Botanical-Biodiversity Assessment of Portion 4 of Rietfontein Extension No. 151 and Portion 4 Graauw Duinen No. 152, Vanrhynsdorp at Brand se Baai, Matzikama Local Municipality Western Cape Province

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Report prepared for EnviroAfrica

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National Legislation and Regulations governing this report

This is a specialist walkdown report and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, as amended and Government Notice 1150 of 2020, Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species and Terrestrial Biodiversity.

Appointment of Specialist

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by EnviroAfrica, to provide specialist botanical consulting services for the botanical and biodiversity assessment required to fulfil the requirements for the bulk sampling of the coast for diamonds on Portion 4 of the farm Rietfontein Extension 151 and Portion 4 of the farm Graauw Duinen No. 152, Vanrhynsdorp at Brand se Baai.

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Expertise

Dr David J. McDonald:

- Qualifications: BSc. Hons. (Botany), MSc (Botany) and PhD (Botany)
- Botanical ecologist with over 40 years' experience in the field of Vegetation Science.
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 800 specialist botanical / ecological studies.
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request)

Curriculum Vitae – Appendix 1.

Independence

The views expressed in the document are the objective, independent views of Dr McDonald and the study was carried out under the aegis of, Bergwind Botanical Surveys and Tours CC. Neither Dr McDonald nor Bergwind Botanical Surveys and Tours CC have any business, personal, commercial, or other interest in the proposed development apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Bergwind Botanical Surveys & Tours CC, it's staff and appointed associates, reserve the right to modify the report in any way deemed fit should new, relevant, or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

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Declaration of independence:

I David Jury McDonald, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I, in terms of the general requirement to be independent:

- other than fair remuneration for work performed in terms of this application, have no business, financial, personal, or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity;
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the specialist:

Company: Bergwind Botanical Surveys & Tours CC Date: 14 June 2024

CONTENTS

1. Introduction and Project Description

Bergwind Botanical Surveys & Tours CC was appointed by EnviroAfrica in May 2024 to undertake a terrestrial botanical and biodiversity assessment of the coast to inland part of Portion 4 of the farm Rietfontein Extension 151,Vanrhynsdorp and Portion 4 of the farm Graauw Duinen No. 152, Vanrhynsdorp, at Brand se Baai, Western Cape Coast. These properties are the target area for bulk sampling prospecting for diamonds in the beach zone between the low- and high-water marks.

With the above in mind, this report focuses specifically on the upper part of the beach around the high-water mark and the dunes immediately inland of the beach environment. Some attention is given to the littoral zone where birds and other animals interact with the sea.

The study is conducted in terms of the National Environmental Management Act (NEMA) (No.7 of 1998) as amended and the 2014 Environmental Regulations. The protocols pertaining to terrestrial plant species and terrestrial biodiversity assessments (GN 1150 of 2020) have been applied.

1.1 Project Description

The prospecting project is aimed at bulk sampling the zone between the high-water and low-water marks of the sea to determine the viability of diamond mining. The botanical and biodiversity assessment reported here has been carried out as part of the required documentation for application for a prospecting permit.

2. Terms of Reference

The Terms of Reference for this specialist investigation were to undertake a visit to the study area, to survey the area above the beach and dunes parallel to the coastline and to compile a report that highlights the biodiversity (plant and animal biota) that could be affected by the proposed project.

3. Methodology

Fieldwork was undertaken on 10 & 11 June 2024. The study area was accessed from the coastal road that extends from Brand se Baai to the Groen River mouth. The survey was

undertaken on foot through the dunes and along the beach. The survey started at the northern end of the identified properties southwards to the boundary at Brand se Baai. The survey was tracked using a Garmin GPSmap 66i as well as the GAIA GPS app on an Apple iPhone. A map of the property was pre-loaded onto the GAIA GPS app for navigational purposes.

At the start of the survey, the plants found in the dunes were listed to enable description of the vegetation. Thereafter, as the survey was extended southwards along the beaches and at the interface of the beaches with the dunes, additional plant species were added to the general plant list. The pattern of the vegetation communities in the dunes was recorded.

Plant species were identified where possible in the field and, when necessary, by using illustrated field guides, as well as the Plants of Southern Africa website (http://newposa.sanbi.org/sanbi/). The online database, iNaturalist (iNaturalist.org) was also used for identification. Animal species were identified where applicable using field-guides.

Photographs obtained in the field as well as available literature and Google Earth Pro ™ were taken as a record of the vegetation or specific plant and / or animal species. The National Vegetation Map (Mucina *et al.* 2005; SANBI, 2018) (referred to as VEGMAP) (Figure 14) was used as the 'base-map' to determine the principal vegetation types that are described in Mucina & Rutherford (2006). The vegetation base map is dated 2019 and is the most recent version, however, despite the survey being done in 2024, the VEGMAP is more than adequate for the purposes of this project.

4. Limitations and Assumptions

The weather at the time of the survey was clear and warm. There had been good rain the previous week, but the plants were not yet showing the positive effect of the rain after a prolonged dry period. Season was not a limitation. There was thus no hindrance from inclement weather and there were no other limitations, and no assumptions were made.

5. Study Area

5.1 Locality

The area of interest or study area is the seaward part of Portion 4 of the farm Rietfontein Extension 151,Vanrhynsdorp and Portion 4 of the farm Graauw Duinen No. 152, Vanrhynsdorp on the Cape West Coast, north of Brand se Baai (Figure 1). The mouth of the Soutrivier lies close to the northern limit of the study area (Figure 2).

Figure 1. The study area (blue boundary) along the coast north of Brand se Baai in the northwest corner of the Western Cape.

