

Terrestrial Plant Species Compliance Statement

prepared in accordance with the
*"Protocol for the Specialist Assessment and minimum report content
requirements for environmental impacts on Terrestrial Plant Species"*

Proposed development of the Kronos – Hydra 2nd 400kV Line
between De Aar and Copperton in the Northern Cape Province



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Terrestrial Plant Species Assessment Report for the proposed Kronos – Hydra 2nd 400kV Line between De Aar and Copperton in the Northern Cape Province

26 July 2023

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SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with the "Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species", as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020. It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1: Details of Specialist

Specialist	Qualification and accreditation
Dr David Hoare (Pr.Sci.Nat.)	<ul style="list-style-type: none">• PhD Botany• SACNASP Reg. no. 400221/05 (Ecology, Botany)

Declaration of independence:

David Hoare Consulting (Pty) Ltd in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by David Hoare Consulting (Pty) Ltd is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

Disclosure:

David Hoare Consulting (Pty) Ltd undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to David Hoare Consulting (Pty) Ltd by the client and in addition to information obtained during the course of this study, David Hoare Consulting (Pty) Ltd present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.



Dr David Hoare

26 July 2023
Date

TERMS OF REFERENCE

This report is prepared in compliance with the PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL PLANT SPECIES

This assessment follows the requirements of The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020 for Terrestrial Biodiversity, and in GN. No. 1150 dated 30 October 2020 for Terrestrial Plant Species. As per these Regulations, the approach for assessing sensitivity with respect to Terrestrial Plant Species is in accordance with guidelines described in the latest version of the "*Species Environmental Assessment Guideline*", available at <https://bgis.sanbi.org/>.

The assessment and minimum reporting requirements of these protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The screening tool can be accessed at:

<https://screening.environment.gov.za/screeningtool>.

INTRODUCTION

Project description and location

The Aries – Kronos – Hydra 400 kV is one of the three major backbone corridors that move power to and from the Northern Cape. Due to anticipated generation expansion, the existing Kronos – Hydra 400 kV line will experience thermal overload by 2023 thus requiring the need for a second (2nd) Kronos – Hydra 400 kV line, which is the subject of the current assessment.

The proposed components of the Hydra – Kronos 2nd 400 kV line is as follows:

Hydra – Kronos 2nd 400 kV line

- Construct a second ± 187 km 400 kV line from Hydra to Kronos Substation.
- Bypass series compensation on the 1st Hydra – Kronos 400 kV line.
- The power line corridor assessed is 300m wide.

Kronos Substation

- Extend 400 kV busbar at Kronos Substation.
- Establish and equip a new 400 kV feeder bay at Kronos Substation.

Hydra Substation

- Equip existing 400 kV feeder bay at Hydra Substation.



Figure 1: Location of the Kronos – Hydra 400 kV line.

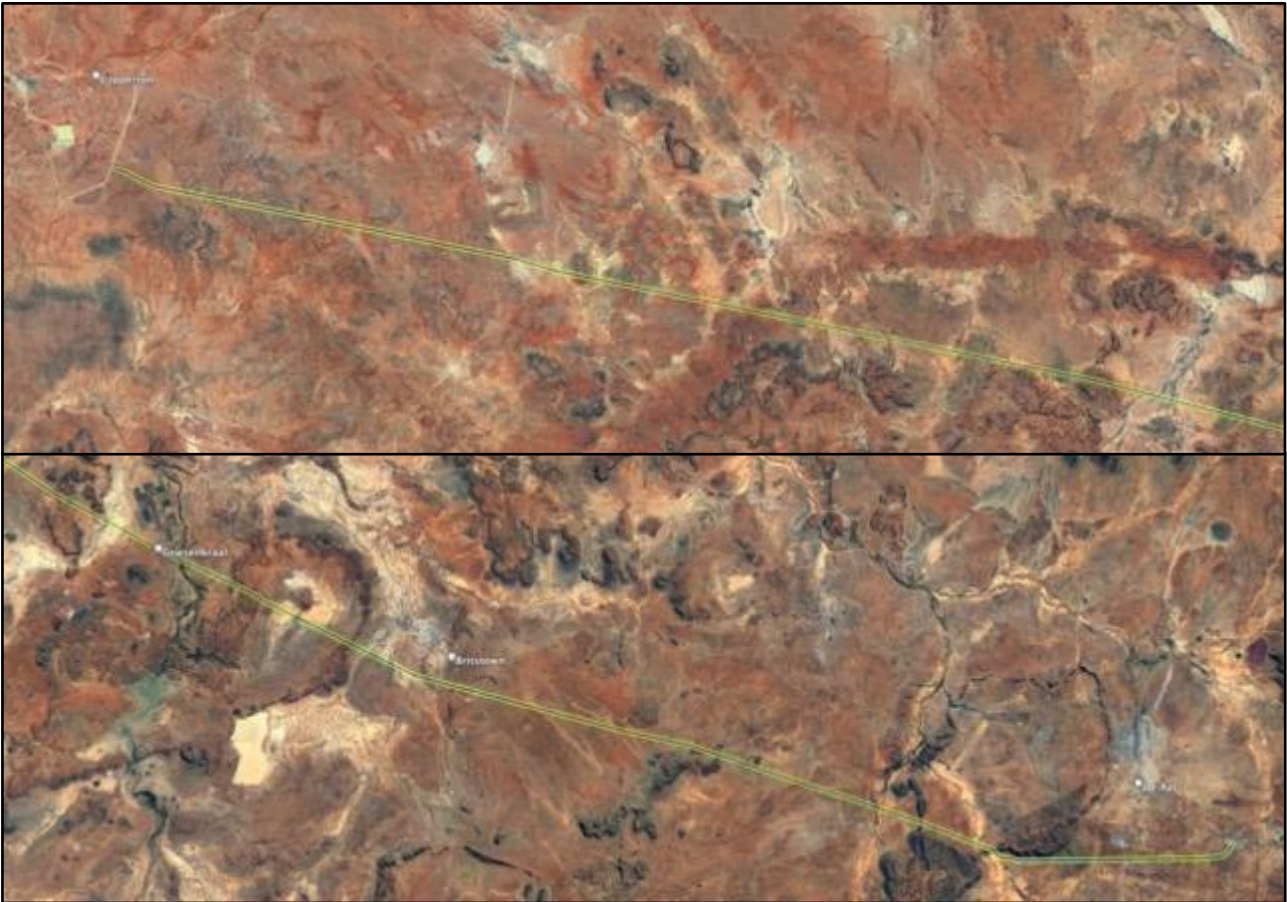


Figure 2: Aerial image of the corridor at the northern (Copperton) end and southern (De Aar) end.

Identified Theme Sensitivities

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Transformation of land | Indigenous vegetation. The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Plant Species Theme			X	

Plant Species theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Hereroa concava
Medium	Tridentea virescens
Medium	Sensitive species 144

ASSESSMENT METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Project Area of Influence (PAOI)

The proposal is to construct a 400kV powerline within the defined 300m corridor area. All impacts associated with the construction and operation of the powerline will be contained within the corridor area. The PAOI is therefore treated here as the corridor (example in Figure 3).

