ENVIRONMENTAL SCOPING REPORT:

Specialist ecological study on the potential impacts of the proposed Tsitsikamma Wind Energy Facility Project, Eastern Cape

Prepared by

Dr David Hoare
(Ph.D., Pr.Sci.Nat.)

David Hoare Consulting cc
Postnet Suite no. 116
Private Bag X025
Lynnwood Ridge, 0040

for

Savannah Environmental (Pty) Ltd
PO Box 148,
Sunninghill,
2197

on behalf of
Exxaro Resources

22 March 2011

DRAFT SCOPING REPORT: 1st Draft

David Hoare Consulting cc
Biodiversity Assessments, Vegetation Description / Mapping, Species Surveys

REGULATIONS GOVERNING THIS REPORT

This report has been prepared in terms the EIA Regulations promulgated under the *National Environmental Management Act* No. 107 of 1998 (NEMA) and is compliant with Regulation 385 Section 33 - Specialist reports and reports on specialized processes under the Act. Relevant clauses of the above regulation are quoted below and reflect the required information in the "Control sheet for specialist report" given above.

Regulation 33. (1): An applicant or the EAP managing an application may appoint a person who is independent to carry out a specialist study or specialized process.

Regulation 33. (2): A specialist report or a report on a specialized process prepared in terms of these Regulations must contain:

(a) details of (i) the person who prepared the report, and
(ii) the expertise of that person to carry out the specialist study or specialized process;
(b) declaration that the person is independent in a form as may be specified by the competent authority;
(c) indication of the scope of, and the purpose for which, the report was prepared;
(d) description of the methodology adopted in preparing the report or carrying out the specialized process;
(e) description of any assumptions made and any uncertainties or gaps in knowledge;
(f) description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;
(g) recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority;
(h) description of any consultation process that was undertaken during the course of carrying out the study;
(i) summary and copies of any comments that were received during any consultation process;
(j) any other information requested by the competent authority.

Appointment of specialist

David Hoare of David Hoare Consulting cc was commissioned by Savannah Environmental (Pty) Ltd to provide specialist consulting services for the Environmental Impact Assessment for the proposed Oyster Bay Wind Energy Facility in the Eastern Cape Province. The consulting services comprise an assessment of potential impacts on the flora, fauna, vegetation and ecology in the study area by the proposed project.

Details of specialist

Dr David Hoare
David Hoare Consulting cc
Postnet Suite no. 116
Private Bag X025
Lynnwood Ridge, 0040

Telephone: 012 804 2281
Cell: 083 284 5111
Fax: 086 550 2053
Email: dhoare@lantic.net

Summary of expertise

Dr David Hoare:

- PhD in ecology
- Registered professional member of The South African Council for Natural Scientific Professions (Ecological Science, Botanical Science), registration number 400221/05.
- Founded David Hoare Consulting cc, an independent consultancy, in 2001.
- Ecological consultant since 1995.
- Conducted, or co-conducted, over 250 specialist ecological surveys as an ecological consultant.
- Published six technical scientific reports, 15 scientific conference presentations, seven book chapters and eight refereed scientific papers.
- Attended 15 national and international congresses & 5 expert workshops, lectured vegetation science / ecology at 2 universities and referee for 2 international journals.

Independence

David Hoare Consulting cc and its Directors have no connection with Exxaro Resources. David Hoare Consulting cc is not a subsidiary, legally or financially, of the proponent. Remuneration for services by the proponent in relation to this project is not linked to approval by decision-making authorities responsible for authorising this proposed project and the consultancy has no interest in secondary or downstream developments as a result of the authorisation of this project. David Hoare is an independent consultant to Savannah Environmental (Pty) Ltd and has no business, financial, personal or other interest in the activity, application or appeal in respect of which he was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of this specialist performing such work. The percentage work received directly or indirectly from the proponent in the last twelve months is 4% of turnover.

Scope and purpose of report

The scope and purpose of the report are reflected in the "Terms of reference" section of this report.

Conditions relating to this report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. David Hoare Consulting cc and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

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INTRODUCTION

Terms of reference and approach

Savannah Environmental (Pty) Ltd. was appointed by Exxaro Resources and Watt Energy to undertake an application for environmental authorisation through an Environmental Impact Assessment (EIA) for the proposed "Tsitsikamma Wind Energy Facility." The project involves the establishment of a wind energy facility and associated infrastructure, including up to 50 wind turbines (depending on the turbine selected), on-site substation/s, a 132 kV power line linking to Eskom's Melkhout substation, underground cables linking the turbines to the substation, workshop area and internal access roads to each turbine. The purpose of the EIA is to identify environmental impacts associated with the project.

