Terrestrial Biodiversity Compliance Statement for the proposed rebuild of the Avondale to Gordonia Substation 132 kV Power Line, near Upington, Northern Cape Province

bergwind
Botanical Surveys & Tours

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Prepared for Zutari (Pty) Ltd

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CONTENTS

1. Appointment and Declaration 3
2. Background 4
3. Locality 4
4. Terrain: Topography and Soils 7
5. Climate 8
6. Limitations and Assumptions 8
7. Disturbance regime 9
8. The Biodiversity 9
9. Site sensitivity 14
10. Conclusions 15
Appendix 1: Curriculum Vitae 16

1. Appointment and Declaration

As the appointed ecological specialist for the proposed rebuild of the Avondale to Gordonia Substation 132 kV Power Line, near Upington, Northern Cape Province,

I hereby verify that:

(a) I conducted a site visit on 12 & 13 June 2021 and 12—16 July 2021.

(b) The impact of the construction of a new 132 kV power line from Avondale to the Gordonia Substation near Upington, was investigated with respect to the biodiversity.

a. **Specialist:** Dr David J. McDonald, Bergwind Botanical Surveys & Tours CC, 14A Thomson Road, Claremont. Telephone: 021-671-4056; mobile – 082-876-4051.
SACNASP Reg. No. 400094/06 Ecological Science (Curriculum Vitae appended).

b. **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:

(i) 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.

(ii) in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all the requirements.

(iii) 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

(iv) am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Dr David J. McDonald Pr. Sci. Nat.
Botanical / Ecological Specialist
Owner/ Director: Bergwind Botanical Surveys & Tours CC

2. Background

Bergwind Botanical Surveys and Tours CC (Dr D.J. McDonald) ('Bergwind') was appointed to conduct a botanical and biodiversity assessment for the construction of a new 132 kV overhead power line (OHPL) from Avondale to the Gordonia Substation near Upington. The reason for the appointment was to verify the biodiversity rating of the National Web-based Screening Tool where the Terrestrial Biodiversity Theme is '**Very High Sensitivity**'.

3. Locality

The 'target area' (Figure 1) for the (OHPL) is the area north of the N14 highway, east of Upington, David Kruiper Municipality, Northern Cape Province. The route traverses two vegetation types, namely Gordonia Duneveld and Kalahari Karroid Shrubland (Figure 2). Figure 3 shows the positions of the waypoints recorded along the power line route.