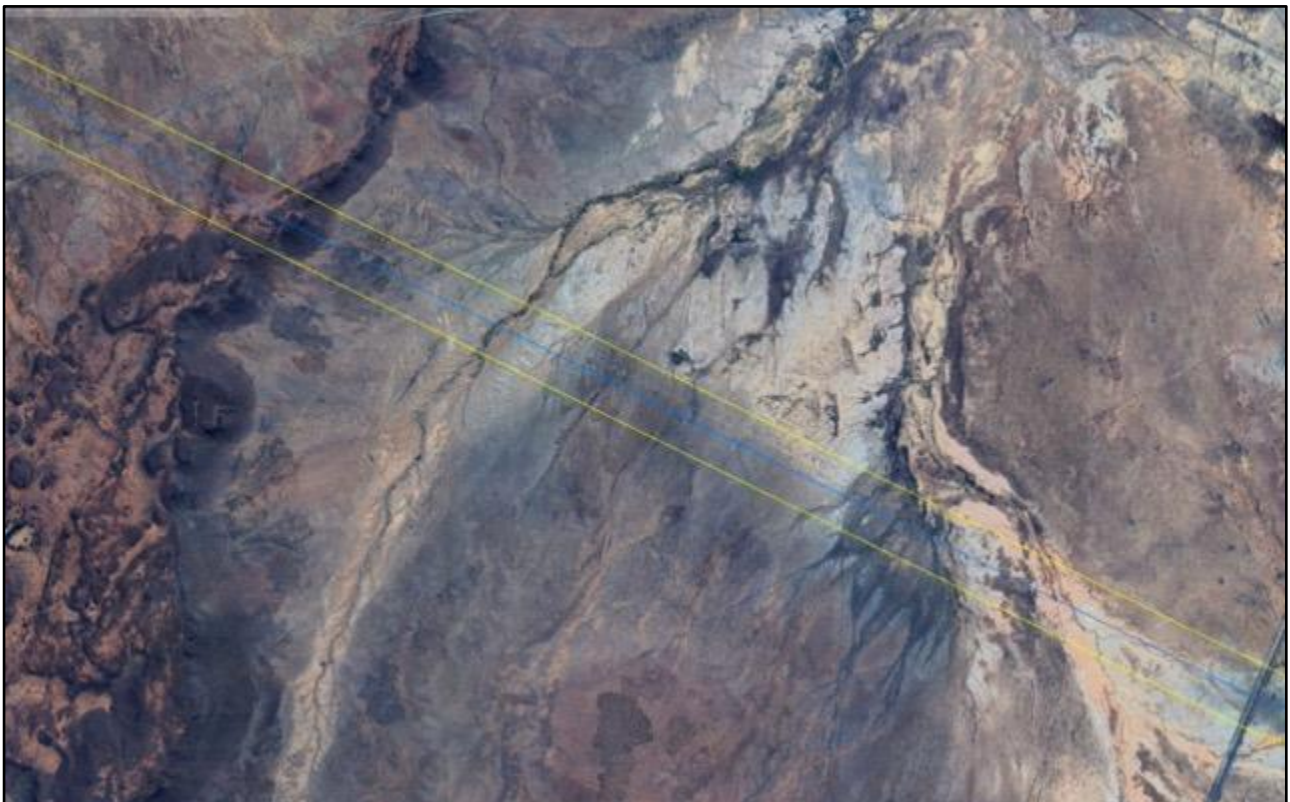


Figure 3: Example of corridor area (yellow lines) in landscape near Britstown.

Survey timing

The study commenced as a desktop-study followed by site-specific field study on 12 to 16 May 2023. The site is within the Nama-Karoo Biome with a late summer rainfall season with a slight decrease in winter (Figure 4). A more accurate indication of rainfall seasonality, which drives most ecological processes, is shown in Figure 5, which shows that De Aar has strongly seasonal summer rainfall, with peak rainfall from January to March. The timing of the survey in May is therefore favourable in terms of assessing the flora and vegetation of the site since it was undertaken towards the end of the growing season when many species are detectable. The overall condition of the vegetation was therefore possible to be determined with a high degree of confidence.

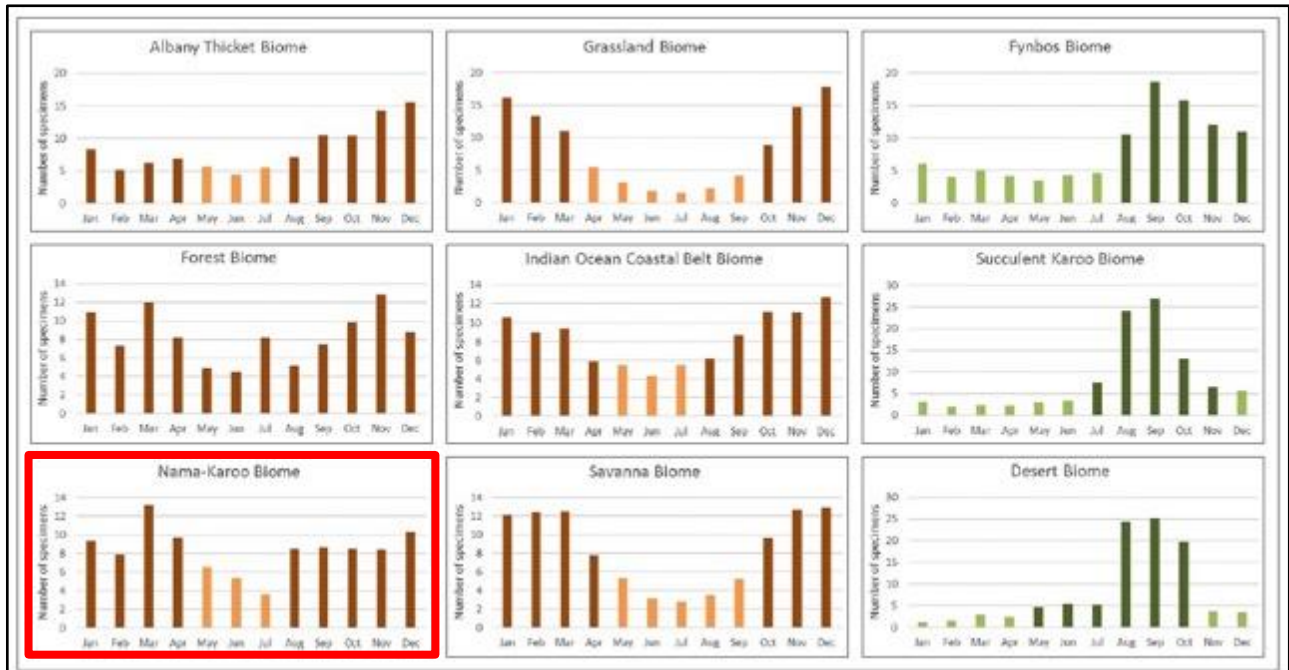


Figure 4: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The corridor is within the Nama-Karoo Biome.



Figure 5: Climate diagrams showing monthly rainfall for De Aar.