In February 2011 David Hoare Consulting cc was appointed by Savannah Environmental (Pty) Ltd to undertake an ecological assessment of the study area. The specific terms of reference for the ecological scoping study include:

- to provide a description of the affected environment;
- to provide a description of potential issues;
- to provide recommendations regarding the methodology to be adopted in assessing potentially significant impacts in the EIA phase (i.e. a Plan of Study for EIA).

This report provides details of the results of the Scoping phase. The findings of the study are based on a desktop assessment of the study area and expert knowledge of the area gained from general fieldwork conducted in the Eastern Cape over a number of years.

Study area

At a regional level the study area falls within the Eastern Cape Province approximately 22 km to the west of the town of Humansdorp. A more detailed description of the study area is provided in a section below.

METHODOLOGY

The environmental study is to be undertaken in two phases, a Scoping phase and an Environmental Impact Assessment phase. The objective of the Scoping phase study was to review fauna and flora patterns within the study area in order to identify any highly sensitive areas that should be avoided during development. It was therefore necessary to provide checklists of sensitive species that could potentially occur in the study area as well as habitats with high conservation value. For potential species, only those of high conservation concern are provided. It was also intended to provide a draft habitat map of the study area based on available maps and database information. The results of the Scoping phase study are provided in this report.

Assessment philosophy

Many parts of South Africa contain high levels of biodiversity at species and ecosystem level. At any single site there may be large numbers of species or high ecological complexity. Sites also vary in their natural character and uniqueness and the level to which they have been previously disturbed. Assessing the potential impacts of a proposed development often requires evaluating the conservation value of a site relative to other natural areas and relative to the national importance of the site in terms of biodiversity conservation. A simple approach to evaluating the relative importance of a site includes assessing the following:

- Is the site unique in terms of natural or biodiversity features?
- Is the protection of biodiversity features on site of national/provincial importance?
- Would development of the site lead to contravention of any international, national or provincial legislation, policy, convention or regulation?

Thus, the general approach adopted for this type of study is to identify any critical biodiversity issues that may lead to the decision that the proposed project cannot take place, i.e. to specifically focus on red flags and/or potential fatal flaws. Biodiversity issues are assessed by documenting whether any important biodiversity features occur on site, including species, ecosystems or processes that maintain ecosystems and/or species. These can be organised in a hierarchical fashion, as follows:

Species

1. threatened plant species
2. protected trees
3. threatened animal species

Ecosystems

1. threatened ecosystems
2. protected ecosystems
3. critical biodiversity areas
4. areas of high biodiversity
5. centres of endemism

Processes

1. corridors
2. mega-conservancy networks
3. rivers and wetlands
4. important topographical features

It is not the intention to provide comprehensive lists of all species that occur on site, since most of the species on these lists are usually common or widespread species. Rare, threatened, protected and conservation-worthy species and habitats are considered to be the highest priority, the presence of which are most likely to result in significant negative impacts on the ecological environment. The focus on national and provincial priorities and critical biodiversity issues is in line with National legislation protecting environmental and biodiversity resources, including, but not limited to the following which ensure protection of ecological processes, natural systems and natural beauty as well as the preservation of biotic diversity in the natural environment:

1. Environment Conservation Act (Act 73 of 1989)
2. National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998)
3. National Environmental Management Biodiversity Act, 2004. (Act 10 0f 2004)

Plant and animal species of concern

The purpose of listing Red Data plant and animal species was to provide information on the potential occurrence of species of special concern in the study area that may be affected by the proposed infrastructure. Species appearing on these lists could then be assessed in terms of their habitat requirements in order to determine whether any of them have a likelihood of occurring in habitats that may be affected by the proposed infrastructure.

Lists were compiled specifically for any species of conservation concern previously recorded in the area and any other species with potential conservation value. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute for the quarter degree squares within which the study area is situated.

Regulations published for the National Forests Act 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.