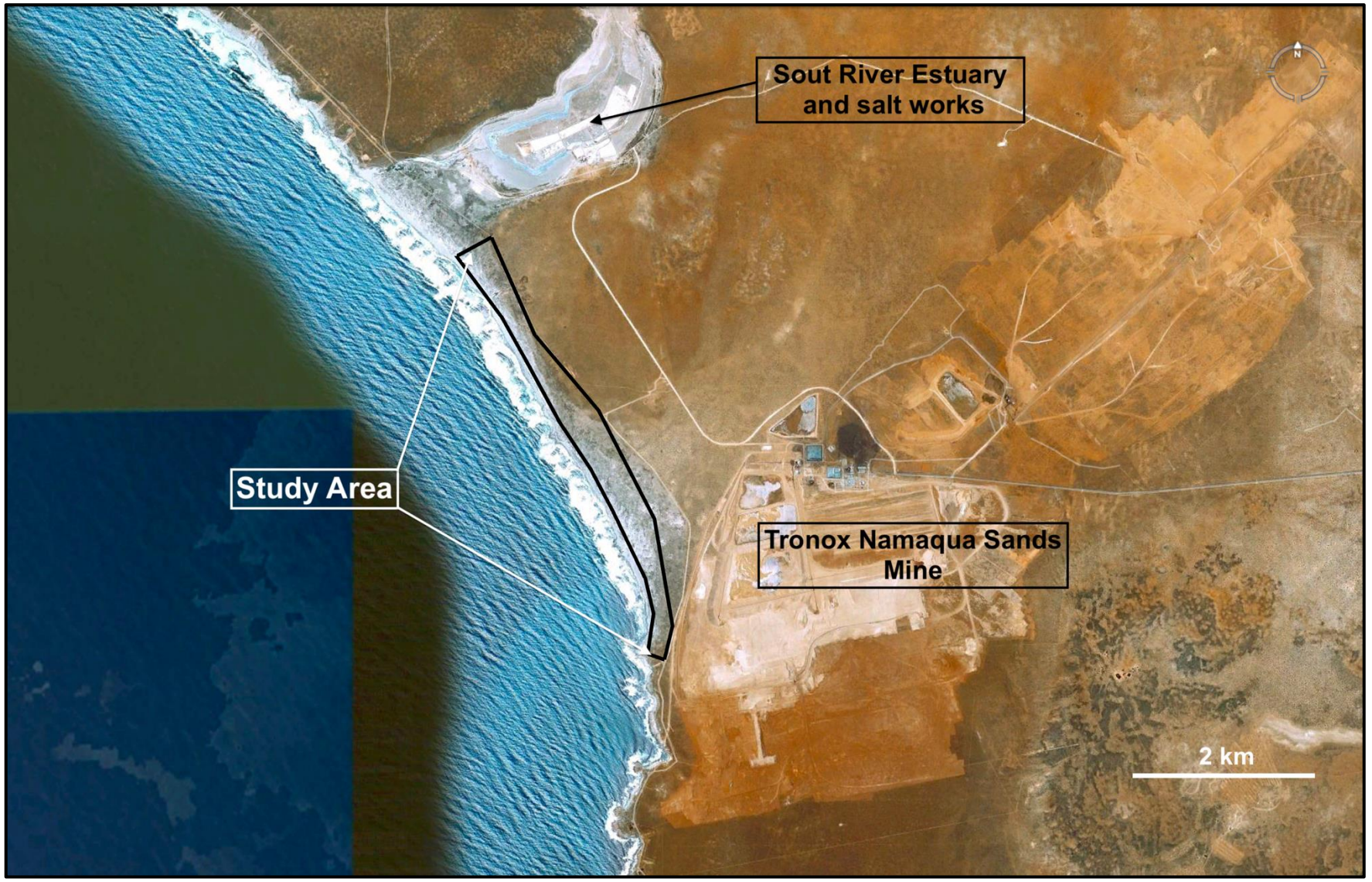


Figure 2. The study area on the Cape West Coast immediately north of the Tronox Namaqua Sands Mine with the northern limit near the estuary of the Sout River.

Figure 3. Aerial image of the study area with the survey track in green with waypoints BsB#.

5.2 General Description

The area investigated includes both a coastal dune system, a beach environment and some rocky headlands that influence the beaches.

5.2.1 Coastal Dunes

Heydoorn & Tinley (1980) described the various types or forms of dunes found along the Cape Coast, however, their description of the dunes along the Cape West Coast was not detailed. Despite this lack of emphasis, the dunes found at Rietfontein Extension and Graauwe Duinen study area may be classified according to the Heydoorn & Tinley (1980) system as the “A” type which is ‘***Barrier Dune with Leeward Slack***’ (Figure 4).

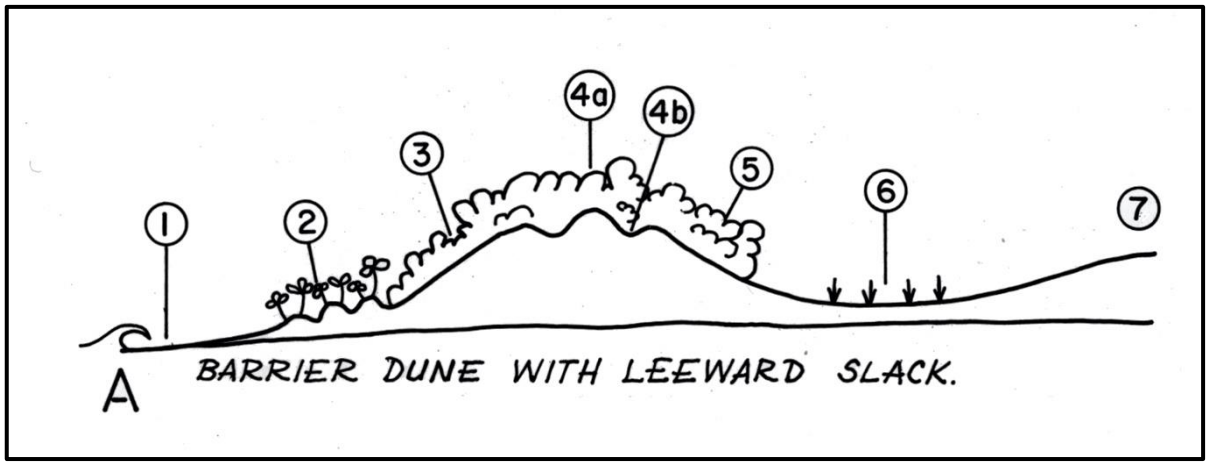


Figure 4. Dune profile after Heydoorn & Tinley (1980) with the number key in the text below.

The following key is the classification of Barrier Dunes according to Heydoorn & Tinley (1980) with some modifications where necessary. The numbers correspond with the numbers in Figure 2. The **bold blue type** indicates the applicability of the classification, or not ,in the study area.

1. **Nearshore and Beach Zone**. Shaped by changes in sea level (long-, medium-, and short-term including seasonal or episodic storm surges). Beach surface reworked by tides, wave action and wind. Major buffer on which storm waves expend their energy. **This applies in the study area.**

2. **Ephemeral or Hummock Dune Zone**. Equinox tide and storm wave zone subject to extensive changes – either erosional (breaching by wind and sea) or growing (dune building by accumulation of sand around colonizing sand-fixing plants). **This applies to a certain extent in the study area, although relatively few hummock dunes were found.**

3. **Seaward or windward face of Barrier Dune.** Bears brunt of wind and salt spray. Where plant-covered slopes area exposed to undercutting and slumping from storm wave action, wind initiates parabolic dune blow-outs. Extremely vulnerable where **Zone 2** has been eroded away. **This applies to the study area.**

4a. Dune Crest. Steep bush covered crest liable to donga erosion by torrential rains, salt "burning" of canopy, or death of bush in droughts (poorest soil moisture in dune profile). All these result in gaps followed by wind erosion (blow-outs, breaching, slumping), or from

fire where dunes are covered by fynbos or grass. **This applies to a certain extent to the dunes in the study area.**

4b. Interdune slack or trough. Ground-water often closer to the surface. Stability of bush cover depends on permanence of Zone 2 and Zone 3 and maintenance of ground water. **Dune slacks and troughs of this nature were not observed in the study area, probably due to the generally semi-arid conditions on the Cape West Coast.**

5. Lee or landward Dune Face. Relatively most stable part of dune profile. High fire hazard from hot Berg Wind fires where bush adjoins grassland or fynbos. Base only stable where adjoining lake or estuary waters – undercutting and subsequent slumping can occur. **The occurrence of fires in the dune vegetation is apparently not a common occurrence, but the stability of the lee side of the dunes applies.**

6. Vlei, Lake or Pan or Floodplain slack. Seasonally or perennially inundated to a greater or lesser extent. Usually biologically highly productive, i.e. fish and bird life, grazing and agriculture. **Perennially inundated areas in the dune field is almost non-existent in the study area. Only one such area was noted that was artificially created by excavation of the dunes.**

7. Old Land Surface. Where substrates are free-draining ideal. Many coastal old-lands have duplex soils, with an impervious subsoil resulting in seasonally waterlogged conditions. **This was not observed in the study area.**

The dunes in the study area are low to moderately high, ranging from the hummock foredunes to the much higher 'inland' dune cordon that extends from north to south through the study area, more or less parallel to the shoreline. The foredunes or hummock dunes are not always present; in fact, few true foredunes were encountered in the survey. The more common situation is that the relatively steep barrier dunes have an abrupt interface with the beach as shown in Figure 5. When foredunes are present, they are either vegetated with Spiny Love Grass (*Cladoraphis spinosa*) (Figure 6) or Sea Pumpkin (*Arctotheca populifolia*). In the latter case, the *A. populifolia* was mostly extremely dehydrated and not in good condition (possibly even dead!) on the hummock dunes (Figure 7). This is attributed to an extremely long dry spell with no rain.