Field survey approach

During the field survey of habitats on site, the entire corridor was assessed on foot or by vehicle. A meander approach was adopted with no time restrictions - the objective was to comprehensively examine all natural variation. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made. Digital photographs were taken of features and habitats on site, as well as of all plant species that were seen. All plant species recorded were uploaded to the iNaturalist website and are accessible by viewing the observations located at this site.

Aerial imagery from Google Earth was used to identify and assess habitats on site. This included historical imagery that may show information not visible in any single dated image. Patterns identified from satellite imagery were verified on the ground.

Sources of information

Regional Vegetation

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (<http://bgis.sanbi.org>), as follows:
 - Mucina, L. and Rutherford, M.C. (editors) 2006. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. Strelitzia 19, South African National Biodiversity Institute, Pretoria.
 - South African National Biodiversity Institute 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 23 September 2021.

Plant species

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website. The description of each vegetation type includes a list of plant species that may be expected to occur within the particular vegetation type.
- Plant species that could potentially occur on in the general area was extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grids in which the site is located.
- The IUCN Red List status for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, www.redlist.sanbi.org/).
- Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute for the quarter degree grids within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.
- Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI database (www.newposa.sanbi.org) for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site (within 50 km), or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.

Assumptions and limitations

The following assumptions, limitations, uncertainties are listed regarding the assessment of the site:

- The assessment is based on a single site visit. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to legislated time constraints for environmental authorisation processes, this is not possible.
- Rare and threatened plant species are, by their nature, usually very difficult to locate and can be easily missed. This addressed by undertaking careful searches in areas that are identified as being suitable for species of concern.
- Many plant species are only detectable during the growing season which, in a relatively arid area, is dependent on recent and seasonal rainfall. Surveys done during the incorrect season, or during periods of drought, are unlikely to detect the full suite of plant species that occur in an area. This is addressed by undertaking field surveys in the correct season, and/or undertaking multiple surveys.

DESCRIPTION OF SITE

Regional vegetation type

The corridor passes through several regional vegetation types. These are divided between two main regions, the Bushmanland region near to Copperton and the Nama-Karoo region across the remainder of the corridor. Within the Bushmanland region are three vegetation types, namely Bushmanland Arid Grassland, Bushmanland Basin Shrubland and Bushmanland Vloere (Figure 6).

The Nama-Karoo region consists primarily of Northern Upper Karoo on the plains and Upper Karoo Hardeveld on the hills and ridges. There is a small area of Eastern Upper Karoo near to De Aar, but it is a small area of two large regions that grade floristically into one another, therefore no local differences are evident and the plains vegetation can be treated as a single type, namely Northern Upper Karoo.

Detailed descriptions of vegetation types are published and available on the SANBI BGIS website. On-site observations indicate that the patterns seen on site conform to these general published descriptions.

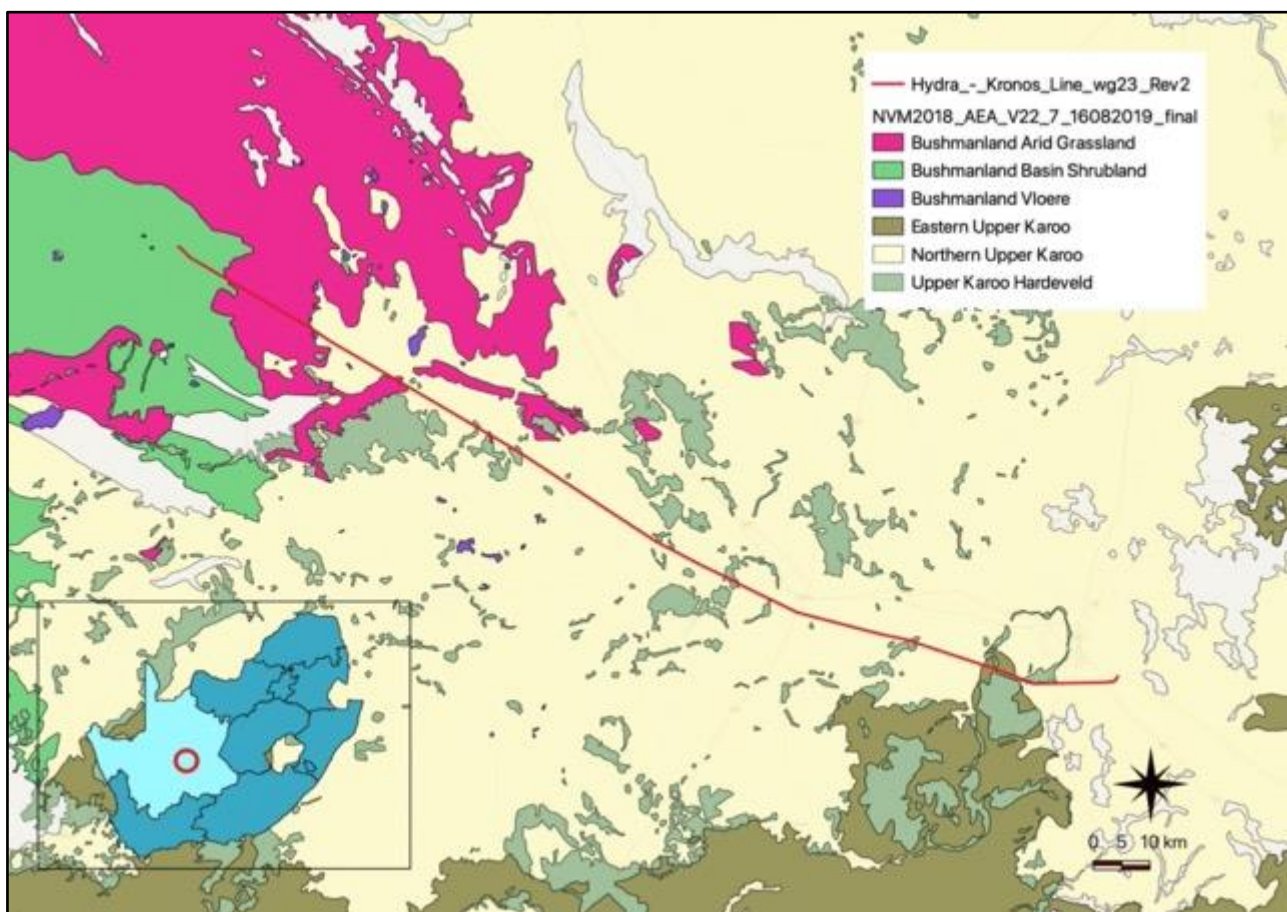


Figure 6: Regional vegetation types.

Plant species seen on site

The powerline corridor runs through a semi-arid landscape that consists of extensive plains interspersed with intermittent hills, ridges, outcrops and flattish uplands (see Figure 7). There are also regular drainage valleys of various dimensions crossing the corridor. The flora differs between these different parts of the landscape, determined largely by broad soil properties - the plains tend to have relatively shallow soils, but low rock cover; the ridges and hills have shallow soils and high rock and stone cover; and the drainage areas tend to have deep, fine-grained soils with few rocks. Corresponding with these soil patterns, the ridges have high shrub cover, but a diversity of habitats that support a variety of other plant functional types. The plains tend to have a relatively uniform cover of dwarf shrub-dominated vegetation with grass cover dependent on recent rainfall amounts. Drainage areas tend to be dominated by low spiny shrubs with relatively high cover of grasses.