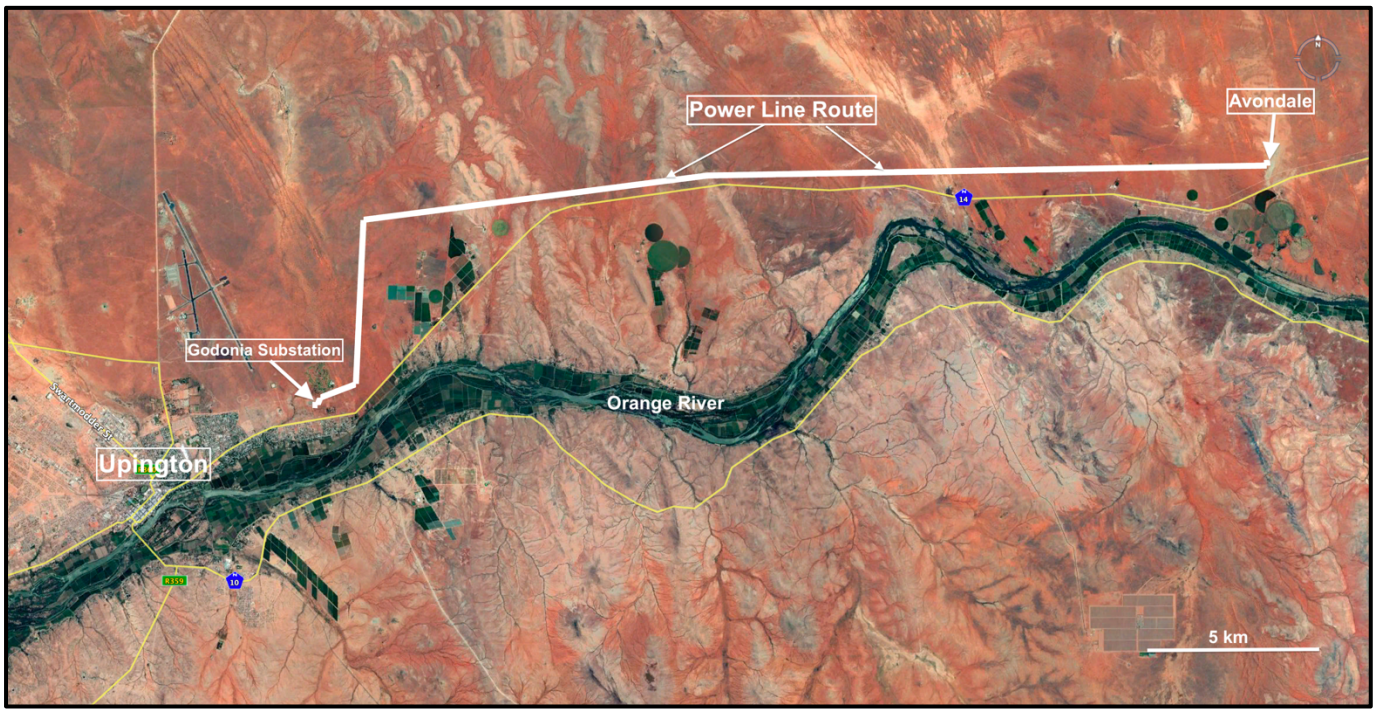


Figure 1. The white line represents the overhead power line route.

