



25 June 2025

TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT: KOEBERG NUCLEAR POWER STATION

As the appointed specialist for assessment of the botanical and terrestrial biodiversity, at the Koeberg Nuclear Power Station site, I hereby verify that:

Section 1.

I conducted a site visit on 17 June 2025 and was accompanied by a security escort, Mr Sipho Beta, who also informed me about some of the past history of the site and the future development intentions. The site is within the 'active security zone' so no electronic devices such as personal GPS, cameras or cell-phones were permitted. Therefore, a memory card from Bergwind was inserted into a small camera supplied by Koeberg and the photographs in this report were taken using this approved device. Not having a means (GPS or cell-phone) to record the survey track was a limitation for the investigation.

Section 2.

a. **Specialist:** Dr David J. McDonald, Bergwind Botanical Surveys & Tours CC, 14A Thomson Road, Claremont. 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, 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 of 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).



Section 3. Study Area, Vegetation, Sensitivity

a. The Study Area and Site History

The Koeberg Nuclear Power Station (Koeberg) was built in 1976. The site chosen was a relatively small area on Farm 1552, Cape Farms, and was more specifically a dune-field of vegetated dunes close to the coast (Figure 1). The reason was to enable the use of seawater to cool the reactors. To allow for the construction of the facility, the dunes had to be flattened, resulting in the loss of the vegetation.

The footprint of the power station is enclosed in a strict security zone and in areas around the buildings (apart from managed gardens) the 'natural' vegetation was allowed to return to the disturbed surfaces that consist of calcareous sand. There was likely to have been some seed in the disturbed soil, but seed was probably also imported by wind and birds.

The study area of the proposed new construction works at Koeberg forms a U-shape on the periphery of the nuclear reactor site (Figure 2).

The site was visited in early winter, but this had no bearing on the outcome of the assessment.



Figure 1. The location of Koeberg on the West Coast of the Western Cape Province (white arrow), north of Cape Town.



Figure 2. The area designated for the habitat survey at Koeberg is by the green shading.

b. The Current Proposal

The Applicant proposes to unearth and upgrade the services located in a specific portion of the plant (referred to as the Area of Investigation for the purpose of the compilation of this report), located north of the reactors, to the modern standard for construction and safety requirements.

As recording of infrastructure installation was not standardized in the 1980s, the unearthing of services will prove to be challenging as, although marked, the exact location of infrastructure is not known.

Therefore, as part of the modernization and upgrading of the infrastructure, vegetation would have to occasionally be cleared within predetermined areas. The proposed installation is located in an area identified as Cape Flats Dune Strandveld, listed as an Endangered Ecosystem, in terms of the List of Ecosystems that are Threatened and in need of Protection, promulgated by the Department of Forestry, Fisheries and Environment (DFFE) and will potentially be partially located within 100 m of the highwater mark of the Atlantic Ocean.

The following infrastructure will be installed as part of the activities associated with the proposed cable infrastructure upgrades:

- Electrical cables with a transmission capacity of 48V, 22V and 380V; and
- Fibre-optic cables to service the security cameras of the plant.

c. The specific areas visited

The area visited is shown in Figure 2. It was surveyed on foot and only areas where there is any vegetation were considered.

d. The Vegetation

The vegetation of the study area was originally **Cape Flats Dune Strandveld** (Figure 3) as described in the Vegetation of South Africa, Lesotho, and Swaziland (VEGMAP) (Rebelo *et al.* 2006 in Mucina & Rutherford, 2006). This vegetation type is classified as **Endangered B1(i) B2(i) B1(iii) B2(iii)**. However, during the site visit, it was confirmed that the vegetation now found at the site is a **degraded form** of the above vegetation type, as discussed below.