A total of 129 plant species were found within the corridor. None of these are Red List species, but one is listed as Near Threatened (*Hoodia officinalis* subsp. *officinalis* - discussed in a section below) and one is listed as Rare (*Gethyllis longistyla*).

A few of the plant species listed in Appendix 1 are potentially sensitive, despite not being listed in any conservation category, including *Titanopsis calcarea*, *Hereroa pallens*, *Lithops hookeri*, *Anacampseros filimentosa*, *Anacampseros albissima*, *Aloe calviflora*, *Aloe hereroensis*, *Euphorbia braunsii*, *Euphorbia crassipes*, *Monsonia salmoniflora*, *Monsonia crassicaulis*, and *Hoodia officinalis*.



Figure 7: Typical landscape towards the southern end of the corridor.

Protected trees

In terms of section 15(1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister of Agriculture, Forestry and Fisheries. The list of Protected Tree Species under the National Forest Act, 1998 (Act No. 84 of 1998) is attached here as Appendix 2. The most recent version of this list was published in the Government Gazette No. 41887 on 7 September 2018, designated as GN No. 536 of 2018, and contains 47 species distributed across South Africa.

The following species have a geographical distribution that includes the corridor:

1. *Vachellia erioloba*.
2. *Vachellia haematoxylon*.
3. *Boscia albitrunca*.

One species of protected tree was found on site, *Boscia albitrunca* (shepherds tree), mostly as scattered individuals (example in Figure 8). Some of these occur within the corridor and may possibly be affected by the proposed powerline.



Figure 8: *Boscia albitrunca* seen within the corridor.

Plant species flagged for the study area

According to the National Web-Based Environmental Screening Tool, three plant species of concern are flagged as of concern for the site (see previous section of this report). A full list of the species is provided below in Table 3.

There is one species on this list that could possibly occur in the types of habitats that occur on site, namely *Tridentea virescens*, listed as Rare. It occurs on stony ground, or on hard loam in floodplains. This habitat preference includes almost the entire corridor, which is also almost entirely within the known distribution range for this species. It is, however, a rare species that has been recorded only a small number of times. There is therefore a possibility that it occurs within the corridor, although the probability of finding it is low, even if it occurs there.

No threatened plant species were found on site.

One Near Threatened species was found at one location on site, namely *Hoodia officinalis* subsp. *officinalis* (Figure 9). Other plants of *Hoodia* were found on site, but were not flowering and looked like *Hoodia gordonii* (Data Deficient). Although not threatened, the latter species is protected nationally.



Figure 9: Near threatened *Hoodia officinalis* subsp. *officinalis* found on site.

One Rare species was found at several locations, namely *Gethyllis longistyla* (Figure 10). It is also protected under the Northern Cape Nature Conservation Act, and is additionally a Sensitive Species, according to the Screening Tool.

There are therefore no threatened plant species that occur on site (although there is a Near Threatened species and a Rare species), and none that are likely to occur in the study area. It is therefore verified that the Plant Species Theme has LOW sensitivity for this site on the basis of the following:

1. **Unsuitable habitat for SCC.**
2. **No SCC found on site that are listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria.**

However, one Near Threatened species occurs on site (*Hoodia officinalis* subsp. *officinalis*), one Rare species occurs on site (*Gethyllis longistyla*), and one nationally protected species occurs on site (*Hoodia gordonii*). It is also possible that *Tridentea virescens* (listed as Rare) may occur on site. A number of sensitive species occurs on site, as well as a number of species protected under the Northern Cape Nature Conservation Act.



Figure 10: Rare species, *Gethyllis longistyla*, found on site.

Table 2: Plant species of concern flagged for the site in the Screening Tool.

Family	Taxon	IUCN status*	Distribution	Habitat	Probability of occurrence
APOCYNACEAE	<i>Tridentea virescens</i>	Rare	Warmbad in southern Namibia to Kakamas and Prieska in the Northern Cape, stretching east to Prince Albert and Aberdeen.	Stony ground, or hard loam in floodplains. It has a very wide geographical distribution but is rarely found. A relatively recent (2017) observation was made in the Doornkloof Nature Reserve north of Colesberg (www.ispotnature.org) and it was documented in 1957 from near Murraysburg.	MEDIUM , but not seen on site.
AIZOACEAE	<i>Hereroa concava</i>	Vulnerable B1ab(iii)	Due to taxonomic uncertainty, this species' distribution range is not well known. It appears to be endemic to a small area in the Great Karoo between Beaufort West, Richmond and De Aar. It is known to occur in Eastern Upper Karoo and Upper Karoo Hardeveld vegetation types.	Plants occur sheltered among shrubs on flats and plateaus with shale outcrops. There are very few records of this species, and these known records are scattered over a wide area. Herbarium collections, where the identity is confirmed, indicate that it is common in the Karoo National Park. Its abundance elsewhere is not well known. Known records from iNaturalist include the plains above the mountains north of Beaufort West, and a hilltop north of Hanover.	LOW , not seen on site.
	Sensitive species 144	VU	Northern Cape, into Namibia: recorded from around Carnarvon and around Prieska. Not known from within or near to the corridor.	On north-facing rocky slopes (particularly dolomite) in the south of its range.	LOW No suitable habitat on site & outside known distribution.

SITE ECOLOGICAL IMPORTANCE

The Species Environmental Assessment Guidelines require that a Site Ecological Importance is calculated for each habitat on site, and provides methodology for making this calculation.

As per the Species Environmental Assessment Guidelines, Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor and its resilience to impacts ($SEI = BI + RR$). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e. $BI = CI + FI$.

Table 3: Site ecological importance for habitats found on site.

Habitat	Conservation importance	Functional integrity	Receptor resilience	Site Ecological Importance (BI)
Plains (Northern Upper Karoo). Hills & outcrops (Upper Karoo Hardeveld). Bushmanland hills near Copperton (Bushmanland Basin Shrubland & Bushmanland Arid Grassland).	Medium Confirmed or highly likely occurrence of populations of NT species.	Very High Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	High (BI = High)
Drainage areas	Low > 50% of receptor contains natural habitat with potential to support SCC.	Very High Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches.	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring,	Medium (BI = Medium)

		No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing). Only minor current negative ecological impacts.	or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	
Transformed (roads)	Very low No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very High Habitat that can recover rapidly	Very low (BI = Very low)

Table 4: Guidelines for interpreting SEI in the context of the proposed development activities.