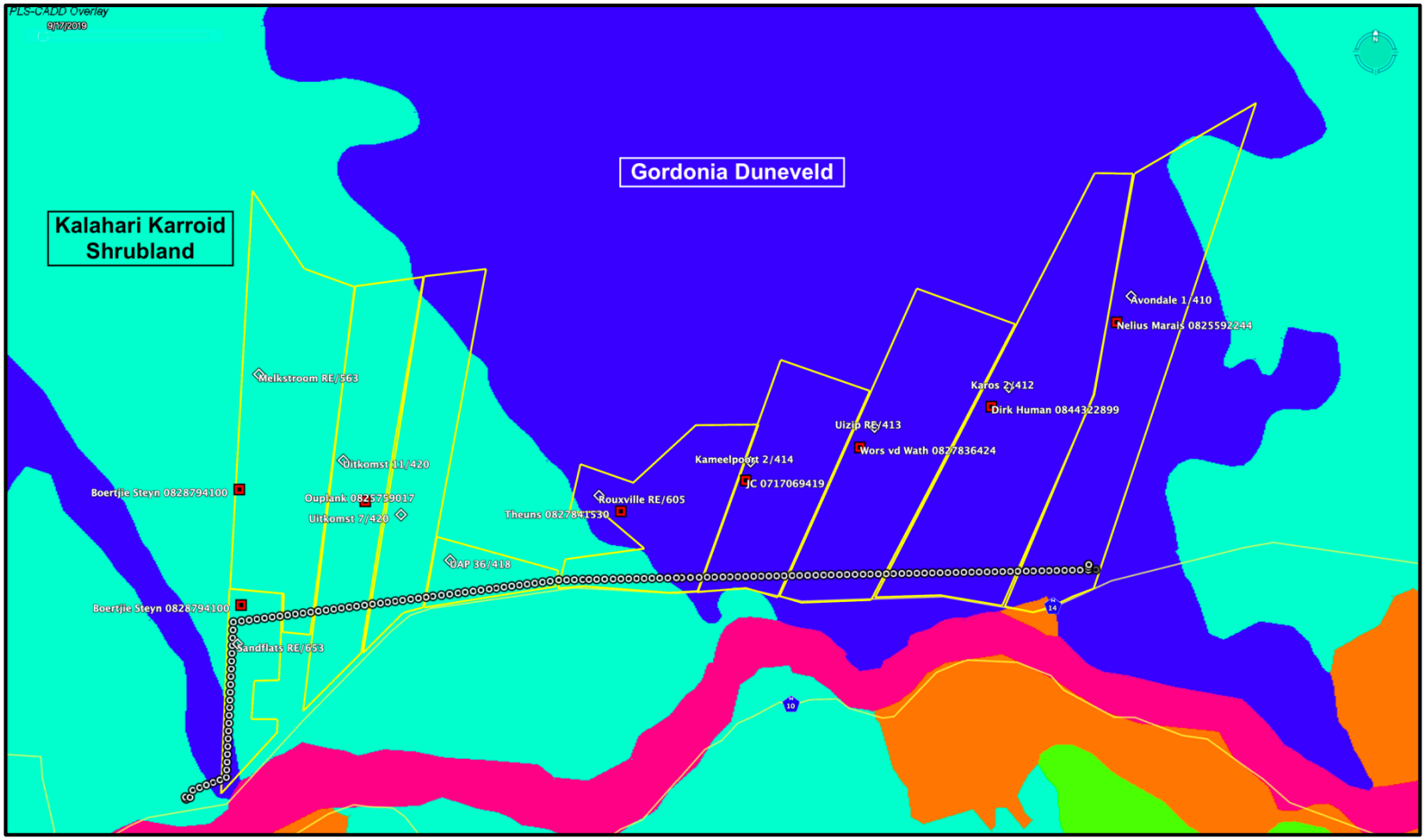


Figure 2. Portion of the Vegetation Map of South Africa, Lesotho and Swaziland (VEGMAP) showing the power line (dotted line), farm portions and main vegetation types.

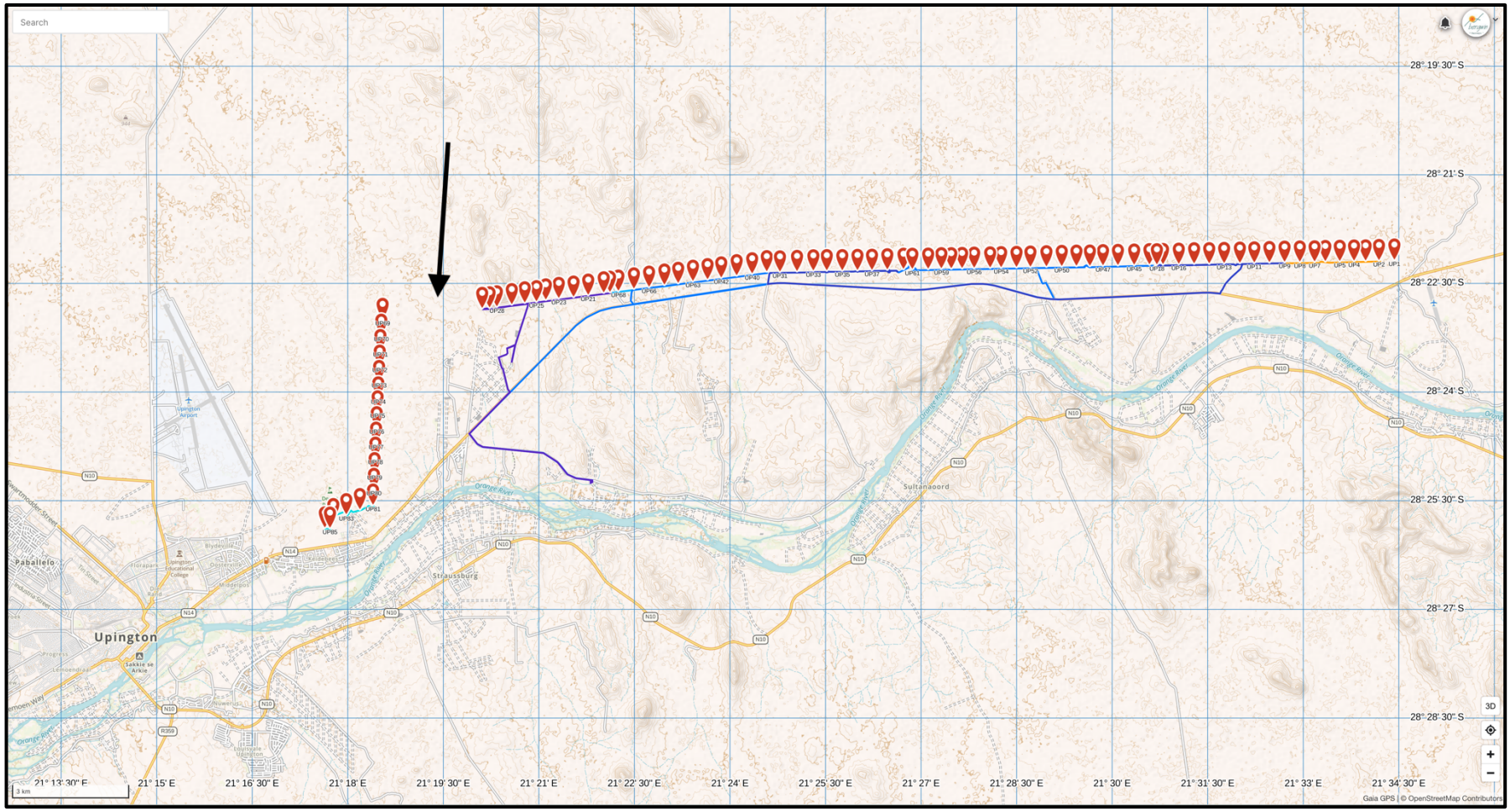


Figure 3. The existing Avondale-Gordonia Substation power line route. The red icons represent the sample waypoints. The black arrow indicates the section of the route on the farms Melkstroom and Sandflats that was inaccessible.

