqualand coastal plain and may occur within the western parts of the site. Refer to Section 3.4 below for a description of the species.

This habitat is considered of High Sensitivity as a result of the steep nature of the dunes and the potential for wind erosion in disturbed areas.

Figure 3-4: Photographic evidence of the Coastal Duneveld. Some areas still have intact vegetation, while other were disturbed historically.

3.3.3 Waterbodies

Waterbodies in the PA are scarce, but sources of water for fauna coming from Rietfontein and Visagiesfontein, embedded in the Richtersveld Coastal Duneveld, are cricital in this arid landscape (Figure 3-5). Furthermore, hollows in outcrops of granite boulders, embedded in either the Northern Richtersveld Yellow Duneveld or the Richtersveld Sandy Coastal Scorpionsveld, are filled with water during the rainy season and act as important sources of water for fauna.

Figure 3-5: Photographic evidence of waterbodies within the Project Area. a. Rietfontein; b. Visagiesfontein; c. and d. Granite outcrop known as the Klipbakke where water accumulates in hollows.

3.3.4 Plains Habitat

This habitat occurs in the south-central part of the SEZ around Duikerkop, as well as the southern and northern parts of the area mapped as Northern Richtersveld Yellow Duneveld. Based on geology and topography, it can be separated into the Lowlands- and Uplands plains habitat. Lowlands occur roughly below 100 masl which is more representative of the Richtersveld Coastal Duneveld, while the upland section is more representative of the Northern Richtersveld Yellow Duneveld occurring above 100 masl. It could be important for fauna owing to the stability of the substrate and presence of burrow systems.

Figure 3-6: Upland habitat characteristic of the Northern Richtersveld Yellow Duneveld.

3.3.5 Transformed Areas

These are areas that have been entirely transformed by mining activities and represent modified habitat according to IFC Performance Standard 6 (IFC, 2012, updated 2019). Very few homesteads and major road networks occur within the PA, but surface mining infrastructure and associated activities are probably the main cause of habitat loss.

Figure 3-7: Transformed habitat owing to mining activities. a. & b. mining activities; c. the modified mined habitat; d. sand dune rehabilitation.

3.4 Faunal Communities

Due to the moderate diversity of habitats and environments present, the site has a fairly rich faunal community. Several unique vegetation features within the PA, including Heuweltjies (termite mounds) associated with the Richtersveld Sandy Coastal Scorpionstailveld, shape the landscape and attribute to the faunal assemblages found within the PA. These are believed to be the oldest termite mounds in the world and serve as valuable records of prehistoric climate conditions. In addition, they also offer two mechanisms to sequester CO_2 (). The southern harvester termite, *Microhodotermes viator,* inhabit these Heuweltjies and play a critical role as ecosystem engineers in regulating ecosystem services by influencing the distribution of natural resources such as water and nutrients in the landscape and consequently the diversity of soil microbes, plants and animals.

3.4.1 Mammals

Based on available information for the larger area, approximately 40 mammal species could occur at the PA (refer to sections 0 and 0). Due to the relatively moderate diversity of habitats available, not all of these are likely to occur at the PA. For example, rocky habitats are limited within the PA for medium sized mammals associated with this habitat. This is less significant for small mammals which are likely to utilise rocky outcrops in this arid landscape. Due to the mobility and broad habitat tolerances of larger mammals, they are not likely to be highly sensitive to the development of the area. The site is ideal for smaller mammal communities and a relatively large number of rodents, shrews, moles and mole rats occur in the surrounding area. Common species observed in and within the vicinity of the PA include *Parotomys brantsii*, *Micaelamys namaquensis* and *Otomys unisulcatus* and some medium to larger species such as *Oryx gazella, Parahyaena brunnea and Felis lybica* (refer to sections 0 for iNaturalist records). According to Pieter van Wyk, the largest population of Brant's whistling rats (*P. brantsii*) in South Africa likely occurs within the PA, just north of Duikerkop. This is significant from an ecosystem services perspective as *P. brantsii* act as an ecosystem engineer, playing a vital role in the plant community composition and structure.

Species associated with sandy habitats are likely to occur in the coastal duneveld while those which require a firmer substrate are likely to occur in the rocky outcrops as well as in the uplands. At least four SCC potentially occur in the PA (refer to section 3.6), including De Winton's Golden Mole *Cryptochloris wintoni* (listed as Critically Endangered) which occurs on coastal dunes and adjacent sandy areas in Strandveld of the Namaqualand coastal plain and Grant's Golden Mole *Eremitalpa granti granti* (listed as Vulnerable) which is likely to occur in the coastal duneveld. Refer to section 3.5.2 for species description.

3.4.2 Reptiles

As many as 58 reptiles may occupy the PA (refer to sections 0 and 0), indicating that the area has a high reptile diversity. The reptiles comprise two orders (Testudines – turtles, and Squamata – lizards and snakes), consisting of three tortoises, two chameleons, 15 snakes and 38 lizards (including geckos and skinks). This indicates that the area is particularly rich in lizards and snakes, verified by the presence of 21 species at the PA. Even though tortoises prefer the rocky outcrops to the east of the PA, records of *Chersina angulata* indicate that they frequent the PA, especially along the R382 where they are vulnerable to collisions with motor vehicles (current impact). Accordingly, tortoises may be negatively impacted by the proposed development from vehicle collisions as well as predation by avian predators while traversing open areas.

Attractive species such as chameleons, lizards and tortoises are also vulnerable to collection for use as pets or trade, and the increased accessibility resulting from the new roads that will be constructed as part of the development would raise the risk for these species.

Five SCC may occur in the area (refer to section 3.6), of which two are listed as Critically Endangered, two as Endangered and one Near Threatened. Only two species, *Pachydactylus rangei* and *Bitis schneideri*, are likely to occur at the PA owing to sparse rocky outcrops for tortoises and limited sandy beaches for turtles. These species are associated with sandy habitats (dunes) and are likely to be most affected by proposed developments. The impact of the port development on turtles needs to be investigated.

3.4.3 Amphibians

As a result of the scarcity of fresh water in the area, only three species are likely to occur at the site. The Namaqua Caco *Cacosternum namaquense* is dependent to a greater or lesser degree on surface water for habitat or breeding purposes. The remaining species are either largely independent of water such as *Breviceps macrops* or well adapted to arid conditions such as the two *Vandijkophrynus* species.

The desert rain frog *Breviceps macrops* occurs in Strandveld vegetation up to 10 km from the coastline and has recently been uplisted from Near Threatened to Vulnerable. The species has been recorded on site (Van Wyk, 2024) and between the PA and the Holgat River towards the south. Waterbodies in the PA are scarce but areas like Rietfontein and Visagiesfontein provide suitable habitat for amphibians, even if just temporary or seasonally.

3.4.4 Database searches: iNaturalist

As a crowdsourced species identification system, iNaturalist is an online social network of people sharing biodiversity information to help each other learn about nature. It helps you to identify the plants and animals around you while generating data for science and conservation. It also operates as an organism occurrence recording tool where access to observational data collected by iNaturalist users can be utilised by members. It is not a repository for external data, and as such there are limitations to its use. If the PA is undersampled owing to its location from major cities/towns, accessibility or observer bias, the quality and quantity of data should be considered in this context. Accordingly, a larger area should be searched for to obtain an observed and expected list of species which could intersect the PA.

For this project, a boundary was drawn from Oranjemund, Namibia, in the North to Port Nolloth in the South (Figure 3-8). Filters applied included selecting only amphibians, reptiles and mammals to obtain an observed list of 56 species for the PA (Figure 3-9). Of these, approximately 15 mammal species, 37 reptile species and 4 amphibian species distribution ranges potentially intersect the PA.

For fauna SCC, the extent was increased to the east towards Richtersveld and Jakkalsputs as observations of sensitive species are obscured and the point locality is therefore not accurate (Figure 3-10). From this, nine fauna SCC have been observed within the larger area (Figure 3-11).

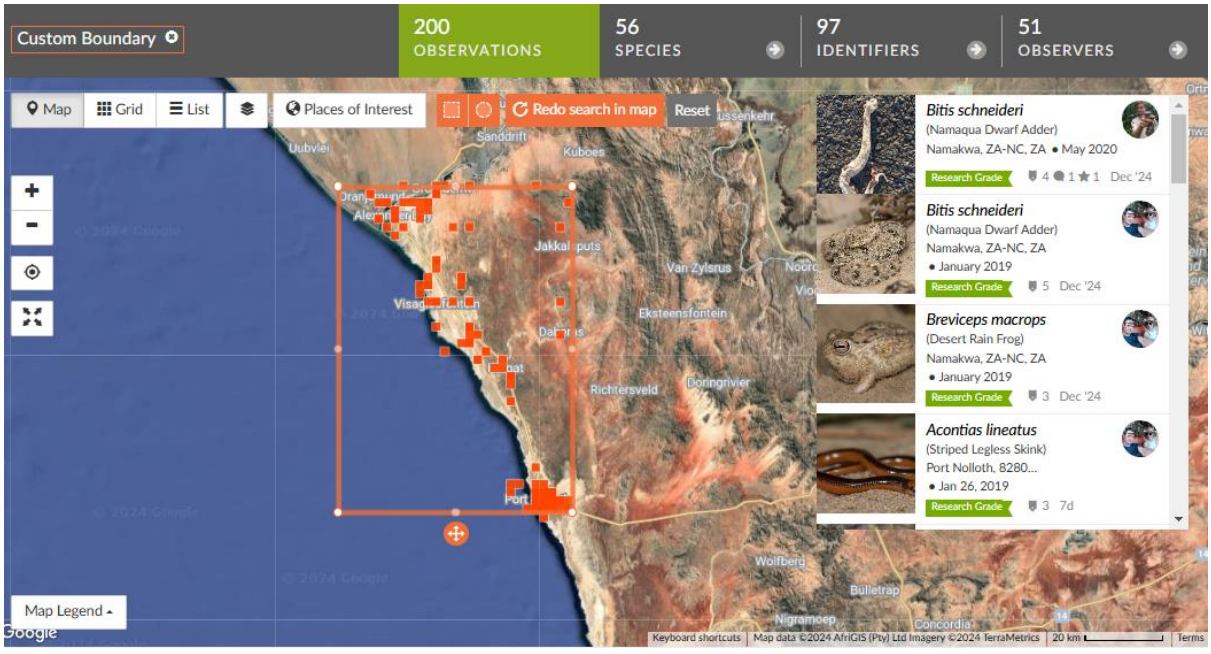


Figure 3-8: Fauna species records for the local Boegoebaai Port and SEZ (Source: iNaturalist:).

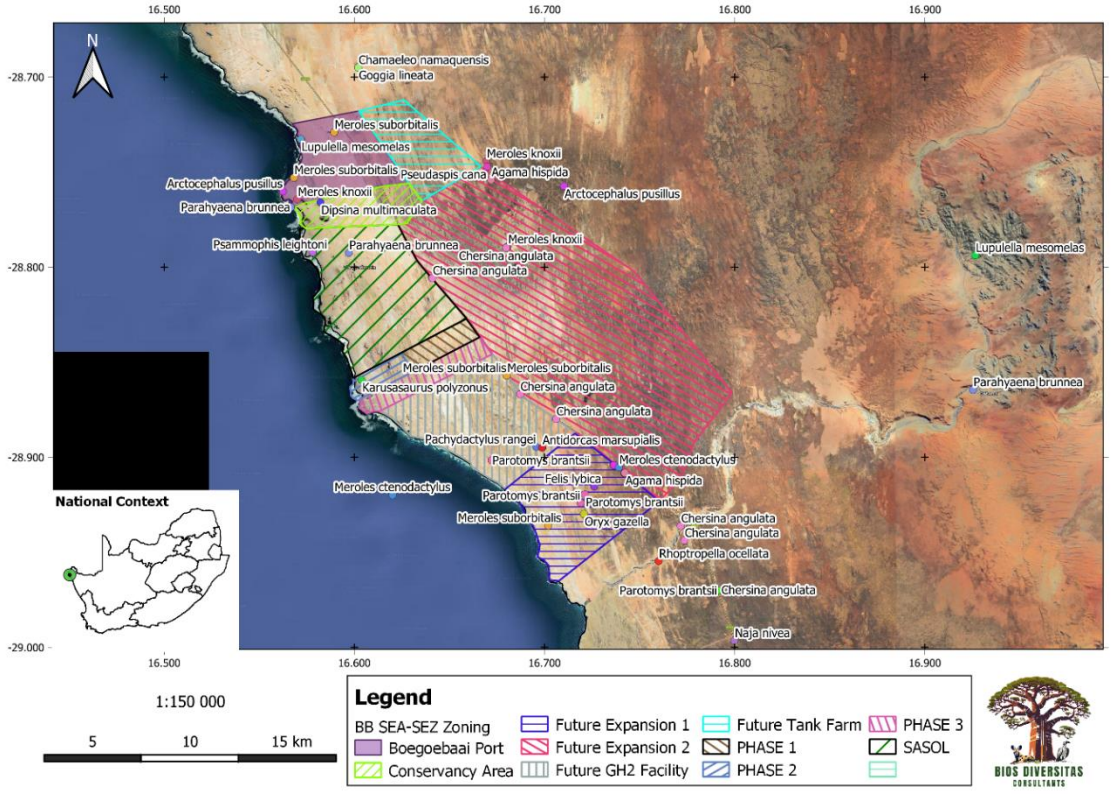


Figure 3-9: Map indicating the records of 56 species as per iNaturalist observations for the Project area.