Figure 5. Dunes and beach in the study area with hummock dunes absent and the foredunes meeting the beach at a steep angle.

Figure 6. Low hummock dune with *Cladoraphis spinosa* being the dominant plant species.

Figure 7. Hummock dunes normally dominated by *Arctotheca populifolia* but the plants were severely affected by drought. The inset photo indicates what the plants should look like.

5.2.2 Beaches

The beaches are typically wide from the shoreline to the base of the dunes (Figures 8 & 9). Some of the beaches are uniformly flat whereas some are stepped i.e. they have a steep part from the shoreline up to 10 m or so landward, and then a flat section extending to the base of the first barrier dune.

Figure 8. Wide beaches in the study area with the high-water mark shown more-or-less by the line of washed-up kelp (*Ecklonia maxima*).

Figure 9. View south-westwards over the dune field with Namaqualand Coastal Duneveld.

5.2.3 Rocky Outcrops

Rocky outcrops are found at irregular intervals along the coast in the study area (Figure 10). This changes the dynamics of the water and sand movement, but dunes still form inland of the rocky promontories.

Figure 10. Rocky outcrops are found at three places in the study area, separating the beaches.

5.3 Geology

The southern part of the study area (approximately half) is underlain by rocks of the Gifberg Group (Van Staden *et al.* 2014) that has a complicated provenance and is not discussed further here apart from indicating that the rocky headlands mentioned above are part of this geological group. North of the Gifberg Group (approximately half of the study area) is composed of Cenozoic sediments of the West Coast Group (Figure 11). The vegetation reflects the sandy surface deposits (dune system) surface and where the Gifberg Group bedrock is exposed, there is very little vegetation. Where present it is in pockets of sand amongst the rocks.

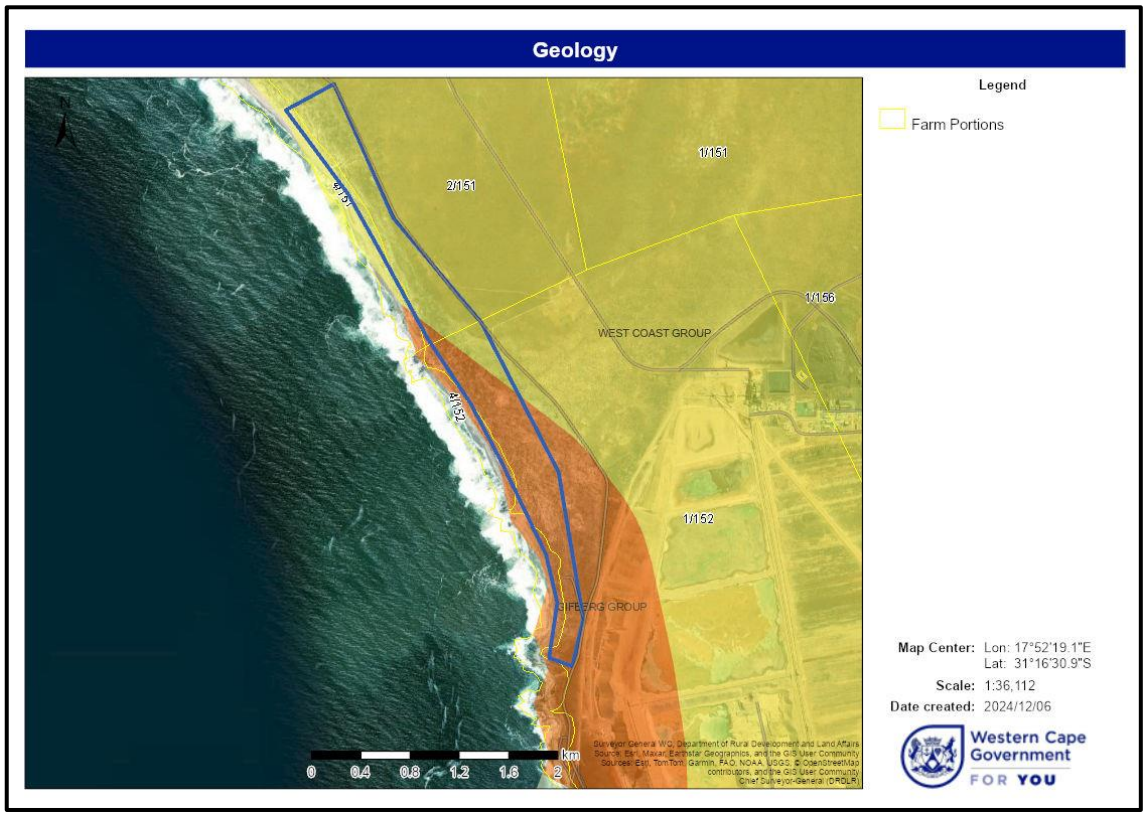


Figure 11. Geology of site shown as blue boundary. Two groups are present; West Coast Group and Gifberg Group.

5.4 Climate

The southern Namaqualand coast experiences low rainfall mainly in winter. A climate diagram published for Namaqualand Coastal Duneveld (Figure 12) (Mucina *et al.* 2006) indicates that the rainfall is in excess of 100 mm per annum for the areas where this vegetation type occurs. The mean maximum temperature does not vary much throughout the year whereas there is a slightly greater amplitude in mean minimum temperature. This is due

to the proximity to the Atlantic Ocean and the effect of the Benguela Current with regular fog occurring over the coastal zone. However, there are extremes with summer daytime temperatures as high as 40 °C having been recorded at Brand se Baai. Winter temperatures can fall to 4 °C at night. Temperatures can also be influenced by easterly berg wind conditions (off-shore flow) in winter when the temperature may exceed 35 °C. The prevailing surface winds are mostly from the south and south-east in summer when winds are strong and speeds can exceed 10 m/s. Strong winds also occur from the west and north-west, mainly in winter.

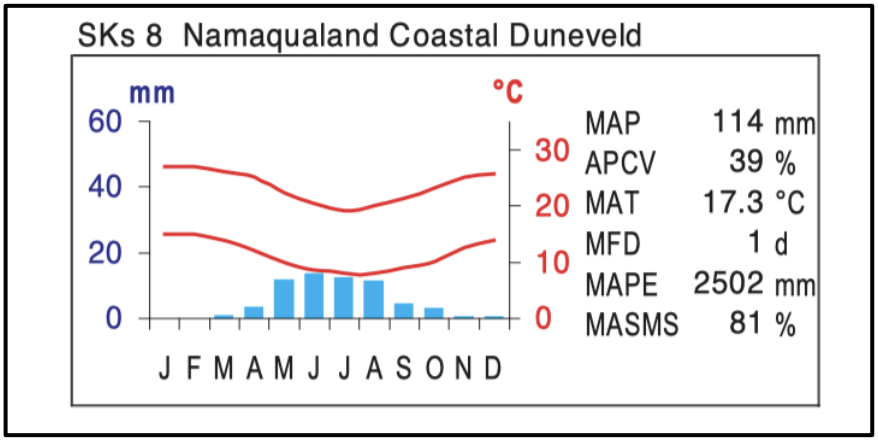


Figure 12. Climate diagram of Namaqualand Coastal Duneveld. MAP: Mean Annual Precipitation; APCV: Annual Precipitation Coefficient of Variation; MAT: Mean Annual Temperature; MFD: Mean Frost Days; MAPE: Mean Annual Potential Evaporation; MASMS: Mean Annual Soil Moisture Stress (Mucina *et al.* 2006, In Mucina & Rutherford, 2006)