4. Terrain: Topography and Soils

The terrain varies along the length of the power line route with mostly 'flat' to shallowly undulating topography (Figure 4). In a few places there are dunes of red Kalahari Group sand. The 'red dunes' are found in the east but are not prominent at any point along the route. Where they occur, they are low but have relatively stable sand and support plant species typical of Kalahari dunes (Figure 5).

Figure 4. View westwards along the power line route showing typical Kalahari Karroid Shrubland.

Figure 5. The power line route traversing a typical red Kalahari dune of Gordonia Duneveld.

The soils are important in terms of biodiversity because they influence the vegetation that in turn determines the habitat and other biota that exist in any given area. The soils are generally sandy but in some places are shallow and rocky. The dominant plants are grasses on the red sandy soils with a scattered array of shrubs and small trees, notably *Senegalia mellifera* subsp. *detinens* (blackthorn), *Parkinsonia africana* (green hair tree), *Boscia albitrunca* (Shepherd's tree) and *Boscia foetida* subsp. *foetida* (stinkbush).

5. Climate

Upington and the outlying areas receive summer rainfall, occurring from October to April with a peak in autumn (March) (Figure 6). The climate is arid with a mean annual rainfall of 150—180 mm. The winters (June—August) are cold and dry and the summers (November to February) are hot with low rainfall until March when the rainfall reaches a peak but is still low.

The weather at the time of the site visit was clear and sunny during the day but cold at night.

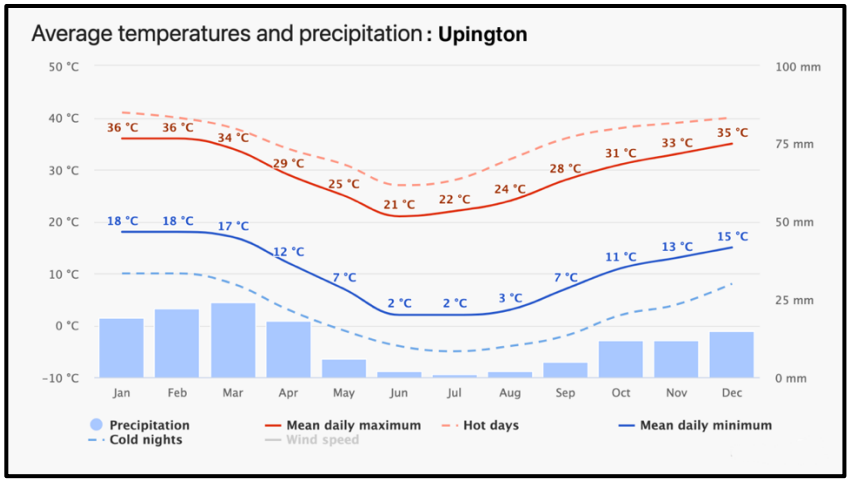


Figure 6. Average rainfall and temperatures for Upington modelled from 30 years of data (Source: Meteoblue)

6. Limitations and Assumptions

The most important limitation for the assessment of biodiversity in the target area was the season. The most ideal time would be in the summer after rain when most insects, reptiles, birds and mammals would be most active. However, bird activity was still noted with passerine species being common and raptors breeding (Verreaux' Eagle). However, migrant birds were

absent. The impression obtained is that the study area has a low to moderate biodiversity but that may be a misinterpretation due to the effect of season.

7. Disturbance regime

Disturbance in the study area along the power line route is limited to the effects of grazing by cattle and sheep and the clearing of shrubs along the Eskom servitude. The grazing was not heavy except in the far west near the Gordonia Substation where there is indiscriminate overgrazing. The shrubs are removed from the Eskom servitude to prevent earthing of the power lines in the event of fires occurring under them.

Senegalia mellifera has pioneer tendencies and hence encroaches when there is disturbance of the soil. This is the main species that is removed along the Eskom servitude. No protected trees species e.g. *Boscia albitrunca* have been removed or disturbed.