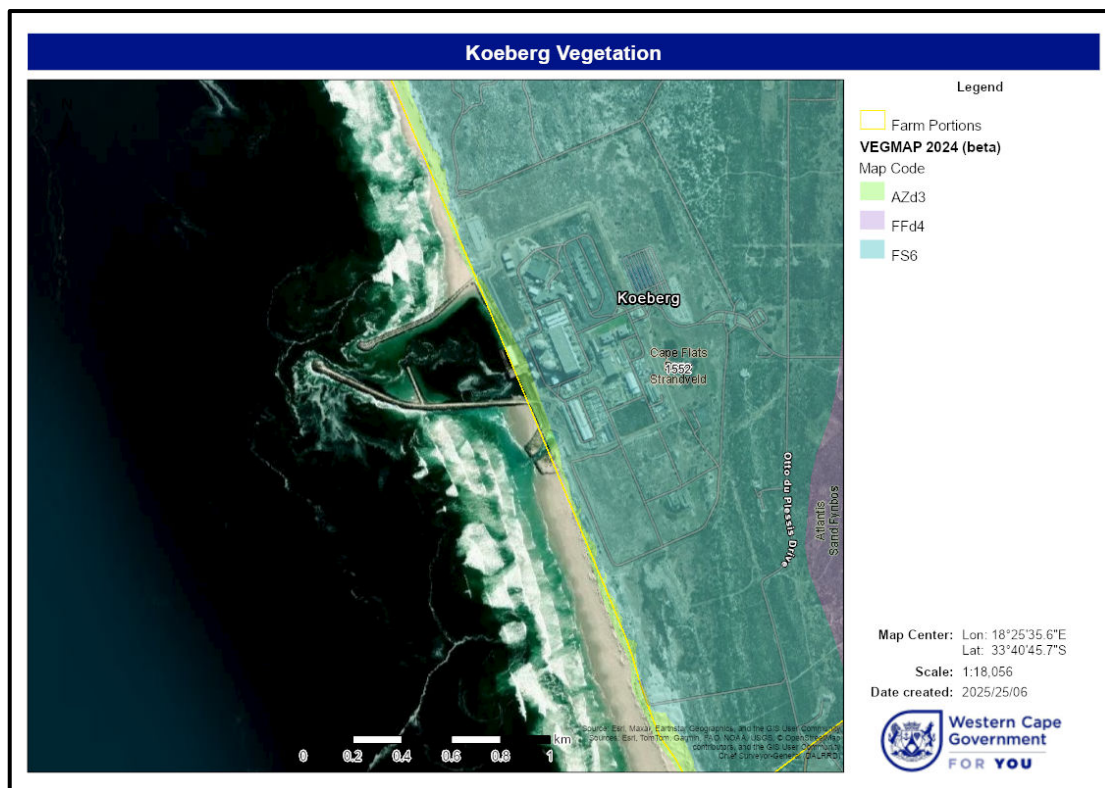


Figure 2. Portion of the Vegetation Map of South Africa, Lesotho, and Swaziland (SANBI, 2024) indicating that Koeberg is in an area mapped as Cape Flats Dune Strandveld.

The vegetation seen currently is the result of historical disturbance. There is no doubt that the sandy soil would have been bare immediately after construction. This soil was recolonized by plant species that are part of the suite of species found in undisturbed vegetation, but they are particularly species that are 'pioneer' species. They are species that respond readily to disturbance and can survive the harsher microclimate present as opposed to the less harsh conditions of already vegetated sites. These species are as follows: *Acacia cyclops**, *Asparagus* sp?, *Avenia fatua**, *Carpobrotus edulis*, *Cenchrus setaceus**, *Chironia baccifera*, *Cynanchum africanum*, *Euclea racemosa*, *Euphorbia helioscopia**, *Helichrysum odoratissimum*, *Helichrysum pandurifolium*,


Lessertia frutescens, *Medicago lupulina**, *Metalsia muricata*, *Morella cordifolia*, *Osteospermum moniliferum*, *Pelargonium capitatum*, *Psoralea bracteolata*, *Ruschia macowanii*, *Salvia africana-lutea*, *Searsia crenata*, *Searsia laevigata*, *Searsia undulata*, *Senecio burchellii*, *Tetragonia decumbens*, *Thamnochortus spicigerus*, *Trachyandra divaricata*. (Species with asterisks are exotic species.)