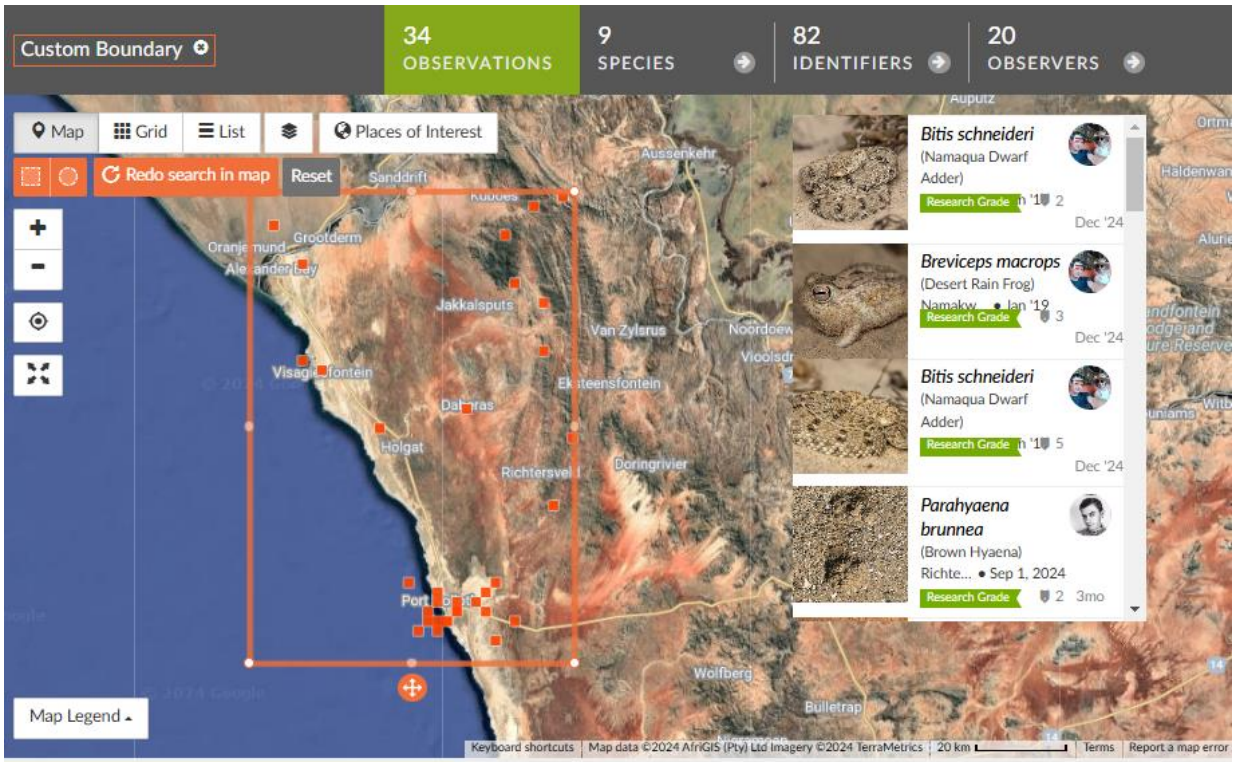


Figure 3-10: Fauna species of conservation concern records for the local Boegoebaai Port and SEZ (Source: iNaturalist).

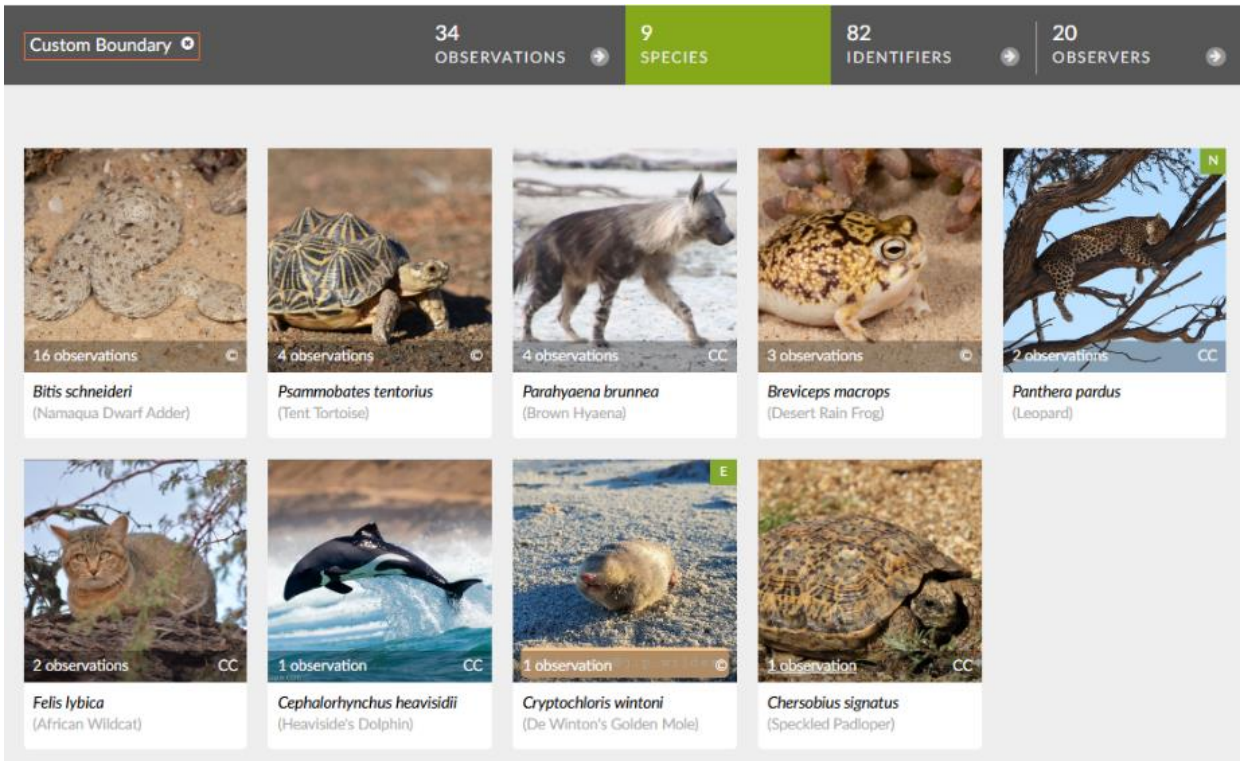


Figure 3-11: Nine fauna species of conservation concern observed at a local scale (Source: iNaturalist).

3.5 Threatened Fauna and Species of Conservation Concern

A list of 10 fauna SCC was generated based on available secondary data for the region, as indicated in Table 3-1. Of these, five (5) are reptiles (indicated in light orange), four (4) are mammals (indicated in light blue) and one amphibian (indicated in light green). Three (3) species are listed regionally as Critically Endangered (CR), two (2) species as Endangered (EN), two (2) species as Vulnerable (VU) and three (3) species as Near Threatened (NT).

Table 3-1: Expected List of Fauna Species of Conservation Concern for the Project Area. Red List based on Regional (R)[7] and IUCN Global (G) status. (Status: NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered).

Scientific Name	Common Name	Red List Status	Likelihood
Chersobius signatus	Speckled Cape Tortoise	EN (R, G)	Moderate to Low
Psammobates tentorius trimeni	Western Tent Tortoise	EN (R, G)	Moderate
Pachydactylus rangei	Namib web-footed gecko	CR (R)	High
Bitis schneideri	Namaqua Dwarf Adder	NT (R)	High
Dermochelys coriacea	Leatherback Sea Turtle	CR (R); VU (G)	Moderate
Cryptochloris wintoni	De Winton's Golden Mole	CR (R)	High
Eremitalpa granti granti	Grant's Golden Mole	VU (R)	High
Hyaena (Parahyaena) brunnea	Brown Hyaena	NT (R)	High
Panthera pardus pardus	African Leopard	VU (G)	Moderate
Breviceps macrops	Desert Rain Frog	VU (R, G)	High

[7] Mammals, Amphibians and Reptiles

3.5.1 Herpetofauna

***Psammobates tentorius trimeni* Western Tent Tortoise – Endangered A4ce**

P. t. trimeni is restricted to the winter-rainfall region dominated by dwarf succulent shrubs and annuals, concentrated in the Namaqualand Sandveld and Richtersveld Bioregions and extends peripherally into the Namaqualand Hardeveld Bioregion (Figure 3-12, Figure 3-13). This subspecies is assessed to be **Endangered** under criterion A4ce (Hofmeyr *et al*. 2018[a]) owing to continuous detrimental impacts on its sensitive habitat as discussed below.

The range of *P. t. trimeni* is small and restricted to a few vegetation units of the western Succulent Karoo, which are under continued pressure from multiple impacts from overgrazing, destructive or illegal mining, and unsustainable land use involving ploughing of natural veld for fodder cropping, uncontrolled harvesting of natural products, and irresponsible tourism activities in sensitive areas (Bourne *et al*. 2012).

Furthermore, predictions are that climate change will bring an increase in temperature and a decrease in rainfall, with increased aridity in the western Succulent Karoo (Bourne *et al*. 2012). Such changes would increase grazing pressure in this region, which is expected to affect the status of *P. t. trimeni* adversely. It is estimated that >30% of the taxon's habitat has been destroyed over the past 40 years (1.5 generations) and that future changes in habitat over the next 40 years (1.5 generations) will be at least of equal proportions, with a total reduction in population size in excess of 50%. Available information indicates that Pied Crow (*Corvus albus*) predation on this taxon is increasingly severe, with anthropogenic facilitation having led to increased abundance of this species in western South Africa over the past three decades (Cunningham *et al*. 2016), making increased predation on *P. t. trimeni* highly likely, especially in conjunction with the current (and predicted) prevailing South African drought.

P. tentorius is included in CITES Appendix II and is protected in South Africa by provincial nature conservation ordinances and biodiversity laws at regional level. Conservation measures to protect the habitat of *P. t. trimeni* are essential, as well as basic research on the taxon's demographics, ecology, and status.

Based on IUCN range data for the higher taxon group and observational records (Figure 3-13), the species is likely to occur in the PA but is found mainly towards the east of the PA in the Richtersveld (this could be due to a lack of observational data). Accordingly, the PA has suboptimal suitable habitat for the species and it is likely to occur in lower numbers. The rocky areas including Boegoeberg North and South and Visagiesfonteinkop could be important climate refugia for the species in the future, but less likely than the Richtersveld towards the east of the PA. The species is considered to have a medium sensitivity for the PA.

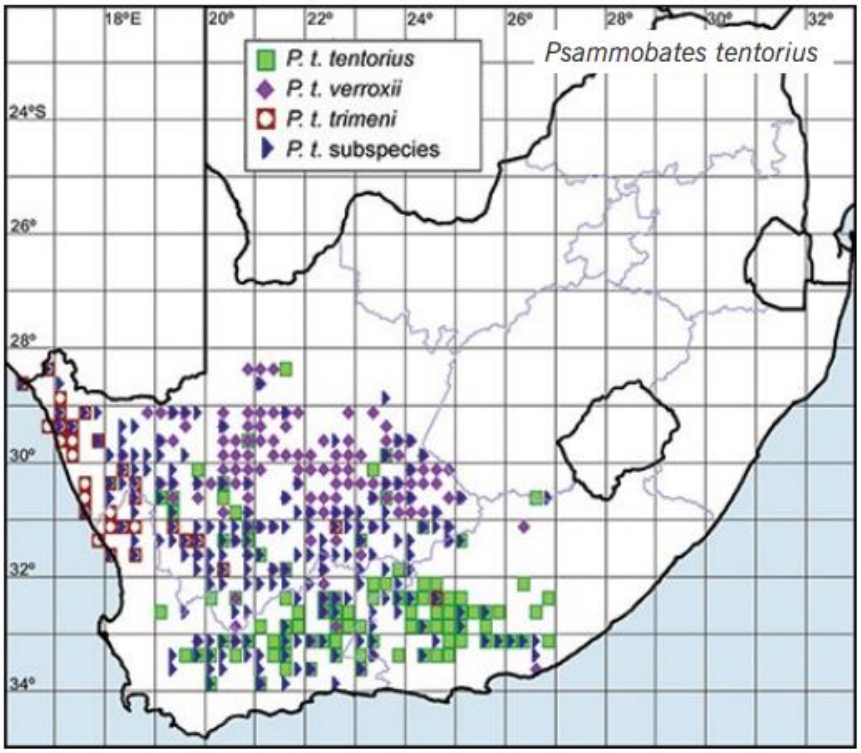


Figure 3-12: Distribution maps based on museum and other records for all *Psammobates tentorius* subspecies (Source: Bates et al. 2014).

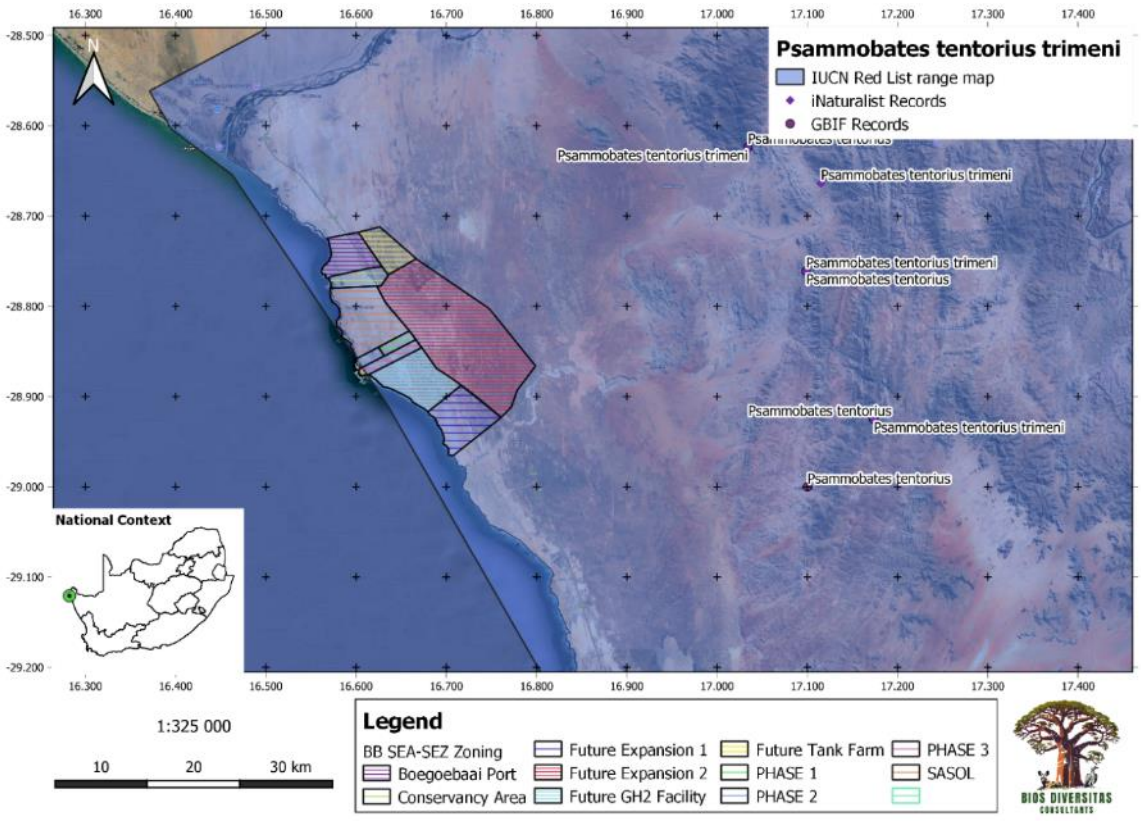


Figure 3-13: IUCN distribution range, iNaturalist and GBIF records for *Psammobates tentorius trimeni* in relation to the Project Area.