Site ecological importance	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/ not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

CONCLUSION

Desktop information, field data collection and analysis of aerial imagery provides the following verifications of patterns for the Plant Species Theme:

1. The corridor crosses a number of regional vegetation types. The published descriptions of these regional vegetation types conform to the patterns seen on site. The northern part of the corridor crosses two main vegetatin types, namely Bushmanland Arid Grassland and Bushmanland Basin Shrubland. The remainder of the corridor crosses Northern | Upper Karoo on the plains and Upper Karoo Hardeveld on the hills and outcrops.
2. One Near Threatened species occurs on site (*Hoodia officinalis* subsp. *officinalis*), one Rare species occurs on site (*Gethyllis longistyla*), and one nationally protected species occurs on site (*Hoodia gordonii*). It is also possible that *Tridentea virescens* (listed as Rare) may occur on site. A number of sensitive species occurs on site, as well as a number of species protected under the Northern Cape Nature Conservation Act. However, no threatened plant species were found on site and the site therefore has "low" sensitivity for terrestrial plant species (as per the published Species Protocols).
3. The proposed project will not have any impact on any threatened SCC, but there are a number of species of lower conservation concern or protected species that may be affected by the project.
4. The proposed development is almost entirely within areas of natural habitat that have moderate biodiversity value and medium or high sensitivity (plant species theme). The development is therefore supported, on condition sensitive areas are subjected to management measures and that required permits are obtained prior to construction (see Recommendations below).

RECOMMENDATIONS

1. An Alien Invasive Management Plan must be compiled for the project.
2. A permit must be obtained for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004). These are given in Appendix 1 and include the following species:
 1. *Adromischus trigynus*
 2. *Aloe claviflora*
 3. *Aloe hereroensis*
 4. *Anacampseros albissima*
 5. *Anacampseros filamentosa*
 6. *Boscia albitrunca*
 7. *Brunsvigia radulosa*
 8. *Crassula muscosa*
 9. *Deverra aphylla*
 10. *Euphorbia braunsii*
 11. *Euphorbia crassipes*
 12. *Euphorbia rhombifolia*
 13. *Gethyllis longistyla*
 14. *Gomphocarpus fruticosus*
 15. *Hereroa pallens*
 16. *Hoodia officinalis* subsp. *officinalis* (Near Threatened)
 17. *Hoodia* cf. *gordonii*
 18. *Jamesbrittenia tysonii*
 19. *Lithops hookeri*
 20. *Malephora crocea* (Data Deficient)
 21. *Mesembryanthemum junceum*
 22. *Pachypodium succulentum*
 23. *Ruschia intricata*
 24. *Titanopsis calcarea*
 25. *Trichodiadema setuliferum*
3. If any individuals of the protected tree, *Boscia albitrunca*, are likely to be affected, a permit is required according to the requirements of the National Forests Act.

For permitting purposes, the following flora survey is required prior to construction activities taking place:

1. Detailed floristic walk-through survey of all footprint areas in order to document composition, especially of protected species. This must be undertaken after an appropriate time-period after rainfall to allow emergence of any species of potential concern. The survey must also cover ALL footprint areas, including final road alignments. However, this means that "final" layouts regularly change. The walk-through survey:
 - a. MUST ASSESS THE FOOTPRINT THAT WILL BE CONSTRUCTED – if this changes then the new footprint areas must be subject to a walk-through survey in full, and
 - b. MUST BE UNDERTAKEN IN THE CORRECT SEASON. For the current study area between De Aar and Copperton, the best time is during summer.

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APPENDICES:

Appendix 1: Plant species recorded on site.

Acanthopsis hoffmannseggiana
Adromischus trigynus (Protected NCNCA App 2)
Afroscirpoides dioeca
Agave americana* (NEMBA Category 3)
Aizoon africanum
Aloe claviflora (CITES App II, Protected NCNCA App 2)
Aloe hereroensis (CITES App II, Protected NCNCA App 2)
Amellus tridactylus
Anacampseros albissima (CITES App II, Sensitive Species, Protected NCNCA App 2)
Anacampseros filamentosa (CITES App II, Protected NCNCA App 2)
Aptosimum spinescens
Argemone ochroleuca* (NEMBA Category 1b)
Aristida adscensionis
Aristida congesta subsp. congesta
Asparagus retrofractus
Asplenium cordatum
Barleria rigida
Berkheya annectens
Blepharis capensis
Blepharis mitrata
Boscia albitrunca (PROTECTED: National Forests Act, Protected NCNCA App 2)
Brunsvigia radulosa (Protected NCNCA App 2)
Cadaba aphylla
Caroxylon aphyllum
Cenchrus ciliaris
Cheilanthes hirta
Citrullus amarus
Convolvulus sagittatus
Crassula muscosa (Protected NCNCA App 2)
Cyperus longus
Cyperus marginatus
Deverra aphylla (Protected NCNCA App 2)
Dicoma capensis
Digitaria eriantha
Diospyros austro-africana
Drimia physodes
Drimia platyphylla
Ehretia rigida
Enneapogon cenchroides
Enneapogon desvauxii
Enneapogon scaber
Eragrostis bergiana
Eragrostis bicolor
Eragrostis echinochloidea
Eragrostis lehmanniana
Eragrostis nindensis
Eragrostis obtusa
Eragrostis rigidior
Eriocephalus ericoides
Euphorbia braunsii (CITES App II, Protected NCNCA App 2)

Euphorbia crassipes (CITES App II, Protected NCNCA App 2)
 Euphorbia rhombifolia (Protected NCNCA App 2)
 Fingerhuthia africana
 Gazania krebsiana
 Geigeria burkei
Gethyllis longistyla (Rare, Sensitive Species, Protected NCNCA App 2)
 Gomphocarpus fruticosus (Protected NCNCA App 2)
 Helichrysum argyrosphaerum
 Hereroa pallens (Protected NCNCA App 2)
 Hermannia sp.
 Hertia pallens
 Heteropogon contortus
Hoodia officinalis subsp. officinalis (Near Threatened, CITES App II, (Protected NCNCA App 2)
Hoodia cf. gordonii (Data Deficient, Protected: NEMBA, Protected NCNCA App 1, CITES App II)
 Jamesbrittenia tysonii (Protected NCNCA App 2)
 Juncus rigidus
 Kewa salsoloides
 Kleinia longiflora
 Lacomucinaea lineata
 Lasiosiphon polycephalus
 Ledebouria sp.
 Limeum aethiopicum
 Lithops hookeri (Sensitive Species, Protected NCNCA App 2)
 Lycium bosciifolium
 Lycium cinereum
 Lycium hirsutum
 Lycium horridum
 Malephora crocea (Data Deficient, Protected NCNCA App 2)
 Melolobium candicans
 Mesembryanthemum junceum (Protected NCNCA App 2)
 Monechma incanum
 Monsonia crassicaulis
 Monsonia salmoniflora
 Nidorella anomala
 Nidorella ivifolia
Opuntia microdasys (NEMBA Category 1b)
Opuntia robusta (NEMBA Category 1b)
 Osteospermum sinuatum
 Pachypodium succulentum (CITES App II, Protected, Protected NCNCA App 2))
 Paspalum distichum
 Peliostomum leucorrhizum
 Pellaea calomelanos
 Pentzia incana
 Pentzia sphaerocephala
 Phaeoptilum spinosum
 Phragmites australis
 Polygala ephedroides
 Portulaca kermesina
Prosopis glandulosa* (NEMBA Category 1b)
 Psora crenata
 Pterodiscus luridus
 Pteronia erythrochaeta
 Pteronia glauca
 Pteronia mucronata
 Radyera urens
 Rhigozum obovatum

Rhigozum trichotomum
Roepera incrustata
Roepera lichtensteiniana
Ruschia intricata (Protected NCNCA App 2)
Salsola kali
Salvia namaensis
Salvia verbenaca
Schmidtia kalahariensis
Searsia burchellii
Setaria verticillata
Sporobolus ioclados
Stipagrostis uniplumis
Suaeda fruticosa
Tetraena retrofracta
Tetraena rigida
Themeda triandra
Titanopsis calcarea (Protected NCNCA App 2)
Tragus berteronianus
Tribulus sp.
Tribulus terrestris
Trichodiadema setuliferum (Protected NCNCA App 2)

Appendix 2: Protected tree species of South Africa.