The above species either occur singly or in mixed stands and they persist despite ongoing disturbance from construction and other factors.


The survey on foot was started on the east side of the Koeberg complex, working northwards and then westwards. The photographs in Table 1 illustrate the vegetation *in situ* in the study area.

Table 1. Photographs and descriptions of some of the plant species found and the various areas considered in this investigation.

	<p>The start of the survey track on the east side of the Koeberg complex, where the area has formerly been a place for stockpiling chipped granite used for construction. Only weeds occur in this area.</p>
	<p>A small stand of 'strandveld' at the north end of the gravel area.</p>

	<p><i>Osteospermum moniliferum</i> (bitou), one of the main component species in the strandveld remnants in the study area.</p>
	<p><i>Cenchrus setaceus</i> (fountain grass) is an exotic grass species that favours disturbed places such as road verges and other vacant land. Without careful control, this species can become a problem.</p>
	<p><i>Euclea racemosa</i> (dune gwarrie) is a distinctive shrub in strandveld vegetation. Very few plants of this species were found in the survey.</p>
	<p><i>Searsia undulata</i> is a shrub that can form large spreading mounds such as seen here.</p>

	<p><i>Lessertia frutescens</i> (cancer bush) is a pioneer species favouring disturbed sites, as here under power lines.</p>
	<p>A patch of regenerated Cape Flats Dune Strandveld vegetation in the northeast area of the survey. The grasses in the foreground are exotic annual species.</p>
	<p>View westwards along the northern boundary of the study area showing the patch of regenerated Cape Flats Dune Strandveld in the foreground a</p>
	<p>Apart from the exotic annual plant species in the foreground, the vegetation contains typical strandveld plant species, <i>Pelargonium capitatum</i>, <i>Searsia laevigata</i> and <i>Metelasia densa</i>.</p>

	<p><i>Cynanchum africanum</i>, a member of the milkweed family, is a climber that is found in dune strandveld vegetation.</p>
	<p>This area is a disturbed zone where strandveld has been removed for the adjacent reservoir construction.</p>
	<p>This gravel road joins the east and west parts of the study area, in the north of the Koeberg complex. It runs immediately north of the two reservoirs that area under construction.</p>
	<p>Immediately south of the new reservoirs is a patch of strandveld that has moderate cover, and the same suite of species as has been described above.</p> <p>The red arrow indicates an area where containers have been stored.</p>



The above container area consists of low grass cover (exotic grasses) with *Pelargonium capitatum*. In addition, a number of trees of the alien invasive *Acacia cyclops* (rooikrans) occur.



In the area to the south of the new reservoirs there are areas of grass and patches of degraded strandveld.



Several roads link the different parts of the Koeberg complex and between some of them, as seen here, strandveld vegetation has persisted.



Extensive earthworks in the northwest corner of the study area are underway and all vegetation has been cleared.

	<p>From the northwest corner of the study area in the direction of the reactor units is a flat, open area (view southwards). This is typical of where the original dunes were flattened. Degraded strandveld has recolonised this area.</p>
	<p>In the area described above the degraded strandveld has formed and low to mid-high shrubland with exotic annual grasses. The dominant shrub here is <i>Osteospermum moniliferum</i>.</p>
	<p>A new pipeline will be laid in the area described above, from the vicinity of the reactor units to the new reservoirs.</p>
	<p>View southwards along the gravel road that separates the open flat area to the west (coast side) and the buildings to the east.</p> <p>The zone through which the pipeline would be laid is not sensitive.</p>

e. Site Sensitivity

The National Web-based Environmental Screening Tool was applied to the area surveyed at Koeberg. The result of the analysis is that the 'PLANT SPECIES THEME' is **MEDIUM SENSITIVITY** over the northern part of the study area (Figure 4) and the 'TERRESTRIAL BIODIVERSITY THEME' is **VERY HIGH SENSITIVITY** for the entire study area (Figure 5).