Dermochelys coriacea Leatherback Sea Turtle – Critically Endangered (Regionally); Vulnerable (Globally)

Leatherbacks are distributed circumglobally, with nesting sites on tropical sandy beaches and migratory and foraging ranges that extend into temperate and sub-polar latitudes (see Eckert *et al*. 2012 for review). The Southwest Indian subpopulation nests along the Indian Ocean coast of South Africa and Mozambique, and marine habitats extend through the Agulhas Current around the Cape of Good Hope in the Indian and Atlantic Oceans. Accordingly, the Southwest Indian Ocean distribution range of the Leatherback Sea Turtle overlaps the PA (Figure 3-14).

Considering the small number of mature individuals (estimated 148 adult males and females total in this subpopulation) and the evidence of a small but continuing decline, assessment of available data under Criterion C resulted in a **Critically Endangered** classification C2a(ii) (Wallace *et al*. 2013).

Even though the PA is not identified as a nesting beach, historical tracking records indicate the species presence in the marine habitat of the Atlantic Ocean, but no observations of the species have been recorded along the west coast between Alexander Bay and Port Nolloth. The rocky cliff areas and diamond mining at the PA are a hinderance for the species to gain access to the sandy beaches, while small patches of the Namib Seashore Vegetation could be utilised by the species.

It is recommended during the EIA application phase to survey the remnant patches along the coast to establish sightings and suitable habitat for the species. It is unlikely that the species could represent a fatal flaw to the project, but in the absence of sufficient field data the precautionary principle must be followed.

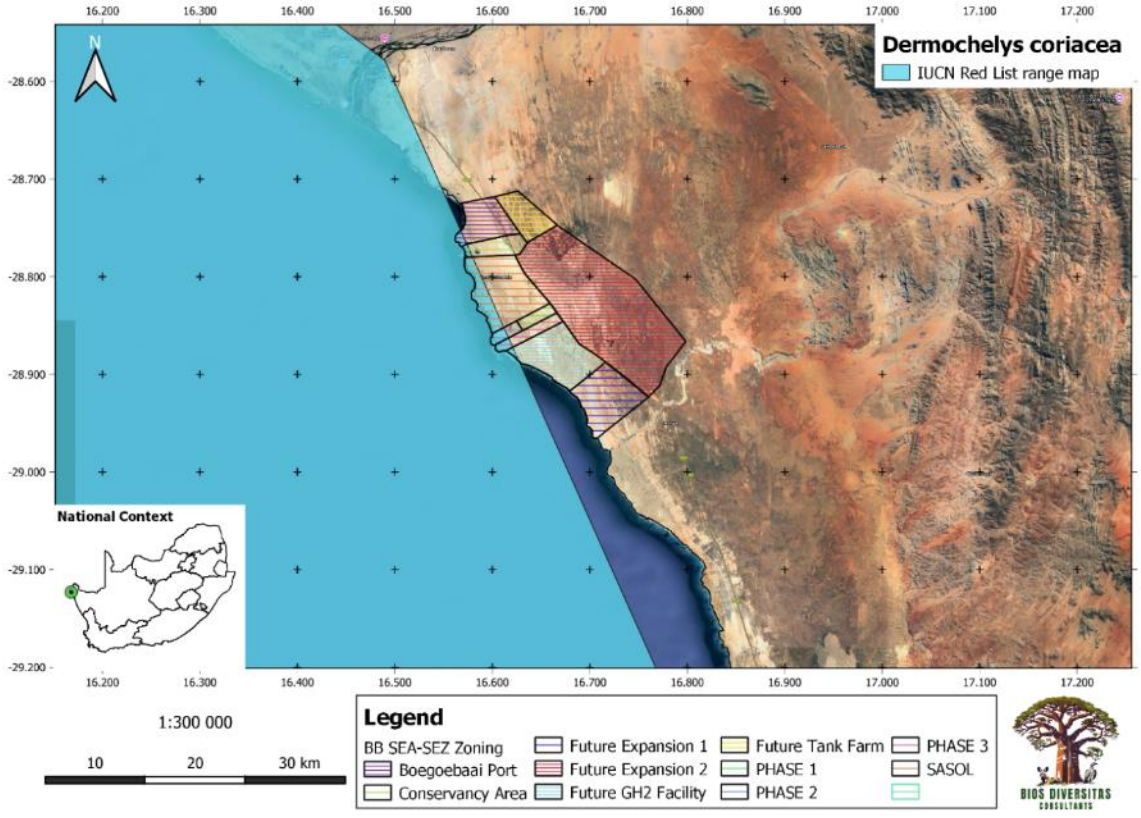


Figure 3-14: IUCN distribution range for *Dermochelys coriacea* in relation to the Project Area.

Chersobius signatus Speckled Cape Tortoise – Endangered A4ace

Previously included in the genus *Homopus*, this species is now considered to be in the genus *Chersobius* as adopted by Turtle Taxonomy Working Group (TTWG, 2017), and subsequently verified by morphological analysis (Hofmeyr and Branch 2018). *C. signatus* is endemic to South Africa, mainly present along the West Coast region. The most northerly records are from the Richtersveld (Bauer and Branch 2001; iNaturalist record 507286, May 2018). The species occurs predominantly in the winter rainfall region of the northwestern Succulent Karoo and Fynbos biomes from a few metres above sea level on the West Coast to elevations of around 1,000 m in the interior at Springbok, Loeriesfontein-Calvinia, and the Cederberg Range. It can be found in low to medium-high Namaqualand succulent blomveld and heuweltjieveld, and fynbos and strandveld shrub vegetation. The species shows a particular preference for rocky terrain (Loehr 2002), which includes typical Namaqualand and Hardeveld granite koppies in the north.

Based on IUCN range data and iNaturalist records (Figure 3-15), the species is unlikely to occur in the PA as it prefers rocky terrain towards the east of the PA in the Richtersveld. Accordingly, the PA has suboptimal suitable habitat for the species and is unlikely to frequent the PA. The species is considered to have a low to medium sensitivity for the PA.

It is estimated that a population reduction of at least 30-40% over the past 25-50 years (1-2 generations) is likely due to anthropogenic land transformation and other threats, where the causes of destruction have not ceased. The reduction in population size is based on surveys that showed habitat destruction and degradation, fragmentation, and the extirpation of populations, a decline in area of occupancy (AOO) and habitat quality (Hofmeyr *et al.*, 2018), as well as an increase in predation by invasive Pied Crows, further amplified by climate change where the western Succulent Karoo is expected to increase in temperatures and decrease in rainfall, causing an increase in aridity which could affect growth rates and fecundity of females and ultimately the survival of the species (Bourne *et al*. 2012; Loehr & Henen 2007, 2009, Loehr *et al*. 2011). Accordingly, the species qualifies as **Endangered** under criteria A4ace.

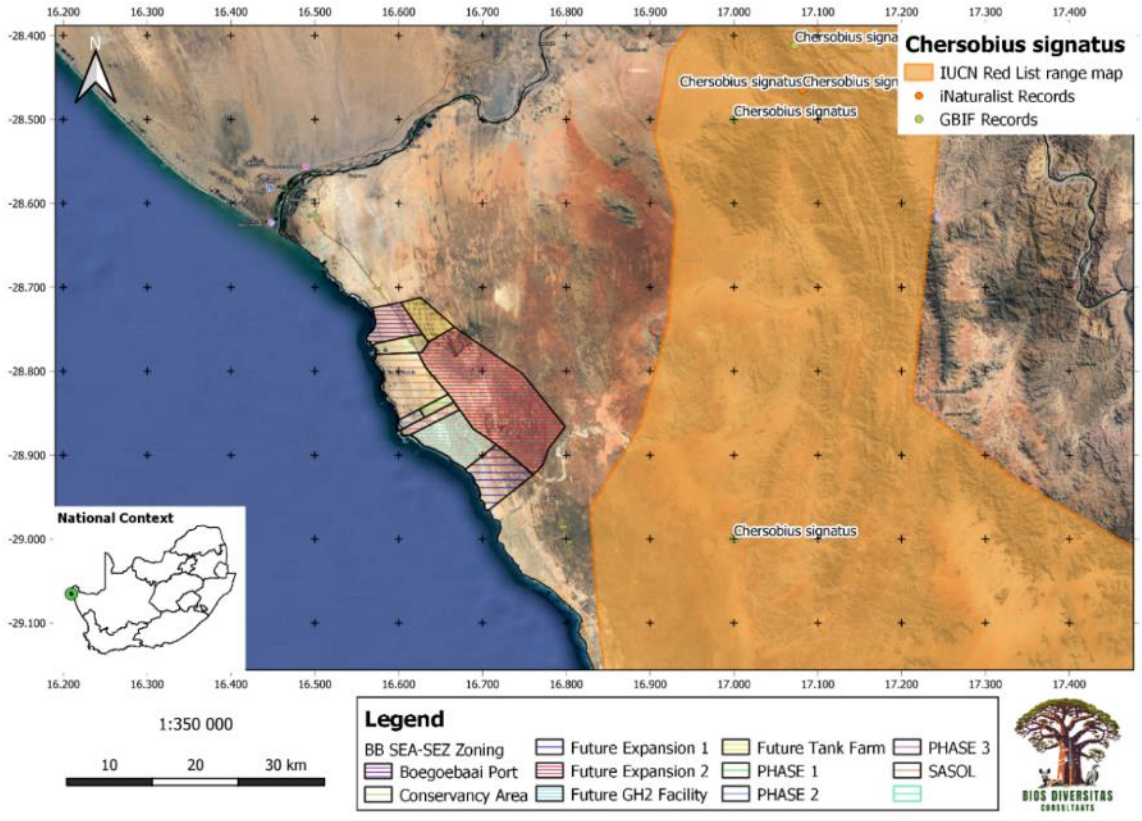


Figure 3-15: IUCN distribution range, iNaturalist and GBIF records for *Chersobius signatus* in relation to the Project Area.

***Pachydactylus rangei* Web-footed Gecko – Critically Endangered (Regionally); Least Concern (Globally)**

The Namib Web-footed Gecko, *P. rangei*, is a nocturnal dune-dwelling gecko endemic to southern Africa. Little is known about the population characteristics and spatial ecology of the species. Home range analyses are crucial for providing information on species movement patterns and habitat preferences (Buchanan *et al*. 2023). It is however known *P. rangei* females lay eggs mainly between November and March, sometimes as late as May (Goldberg, 2008; Haacke, 1976) which is important for proposed developments to reduce construction phase impacts during this period.

It occurs in Desert and Coastal Sand Dune habitats in the Northern Cape of South Africa and northwards along the coast of Namibia into southern Angola. It is typically associated with wind-blown sands along the coast and desert (Branch 1998). They are nocturnal, spending the day in a tunnel in the sand (Branch 1998). This terrestrial species has a marginal extension into South Africa where it is threatened by alluvial diamond mining and is considered **Critically Endangered** (Bates *et al*. 2014). Elsewhere, it has an extensive range in the desolate dune seas of the Namib Desert in Namibia and Angola (where it is abundant, with a stable population) where it is listed globally as **Least Concern** (Baptista *et al*. 2020). The regional assessment might have to be reevaluated considering the species abundance and extensive range as well as taking into consideration the continuous detrimental impacts on the species habitat, especially within the coastal duneveld habitats along the coast owing to diamond-mining in South Africa.

The PA intersects with the species distribution range, with one iNaturalist record and two additional records from GBIF (Figure 3-16). Accordingly, the presence of the species in the PA, especially within the coastal duneveld habitat is considered of high sensitivity. Additional mitigation measures will be required during the species breeding period for the construction phase.

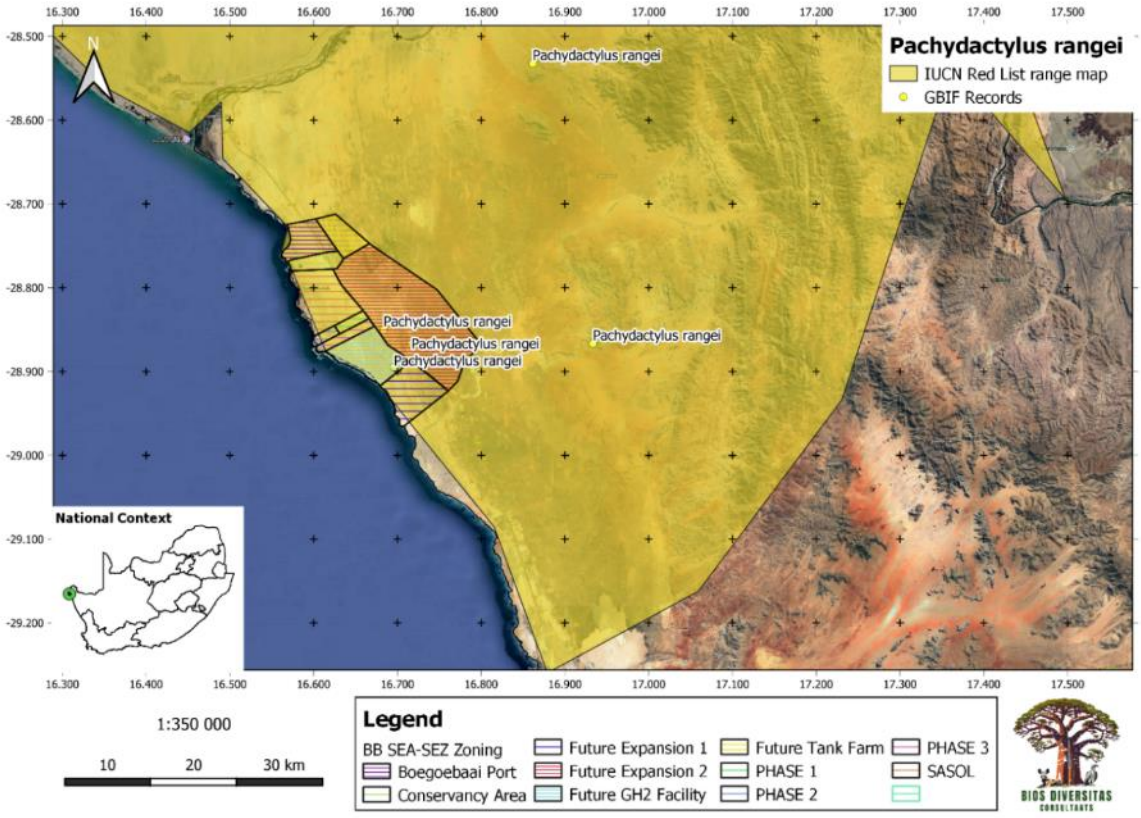


Figure 3-16: IUCN distribution range and observation records of *Pachydactylus rangei* in relation to the Project Area.