6. Biome, Bioregion and Vegetation Types

6.1 Biome and Bioregion

The study area falls within the extensive, arid **Succulent Karoo Biome** (Rutherford & Westfall, 1994; Mucina *et al.* 2006 in Mucina & Rutherford, 2006) and regionally within the **Namaqualand Sandveld Bioregion** that lies parallel to the west coast in the western part of the Succulent Karoo Biome (Rutherford, Mucina & Powrie, 2006 in Mucina & Rutherford, 2006; Desmet, Turner & Helme, 2009) (Figure 13). The Succulent Karoo Biome has high levels of plant diversity and endemism and is one of the earth's 'hotspots' of plant diversity and the only entirely arid hotspot in the world (Van Wyk & Smith, 2001). Two main vegetation types are found in the Brand se Baai study area. They are (1) azonal **Namaqualand Seashore Vegetation** (AZd2) along the coast and (2) **Namaqualand Coastal Duneveld** (SKs8) on the semi-mobile coastal dunes overlying a basement of marine sediments and granite-gneisses. A third vegetation type occurs inland of the dunes. It is **Namaqualand Salt Pan** vegetation (AZi2) found at the coastal end of the Soutrivier.

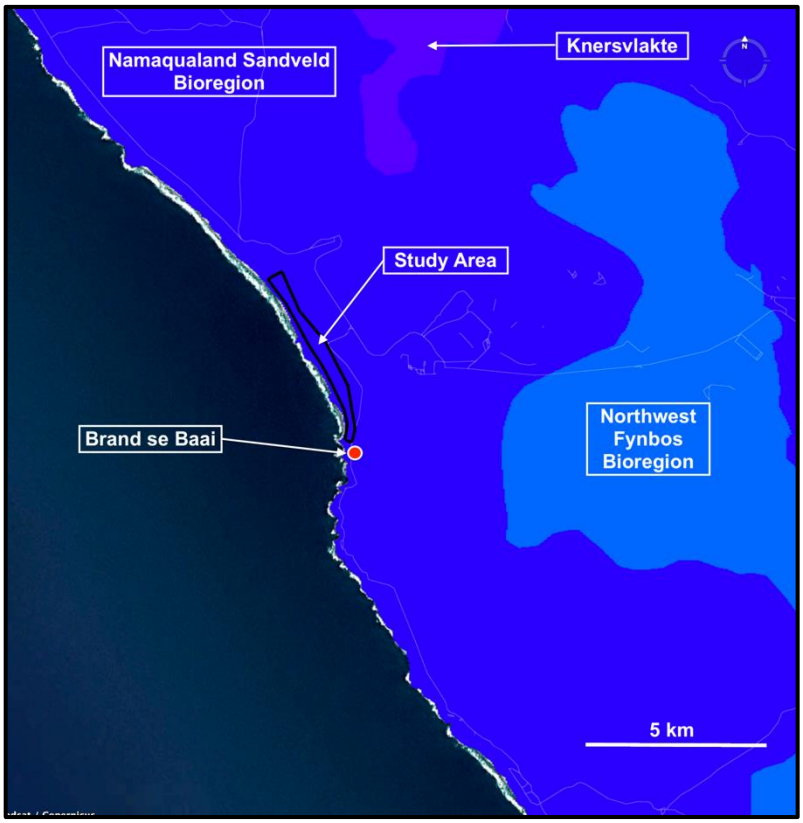


Figure 13. The bioregions where the Brand se Baai study area is located. The study area is the Namaqualand Sandveld Bioregion.

6.2 Vegetation types

6.2.1 Namaqua Seashore Vegetation

Namaqualand Seashore Vegetation is not well developed in the study area. It is represented by a few plant species on the seaward-facing dunes on a very narrow band and it then gives way almost immediately eastwards to Namaqualand Coastal Duneveld that is well-developed on the higher dunes landward from the foredunes (Figure 14)

The low hummock dunes mentioned above support sparse communities of plant species that are true members of Namaqualand Seashore Vegetation, these being *Arctotheca populifolia*, and the grasses *Cladoraphis spinosa* (Figure 15) and *Sporobolus virginicus* (Figure 16). All these species are distinctly salt-tolerant.

The higher sea-facing dunes are mostly dominated by the spreading succulent (vygie), *Amphibolia laevis* (Figures 18 & 18) also known to be salt-tolerant. Other shrubs such as *Lycium tetrandrum* and *Atriplex vestita* also occur occasionally in this position on the dunes.

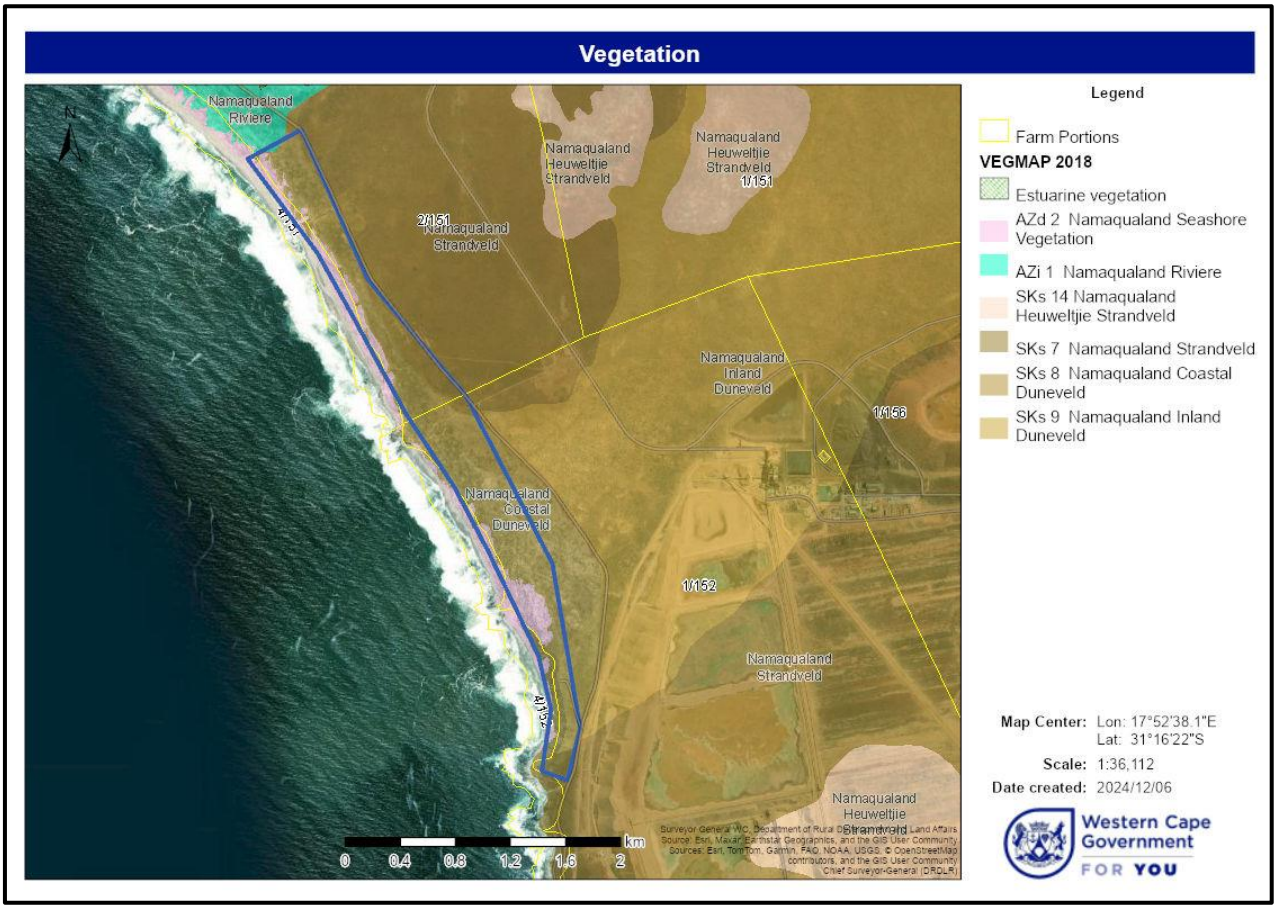


Figure 14. A portion of the Vegetation Map of South Africa, Swaziland (Eswatini) and Lesotho (VEGMAP) (Mucina et al. 2005; SANBI, 2018) overlaid on a Google Earth ™ aerial image with the boundary of the study area indicated by blue outline.