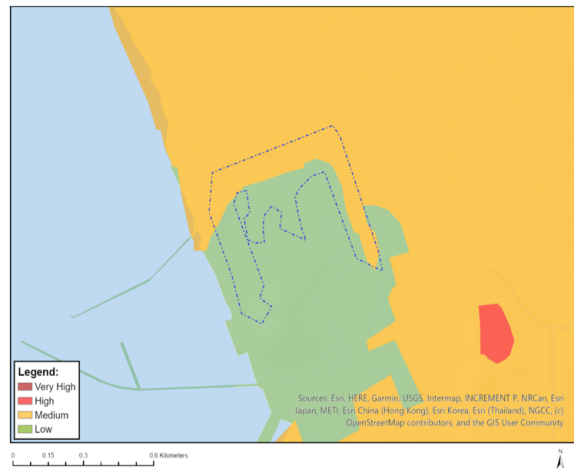
The above classifications or estimates of sensitivity from the screening tool are not correct. The reason is that the basis of the analysis is faulty. For the vegetation sensitivity, the analysis is based on the vegetation being **UNDISTURBED** endangered Cape Flats Dune Strandveld, which it is not, and that the vegetation has the plant species listed in Figure 4 present, which is also not the case. Therefore, the entire area should be mapped as having **LOW** sensitivity.

The basis for the terrestrial biodiversity is also faulty since all the 'sensitivity features' classified as **VERY HIGH** should be **LOW**. Once again, the reason for the erroneous classification is that the premise is that the vegetation is endangered Cape flats Dune Strandveld, which it is not! The Koeberg Nature Reserve that is outside the secure nuclear reactor area has minimal influence on the area surveyed.

The Western Cape Biodiversity Spatial Plan 2023 (CapeNature 2024) recognizes the entire Koeberg area as part of a Protected Area (Figure 6).

From field observations it was determined that the vegetation is nowhere near as sensitive as the Red Listed Ecosystems classification indicates (Figure 7). The areas surveyed inside the secure zone at Koeberg are degraded Cape Flats Dune Strandveld containing relatively few plant species when compared with undisturbed strandveld vegetation. It should therefore not be classified as endangered nor a Red Listed ecosystem.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Lampranthus stenius
Medium	Lampranthus tenuifolius
Medium	Cleretum clavatum
Medium	Ruschia geminiflora
Medium	Lessertia argentea
Medium	Psoralea glauca
Medium	Indigofera platypoda
Medium	Indigofera psoraloides
Medium	Lebeckia plukenetiana
Medium	Podalyria sericea
Medium	Thesium litoreum
Medium	Leucospermum hypophyllocarpodendron subsp. canaliculatum
Medium	Leucospermum hypophyllocarpodendron subsp. hypophyllocarpodendron
Medium	Leucospermum tomentosum
Medium	Manulea corymbosa
Medium	Sensitive species 878
Medium	Sensitive species 816
Medium	Hermannia procumbens subsp. procumbens
Medium	Galenia crystallina var. maritima
Medium	Isolepis venustula
Medium	Cannomois arenicola
Medium	Elegia prominens
Medium	Cynanchum zeyheri
Medium	Sensitive species 985
Medium	Gnidia spicata
Medium	Metalsia capitata
Medium	Steirodiscus tagetes
Medium	Cotula duckittiae
Medium	Cotula eckloniana
Medium	Oncosiphon africanum
Medium	Agathosma corymbosa
Medium	Agathosma glabrata
Medium	Cliffortia ericifolia
Medium	Cliffortia hirta
Medium	Cliffortia longifolia
Medium	Limonium purpuratum
Medium	Muraltia macropetala
Medium	Muraltia mitior
Medium	Sensitive species 158
Medium	Phylla plumosa var. squarrosa
Medium	Argyrobium velutinum
Medium	Xiphotheca reflexa
Medium	Sensitive species 599
Medium	Sensitive species 654
Medium	Lachnaea grandiflora
Medium	Cotula pusilla
Medium	Caesia sabulosa

Figure 4. Classification of the study area for Plant Species Sensitivity using the screening tool.