Bitis schneideri Namaqua Dwarf Adder – Near Threatened (Regionally); Least Concern (Globally)

The species is endemic to southern Africa and found from the mouth of the Olifants River in the Western Cape, South Africa, northwards to Lüderitz Bay in southwestern Namibia (Branch 1998, Bates et al. 2014). The species is considered well protected, has a moderately sized distribution (15,300 km^2) and a large extent of occurrence (EOO = 27,100 km^2) that shows no evidence of decline in extent.

The species is a habitat specialist with a small distribution across a region of South Africa that is impacted by habitat transformation due to mining and urbanisation, but the habitat loss is relatively small compared to the species overall range. Accordingly, the species is considered Least Concern globally (Tolley *et al*. 2019). It inhabits semi-vegetated sandy desert areas, mostly close to the coast. These snakes occur at high population densities, experience relatively high annual mortality (Maritz and Alexander 2012), which is counter-balanced by frequent reproduction (Maritz and Alexander 2013). They are generalist predators that consume a wide range of small-bodied vertebrates (Maritz and Alexander 2014).

The PA intersects with the species distribution range, and several iNaturalist and GBIF records occur within the vicinity of the PA (Figure 3-17). It is likely that the species could occur in the PA and the species is considered moderate sensitivity for the PA. Appropriate mitigation measures will be required to reduce negative impacts and to enhance the species habitat and movement.

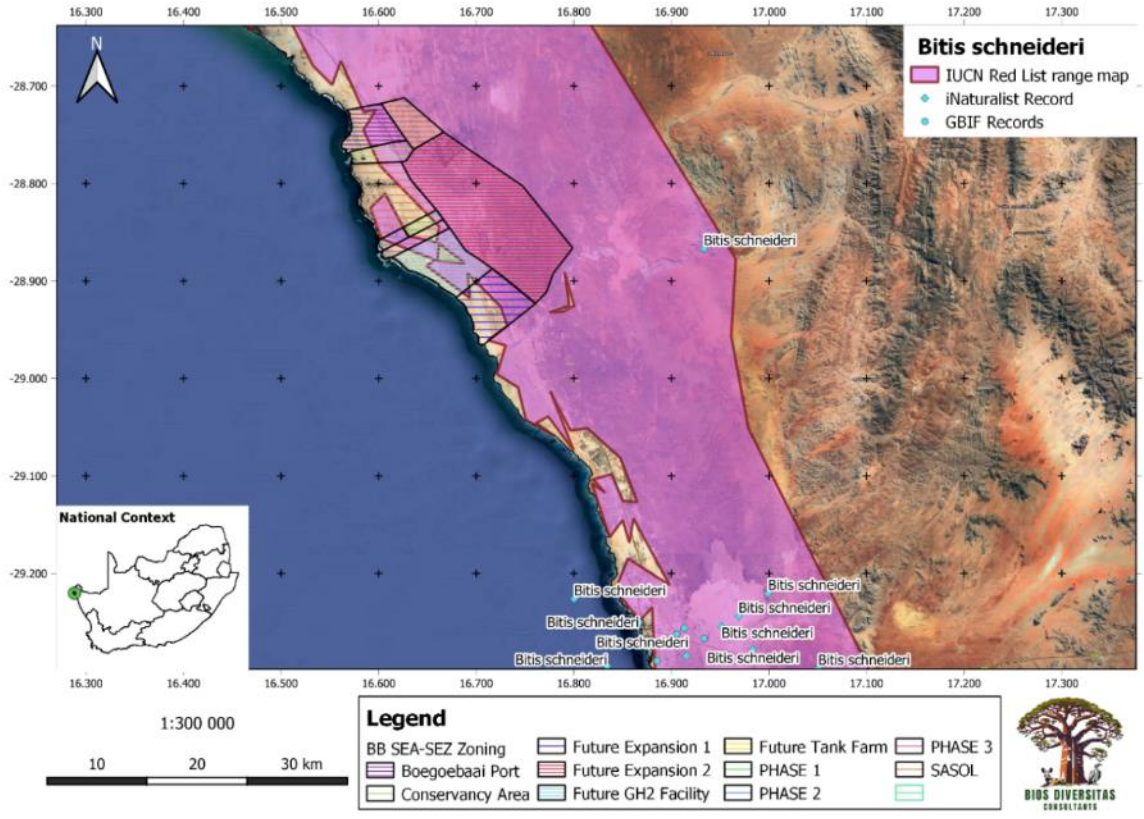


Figure 3-17: IUCN distribution range and observation records of *Bitis schneideri* in relation to the Project Area.

Breviceps macrops Desert Rain Frog – Uplisted to Vulnerable

B. macrops has recently been uplisted from Near Threatened to **Vulnerable** owing to changes in government policy that will increase approved mining in the region. The species occupies a narrow coastal strip along the northwestern Namaqualand coast, from Alexander Bay (2816CB) southward as far as the farm Skulpfontein north of Koingnaas (3017AB). Distribution data for this species are scarce, as much of the area it occupies lies within diamond-mining concessions and is not easily accessible. The available data are restricted mainly to areas lying outside the mining concessions and are therefore incomplete.

The species is restricted to Richtersveld Coastal Duneveld (SKs 1) and Namaqualand Coastal Duneveld (SKs 8), in the Succulent Karoo Biome, where it inhabits sand dunes vegetated by low, succulent shrubs and other xerophytes. These plants usually cover the crests of the dunes which are separated by open areas of bare sand. The dunes are mostly formed by white, calcareous sand, but reddish dunes occur at some localities where the species is known to occur. This species appears to be only active during dense fog conditions.

The PA intersects with the species distribution range, and several GBIF records indicate the species presence adjacent the PA (Figure 3-18). It is highly likely that the species occur in the larger PA, as Van Wyk (2024) confirmed the presence of a large colony at Visagiesfontein hill. A detailed assessment is required during the EIA application phase to record suitable habitat and understand the extent of the species distribution throughout the PA. The impact of the proposed development on the species needs to be assessed in detail to identify if any residual impacts may remain.

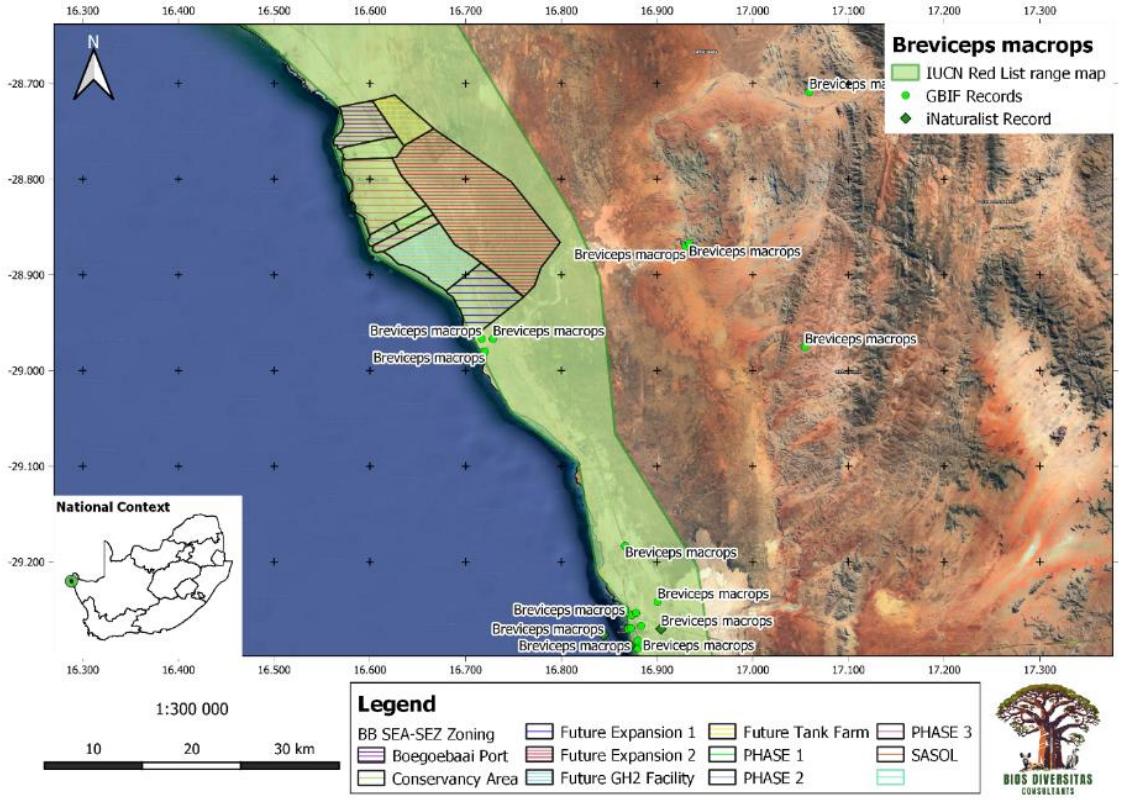


Figure 3-18: IUCN distribution range and observation records for *Breviceps macrops* in relation to the Project Area.

3.5.2 Mammals

Cryptochloris wintoni De Winton's golden mole – Critically Endangered

The De Winton's Golden Mole occurs on coastal dunes and adjacent sandy areas in Strandveld of the Namaqualand coastal plain of the Northern Cape (Bronner 2013). The species is known from only the type locality at Port Nolloth, Northern Cape Province and has recently been rediscovered after 86 years. The species was last seen in 1937 on the north-western coast of South Africa, and later declared "lost" to science, presumably extinct.

In July 2021, a team of conservationists and geneticists[8] began an expedition along the west coast to Port Nolloth (Mynhardt et al. 2024), the only site where De Winton's Golden Mole had ever been found. Several

[8] from the Endangered Wildlife Trust, Stellenbosch University and the University of Pretoria

sites along a 300 km stretch of coastline, from the Groen River mouth northwards to Alexandra Bay were surveyed. In November 2022, after tracking its environmental DNA through the sand dunes, the species was found (Figure 3-19). Mynhardt et al. (2024) indicated that this species may be widespread in the area, ranging from Lambert's Bay in the south to Visagiesfontein (which is part of the study area), beyond Port Nolloth in the north, giving an indication that the species may be more widespread (Figure 3-20). Nevertheless, this cannot be taken to mean that the species is abundant across this distribution.

Figure 3-19: Recent Photographs of *Cryptochloris wintoni* taken by JP le Roux in November 2022 (Source: iNaturalist - Photo 337842824).

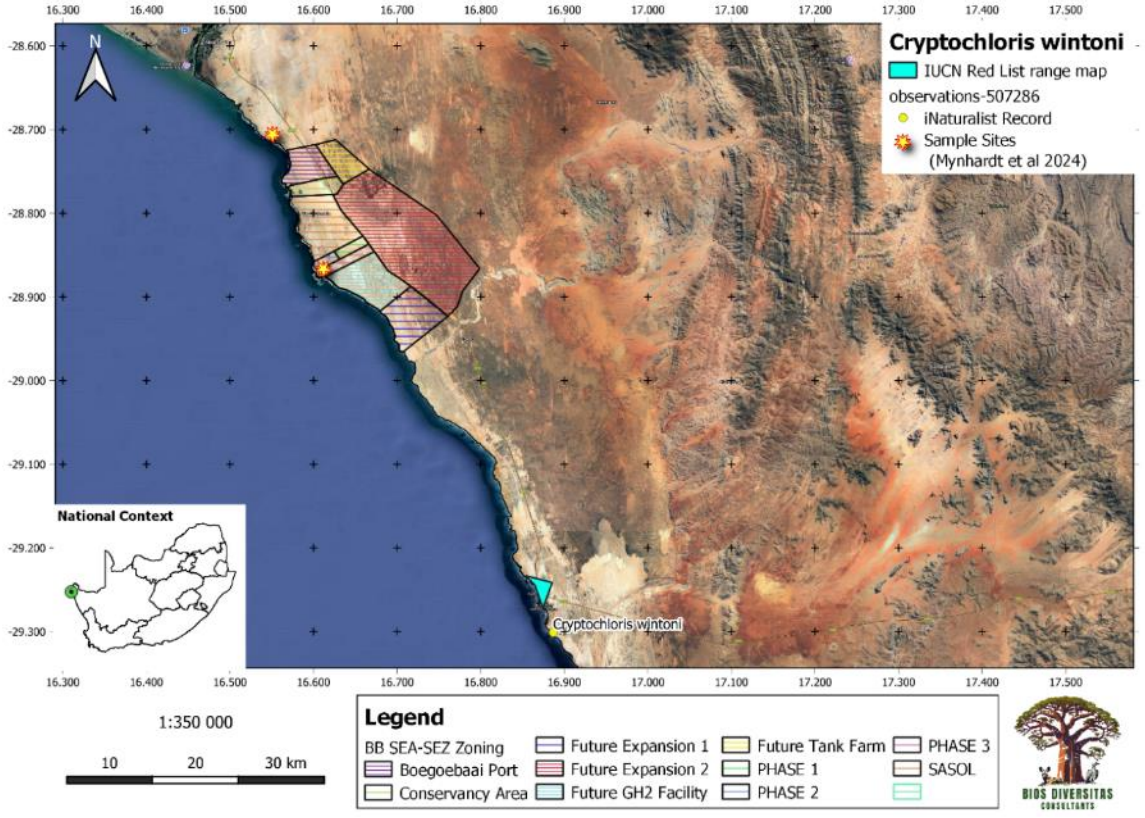


Figure 3-20: *Cryptochloris wintoni* current range map (IUCN), 2022 iNaturalist record and DNA samples sites taken by Mynhardt et al. (2024).

De Winton's Golden Mole occurs in an area of high threat owing to radical habitat transformation by alluvial diamond mining on the South African west coast and it is suspected that the population has declined substantially over the past century. Accordingly, it is listed as **Critically Endangered** under criteria B1ab(iii)+2ab(iii).

The species has been recorded by eDNA samples along the coast at Visagiesfontein (Mynhardt et al. 2024). Accordingly, the presence of the species must be established through appropriate survey techniques during the EIA application phases for the project. **If recorded, the presence of the species likely represents a fatal flaw to the project, especially the Coastal Duneveld habitat.**

Eremitalpa granti granti Grant's Golden Mole – Vulnerable

Grant's Golden Mole is endemic to southern Africa, with its distribution primarily focused on the arid and semi-arid regions of the western parts of the Northern Cape and Namibia. Within the Northern Cape, its range is concentrated in the Succulent Karoo Biome and along coastal dunes. Its range overlaps with sandy habitats extending into desert-like environments, including the Namaqualand coastal areas (Port Nolloth and possibly as far north as Alexander Bay) and parts of the Sperrgebiet in Namibia.