Figure 15. The true Namaqualand Coastal Vegetation is poorly represented, mostly by grasses (here *Cladoraphis spinosa*).

Figure 16. Some of the foredunes have the salt-tolerant grass, *Sporobolus virginicus* present.

Figure 17. *Amphibolia laevis*, a salt-tolerant, spreading succulent is the dominant plant species on the seaward-facing high dunes, throughout the study area.

Figure 18. Flower of *Amphibolia laevis.*

6.2.2 Namaqualand Coastal Duneveld

Namaqualand Coastal Duneveld is well-developed on the dunes that lie inland of the first dune cordon. The dunes are an irregular system of crests and swales that have a variable cover of vegetation. However, the plant community, a low to mid-high somewhat xerophytic shrubland is uniform over virtually the entire length of the study area (Figures 19—23). Plant species recorded in this vegetation include, *Amphibolia laevis*, *Arctotis decurrens*, *Babiana hirsuta*, *Calobota angustifolia*, *Cladoraphis spinosa*, *Crassothonna cylindrica*, *Didelta carnosa var. tomentosa, Drosanthemum sp.*, *Grielum humifusum*, *Kewa angrae-pequenae*, *Lycium ferocissimum*, *Lycium tetrandrum*, *Mesembryanthemum guerichianum*, *Osteospermum incanum*, *Roepera cordifolia*, *Roepera morgsana*, *Trachyandra cf. divaricata.*

Figure 19. Namaqualand Coastal Duneveld with *Roepera morgsana* (bright green shrubs) prominent in the upper, open stratum.

Figure 20. The cover of vegetation in the duneveld is described as ‘open’ with a repeated pattern of the same plant community.

Figure 21. Namaqualand Coastal Duneveld in a swale or dune-slack behind the sea-facing dunes.

Figure 22. *Helichrysum* sp. forms rounded shrubs due to salt-pruning from slat-laden onshore winds.

Figure 23. View southwards along the dunes with the same plant community all along, wide beaches and rocky headland.

6.2.3 Namaqualand Salt Pans

The salt pans at the coastal end of the Soutrivier support Namaqualand Salt Pan vegetation (AZi2). The salt pans are actively worked to harvest salt so much of the vegetation is disturbed. However, the salt pans attract an abundance of birdlife, notably Lesser and Greater Flamingo, that feed on the micro-organisms in the water (Figures 24 & 25).

It should be clearly noted that the Soutrivier mouth is closed and has been for some time. The proposed prospecting along the coast would happen southwest of the salt pans and would thus have very limited direct negative impact on the salt pans and their birdlife.

Figure 24. Halophytic (salt-tolerant) plant species fringe the edge of the salt pans at the coastal end of the Soutrivier.

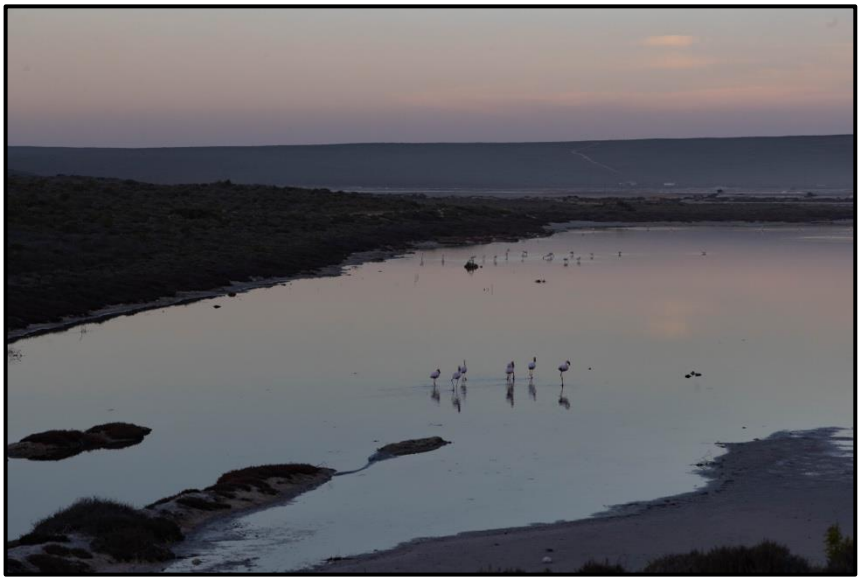


Figure 25. Numerous waterbirds, especially flamingos, are attracted to the extensive pans at the end of the Soutrivier.

7. Fauna

7.1 Avifauna

A total of 154 terrestrial and coastal bird species have been recorded along the coast and near-coast environments of Namaqualand, based on data obtained from the Southern African Bird Atlas Project 1 (SABAP), and more recently the Southern African Bird Atlas Project 2 (SABAP 2, http://sabap2.adu.org.za/). Of these, 11 are listed as threatened and five as near-threatened, while 18 species are considered endemic and 38 near-endemic to South Africa.

The overall landscape of the area is dominated by the Namaqualand Duneveld Vegetation and the beach bordered to the west by the cold Benguela coast. Two principal habitats are important for birds in the study area (i) the low to mid-high shrubland of the dunes and (ii) the beach and littoral zone.

Namaqualand Coastal Duneveld (Mucina & Rutherford, 2006 supports a significant diversity of bird species (102) comprising mostly small passerines (63 species). Whereas none of the passerines are Red Listed, 14 species are endemic and 22 are near-endemic to South Africa (Taylor *et al*., 2015). The most commonly encountered and typical species include the following: Pied Starling (*Lamprotornis bicolor*), African Stonechat (*Saxicola torquatus*), Bokmakierie (*Telophorus zeylonus*), Yellow Canary (*Crithagra flaviventris*), Karoo Scrub-robin (*Cercotrichas coryphoeus*), Anteating Chat (*Myrmecocichla formicivora*), Grey-backed Cisticola (*Cisticola subruficapilla*), Cape Long-billed Lark (*Certhilauda curvirostris*) (Figure 26), Spike-heeled Lark (*Chersomanes albofasciata*), Karoo Prinia (*Prinia maculosa*), Malachite Sunbird (*Nectarinia famosa*), Southern Double-collared Sunbird (*Cinnyris chalybeus*), White-throated Canary (*Crithagra albogularis*), Cape Bunting (*Emberiza capensis*), Tractrac Chat (*Cercomela tractrac*), Cape Weaver (*Ploceus capensis*), Cape Bulbul (*Pycnonotus capensis*), Karoo Lark (*Calendulauda albescens*), and Chat Flycatcher (*Bradornis infuscatus*).