8. The Biodiversity

Biodiversity is a multifaceted concept and serves as a 'catch-all' hence the sensitivity rating is often high to very high based on the presence of one or more important biota or trophic levels. In view of this, the approach is to briefly examine the role of ***keystone species*** in the target area.

What are **keystone species**? The definition given in Wikipedia is as follows:

A keystone species is a species which has a disproportionately large effect on its natural environment relative to its abundance, a concept introduced in 1969 by the zoologist Robert T. Paine. Keystone species play a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community. Without keystone species, the ecosystem would be dramatically different or cease to exist altogether.

Apart from the abundance of grasses, four important tree species and a few shrub species function as keystone species in the study area. They underpin the functioning of the duneveld and karroid shrubland ecosystem. These species are:

***Senegalia mellifera* subsp. *detinens* (blackthorn)**

S. mellifera subsp. *detinens* (Figure 7) is a widespread leguminous species that is able to fix atmospheric nitrogen and so introduce nutrients to the soil. It is a 'pioneer' species that tends

to respond vigorously to disturbance and provides food for insects and animals, as well as protective nesting sites in the thorny branches for birds such as White-browed Sparrow Weaver and other small bush birds.

Figure 7. A shrubby tree of *Senegalia mellifera* subsp. *detinens* (blackthorn)

***Vachellia erioloba* (camelthorn)**

The camelthorn is a protected tree species in South Africa and is found mostly on deep, red sandy soils on dunes and along watercourses (Figure 8). It is an important keystone species, with many bird species, small mammals and insects deriving food and protection from these trees.

Figure 8. Mature *Vachellia erioloba* (camelthorn) along a watercourse in the Kalahari.

V. erioloba produces copious amounts of grey seed pods that provide a source of food for ungulates during periods of drought. The seed pods are also infested by several different insect species that feed on the seeds and they in turn are food for insectivorous birds such as the Crimson-breasted Shrike (Figure 9). The tree branches and trunks also often have holes that serve as nesting holes for birds such as Acacia Pied Barbet, Lilac-breasted Roller (Figure 10), Purple Roller, Golden-tailed Woodpecker and more.

Figure 9. Crimson-breasted Shrike is strongly associated with Vachellia erioloba trees.

Figure 10. Lilac-breasted Roller at nest entrance in a hole in the trunk of a camelthorn tree.

In the study area there are not many camelthorn trees and where they occur, they often support the nests of Sociable Weavers (Figure 11), however, these birds are opportunistic and also use the power line pylons for their nests (Figure 12). This in turn can provide useful platforms for other birds such as the apex predators, Verreaux's Eagles, to build nests (Figures 13 & 14).

Figure 11. Sociable Weaver's nest in *Vachellia erioloba*

Figure 12. Sociable Weavers' nest on one of the power line pylons.

Figure 13. Verreaux's Eagles have built a nest on top of one of the large Sociable Weavers' nests on one of the pylons.

Figure 14. A Verreaux's Eagle male approaching the nest on top of the Sociable Weaver's nest.

***Boscia albitrunca* (witgat; shepherds' tree)**

Boscia albitrunca (family Capparaceae) (Figure 15) gets its name from the white bark on the trunk and branches. This is a protected tree and although common has an important role in the ecology of the Kalahari. It survives drought well and is often the only source of sustenance for birds and animals when other plants have succumbed to dry conditions. This tree species

becomes very old with gnarled trunks, and it provides shade and protection for burrowing animals under its canopy.

Figure 15. An old, gnarled tree of *Boscia albitrunca*.