SCHEDULE A

Botanical name	English common names	Other common names Afrikaans (A), Sepedi (P), Sesotho (S), Setswana (T), Tshivenda (V), isiXhosa (X), isiZulu (Z), Xitsonga (XT)	National tree number
<i>Acacia erioloba</i>	Camel thorn	Kameeldoring (A)/Mogohlo (NS)/Mogoŋlho (T)/	168
<i>Acacia haematoxylon</i>	Grey camel thorn	Vaalkameeldoring (A)/Mokholo (T)	169
<i>Adansonia digitata</i>	Baobab	Kremetart (A)/Seboi (NS)/Mowana (T)/Ximuwu (XT)	467
<i>Azelia quanzensis</i>	Pod mahogany	Peulmahonie (A)/Mutokota (V)/Inkehli (Z)	207
<i>Balanites</i> subsp. <i>maughamii</i>	Torchwood	Groendoring (A)/Ugobandlovu (Z)	251
<i>Barringtonia racemosa</i>	Powder-puff tree	Poeierkwasboom (A)/lboqo (Z)	524
<i>Boscia albitrunca</i>	Shepherd's tree	Witgat (A)/Mohloŋpi (NS)/Motlhoŋpi (T)/Muvhombwe (V)/Umgqomogqomo (X)/Umvithi (Z)	122
<i>Brachystegia spiciformis</i>	Msasa	Msasa (A)	198.1
<i>Breonadia salicina</i>	Matumi	Mingerhout (A)/Mohlome (NS)/Mutu-lume (V)/Umfomfo (Z)	684
<i>Bruguiera gymnorhiza</i>	Black mangrove	Swartwortelboom (A)/isiKhangati (X)/IsiHlobane (Z)	527
<i>Cassipourea swaziensis</i>	Swazi onionwood	Swazi-ueihout (A)	531.1
<i>Catha edulis</i>	Bushman's tea	Boesmanstee (A)/Mohlatse (NS)/Igqwaka (X)/Umhlwazi (Z)	404
<i>Ceriops tagal</i>	Indian mangrove	Indiese wortelboom (A)/isinkaha (Z)	525
<i>Cleistanthus schlechteri</i> var. <i>schlechteri</i>	False tamboti	Bastertambotie (A)/Umzithi (Z)	320
<i>Colubrina nicholsonii</i>	Pondo weeping thorn	Pondo-treurdoring (A)	453.8
<i>Combretum imberbe</i>	Leadwood	Hardekool (A)/Mohwelere-tšhipi (NS)/Motswiri (T)/Impondondlovu (Z)	539
<i>Curtisia dentata</i>	Assegai	Assegai (A)/Umgxina (X)/Umagunda (Z)	570

<i>Elaeodendron transvaalensis</i>	Bushveld saffron	Bosveld-saffraan (A)/Monomane (T)/Ingwavuma (Z)	416
<i>Erythrophysa transvaalensis</i>	Bushveld red balloon	Bosveld-rooiklapperbos (A)/Mofalatsane (T)	436.2
<i>Euclea pseudebenus</i>	Ebony guarri	Ebbeboom-ghwarrie (A)	598
<i>Ficus trichopoda</i>	Swamp fig	Moerasvy (A)/Umvubu (Z)	54
<i>Leucadendron argenteum</i>	Silver tree	Silwerboom (A)	77
<i>Lumnitzera racemosa</i> var. <i>racemosa</i>	Tonga mangrove	Tonga-wortelboom (A)/isiKhahasesibomvu (Z)	552
<i>Lydenburgia abbottii</i>	Pondo bushman's tea	Pondo-boesmanstee (A)	407
<i>Lydenburgia cassinoides</i>	Sekhukhuni bushman's tea	Sekhukhuni-boesmanstee (A)	406
<i>Mimusops caffra</i>	Coastal red milkwood	Kusrooimelkhou (A)/Umthunzi (X)/Umkhakhayi (Z)	583
<i>Newtonia hildebrandtii</i> var. <i>hildebrandtii</i>	Lebombo wattle	Lebombo-wattel (A)/Umfomothi (Z)	191
<i>Ocotea bullata</i>	Stinkwood	Stinkhout (A)/Umhlungulu (X)/Umnukane (Z)	118
<i>Ozoroa namaquensis</i>	Gariep resin tree	Gariep-harpuisboom (A)	373.2
<i>Philenoptera violacea</i>	Apple-leaf	Appelblaar (A)/Mphata (NS)/Mohata (T)/isiHomohomo (Z)	238
<i>Pittosporum viridiflorum</i>	Cheesewood	Kasuur (A)/Kgalagangwe (NS)/Umkhwenkwe (X)/Umfusamvu (Z)	139
<i>Podocarpus elongatus</i>	Breede River yellowwood	Breeiviergeelhout (A)	15
<i>Podocarpus falcatus</i> (<i>Afrocarpus falcatus</i>)	Outeniqua yellowwood	Outniekwageelhout (A)/Mogōbagōba (NS)/Umkhoba (X)/Umsonti (Z)	16
<i>Podocarpus henkelii</i>	Henkel's yellowwood	Henkel se geelhout (A)/Umsonti (X)/Umsonti (Z)	17
<i>Podocarpus latifolius</i>	Real yellowwood	Regte-geelhout (A)/Mogōbagōba (NS)/Umcheya (X)/Umkhoba (Z)	18
<i>Protea comptonii</i>	Saddleback sugarbush	Barberton-suikerbos (A)	88
<i>Protea curvata</i>	Serpentine sugarbush	Serpentynsuikerbos (A)	88.1
<i>Prunus africana</i>	Red stinkwood	Rooistinkhout (A)/Umkhakhase (X)/Umdomezulu (Z)	147
<i>Pterocarpus angolensis</i>	Wild teak	Kiaat (A)/Morōtō (NS)/Mokwa (T)/Mutondo (V)/Umvangazi (Z)	236
<i>Rhizophora mucronata</i>	Red mangrove	Rooiwortelboom (A)/isiKhangathi (X)/Umhlume (Z)	526