Grant's Golden Mole does not construct permanent burrows like many other moles. Instead, the species "swims" through the sand, utilising loose, dry soils to forage for invertebrates such as termites and beetle larvae. This species avoids hard or compact soils and relies on habitats with adequate prey availability and minimal soil disturbance.

E. g. granti is highly specialised for sandy environments, preferring:

- Coastal dunes with loose, sandy soils that allow easy tunnelling;
- Sandy plains with sparse vegetation, often dominated by grasses, succulents, and small shrubs; and
- Semi-arid areas where rainfall is infrequent, and temperatures are extreme, requiring adaptive strategies for survival.

Grant's Golden Mole is a remarkable example of adaptation to extreme environments, but its narrow habitat requirements and sensitivity make it vulnerable to human and environmental changes. The species has been recorded with eDNA samples along the coast at Visagiesfontein (Mynhardt *et al*. 2024) and south of the PA (Figure 3-21). Accordingly, the presence of the species must be established through appropriate survey techniques during the EIA application phases for the project. **If recorded, the presence of the species likely represents a fatal flaw to the project, especially the Coastal Duneveld habitat.**

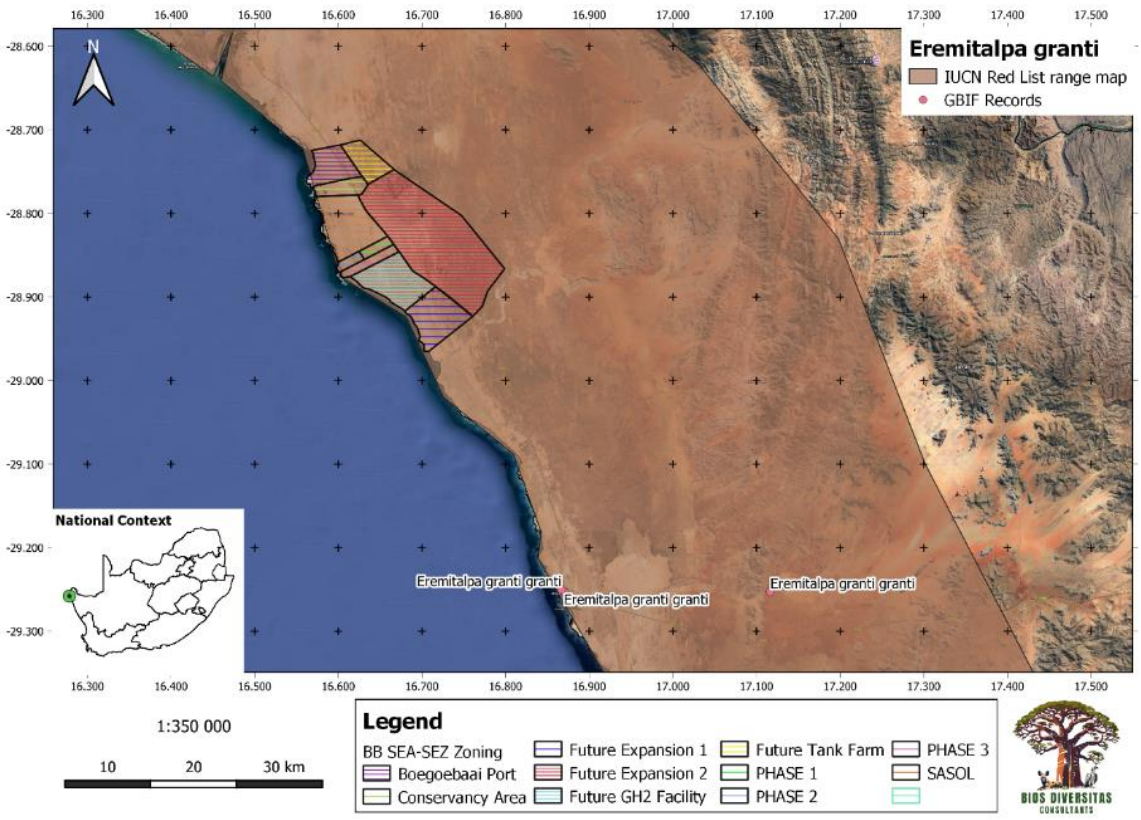


Figure 3-21: IUCN distribution range and observation records for *Eremitalpa granti granti* in relation to the Project Area.

The species demonstrates high sensitivity to environmental and anthropogenic pressures such as:

- Habitat Loss and Fragmentation due to urbanisation, agriculture, and mining activities which reduce available sandy habitats and prey abundance. Coastal dune development for tourism or industry significantly impacts populations by destroying suitable primary habitats.
- Activities that compact soil, such as off-road vehicle use, grazing, and heavy machinery operations, can render habitats unsuitable for the mole.
- Rising temperatures and shifting rainfall patterns may exacerbate desertification, impacting prey availability and habitat suitability.

Panthera pardus pardus African Leopard – Vulnerable

The African Leopard (*Panthera pardus pardus*) is widely distributed across southern Africa but occurs at low densities in the Northern Cape province. It has the widest habitat tolerance of any African felid and is the only species occupying both rainforest and desert habitats. Leopards are most abundant in woodland, grassland savanna and all forest types, but also occur widely in montane habitats, coastal scrub, shrubland, semi-desert and desert.

In the Northern Cape, Leopards are most commonly found in mountainous regions such as the Namaqualand escarpment, parts of the Cederberg adjacent to the Northern Cape, and the rugged landscapes of the Augrabies Falls National Park. In the Kalahari, including areas in the Kgalagadi Transfrontier Park, the leopards are adapted to semi-arid environments. They also inhabit unprotected areas, though their populations are fragmented due to habitat degradation and human activity, including persecution. Sixty eight percent (68%) of leopard habitat is currently outside of protected areas, and leopard conservation efforts should be focused on these areas, where leopards are most at risk.

Leopards have lost 63–75% of their historic range globally and 80% of their former range within South Africa. As a result, the species has recently been uplisted to *Vulnerable* on both the global IUCN Red List and the Red List of Mammals of South Africa, Swaziland, and Lesotho, underscoring growing concerns about its conservation status. Like other large carnivores, leopard populations are declining throughout their range. South Africa's National List of Threatened or Protected Species (ToPS 2007, as amended) lists the leopard as Vulnerable and the Convention on the International Trade Endangered Species (CITES) placed it in Appendix I.

The primary threats to leopards are ongoing and include habitat loss and fragmentation, prey depletion, human-wildlife conflict, unsustainable trophy hunting, poaching for skins and body parts, and indiscriminate killing. In South Africa, the illegal skin trade poses the greatest threat to leopard survival. Data from the South African Leopard Monitoring Project indicate an alarming annual population decline of 8% nationally. Significant reductions in leopard density were recorded in five of the 18 surveyed sites in 2017.

The species has not been recorded on or surrounding the PA but does occur eastwards towards the Richtersveld (Figure 3-22). Should the species utilise the site, it does not represent a fatal flaw to the project as the necessary mitigation measures can be implemented to reduce impacts on the species.

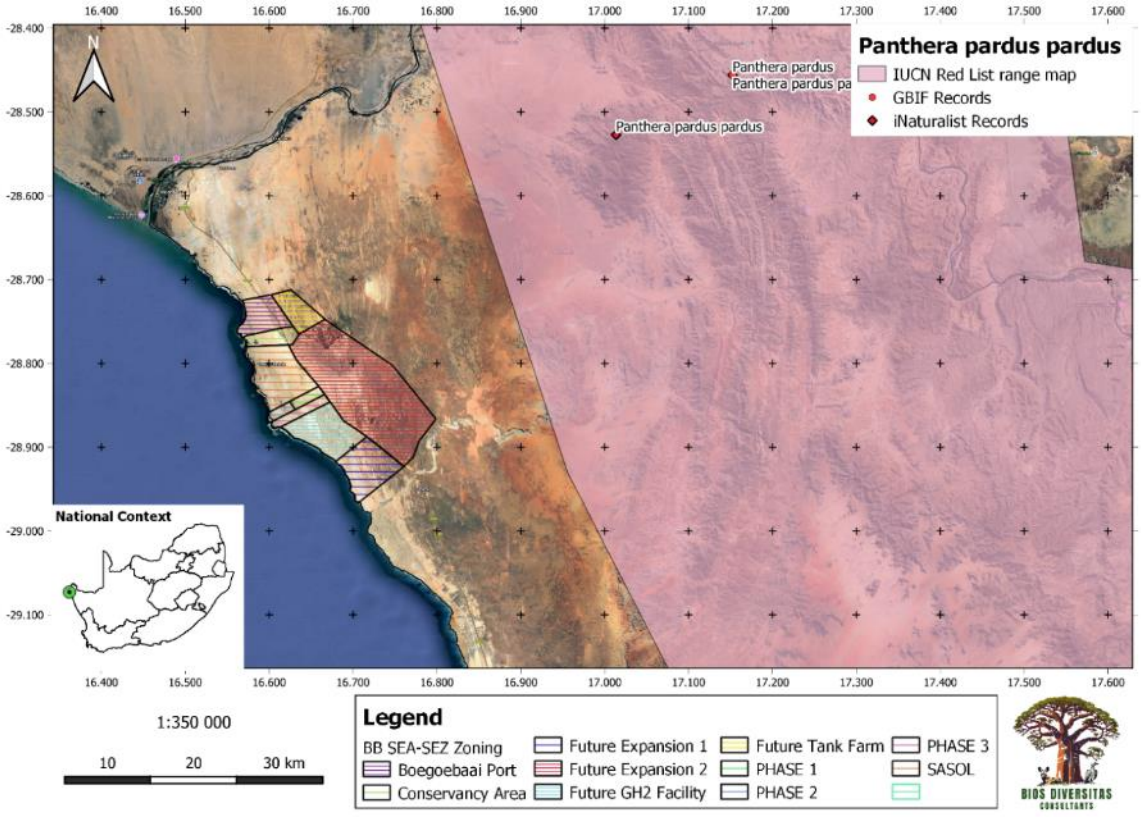


Figure 3-22: IUCN distribution range and observation records for *Panthera pardus pardus* in relation to the Project Area.

Leopards are highly adaptable and occupy diverse habitats, provided sufficient cover, prey, and water is available. In the Northern Cape, their habitat preferences include:

- Mountainous Areas: Rugged terrains with rocky outcrops and dense vegetation offer excellent cover for hunting and denning.
- Arid and Semi-Arid Areas: Leopards in the Kalahari and Namaqualand are well-adapted to semi-desert conditions, relying on sparse vegetation and sand dunes for concealment.

- Riparian Zones: Leopards are drawn to areas along rivers, such as the Orange River, which provide higher prey density and vegetation cover.
- Savanna and Shrubland: In open habitats, they depend on patches of dense vegetation or rocky areas for stalking prey.

Conservation Recommendations

- Secure key habitats and corridors through land-use planning, including connecting protected areas and maintaining wildlife-friendly landscapes.
- Minimise habitat destruction from mining, agriculture, and urban expansion.
- Strengthen enforcement against illegal hunting and trafficking of leopard parts.
- Use camera traps and GPS tracking to monitor leopard movements and identify key areas of utilisation in relation to the PA.

Leopards in the Northern Cape are resilient predators but face significant threats due to human pressures, habitat loss, and prey depletion. Effective conservation strategies must prioritise conflict mitigation, habitat connectivity, and community involvement to ensure the long-term survival of this iconic species.

Parahyaena brunnea Brown Hyena – Near Threatened (2015)

The Brown Hyena, *Parahyaena brunnea*, occurs across southern Africa, with a significant presence in the arid and semi-arid regions of the Northern Cape, South Africa. This species primarily occupies the western parts of the province, including areas within the Succulent Karoo Biome and Namaqualand subregion. It is associated with protected areas such as the Kgalagadi Transfrontier Park but also roams extensively across unprotected private lands, particularly in areas with low human density. Although its range can extend into communal and farmlands, its distribution is fragmented due to habitat degradation and human activity. The species distribution range (as per IUCN) does not intersect the PA, but several records of the species occur on the PA (Figure 3-23).

The species has been recorded on and surrounding the PA. Accordingly, appropriate mitigation measures are required to reduce direct and indirect impacts on the species and its habitat for foraging. The presence of the species does not represent a fatal flaw to the project.

Brown Hyenas are highly adaptable carnivores, thriving in a variety of arid and semi-arid habitats:

- Deserts: Particularly in the Kalahari, they favour open landscapes that provide opportunities for scavenging.
- Coastal Environments**:** In parts of Namaqualand, they forage along the coastline for marine carrion such as seals and fish.
- Rocky Outcrops and Hills**:** Often used as denning sites, providing shelter from predators and human disturbance.

This species is less dependent on permanent water sources, as it obtains most of its moisture from prey and carrion. The Brown Hyena is a resilient yet vulnerable species, relying heavily on effective management of human impacts and habitat conservation to ensure its long-term survival in the Northern Cape. Brown Hyenas face several ecological and anthropogenic threats in the Northern Cape:

- They are often persecuted by farmers who perceive them as a threat to livestock, despite their scavenging tendencies and limited predation on domestic animals.
- Poisoning, trapping, and shooting are common threats in agricultural landscapes.

- Expansion of human settlements, agriculture, and mining reduces suitable habitat.
- Fragmentation limits their range and isolates populations, reducing genetic diversity.
- Increased road networks in the vicinity of the PA can lead to direct collisions with vehicles.
- Changes in prey availability and ecosystem dynamics due to shifting rainfall patterns and increasing temperatures could affect scavenging opportunities.