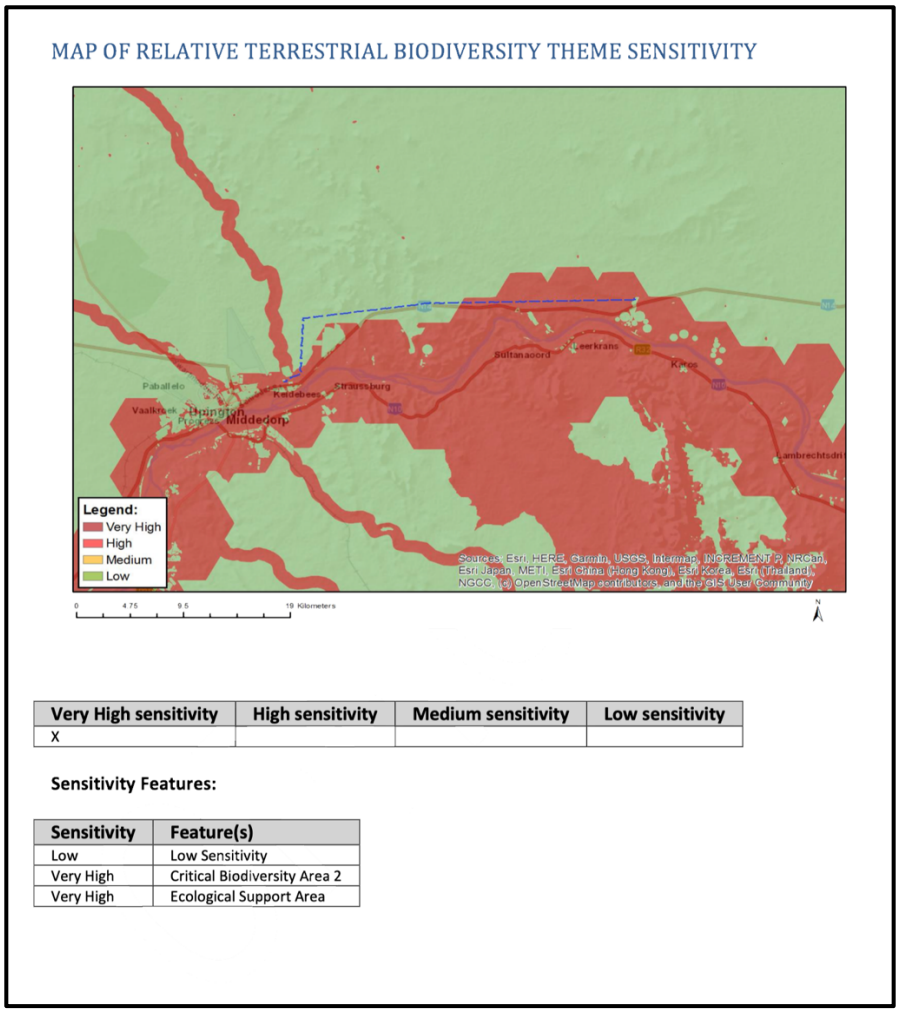
Recent research by Dr Reinier Terblanche has shown that *Boscia albitrunca* together with its sibling species *Boscia foetida* subsp. *foetida* that also occurs in the study area are the food plants of the Pioneer Caper White or Brown-veined White (*Belenois aurota*) (Figure16), a species of butterfly whose population explodes after good rains with the adult butterflies then undertaking long-distance migrations rom the Kalahari north-eastwards across southern Africa.

Figure 16. *Belenois aurota* (Pioneer Caper White).

9. Site sensitivity

9.1 Site sensitivity as determined using the National Web-based Environmental Screening Tool.

The National Web-based Environmental Screening Tool was applied to the target area (Figure 17). According to this tool, the target area has **Very High Sensitivity** for the Relative Terrestrial Biodiversity Theme in the area towards the east, which is Gordonia Duneveld, whereas towards the west in Kalahari Karroid Shrubland, the sensitivity is rated as **Low**.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical Biodiversity Area 2
Very High	Ecological Support Area

Figure 17. The output of the National Web-based Screening Tool for the power line target area (dotted blue line), showing biodiversity sensitivity.

9.1 Site sensitivity as determined in the field

Observations in the field are in general agreement with the classification of the screening tool, whereas, given that large and medium-sized mammals as well as many bird species were not observed, possibly due to seasonal bias, the sensitivity is classified as low to moderate rather than high to very high. Greater biodiversity sensitivity has been observed by the author in areas of the Kalahari north of the study area.

10. Conclusions

It is generally concluded that the Terrestrial Biodiversity Sensitivity is moderate to low along the entire power line route, particularly since there has been disturbance by grazing and more so by the removal of shrubs and trees along the Eskom servitude. The proposed rebuild of the 132 kV power line is likely to have very low impacts on the biodiversity of the area since it is a linear activity, and its influence will be limited to the linear zone of construction and operation. None of the keystone trees and shrub species are likely to be negatively affected and thus there will be no cascading loss of biodiversity.

Report submitted: 17 August 2021

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

Tel: (021) 671-4056 **Mobile:** 082-876-4051 **Fax:** 086-517-3806

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
- Fifteen 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:

- South Africa Association of Botanists
- 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 300 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