<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Marula	Maroela (A)/Morula (NS)/Morula (T)/Unganu (Z) /Nkanyi (XT)	360
<i>Securidaca longepedunculata</i>	Violet tree	Krinkhout (A)/Mmaba (T)	303
<i>Sideroxylon inerme</i> subsp. <i>inerme</i>	White milkwood	Witmelkhout (A)/Ximafana (X)/Umakhwelafingqane (Z)	579
<i>Tephrosia pondoensis</i>	Pondo poison pea	Pondo-gifertjie (A)	226.1
<i>Warburgia salutaris</i>	Pepper-bark tree	Peperbasboom (A)/Molaka (NS)/Mulanga (V)/isiBaha (Z)	488
<i>Widdringtonia cedarbergensis</i>	Clanwilliam cedar	Clanwilliamseder (A)	19
<i>Widdringtonia schwarzii</i>	Willowmore cedar	Baviaanskloofseder (A)	21
<i>Berchemia zeyheri</i> (RHAMNACEAE) LC	Red ivory Pink ivory	Rooi-ivoor (A) / Rooihout (A) / Monee (S) / umNeyi (SW) / umNini (Z, X) / Xiniyani (TS) / Moye (T) / Munianiane (V)	450
<i>Diospyros mespiliformis</i> (EBENACEAE) LC	Jackal berry	Jakkalsbessie (A) / Musuma (V) / Muntoma (TS) / Mgula (TS)	606
<i>Schinziophyton rautanenii</i>	Manketti / Mongongo	Mankettiboom (A) / Monghongho (T) / Makongwa (T)	337
<i>Umtiza listeriana</i>	Umtiza	Umtiza (X) / Omtisa (A)	205

Appendix 3: Flora protected under the Northern Cape Nature Conservation Act No. 9 of 2009.

SCHEDULE 1: SPECIALLY PROTECTED SPECIES

As per the Northern Cape Nature Conservation Act, No. 9 of 2009, Schedule 1

Family: AMARYLLIDACEAE	
<i>Clivia mirabilis</i>	Oorlofskloof bush lily / Clivia
<i>Haemanthus graniticus</i>	April fool
<i>Hessea pusilla</i>	
<i>Strumaria bidentata</i>	
<i>Strumaria perryae</i>	
Family: ANACARDIACEAE	
<i>Ozoroa</i> spp.	All species
Family: APIACEAE	
<i>Centella tridentata</i>	
<i>Chamarea snijmaniae</i>	
Family: APOCYNACEAE	
<i>Hoodia gordonii</i>	
<i>Pachypodium namaquanum</i>	Elephant's trunk
Family: ASPHODOLACEAE	
<i>Aloe buhrii</i>	
<i>Aloe dichotoma</i>	
<i>Aloe dichotoma</i> var. <i>rumosissima</i>	Maiden quiver tree
<i>Aloe dabenorisana</i>	
<i>Aloe erinacea</i>	
<i>Aloe meyeri</i>	
<i>Aloe pearsonii</i>	
<i>Aloe pillansii</i>	
<i>Trachyandra prolifera</i>	
Family: ASTERACEAE	
<i>Athanasia adenantha</i>	
<i>Athanasia spathulata</i>	
<i>Cotula filifolia</i>	
<i>Euryops mirus</i>	
<i>Euryops rosulatus</i>	
<i>Euryops virgatus</i>	
<i>Felicia diffusa</i> subsp. <i>khamiesbergensis</i>	
<i>Othonna armiana</i>	
Family: CRASSULACEAE	
<i>Tylecodon torulosus</i>	
Family: DIOSCORACEAE	
<i>Dioscorea</i> spp.	Elephant's foot, all species
Family: ERIOSPERMACEAE	
<i>Eriospermum erinum</i>	
<i>Eriospermum glaciale</i>	
Family: FABACEAE	
<i>Amphithalea obtusiloba</i>	
<i>Lotononis acutiflora</i>	
<i>Lotononis polycephala</i>	
<i>Lessertia</i> spp.	
<i>Sceletium toruosum</i>	
<i>Sutherlandia</i> spp.	Cancer Bush, all species

Wiborgia fusca subsp. macrocarpa	
Family: GERANIACEAE	
Pelargonium spp.	Pelargonium, all species
Family: HYACINTHACEAE	
Drimia nana	
Ornithogalum bicornutum	
Ornithogalum inclusum	
Family: IRIDACEAE	
Babiana framesii	
Ferraria kamiesbergensis	
Freesia marginata	
Geissorhiza subrigida	
Hesperantha minima	
Hesperantha oligantha	
Hesperantha rivulicola	
Lapeirousia verecunda	
Moraea kamiesensis	
Moraea namaquana	
Romulea albiflora	
Romulea discifera	
Romulea maculata	
Romulea rupestris	
Family: MOLLUGINACEAE	
Hypertelis trachysperma	
Psammotropha spicata	
Family: ORCHIDACEAE	
Corycium ingeanum	
Disa macrostachya	Disa
Family: OXALIDACEAE	
Oxalis pseudo-hirta	Sorrel
Family: PEDALIACEAE	
Harpagophytum spp.	Devils' claw
Family: POACEAE	
Prionanthium dentatum	
Secale strictum subsp. africanum	Wild rye
Family: PROTEACEAE	
Leucadendron meyerianum	Tolbos
Mimetes spp.	All species
Orothamnus zeyheri	
Family: ROSACEAE	
Cliffortia arborea	Sterboom
Family: SCROPHULARIACEAE	
Charadrophila capensis	Cape Gloxinia
Family: STANGERIACEAE	
Stangeria spp.	Cycads, all species
Family: ZAMIACEAE	
Encephalartos spp.	Cycads, all species

SCHEDULE 2: PROTECTED SPECIES

As per the Northern Cape Nature Conservation Act, No. 9 of 2009, Schedule 2

Family: ACANTHACEAE	
Barleria paillosa	

Monechme saxatile	
Peristrophe spp.	All species
Family: ADIANTHACEAE	
Adiantum spp.	Maidenhair Fern, all species
Family: AGAPANTHACEAE	
Agapanthus spp.	All species
Family: (MESEMBRYANTHEMACEAE)	AIZOACEAE All species
Family: AMARYLLIDACEAE	All species except those listed in Schedule 1
Family: ANTHERICACEAE	All species
Family: APIACEAE	All species except those listed in Schedule 1
Family: APOCYNACEAE	All species except those listed in Schedule 1
Family: AQUIFOLIACEAE	All species
Ilex mitis	
Family: ARACEAE	
Zantedeschia spp.	Arum lilies, all species
Family: ARALIACEAE	
Cussonia spp.	Cabbage trees, all species
Family: ASPHODOLACEAE	All species except those listed in Schedule 1 and the species Aloe ferox
Family: ASTERACEAE	
Helichrysum jubilatum	
Felicia deserti	
Gnaphalium simii	
Lopholaena longipes	
Senecio albo-punctatus	
Senecio trachylaenus	
Trichogyne lerouxiae	
Tripteris pinnatilobata	
Troglophyton acocksianum	
Vellereophyton lasianthum	
Family: BURMANNIACEAE	
Burmannia madagascariensis	Wild ginger
Family: BURSERACEAE	
Commiphora spp.	All species
Family: CAPPARACEAE	
Boscia spp.	Shepherd's trees, all species
Family: CARYOPHYLLACEAE	
Dianthus spp.	All species
Family: CELASTRACEAE	
Gymnosporia spp.	All species
Family: COLCHICACEAE	
Androcymbium spp.	All species
Gloriosa spp.	All species
Family: COMBRETACEAE	
Combretum spp.	All species
Family: CRASSULACEAE	All species except those listed in Schedule 1
Family: CUPPRESSACEAE	
Widdringtonia spp.	Wild cypress, all species
Family: CYATHEACEAE	