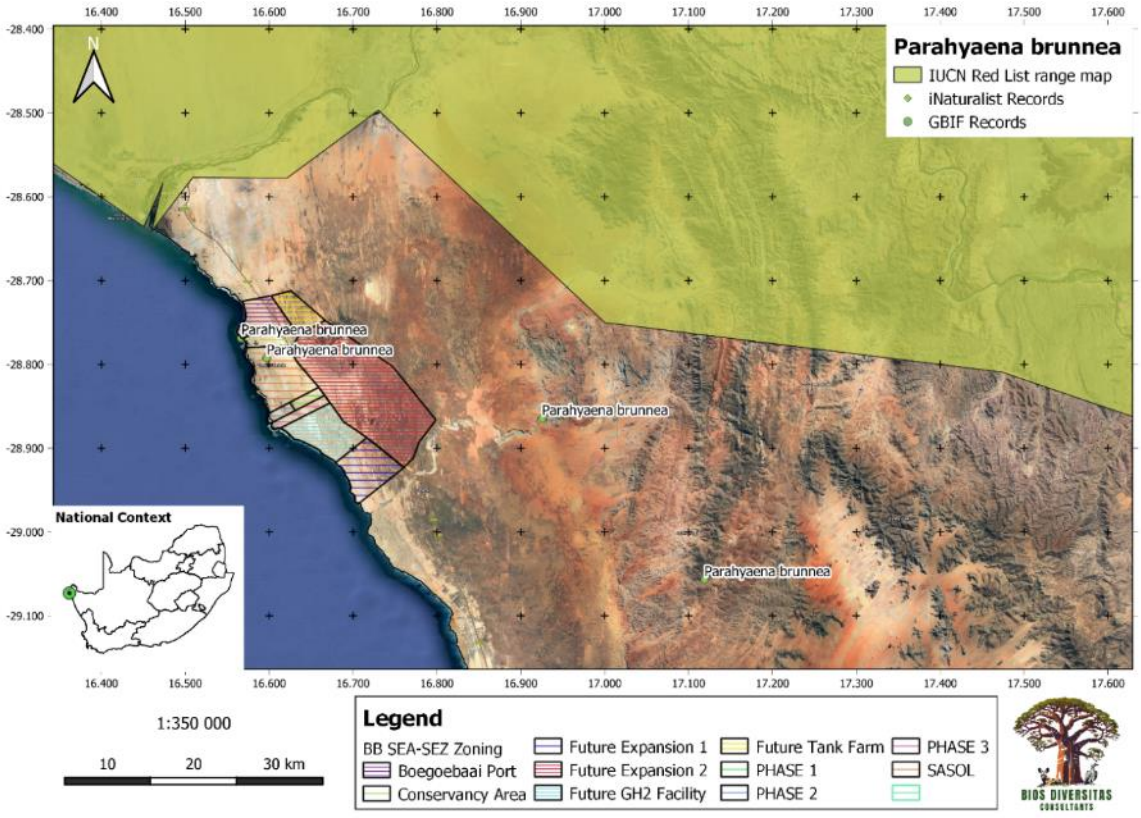


Figure 3-23: IUCN distribution range and observation records for *Hyaena brunnea* in relation to the Project Area.

Bathyergus janetta Namaqua Dune Mole-rat – Uplisted to Endangered A4(a)

Based on the unpublished 2025 National Red List, the Namaqua Dune Mole-rat has been **uplisted to Endangered** owing to climate change and the threat of continued habitat destruction of three isolated subpopulations. The species is not directly impacted by the proposed developments as the Project Area it is not located in the global range and there are no known records from the area (Figure 3-24). Accordingly, the species is not considered threatened by the proposed Boegoebaai Port and SEZ.

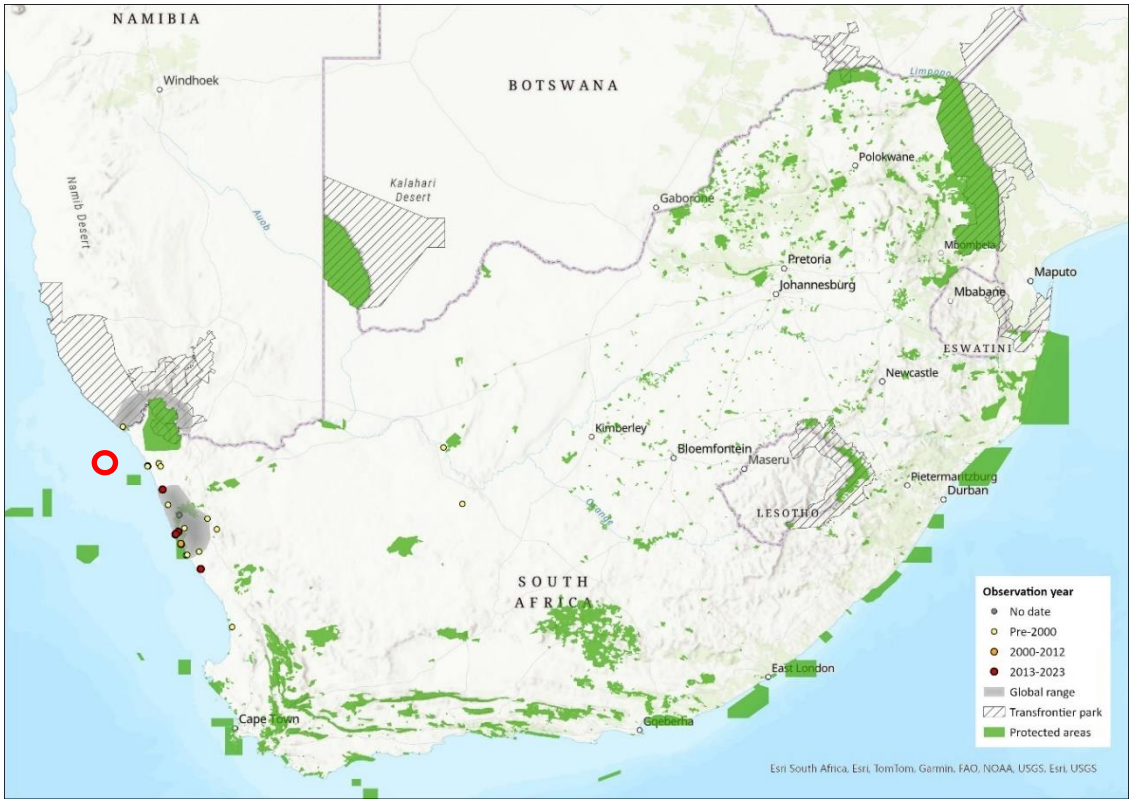


Figure 3-24: Unpublished 2025 National Red List map for *Bathyergus janetta* in relation to the Project Area (indicated in red circle).

3.6 Sensitive Habitats and Features

A preliminary sensitivity map is produced based on the precautionary principle and the available secondary data for the area (refer to Figure 3-25). It must be noted that species-specific baseline assessments are required to verify and update this sensitivity map, based on species presence and suitable habitat with appropriate buffer zones.

Development within Very High and High sensitivity areas should be avoided as far as possible due to the sensitive nature of these areas and potential negative impacts the development might have on the listed species which could occur in this part of the site. The sandy dunes are classified as Medium to High Sensitivity, as the sandy substrate makes these areas vulnerable to disturbance within the context of the aridity and high winds which characterise the West Coast. The overall implications of the sensitivity map include that fact that the site is generally a sensitive environment in terms of vulnerability to disturbance and that there appears to be fewer options with regards to finding alternative lower sensitivity placements of infrastructure.

The following sensitivities have been applied to the PA (Figure 3-25):

- Very High sensitivity:
    - Remnants of the Richtersveld Coastal Duneveld and Namib Seashore Vegetation which are Critically Endangered ecosystems and potentially harbour several fauna SCC.
    - Suitable habitat for several fauna SCC, including *Pachydactylus rangei, Bitis schneideri, Breviceps macrops, Cryptochloris wintoni, Eremitalpa granti granti* and *Parahyaena brunnea.*

- Several unique and important features within the PA, including the Boegoeberg Twins, Visagiesfonteinkop, and sandy beaches.

- Medium to High sensitivity:
  - Important and unique features of the Northern Richtersveld Yellow Duneveld.
  - Remaining natural habitat and Namaqualand Salt Pans and Western Gariep Plains Desert.
  - The Swartbank Heuweltjies, part of the Richtersveld Sandy Coastal Scorpionstailveld.
  - Connecting the coastal to the inland habitats, several SCC could utilise this area which overlaps their distribution range.
  - Include focus areas for protected areas of expansion which intersect sensitive features.
- Medium sensitivity:
  - This represents the remaining natural habitat of the Northern Richtersveld Yellow Duneveld and Richtersveld Sandy Coastal Scorpionstailveld, excluding the Swartbank Heuweltjies which is considered more sensitive.
  - Very few fauna SCC have suitable habitat in this region, but it could be important ecological corridors and act as large high value climate resilience areas (to be confirmed).
- Low sensitivity:
  - Transformed or modified habitat due to mining and other human activities.
  - Fauna species will still access these areas for movement between intact habitats, but it is less suitable for breeding and foraging.

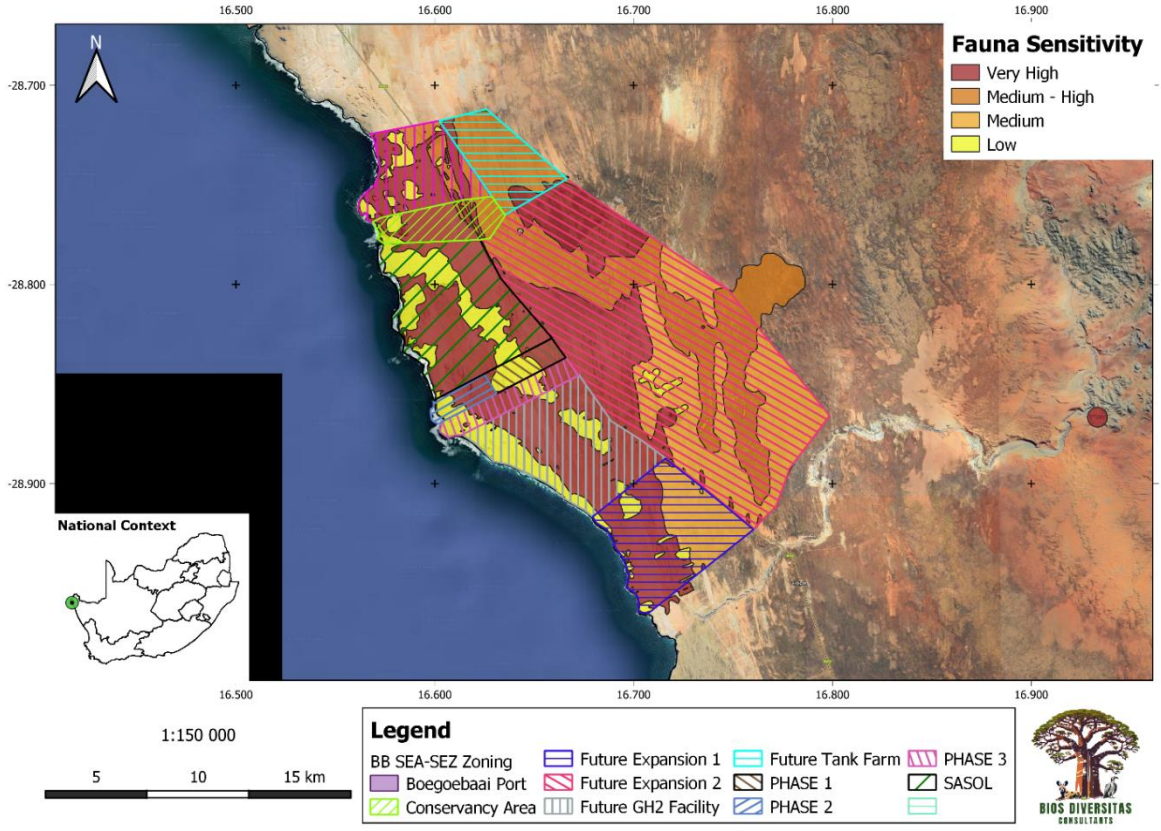


Figure 3-25: Preliminary fauna sensitivity map based on secondary data collection and current impacts (especially mining) for the proposed Boegoebaai Port and SEZ development.

3.7 Anticipated impacts on fauna

The proposed Boegoebaai Port and SEZ development along the west coast of the Northern Cape poses several potential risks to fauna. Refer to the Aspects and Impacts Register in Table 3-2 that describes the impacts that may occur for the identified infrastructure aspect / SEZ subzone and cite the primary receiving environment of concern.

The major impact associated with the development will occur during the construction phase of the project, with significant impacts being the loss of natural vegetation and transformation and disturbance of natural ecosystems at the PA.

During the operational phase, human activity and disturbance levels at the site should be relatively low as compared to the construction phase. During the operational phase, the major impacts are likely to be related to maintenance activities and carry-over effects resulting from the construction phase. In particular the site will remain highly vulnerable to wind erosion and alien plant invasion for some time following construction.

Should decommissioning be required for the project or parts thereof, it is likely to face similar issues generated by the construction phase; that is negative impacts related to disturbance and human presence at the site. The decommissioning phase should attempt to rehabilitate the site with as little disturbance as possible.

The major risk associated with the project post-construction and decommissioning would be that the site is not adequately rehabilitated to a functioning system and a degraded, vulnerable and disturbed ecosystem is left behind.

1 Table 3-2: Aspects and Impacts Register for the proposed Boegoebaai Port and SEZ.

Port infrastructure aspect / SEZ subzone	Potential impact	Receiving environment of concern (spatially explicit)
Jetty, Admin Craft Basin and Breakwaters Includes a transverse beam supported by an anchored concrete abutment on the land side.	Loss of important / unique habitat on the beach for SCC. Degradation and fragmentation of CR ecosystem. Decrease in ecosystem services and meeting biodiversity targets.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Dry Bulk Material Handling and Conveyor Belts Manganese stored in closed stockpiles including dust suppression systems	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Barriers to animal movement.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Main Buildings (Port Access Gateway, Induction Centre, Port Authority Building, Terminal Operator's Building)	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Increased habitat fragmentation. Mortality owing to trenching and foundation layers. Fences act as barriers to animal movement.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Internal Port Roads and Bridges	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Increased habitat fragmentation. Mortality owing to increased traffic. Barriers to animal movement.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
External Roads Attract mining ore transported by trucks along the R382, serving as the primary route for transporting mining commodities until rail transport viability is considered for future port expansion phases.	Existing Impact, but increased traffic volume. Mortality owing to increased traffic of mining transport trucks. Barriers to animal movement.	The R382 splits CR ecosystems and primary habitat for SCC.
Bulk Services: Pipeline with treatment plant	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Increased habitat fragmentation. Barriers to animal movement if above ground.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.

Port infrastructure aspect / SEZ subzone	Potential impact	Receiving environment of concern (spatially explicit)
Bulk Services: Onsite desalination plant	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Mortality owing to trenching and foundation layers.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Bulk Services: Sewer	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Increased habitat fragmentation. Barriers to animal movement for above ground infrastructure. Spillage and contamination into the ocean, beachfront, CR ecosystems and inland watercourses.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Stormwater	Increased erosion and degradation of CR ecosystem and important habitat for SCC if not implemented and managed appropriately.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Substations	Vegetation clearance of critical habitat for SCC. Decrease in ecosystem services and meeting biodiversity targets. Fences act as barriers to animal movement.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Liquid bulk storage facility including tanker loading facilities	Spillage and contamination into the ocean, beachfront, CR ecosystems and inland watercourses.	Areas mapped Very high sensitivity as in Figure 3-25. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Confirmed green ammonia facility – 4 508 ha Sasol's green ammonia facility, including 188 ML/day desalination plant, will be located near the TNPA port precinct to minimize pipeline length and enhance efficiency.	Source of nitrogen pollution. Excess nitrogen can lead to deterioration of ecosystems, photochemical smog, acid rain and health problems such as respiratory illnesses. Loss of ecosystem services as it is in critically endangered ecosystems and CBA1. Vegetation clearance causing loss of important / unique habitat for SCC. Loss of fauna SCC. Spillage and contamination into the ocean, beachfront, CR ecosystems and inland watercourses.	Areas mapped Very high sensitivity as in Figure 3-25 as well as regional area if spillage and contamination takes place. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.