Species of special concern within the succulent shrubland include large terrestrial birds (5 species) and raptors (11 species), with the following species being of particular importance (with Red List status): the Endangered Ludwig's Bustard (*Neotis ludwigii*), Martial Eagle (*Polemaetus bellicosus*), Black Harrier (*Circus maurus*), the Vulnerable Secretarybird (*Sagittarius serpentarius*), Lanner Falcon (*Falco biarmicus*), Southern Black Korhaan (*Afrotis afra*), and the Near-threatened Kori Bustard (*Ardeotis kori*). Besides Ludwig's Bustard and Southern Black Korhaan, these species all appear to be rare to uncommon in the study area owing to probable low SABAP 2 reporting rates or they are simply absent.

The following bird species were recorded in the dune habitat during the June 2024 survey: African Stonechat, Bokmakierie, Cape Long-billed Lark (Figure 26), Grey Wagtail, Pied Crow, Southern Double-collared Sunbird. These birds are not the only species that are likely to occur. For example, this is suitable habitat for Black Harrier, but none were seen. These birds are unlikely to be affected by the proposed prospecting.

Figure 26. Cape Long-billed Lark.

In the seashore environment the following bird species were recorded: African Oystercatcher [Near Threatened] (Figure 27), Bank Cormorant, Hartlaub's Gull, Kelp Gull, Pied Avocet (Figure 28) Water Thick-knee, White-breasted Cormorant, White-fronted Plover (Figure 29). These bird species are likely to be affected by the prospecting operation as well as any possible future mining for alluvial diamonds.

Figure 27. African Oystercatchers use rocky outcrops and beaches to forage for food.

Figure 28. A group of Pied Avocet feeding at the shoreline.

Figure 29. White-fronted Plover actively use the littoral zone to feed.

7.2 Mammalian Fauna

No mammals were observed directly but tracks were observed in the sand. In addition, droppings were found at a site that is obviously a territorial marking spot. The scats (Figure 30) are thought to be those of African Wild Cat.

It has been mentioned in the Scoping Report for this project that the larger mammals in the area are mainly Steenbok, Common Duiker and Cape Porcupine with Cape Fox and African Wild Cat. Evidence of porcupine digging for bulbs was noted. It is believed that predators such as African Wild Cat and Black-backed Jackal forage on the beaches for carrion.

Figure 30. Scats of a carnivorous mammal, probably African Wild Cat.

7.3 Amphibians

The study areal lies within the known distribution range of seven frog and toad species. However, as there is very little perennial water in the area, many of these are not likely to occur at the site. Species likely to be present include the Desert Rain Frog *Breviceps macrops*, Namaqua Rain Frog *Breviceps namaquensis* and Karoo Toad *Vandijkophrynus gariepensis*. The Desert Rain Frog occurs along the coast, in Strandveld vegetation up to 10 km from the coastline and is listed as **Vulnerable** due in large part to habitat loss from mining activities. The proposed prospecting is unlikely to lead to additional habitat loss.

7.4 Reptiles

Likely species in the study area, in the dune habitat, include Variable Skink *Mabuya varia*, Giant Desert Lizard *Meroles ctenodactylus* and Angulate Tortoise *Chersina angulata* with the Spotted Desert Lizard *Meroles suborbitalis* more frequent on the firmer lowland substrates slightly further away from the coast.

7.5 Insects

The Namaqualand Coastal Belt is biogeographically important for a number of insect groups and two are singled out. They are dung beetles and butterflies. Several species of dung beetles, both flightless and winged, are endemic to the Cape West Coast, Namaqualand Coast and Southern

Namibian Coast. The continuity of their habitat has already been broken by coastal mining activities and further mining will cause negative impacts, although will not cause their demise in the short term.

A search for the lepidoptera (butterflies and moths) in the Virtual Museum LepiMap Database that occur in the 3117BD Quarter Degree Square (QGS) yielded the list given below in Figure 31.

#	Species code	Family	Scientific name	Common name	Red list category	Number of QDSs	Number of records	Last recorded	Records link
1	458890	LYCAENIDAE	Aloeides arida	Namaqualand russet	Least Concern (SABCA 2013)	1	2	2005-09-18	Records
2	459660	LYCAENIDAE	Aloeides vansoni	Roggeveld russet	Least Concern (SABCA 2013)	1	1	2005-09-13	Records
3	457920	LYCAENIDAE	Argyraspodes argyraspis	Warrior silver-spotted copper	Least Concern (SABCA 2013)	1	1	2005-09-18	Records
4	456940	LYCAENIDAE	Chrysoritis aridus	Namaqua opal	Least Concern (SABCA 2013)	1	2	2005-09-18	Records
	Total					**4**	**6**	**2005-09-18* 2005-09-15****	

Figure 31. Extract from the LepiMap database indicating the butterflies likely to occur in the study area.

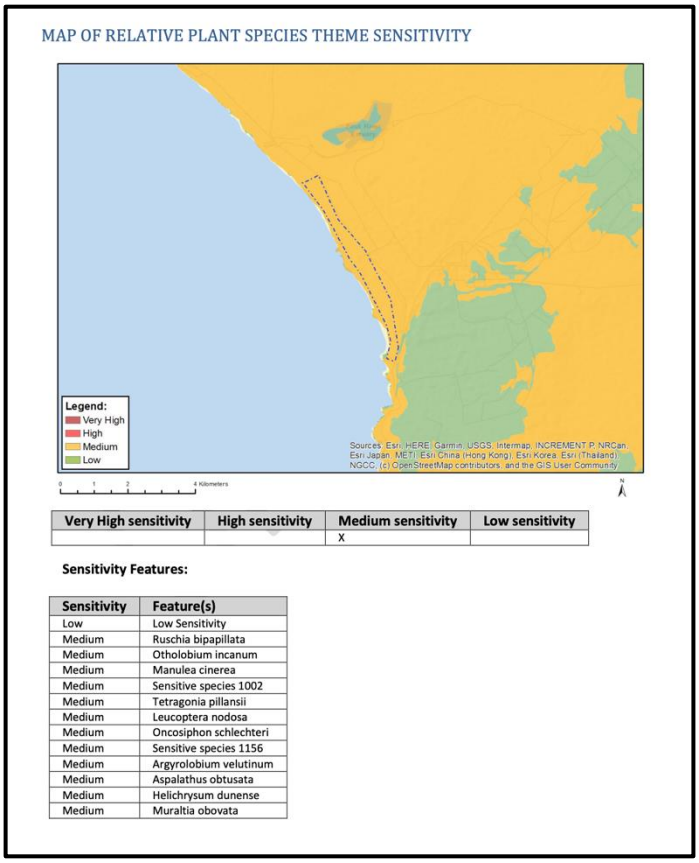
Butterflies are mainly represented by four species in the family Lycaenidae Two species of *Aloeides*, *A. arida* (Namaqualand Russet) and *A. vansoni*, (Roggeveld Russet), one species in the genus *Chrysoritis*; *C. aridus* (Namaqua Opal) and one species of *Argyraspodes, A. argyraspis* (Warrior silver-spotted Copper). The ubiquitous butter, *Vanessa cardui* (Painted Lady) was observed during fieldwork. The proposed prospecting activities are unlikely to affect their status.

8. Botanical and Terrestrial Biodiversity Sensitivity

8.1 Sensitivity according to the National Environmental Screening Tool

The National Environmental Screening Tool was applied to the footprint of the to determine the botanical and biodiversity sensitivity of the site which is mapped as **Medium** sensitivity for the flora (Figure 32) and **Very High** for terrestrial biodiversity (Figure 33). It is my view that the terrestrial biodiversity should only be **Medium**.

None of the sensitive plant species listed by the screening tool were recorded during the June survey. This could be related to the season, since it is highly likely that the sprawling *Helichrysum dunense* (Vulnerable) occurs in the duneveld. A record exists of this summer-flowering species in the dunes immediately north of the study area (N. Helme – iNaturalist). The other plants species listed, including sensitive species 1002 and 1156 were not recorded during the survey. The sensitive animal species number 32 was also not recorded.