Lists of threatened animal and bird species that have a geographical range that includes the study area were obtained from literature sources (Alexander & Marais 2007, Barnes 2000, Branch 1988, 2001, du Preez & Carruthers 2009, Friedmann & Daly 2004, Mills & Hes 1997). The likelihood of any of them occurring was evaluated on the basis of habitat preference and habitats available at each of the proposed sites. The three parameters used to assess the probability of occurrence for each species were as follows:

- *Habitat requirements*: most Red Data animals have very specific habitat requirements and the presence of these habitat characteristics within the study area were assessed;
- *Habitat status*: in the event that available habitat is considered suitable for these species, the status or ecological condition was assessed. Often, a high level of degradation of a specific habitat type will negate the potential presence of Red Data species (especially wetland-related habitats where water-quality plays a major role); and
- *Habitat linkage*: movement between areas used for breeding and feeding purposes forms an essential part of ecological existence of many species. The connectivity of the study area to these surrounding habitats and adequacy of these linkages are assessed for the ecological functioning Red Data species within the study area.

For all threatened organisms (flora and fauna) that occur in the general geographical area of the site, a rating of the likelihood of it occurring on site is given as follows:

- LOW: no suitable habitats occur on site / habitats on site do not match habitat description for species;
- MEDIUM: habitats on site match general habitat description for species (e.g. fynbos), but detailed microhabitat requirements (e.g. mountain fynbos on shallow soils overlying Table Mountain sandstone) are absent on the site or are unknown from the descriptions given in the literature or from the authorities;
- HIGH: habitats found on site match very strongly the general and microhabitat description for the species (e.g. mountain fynbos on shallow soils overlying Table Mountain sandstone);
- DEFINITE: species found in habitats on site.

Vegetation habitats of concern

The purpose of producing a vegetation habitat map was to provide information on the location of potentially sensitive features in the broad study area. Various provincial, regional or national level conservation planning studies have been undertaken in the area, e.g. the National Spatial Biodiversity Assessment (NSBA), Succulent Thicket Ecosystem Project (STEP), Eastern Cape Biodiversity Conservation Plan (ECBCP), and the mapped results from these were taken into consideration in compiling the vegetation habitat map.

The general status of the vegetation of the study area was derived by updating the National Landcover data layer for this part of the study area (Fairbanks et al. 2000) using available satellite imagery and aerial photography. From this it could be determined which areas were transformed and no longer had primary vegetation.

Limitations

- Red List species are, by their nature, usually very rare and difficult to locate. Compiling the list of species that could potentially occur in an area is limited by the paucity of collection records that make it difficult to predict whether a species may occur in an area or not. The methodology used in this assessment is designed to reduce the risks of ommitting any species, but it is always possible that a species that does not occur on a list may be unexpectedly located in an area.

Exclusions

The avifaunal assessment is excluded from this study and will be undertaken by a separate specialist.

DESCRIPTION OF STUDY AREA

Location

The study site is situated approximately 22 km west of Humansdorp in the Eastern Cape Province and falls within the quarter degree grids 3424AB and 3424BA (Figure 1). The site is situated between the N2 national road and the coast.

The farm portions on which the proposed wind energy facility would occur include the following: Remainder of the Farm 678, Portion 3, 4, 5, 6, 7, 8, 9 of the Farm 787, Farm 818, Portion 3 of the Farm Klip Rug 676, Portion 2 of the Farm New Driefontein 720, Portion 1 of the Farm Ou Driefontein 721, Portions 3 and 5 of the Farm Vergaarderings Kraal 675 and Portions 19 and 22 of the Farm Zalverige Valley 660. No alternative site is currently being considered for the proposed wind energy facility.

The study area is located between the coast and the N2 that links Port Elizabeth to George / Knysna. Access to the site is via the R62 road from Humansdorp towards the west, which runs parallel to the N2 national road. From the R62 there are various roads running towards the coast, of which one to Klidrif and one to Orangezicht provide access to the site. The site is therefore well-connected to a major route in this region. There is a road running through the site that connects Orangezicht to Klipdrif and various smaller roads providing access to other parts of the site.

The Melkhout substation is located off site near Humansdorp. This is a minimum of 20 km from the site.