Port infrastructure aspect / SEZ subzone	Potential impact	Receiving environment of concern (spatially explicit)
Conservancy Area (1170 ha) Includes Boegoeberg koppies, Swartvygie Heuweltjie Strandveld and seal colony on the Boegoebaai point, including interesting archaeological site.	*Pros* • Protection of remnant intact patches. • Protection of CR ecosystem and refugia for animal species. • Opportunity for rehabilitation of mining areas. *Cons* • Unrepresentative of all habitats and sensitive features within the Project Area. • Loss of biodiversity - only partially protecting CBA1 and CR ecosystem – will not meet biodiversity targets. • Create isolated island effect due to increased habitat fragmentation. • Increased edge effects. • Reduced ecological corridors. • Not sufficient for biodiversity offset elsewhere in the PA. • Crosses the R382 – increased mortality of SCC without appropriate crossings for fauna.	The direct area indicated in the map. Other important features such as Visagiesfonteinkop and Namaqualand Salt Pans not included. Cumulative impacts need to be investigated for this protected area surrounded by potential destructive operations. Entire area needs to be considered and a network of corridors to the surrounding natural areas need to be explored.
SEZ Industrial Park Zones 4-6 / Phases 1-3 Mixed-use purposes, including a manufacturing cluster, logistics and warehousing, offices. 2.7 ML/day desalination plant, including pump station, supply pipelines, feeder pipelines.	Loss of ecosystem services as it is in CR ecosystems and CBA1, especially Zones 5 and 6; unlikely to meet biodiversity targets. Vegetation clearance causing loss of important / unique habitat for SCC. Loss of fauna SCC. Increased habitat fragmentation and edge effects. Barriers to animal movement for above ground infrastructure.	Areas mapped Very high sensitivity as in Figure 3-25 as well as regional area if spillage and contamination takes place. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Future green hydrogen facility 3 713 ha Water treatment unit and water reservoir; Containerised units for the electrolysers; Air separation unit; Liquid air energy system (LAES) for nitrogen storage; Hydrogen and oxygen storage; Ammonia processing unit and liquid ammonia storage tank; pipelines required.	Source of nitrogen pollution. Excess nitrogen can lead to deterioration of ecosystems, photochemical smog, acid rain and health problems such as respiratory illnesses. Loss of ecosystem services as it is in critically endangered ecosystems and CBA1. Vegetation clearance causing loss of important / unique habitat for SCC. Loss of fauna SCC. Spillage and contamination into the ocean, beachfront, CR	Areas mapped Very high sensitivity as in Figure 3-25 as well as regional area if spillage and contamination takes place. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.

Port infrastructure aspect / SEZ subzone	Potential impact	Receiving environment of concern (spatially explicit)
	ecosystems and inland watercourses. Barriers to animal movement for above ground infrastructure.	
Future expansion 01 – 3 408 ha	Loss of ecosystem services as it is in critically endangered ecosystems and CBA1. Vegetation clearance causing loss of important / unique habitat for SCC. Loss of fauna SCC. Barriers to animal movement for above ground infrastructure.	Areas mapped Very high sensitivity as in Figure 3-25 as well as regional area if spillage and contamination takes place. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Future expansion 02 – 15 067 ha	Loss of ecosystem services as it is in critically endangered ecosystems and CBA1. Vegetation clearance causing loss of important / unique habitat for SCC. Loss of fauna SCC. Barriers to animal movement for above ground infrastructure	Areas mapped Very high sensitivity as in Figure 3-25 as well as regional area if spillage and contamination takes place. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.
Future tank farm – 1 704 ha	Only small sections within CR ecosystem and CBA1 - loss of ecosystem services due to direct loss and indirect due to increased edge effects. Vegetation clearance causing loss of important / unique habitat for SCC. Loss of fauna SCC. Barriers to animal movement for above ground infrastructure.	Areas mapped Very high sensitivity as in Figure 3-25 as well as regional area if spillage and contamination takes place. Medium to High areas need to minimise impacts through appropriate mitigation measures and ensure sustainable development.

Below is an expanded analysis of the key anticipated impacts based on the provided information:

3.7.1 Habitat Loss and Alteration

Impacts: Large-scale habitat removal or modification can eliminate essential habitats, particularly for SCC such as De Winton's Golden Mole (*Cryptochloris wintoni*), Grant's Golden Mole (*Eremitalpa granti granti*), the Desert Rain Frog (*Breviceps macrops*) and Web-footed Gecko (*Pachydactylus rangei)* which rely on specific sand dune environments. Loss of these habitats may lead to population declines and local extinctions if alternative suitable habitats are unavailable.

Mitigation: Minimising habitat disturbance through careful site selection and restricting development to less sensitive areas can reduce these impacts. Habitat restoration and translocation of affected species may be necessary in extreme cases, but this should be assessed on a species-specific basis as some species do need to be protected *in situ*.

3.7.2 Habitat Fragmentation and Movement Restrictions

Impacts: Construction activities and infrastructure, such as pipelines, powerlines and roads, can fragment habitats and restrict movement, particularly for range restricted and fossorial species (those that burrow or live underground). Barriers to movement disrupt normal behaviour such as foraging, mating, and dispersal. This is especially critical for species like tortoises, which are slow-moving and less adaptable to fragmented landscapes.

Mitigation:

- Ensuring pipelines and powerlines are buried or elevated to allow animal movement underneath can help maintain connectivity. Designing wildlife corridors (underpasses and overpasses) at strategic points and other barriers would be vital.
- Maintain strips of natural vegetation across fragmented areas to facilitate dispersal and reduce isolation effects.
- During construction, provide temporary safe pathways for fauna.

3.7.3 Increased Predation by Corvids

Impacts: Corvids (e.g., crows and ravens) are opportunistic predators often attracted by human activities and infrastructure - most impactful in remote areas where other infrastructure is limited. If the proposed development continues, it will create habitat for the species to nest and breed. These birds can heavily predate on reptiles, especially small, cryptic, or slow-moving species like the Speckled Cape Tortoise (*Chersobius signatus*). Sustained predation pressure can lead to local population declines or extinctions.

Mitigation:

- Measures to manage waste and reduce food availability for corvids, combined with habitat design that minimises perching and nesting opportunities, can help mitigate this risk.
- As a last resort, work with wildlife authorities to manage corvid populations if they pose a severe risk to vulnerable reptile species.

3.7.4 Roadkill from Increased Traffic

Impacts: Increased vehicular movement, combined with new and expanded road networks, raises the likelihood of roadkills. Many reptiles are ectothermic and may use warm road surfaces for thermoregulation, putting them at greater risk. This issue disproportionately affects species like tortoises and snakes. In addition, roads can fragment the landscape and act as barriers which restrict movement of

species, or even worse act as a death trap for slow moving mammals, amphibians and reptiles. Data from the Endangered Wildlife Trust's National Roadkill Database for South Africa reveals that mammals account for the highest proportion of reported roadkill (50%), followed by birds (18%), reptiles (6%), and amphibians (1%), with 24% of cases involving unidentified species.

Mitigation:

- Implement wildlife crossings.
- Implement educational campaigns for workers.
- Enforce strict speed limits in areas of high fauna activity.
- Install wildlife crossing signage to alert drivers.
- Use low fencing or similar to guide fauna toward designated crossings.
- Increase awareness and monitoring during breeding or migratory seasons when fauna activity is highest.

3.7.5 Disturbance from Noise, Dust, and Lights

Impacts: Construction and operational activities generate noise, dust, and artificial lighting, which can disrupt the natural behaviour of fauna, such as breeding, foraging, and predator avoidance. Sensitive nocturnal species may be particularly affected by light pollution.

Mitigation:

- Use low-intensity, motion-activated and directional lighting,
- Implement dust control measures by watering or soil stabilisation techniques.
- Schedule activities to minimise noise during critical periods for wildlife (e.g., breeding seasons).
- Use noise barriers or muffling equipment around high-intensity activity zones.
- Adjust light spectra to wavelengths less likely to disturb nocturnal species (e.g., red lighting instead of white).

3.7.6 Wildlife interactions with infrastructure

Impacts:

- Reptiles, being ectothermic, rely on external heat sources to regulate their body temperature. Electrical infrastructure, such as transformers and substations, generates substantial heat, making it an attractive basking site for these animals. Reptiles may be drawn to substations, not only for thermoregulation but also for foraging, as prey species like rodents and birds are likely to nest in these areas. Contact with live components, such as exposed bushings, jumpers, and phases, significantly increases the likelihood of reptile electrocution. It also raises the risk of damage to substation components causing operational disruptions in electrical systems.
- Small mammals, such as squirrels and mongooses, are also attracted to the sheltered environments offered by infrastructure such as substations and other buildings where they create large burrows under infrastructure. Extensive burrowing may alter soil integrity and vegetation patterns, affecting other ground-dwelling species. Small mammals climbing transformers or entering live areas can cause short circuits by bridging the gap between live components and the ground, resulting in equipment damage and power outages as well as increased mortality. Porcupines may dig under transmission towers in areas with less compacted soil, compromising foundation stability and increasing maintenance costs.

Mitigation:

- Ensure electrical components are insulated or enclosed to prevent contact by wildlife.
- Regularly inspect infrastructure for burrows and other animal activity to identify and address risks proactively.
- Incorporate wildlife corridors and minimise habitat fragmentation by maintaining natural linkages between critical habitats.
- Employ measures to discourage opportunistic predators from nesting or hunting near infrastructure, such as waste management and anti-perching devices.
- Implement appropriate buffer zones around critical habitats to protect them from direct disturbance.
- Use compacted soil or foundation reinforcement around towers to deter burrowing mammals like porcupines.
- Add physical barriers around tower bases to prevent digging.
- Could establish burrowing refuges (artificial habitats) for fossorial species in safe zones to prevent them from seeking shelter near hazardous infrastructure.

3.7.7 Broader Implications for Biodiversity

- The cumulative impacts of these disturbances may lead to shifts in local faunal community structures, favouring generalist species over specialists. This could result in reduced biodiversity and changes in ecosystem functioning.
- The resilience of fauna to these impacts depends on the availability of nearby undisturbed habitats and the implementation of effective mitigation strategies.

4. DISCUSSION

The proposed Boegoebaai Port and SEZ development presents a range of potential environmental impacts, particularly on fauna and SCC. The potential presence of sensitive species such as *Pachydactylus rangei, Cryptochloris wintoni, Breviceps macrops,* and *Eremitalpa granti granti* combined with CBA 1 and CBA 2, and two threatened ecosystems (both listed as CR) underscores the ecological sensitivity of the project area. While comprehensive mitigation measures can reduce the severity of some impacts, avoidance of highly sensitive features should be the first and best option.

The project has potential benefits, including renewable energy production and economic development. These must however be weighed against the irreversible nature of biodiversity loss and the potential loss of ecosystem services provided by ecosystems and biodiversity hotspots, which are vital for the maintenance of regional biodiversity and ecosystem services and support local fauna communities.

Some of the proposed mitigation measures, e.g., habitat offsets, wildlife corridors, predator deterrence, are effective in theory but challenging to implement in practice for several reasons:

- Species-Specific Needs: Many SCC, such as De Winton's Golden Mole and the Desert Rain Frog, have specific microhabitat requirements that are difficult to replicate or restore.
- Long-Term Monitoring: Ensuring the success of mitigation measures requires sustained monitoring and adaptive management, which may not always be feasible or adequately resourced.
- Residual Risks: Despite mitigation, residual impacts on fauna and habitats are likely, particularly in highly sensitive areas.

Furthermore, the fine-resolution spatial data generated through on-site ground-truthing will play a crucial role in shaping the future planning of the proposed development and will serve as a key reference for future Environmental Impact Assessments (EIAs).

Given the high ecological sensitivity of the PA and the presence of fauna SCC, the proposed development poses significant risks to biodiversity. While mitigation can reduce some of these risks, it cannot fully eliminate the impacts on critical habitats and species, where avoidance is the only option.

The proposed development needs to consider site and technological alternatives, as well as designs which reduce impacts on the receiving environment. Sites with lower ecological sensitivities can achieve development goals with minimal environmental trade-offs. The project requires a cautious approach with a strong emphasis on biodiversity conservation. It should only proceed if it can demonstrate net ecological benefit or neutrality through rigorous mitigation strategies.

4.1 Applicable Legislation and Guidelines

Going forward, any aspect of the project which requires environmental authorisation will have to adhere to the following legislation and guidelines, as relevant at the time of the assessments:

- National Environmental Management Act (NEMA) (Act No 107, 1998): NEMA requires that measures are taken that "prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." The disturbance of ecosystems and loss of biological diversity should be avoided, or where they cannot be altogether avoided, are minimised and remedied.
- The National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) provides for listing of endangered, threatened and otherwise controlled species (ToPS) as well as threatened or protected ecosystems (latest 2022 Ecosystem Status). Should the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem take place, activities

under Listing Notice 3 of the EIA Regulations are triggered. Focus areas for protected area expansion are identified in the NPAES.

- The National Protected Area Expansion Strategy (NPAES 2016) falls under NEMBA and is South Africa's national strategy for expansion of the protected area network.

- The National Biodiversity Assessment (NBA) is the primary tool for monitoring and reporting on the state of biodiversity in South Africa. It is used to inform policies, strategies and actions in a range of sectors for managing and conserving biodiversity more effectively.

- The minimum report content requirements for environmental impacts on animal species in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)[9] will be applicable.

- Guidance for the implementation of the above-mentioned protocol is followed according to SANBI (2020, as amended), hereafter referred to as "the animal species protocol guidelines".

4.2 Field Guides and other resources for EIA assessments

Mammals

- Skinner & Chimimba (2005) and Stuart & Stuart (1998) should be consulted in order to provide baseline ecological information to inform the conclusions regarding SCC.

Herpetofauna

- All available books and publications providing information on the distribution ranges and for identification purposes of South African herpetofauna should be utilised for the PA, including Branch 1998; Bates *et al*. 2014; du Preez & Carruthers 2017; Channing & Rödel 2019.

- Reptile species nomenclature should follow Reptile Database (Uetz *et al*. 2023), and amphibian nomenclature should follow Frost (2024), as these online resources provide more updated nomenclature than printed reference material.