Cyathea spp.	Tree ferns, all species
Cyathea capensis	Tree Fern
Family: CYPERACEAE	
Carex acocksii	
Family: DROSERACEAE	
Drosera spp.	Sundews, all species
Family: DRYOPTERIDACEAE	
Rumohra spp.	Seven Weeks Fern, all species
Family: ERICACEAE	Erica, all species
Family: EUPHORBIACEAE	
Alchornea laxiflora	Venda Bead-string
Euphorbia spp.	All species
Family: FABACEAE	
Aspalathus spp.	Tea Bush, all species
Erythrina zeyheri	Ploughbreaker
Argyrolobium petiolare	
Caesalpinia bracteata	
Calliandra redacta	
Crotalaria pearsonii	
Indigofera limosa	
Lebeckia bowieana	
Polhillia involucrate	
Rhynchosia emarginata	
Wiborgia humilis	
Family: HYACINTHACEAE	
Daubenya spp.	
Lachenalia spp.	Daubenya, all species
Veltheimia spp.	Violtjie, all species
Eucomis spp.	Pineapple flower, all species
Neopatersonia namaquensis	
Ornithogalum spp.	All species
Family: IRIDACEAE	All species except those listed in Schedule 1
Family: LAURACEAE	
Ocotea spp.	Stinkwood, all species
Family: MESEMBRYANTHEMACEAE	All species
Family: MELIACEAE	
Nymania capensis	Chinese Lantern
Family: OLEACEAE	
Olea europea subsp. africana	Wild olive
Family: ORCHIDACEAE	Orchids, all species except those listed in Schedule 1
Family: OROBANCHACEAE	
Harveya spp.	Harveya, all species
Family: OXALIDACEAE	
Oxalis spp.	Sorrel, all species except those listed in Schedule 1
Family: PLUMBAGINACEAE	
Afrolimon namaquanum	
Family: POACEAE	
Brachiaria dura var. dura	
Dregeochloa calviniensis	
Pentaschistis lima	
Family: PODOCARPACEAE	

Podocarpus spp.	Yellowwoods, all species
Family: PORTULACACEAE	
Anacampseros spp.	All species
Avonia spp.	All species
Portulaca foliosa	
Family: PROTEACEAE	All species except those listed in Schedule 1
Family: RESTIONACEAE	All species
Family: RHAMNACEAE	
Phyllica spp.	All species
Family: RUTACEAE	
Agathosma spp.	Buchu, all species
Family: SCROPHULARIACEAE	
Diascia spp.	All species
Halleria spp.	All species
Jamesbrittenia spp.	All species
Manulea spp.	All species
Nemesia spp.	All species
Phyllopodium spp.	All species
Polycarena filiformis	
Chaenostoma longipedicellatum	
Family: STRELITZIACEAE	
Strelitzia spp.	All species
Family: TECOPHILACEAE	
Cyanella spp.	All species
Family: THYMELAEACEAE	
Gnidia leipoldtii	
Family: ZINGIBERACEAE	
Siphonochilus aethiopicus	Wild ginger

Appendix 4: Flora and vertebrate animal species protected under the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)

(as updated in R. 1187, 14 December 2007)

CRITICALLY ENDANGERED SPECIES

Flora

Adenium swazicum
Aloe pillansii
Diaphanathe millarii
Dioscorea ebutsniorum
Encephalartos aemulans
Encephalartos brevifoliolatus
Encephalartos cerinus
Encephalartos dolomiticus
Encephalartos heenanii
Encephalartos hirsutus
Encephalartos inopinus
Encephalartos latifrons
Encephalartos middelburgensis
Encephalartos nubimontanus
Encephalartos woodii

Reptilia

Loggerhead sea turtle
Leatherback sea turtle
Hawksbill sea turtle

Aves

Wattled crane
Blue swallow
Egyptian vulture
Cape parrot

Mammalia

Riverine rabbit
Rough-haired golden mole

ENDANGERED SPECIES

Flora

Angraecum africae
Encephalartos arenarius
Encephalartos cupidus
Encephalartos horridus
Encephalartos laevifolius
Encephalartos lebomboensis
Encephalartos msinganus
Jubaeopsis caffra
Siphonochilus aethiopicus
Warburgia salutaris
Newtonia hilderbrandi

Reptilia

Green turtle
Giant girdled lizard
Olive ridley turtle
Geometric tortoise

Aves

Blue crane
Grey crowned crane
Saddle-billed stork
Bearded vulture
White-backed vulture
Cape vulture
Hooded vulture
Pink-backed pelican
Pel's fishing owl
Lappet-faced vulture

Mammalia

Robust golden mole
Tsessebe
Black rhinoceros
Mountain zebra
African wild dog
Gunning's golden mole
Oribi
Red squirrel
Four-toed elephant-shrew

VULNERABLE SPECIES

Flora

Aloe albida
Encephalartos cycadifolius
Encephalartos Eugene-maraisii
Encephalartos ngovanus
Merwillia plumbea
Zantedeschia jucunda

Aves

White-headed vulture
Tawny eagle
Kori bustard
Black stork
Southern banded snake eagle
Blue korhaan
Taita falcon
Lesser kestrel
Peregrine falcon

Bald ibis
Ludwig's bustard
Martial eagle
Bataleur
Grass owl

Mammalia

Cheetah
Samango monkey
Giant golden mole
Giant rat
Bontebok
Tree hyrax
Roan antelope
Pangolin
Juliana's golden mole
Suni
Large-eared free-tailed bat
Lion
Leopard
Blue duiker

PROTECTED SPECIES

Flora

Adenia wilmsii
Aloe simii
Clivia mirabilis
Disa macrostachya
Disa nubigena
Disa physodes
Disa procera
Disa sabulosa
Encephelartos altensteinii
Encephelartos caffer
Encephelartos dyerianus
Encephelartos frederici-guilielmi
Encephelartos ghellinckii
Encephelartos humilis
Encephelartos lanatus
Encephelartos lehmannii
Encephelartos longifolius
Encephelartos natalensis
Encephelartos paucidentatus
Encephelartos princeps
Encephelartos senticosus
Encephelartos transvenosus
Encephelartos trispinosus
Encephelartos umbeluziensis
Encephelartos villosus
Euphorbia clivicola
Euphorbia meloformis
Euphorbia obesa
Harpagophytum procumbens
Harpagophytum zeyherii

Hoodia gordonii

Hoodia currorii
Protea odorata
Stangeria eriopus

Amphibia

Giant bullfrog
African bullfrog

Reptilia

Gaboon adder
Namaqua dwarf adder
Smith's dwarf chameleon
Armadillo girdled lizard
Nile crocodile
African rock python

Aves

Southern ground hornbill
African marsh harrier
Denham's bustard
Jackass penguin

Mammalia

Cape clawless otter
South African hedgehog
White rhinoceros
Black wildebeest
Spotted hyaena
Black-footed cat
Brown hyaena
Serval
African elephant
Spotted-necked otter
Honey badger
Sharpe's grysbok
Reedbuck
Cape fox