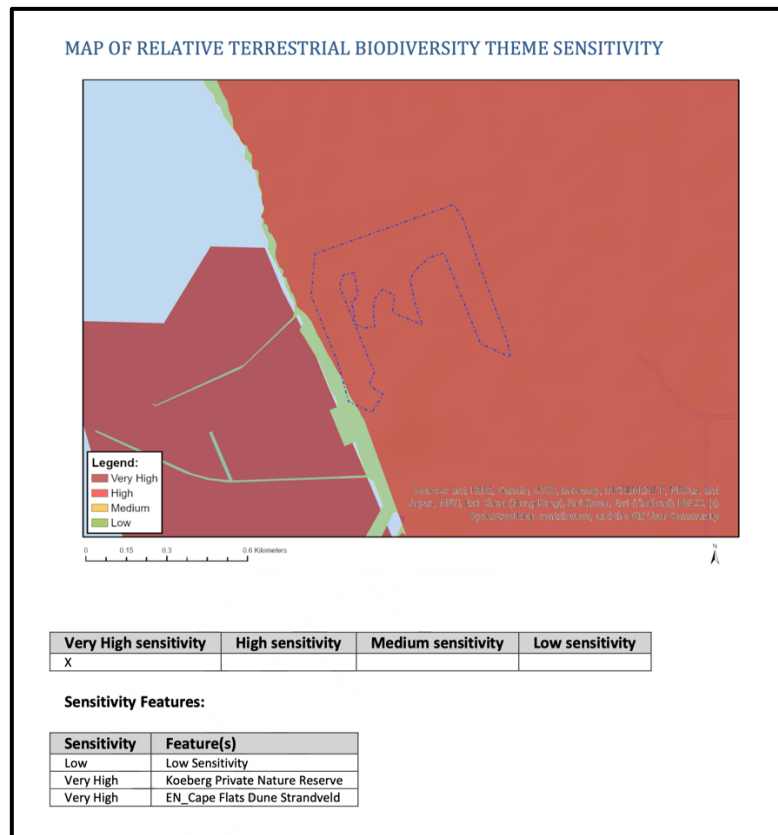


Figure 5. Classification of the study area for Terrestrial Biodiversity Sensitivity using the screening tool.



Figure 6. The Western Cape Biodiversity Spatial Plan map showing that the entire Koeberg facility fall within a protected area (dark green shading).



Figure 7. The 'remnant' layer of the Red Listed Ecosystem classification (SANBI, 2021) indicating that the eastern, northern and some of the western area surveyed at Koeberg fall within an Endangered ecosystem.

No observations during the survey indicated that the habitat concerned has high value for any animal or bird species. The only evidence of animal activity was the presence of molehills caused by the Cape Dune Mole-rat (*Bathergus suillus*) but even these were not extensive.

Conclusions

The botanical and terrestrial biodiversity investigation at Koeberg, conclusively showed that the remaining vegetation present in the secure zone, although similar to Cape Flats Dune Strandveld is in reality a highly degraded form of this vegetation type that recolonized after the construction of the Koeberg Nuclear Reactor facility in the mid-1970s. The plant species recorded are all 'pioneer' species and no species area species of conservation concern. In general, the vegetation has **low sensitivity** and most certainly cannot be classified as endangered. The diversity of fauna in the study is also very low and not threatened.

The proposed infrastructure development is **fully supported**, and compliance statement is not issues with any conditions.

Signature of the specialist:

Appendix: 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:

- 19 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
- 19 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