4.3 Weather monitoring

All herpetofauna are ectothermic and their behaviour is strongly influenced by temperature and the presence of rain. To interpret survey data more comprehensively, it is necessary to present herpetofauna survey data in the context of the prevailing weather conditions. A temperature & relative humidity logger should be placed at a relevant trap location to record the prevailing temperature and relative humidity at 30-minute intervals.

4.4 Recommendations

To assess baseline studies which should include site sensitivity verification and data collection, the next steps and activities are recommended:

- Comprehensive baseline biodiversity surveys are required for impacted SCC as part of the EIA process.

[9] GOVERNMENT GAZETTE, No. 43855, 30 OCTOBER 2020. Available from: https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Animal_Species_Assessment_Protocols.pdf

- Monitoring faunal populations during and after construction to assess the effectiveness of mitigation measures.
- Modify management practices based on monitoring outcomes and emerging challenges.
- Collaboration with taxa specific specialists and conservation organisations (such as EWT) to refine impact assessments and conservation actions.
- Acquisition of all observation data from participating specialists and inclusion into the final complete dataset.
- Review of field reports from other disciplines and in particular, habitat descriptions and delineations of the botanical and soil specialists to more accurately and consistently describe and map fauna habitats.
- Obtain revised infrastructure layout from developer based on all defined habitat sensitivities and logistical considerations – developer is advised to plan infrastructure layout to avoid as much of the sensitive habitats as possible.
- Workshop with all participating specialists and developer to share understanding of project and discuss all potential impacts. Of particular importance is the necessity to understand the requirements of the developer related to SCC and their assumed versus actual occurrences. Should the developer wish to demonstrate a high degree of confidence for the absence of particular species in habitats within the PA then additional surveys will be required and must be included in the impact assessment. At this stage it is recommended that it is better to assume the presence of SCC under the precautionary principle and develop appropriate mitigation and management considerations to limit any anticipated impacts, with avoidance mitigation being the best possible approach.

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Appendices

Appendix A – iNaturalist records for Mammals, Amphibians and Reptiles

Table 5-1: Species records submitted on iNaturalist within the larger Project Area. Species of Conservation Concern are indicated in Bold. Status: NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered.

Order	Family	Scientific Name	Common Name	Red List Status[10]
Mammalia				
Afrosoricida	**Chrysochloridae**	***Cryptochloris wintoni***	**De Winton's Golden Mole**	**CR**
Artiodactyla	Bovidae	*Antidorcas marsupialis*	Springbok	LC
Artiodactyla	Bovidae	*Oryx gazella*	South African Oryx	LC
Artiodactyla	Bovidae	*Raphicerus campestris*	Steenbok	LC
Carnivora	Canidae	*Lupulella mesomelas*	Black-backed Jackal	LC
Carnivora	Felidae	*Felis lybica cafra*	African Wildcat	LC
Carnivora	**Hyaenidae**	***Parahyaena brunnea***	**Brown Hyaena**	**NT**
Eulipotyphla	Talpidae	*Talpidae*	Moles and Desmans	LC
Eulipotyphla	Soricidae	Myosorex varius	Forest Shrew	LC
Rodentia	Muridae	*Otomys unisulcatus*	Karoo Bush Rat	LC
Rodentia	Muridae	*Parotomys brantsii*	Brants's Whistling Rat	LC
Rodentia	Muridae	*Parotomys brantsii brantsii*		LC
Rodentia	Nesomyidae	*Malacothrix typica*	Large-eared Mouse	LC
Amphibia				
Anura	**Brevicipitidae**	***Breviceps macrops***	**Desert Rain Frog**	**NT[11]**
Anura	Bufonidae	*Vandijkophrynus gariepensis*	Karoo Toad	LC
Anura	Bufonidae	*Vandijkophrynus robinsoni*	Paradise Toad	LC
Anura	Pyxicephalidae	*Cacosternum namaquense*	Namaqua Caco	LC
Reptilia				
Testudines	Testudinidae	*Chersina angulata*	Angulate Tortoise	LC
Testudines	**Testudinidae**	***Chersobius signatus***	**Speckled Cape Tortoise**	**EN (2017)**
Testudines	**Testudinidae**	***Psammobates tentorius trimeni***	**Western Tent Tortoise**	**NT[12], EN[13]**
Squamata	Agamidae	*Agama hispida*	Common Spiny Agama	LC
Squamata	Chamaeleonidae	*Bradypodion occidentale*	Namaqua Dwarf Chameleon	LC
Squamata	Cordylidae	*Karusasaurus polyzonus*	Karoo-gordelakkedis	LC
Squamata	Elapidae	*Naja nivea*	Cape Cobra	LC
Squamata	Gekkonidae	*Pachydactylus labialis*	Calvinia Thick-toed Gecko	LC
Squamata	Gekkonidae	*Pachydactylus austeni*	Austen's Thick-toed Gecko	LC
Squamata	**Gekkonidae**	***Pachydactylus rangei***	**Namib Sand Gecko / Namib Web-footed gecko**	**CR* (2014)**
Squamata	Gekkonidae	*Ptenopus garrulus maculatus*	Spotted Barking Gecko	LC

[10] Based on available information at the time of sourcing the data in December 2024.
[11] IUCN SSC Amphibian Specialist Group & SA-FRoG (2017).
[12] Regional status applied from a higher-level taxon (Hofmeyr *et al.* 2017).
[13] Assessed to be Endangered under criterion A4ce.

Order	Family	Scientific Name	Common Name	Red List Status[10]
Squamata	Gekkonidae	*Rhoptropella ocellata*	Spotted Day Gecko	LC
Squamata	Lacertidae	*Meroles ctenodactylus*	Smith's Desert Lizard	LC
Squamata	Lacertidae	*Meroles knoxii*	Knox's Ocellated Sand Lizard	LC
Squamata	Lacertidae	*Meroles suborbitalis*	Spotted Desert Lizard	LC
Squamata	Psammophiidae	*Dipsina multimaculata*	Dwerghaakneusslang	LC
Squamata	Psammophiidae	*Psammophis leightoni*	Cape Sand Snake	LC
Squamata	Pseudaspididae	*Pseudaspis cana*	Mole Snake	LC
Squamata	Scincidae	*Acontias lineatus*	Striped Legless Skink	LC
Squamata	Scincidae	*Scelotes sexlineatus*	Striped Dwarf Burrowing Skink	LC
Squamata	Scincidae	*Trachylepis variegata*	Variegated Skink	LC
Squamata	Scincidae	*Trachylepis spilogaster*	Kalahari Tree Skink	LC
Squamata	Scincidae	*Typhlosaurus vermis*	Boulenger's Legless Skink	LC
Squamata	**Viperidae**	***Bitis schneideri***	**Namaqua Dwarf Adder**	**NT**

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Appendix B – Virtual Museum for Mammals, Amphibians and Reptiles

Expected species lists for Mammals (Table 5-2), Amphibians (Table 5-3) and Reptiles (Table 5-4) were obtained from the Virtual Museum for Quarter Degree Squares (QDS) 2816DC[14], 2816DD, 2916BB, 2916BD and 2816DA.

Table 5-2: Expected mammals species lists from the MammalMAP (take note: bats and marine species are excluded from the list). Red list status: LC = Least concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered).

Family	Species	Red List Status[15]	2816DA	2816DC	2816DD	2916BB	2916BD
Bathyergidae	*Bathyergus janetta*	LC **(EN)**[16]				X	X
Bathyergidae	*Georychus capensis*	LC				X	
Bovidae	*Oryx gazella*	LC	X		X		
Bovidae	*Raphicerus campestris*	LC			X		
Canidae	*Canis mesomelas*	LC			X	X	
Canidae	*Otocyon megalotis*	LC		X	X		
Canidae	*Vulpes chama*	LC			X		
Cercopithecidae	*Chlorocebus pygerythrus*	LC	X				
Chrysochloridae	*Chrysochloris asiatica*	DD			X		
Chrysochloridae	*Cryptochloris wintoni*	CR					X
Chrysochloridae	*Eremitalpa granti*	VU		X		X	X
Felidae	*Caracal caracal*	LC			X		
Felidae	*Felis silvestris*	LC			X	X	
Herpestidae	*Cynictis penicillata*	LC				X	
Herpestidae	*Herpestes pulverulentus*	LC			X		
Herpestidae	*Suricata suricatta*	LC			X	X	X
Hyaenidae	*Hyaena brunnea*	NT	X		X	X	
Hystricidae	*Hystrix africaeaustralis*	LC			X	X	
Leporidae	*Lepus capensis*	LC	X	X	X		
Leporidae	*Pronolagus rupestris*	LC			X		
Macroscelididae	*Elephantulus edwardii*	LC		X			
Macroscelididae	*Elephantulus rupestris*	LC			X		
Macroscelididae	*Macroscelides proboscideus*	LC		X	X		
Muridae	*Micaelamys namaquensis*	LC	X				
Muridae	*Gerbilliscus paeba*	LC	X				X
Muridae	*Mus musculus musculus*	LC					X
Muridae	*Mus (Nannomys) minutoides*	LC	X				
Muridae	*Otomys unisulcatus*	LC	X	X	X	X	X
Muridae	*Parotomys brantsii*	LC	X		X	X	X
Muridae	*Rhabdomys pumilio*	LC	X	X		X	X
Mustelidae	*Ictonyx striatus*	LC			X	X	X

[14] Main area covering the Project Area around Visagiesfontein
[15] Based on the relevant information at the time, December 2024.
[16] recently uplisted to Endangered (2025 National Red List)

Family	Species	Red List Status[15]	2816DA	2816DC	2816DD	2916BB	2916BD
Mustelidae	*Mellivora capensis*	LC			X		
Nesomyidae	*Petromyscus collinus*	LC	X				
Orycteropodidae	*Orycteropus afer*	LC			X		
Petromuridae	*Petromus typicus*	LC	X				
Soricidae	*Myosorex varius*	LC			X		
Soricidae	*Suncus varilla*	LC				X	X

Table 5-3: Expected Amphibians species lists from the FrogMAP. Red list status: LC = Least concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered).

Family	Species	Status	2816DC	2816DA	2816DD	2916BB	2916BD
Brevicipitidae	*Breviceps macrops*	LC (VU) [17]	X	X	X	X	X
Brevicipitidae	*Breviceps namaquensis*	LC	X	X	X	X	
Bufonidae	*Vandijkophrynus gariepensis gariepensis*	LC		X			

Table 5-4: Expected Reptile species lists from the ReptileMAP. Red list status: LC = Least concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered).

Family	*Species*	Status	2816DA	2816DC	2816DD	2916BB	2916BD
Agamidae	*Agama anchietae*	LC					X
Agamidae	*Agama atra*	LC	X		X		X
Agamidae	*Agama hispida*	LC	X	X	X	X	X
Chamaeleonidae	*Bradypodion occidentale*	LC		X	X	X	X
Chamaeleonidae	*Chamaeleo namaquensis*	LC	X	X	X	X	X
Colubridae	*Dasypeltis scabra*	LC			X	X	X
Colubridae	*Dipsina multimaculata*	LC	X			X	X
Cordylidae	*Cordylus macropholis*	NT					X
Cordylidae	*Karusasaurus polyzonus*	LC	X	X	X	X	X
Elapidae	*Aspidelaps lubricus lubricus*	LC					X
Elapidae	*Naja nivea*	LC				X	X
Gekkonidae	*Afrogecko porphyreus*	LC				X	
Gekkonidae	*Chondrodactylus angulifer*	LC	X		X		X
Gekkonidae	*Chondrodactylus bibronii*	LC		X	X	X	X
Gekkonidae	*Goggia lineata*	LC		X	X	X	X
Gekkonidae	*Lygodactylus bradfieldi*		X				
Gekkonidae	*Pachydactylus amoenus*	LC				X	
Gekkonidae	*Pachydactylus austeni*	LC		X	X	X	X
Gekkonidae	*Pachydactylus barnardi*	LC			X	X	X
Gekkonidae	*Pachydactylus labialis*	LC				X	X
Gekkonidae	*Pachydactylus macrolepis*	LC			X		
Gekkonidae	*Pachydactylus punctatus*	LC	X		X		

[17] 2025 National Red List

Family	*Species*	Status	2816DA	2816DC	2816DD	2916BB	2916BD
Gekkonidae	*Pachydactylus rangei*	CR	X	X	X		
Gekkonidae	*Ptenopus garrulus maculatus*	LC	X		X	X	X
Gekkonidae	*Rhoptropella ocellata*	LC					X
Gerrhosauridae	*Gerrhosaurus typicus*	LC			X		
Lacertidae	*Meroles ctenodactylus*	LC	X	X	X	X	X
Lacertidae	*Meroles cuneirostris*	LC	X	X	X		
Lacertidae	*Meroles knoxii*	LC		X	X	X	X
Lacertidae	*Meroles suborbitalis*	LC	X	X	X		X
Lacertidae	*Nucras tessellata*	LC				X	X
Lacertidae	*Pedioplanis lineoocellata pulchella*	LC			X		
Lacertidae	*Pedioplanis namaquensis*	LC			X		
Lamprophiidae	*Boaedon capensis*	LC			X	X	X
Lamprophiidae	*Homoroselaps lacteus*	LC				X	
Lamprophiidae	*Prosymna frontalis*	LC					X
Lamprophiidae	*Psammophis crucifer*	LC				X	X
Lamprophiidae	*Psammophis leightoni*	VU	X		X	X	X
Lamprophiidae	*Psammophis notostictus*	LC	X			X	X
Lamprophiidae	*Psammophylax rhombeatus*	LC		X			X
Lamprophiidae	*Pseudaspis cana*	LC		X	X	X	X
Scincidae	*Acontias litoralis*	LC	X		X	X	X
Scincidae	*Acontias namaquensis*	LC				X	X
Scincidae	*Acontias tristis*	LC		X	X	X	X
Scincidae	*Scelotes sexlineatus*	LC	X		X		X
Scincidae	*Trachylepis capensis*	LC			X	X	X
Scincidae	*Trachylepis occidentalis*	LC	X				
Scincidae	*Trachylepis sulcata sulcata*	LC			X		X
Scincidae	*Trachylepis variegata*	LC		X	X	X	X
Scincidae	*Typhlosaurus vermis*	LC	X		X	X	X
Testudinidae	*Chersina angulata*	LC	X	X	X	X	X
Testudinidae	*Chersobius signatus*	VU					X
Testudinidae	*Psammobates tentorius trimeni*	EN			X		X
Typhlopidae	*Rhinotyphlops lalandei*	LC				X	X
Varanidae	*Varanus niloticus*	LC			X		
Viperidae	*Bitis arietans arietans*	LC	X		X	X	

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