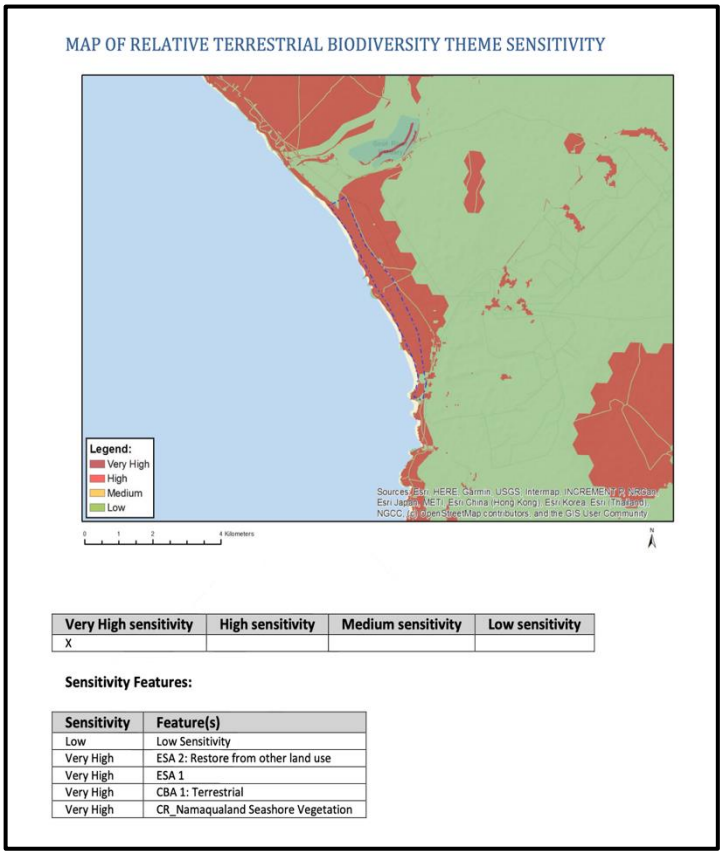


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Ruschia bipapillata
Medium	Otholobium incanum
Medium	Manulea cinerea
Medium	Sensitive species 1002
Medium	Tetragonia pillansii
Medium	Leucoptera nodosa
Medium	Oncosiphon schlechteri
Medium	Sensitive species 1156
Medium	Argyrolobium velutinum
Medium	Aspalathus obtusata
Medium	Helichrysum dunense
Medium	Muraltia obovata

Figure 32. The relative plant species theme sensitivity as mapped by the environmental screening tool is **MEDIUM**.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	ESA 2: Restore from other land use
Very High	ESA 1
Very High	CBA 1: Terrestrial
Very High	CR_Namaqualand Seashore Vegetation

Figure 33. The relative terrestrial biodiversity sensitivity as mapped by the environmental screening tool is **VERY HIGH.**

9. Impact Assessment

The proposed prospecting would take place at 16 prospecting pits and the bulk would take place in four trenches between the high-water and low-water marks on the beaches in the study area (Figure 34). There would be no negative impact on the Namaqualand Seashore Vegetation nor on the Namaqualand Coastal Duneveld. The prospecting would only affect the beach littoral zone. It would thus have a negative impact on the birds that inhabit the seashore due to disturbance of the species as described above. Impact assessment tables are presented below for (1) the beaches and (2) the duneveld including the Namaqualand Seashore Vegetation.

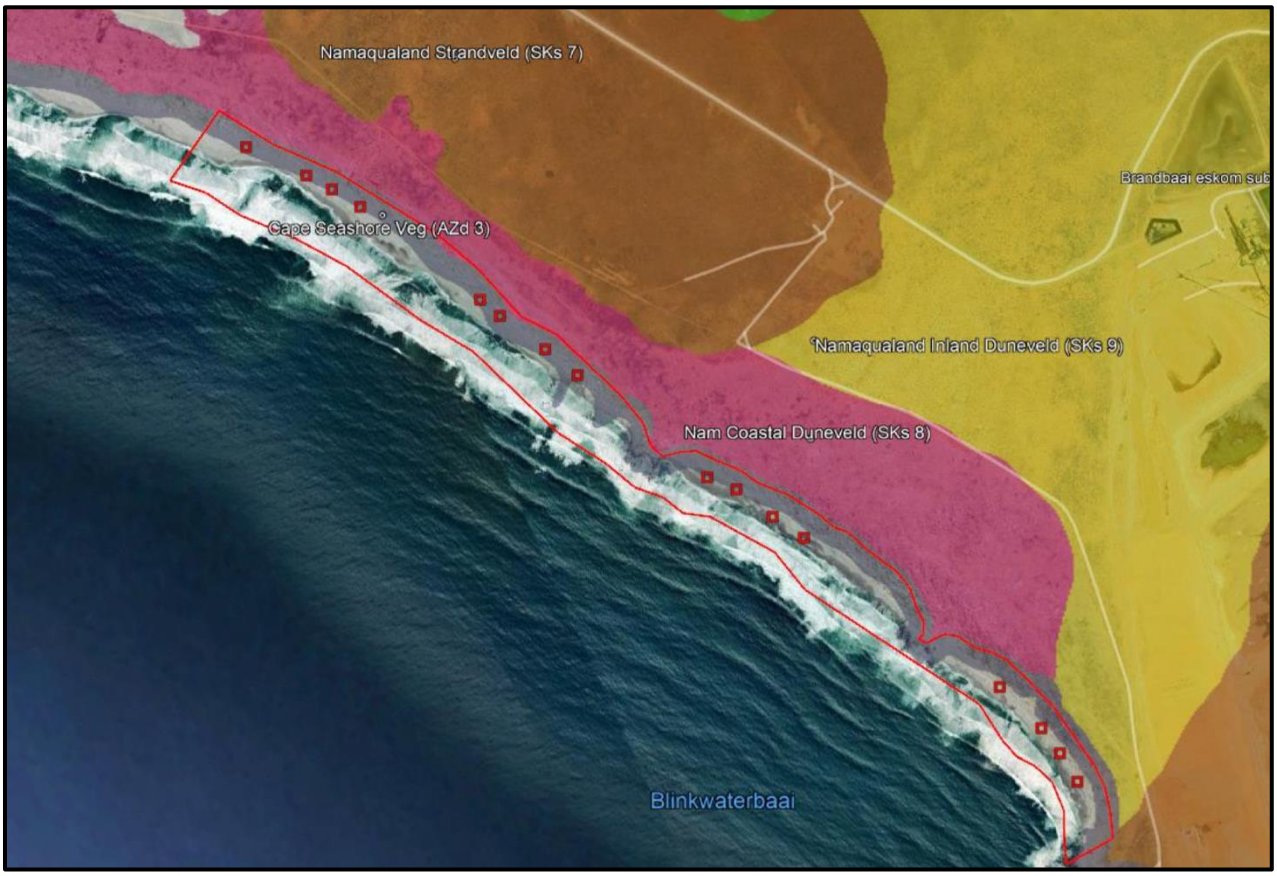


Figure 34. Map of the study area (red boundary) taken from the Scoping Report, showing the location of the proposed 16 prospecting pits.

Table 1. Impact assessment of the proposed bulk sampling on the dune a seashore environment of the Brand se Baai Study area.

Alternative:	Preferred Alternative	No-Go Option
SAMPLING PHASE		
Potential impact and risk:	**Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld**	**Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld**
Nature of impact:	Negative	Negative
Extent and duration of impact:	Local and short-term	Local and short-term
Consequence of impact or risk:	Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld	Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld
Probability of occurrence:	Definite	Probable
Degree to which the impact may cause irreplaceable loss of resources:	Very low	N/A
Degree to which the impact can be reversed:	High	N/A
Indirect impacts:	None foreseen	N/A
Cumulative impact prior to mitigation:	Low negative	N/A
Significance rating of impact prior to mitigation	**Low negative**	**Low negative**
Degree to which the impact can be avoided:	Medium	N/A
Degree to which the impact can be managed:	Medium	N/A
Degree to which the impact can be mitigated:	Medium	N/A
Proposed mitigation:	• Avoid disturbing vegetation in the duneveld and hummock dunes.	N/A
Residual impacts:	Very low	N/A
Cumulative impact post mitigation:	Very low negative	N/A
Significance rating of impact after mitigation	**Very low negative**	**N/A**
OPERATIONAL PHASE		
Potential impact and risk:	**Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld**	**Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld**
Nature of impact:	Negative.	The status quo remains.
Extent and duration of impact:	Local and long-term	Local and long-term
Consequence of impact or risk:	**Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld**	**Loss of Namaqualand Seashore Vegetation (beaches) and Namaqualand Coastal Duneveld**

Alternative:	Preferred Alternative	No-Go Option
Probability of occurrence:	Definite	Probable
Degree to which the impact may cause irreplaceable loss of resources:	Very low	N/A
Degree to which the impact can be reversed:	High	N/A
Indirect impacts:	None foreseen	N/A
Cumulative impact prior to mitigation:	Very low negative	N/A
Significance rating of impact prior to mitigation	**Very low negative**	**Low negative**
Degree to which the impact can be avoided:	High	N/A
Degree to which the impact can be managed:	Medium	N/A
Degree to which the impact can be mitigated:	Medium	N/A
Proposed mitigation:	• Closing of prospecting pits and bulk sampling trenches on the beaches. • Continued avoidance of disturbing the dunes, including the hummock dunes.	N/A
Residual impacts:	Very low	N/A
Cumulative impact post mitigation:	Very low negative	N/A
Significance rating of impact after mitigation	**Very low negative**	**N/A**
DECOMMISSIONING AND CLOSURE PHASE		
Unless mining is authorised, the prospecting pits and trenches for bulk sampling would be closed and any disturbance rehabilitated.		

10. General Assessment and Recommendations

- The principal vegetation types that occur in the study area are Namaqualand Seashore Vegetation (poorly represented) and Namaqualand Coastal Duneveld. The latter vegetation type is well-developed on the white sands of the dunes
- None of the threatened or sensitive plant species (Species of Conservation Concern) were found during the survey. The probability of the occurrence of such species of conservation concern may be confirmed by a survey in a different season. However, the dunes would hardly be affected so impact on SCC would be negligible. Another survey is thus not warranted.
- There is agreement between the results of this study and the output of the National Web-based Environmental Screening Tool for the vegetation i.e. **Medium**.

- For the biodiversity of the study area, the screening tool grossly overestimates the sensitivity indicating that it is **very highly sensitive.** The observations in this study indicate that the biodiversity has **Medium** sensitivity as for the botanical sensitivity above.
- No mammals and reptiles were directly observed, but there is indication that the mammals mentioned above frequent the dunes, and from time-to-time the beaches.
- The birds frequenting the littoral zone of the beaches would be negatively impacted by the bulk sampling operation, however, they are mobile and would probably temporarily avoid areas where the prospecting is taking place.
- No dung beetles were found and only one butterfly species, *Vanessa cardui* (cosmopolitan). These species would not be affected by the prospecting.
- Generally, the receiving environment is not disturbed but it was noted that a quad bike had been used on the beach, in places going over the hummock dunes and into the high barrier dunes. This damaging activity must be curtailed. No damaging of the foredunes and barrier dunes must be allowed during the prospecting.
- Entry into and exit from the beach environment would be through a few access points in the dunes. These routes must be adhered to and no further entry and exit points established.
- No activities should be allowed in the dune-field. The prospecting and other activities must be strictly limited to the beach environment.

11. Conclusions

Based on the data collected and analyzed for the Bulk Sampling Project in the designated area, the negative impact is rated as **Medium Negative** overall, but it would be possible to mitigate it to **Low Negative**. Taking all the ecological factors into consideration, and as long as good practice is implemented and the No Go areas observed, the project is supported from a botanical and terrestrial biodiversity perspective.

12. References

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Report submitted: 14 June 2024

Appendix 1: Curriculum Vitae

Dr David Jury McDonald Pr. Sci. Nat.

Name of Company: Bergwind Botanical Surveys & Tours CC. (Independent consultant)

Work and Home Address: 14 A Thomson Road, Claremont, 7708

Mobile: 082-876-4051

E-mail: dave@bergwind.co.za

Website: www.bergwind.co.za

Profession: Botanist / Vegetation Ecologist / Consultant / Tour Guide

Date of Birth: 7 August 1956

Employment history:

- Nineteen years with National Botanical Institute (now SA National Biodiversity Institute) as researcher in vegetation ecology.
- Five years as Deputy Director / Director Botanical & Communication Programmes of the Botanical Society of South Africa
- Eighteen years as private independent Botanical Specialist consultant (Bergwind Botanical Surveys & Tours CC)

Nationality: South African (ID No. 560807 5018 080)

Languages: English (home language) – speak, read, and write
Afrikaans – speak, read, and write.

Membership in Professional Societies:

- International Association for Impact Assessment (SA)
- South African Council for Natural Scientific Professions (**Ecological Science, Registration No. 400094/06**)
- Field Guides Association of Southern Africa

Key Qualifications:

- Qualified with a M. Sc. (1983) in Botany and a PhD in Botany (Vegetation Ecology) (1995) at the University of Cape Town.
- Research in Cape fynbos ecosystems and more specifically mountain ecosystems.
- From 1995 to 2000 managed the Vegetation Map of South Africa Project (National Botanical Institute).
- Conducted botanical survey work for AfriDev Consultants for the Mohale and Katse Dam projects in Lesotho from 1995 to 2002. A large component of this work was the analysis of data collected by teams of botanists.
- **Director: Botanical & Communication Programmes** of the Botanical Society of South Africa (2000—2005), responsible for communications and publications; involved with conservation advocacy particularly with respect to impacts of development on centres of plant endemism.
- Further tasks involved the day-to-day management of a large non-profit environmental organisation.
- **Independent botanical consultant** (2005 – to present) over 800 projects have been completed related to environmental impact assessments in the Western, Southern and Northern Cape, Karoo, and Lesotho. A list of reports (or selected reports for scrutiny) is available on request.

Higher Education

Degrees obtained
and major subjects passed:

B.Sc. (1977), University of Natal, Pietermaritzburg
Botany III
Entomology II (Third year course)

B.Sc. Hons. (1978) University of Natal, Pietermaritzburg
Botany (Ecology /Physiology)

M.Sc. – (Botany), University of Cape Town, 1983.
Thesis title: 'The vegetation of Swartboschkloof, Jonkershoek, Cape Province'.

PhD (Botany), University of Cape Town, 1995.
Thesis title: 'Phytogeography endemism and diversity of the fynbos of the southern Langeberg'.

Certificate of Tourism: Guiding (Culture: Local)
Level: 4 Code: TGC7 (Registered Tour Guide: WC 2969).

Employment Record:

January 2006 – present: Independent specialist botanical consultant and tour guide in own company:
Bergwind Botanical Surveys & Tours CC

August 2000 – 2005 : Deputy Director, later Director Botanical & Communication Programmes, Botanical Society of South Africa

January 1981 – July 2000 : Research Scientist (Vegetation Ecology) at National Botanical Institute

January 1979—Dec 1980 : National Military Service

Further information is available on my company website: www.bergwind.co.za