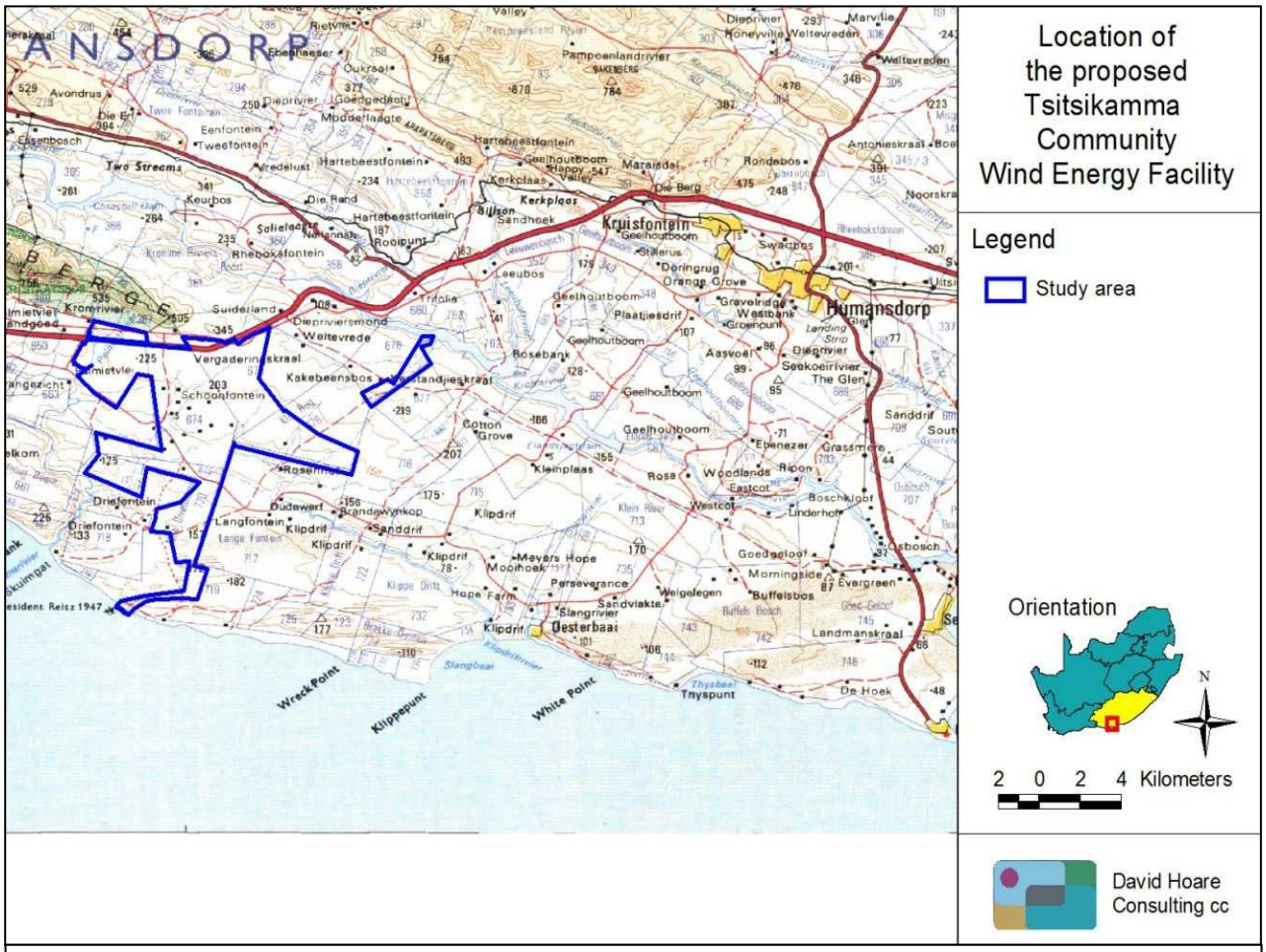

Figure 1: Location of the proposed Tsitsikamma Community Wind Energy Facility.

Physiography and soils

The study site is located on the coastal plains south of the Cape Fold mountains in the Humansdorp region. The site is flat to undulating, sloping gently towards the coast. The plains are dissected by relatively shallow river valleys in which perennial or non-perennial streams are found. Most of the site is underlain by Table Mountain Group rocks, except in the southern part of the site closest to the coast, where vegetated sand dunes are found.

The study area is moderately sloping. The elevation varies from sea level to 253 m above sea level. The site slopes in general towards the coast, but slopes and topography are locally influenced by the various river valleys.

The site is in the catchment of the Klipdrif River, which flow into the sea about 12.5 km to the south-east of the site. There are a number of small drainage lines dissecting the landscape, many of which originate on site. Most of the site drains into the Tsitsikamma River and the Palmiet River, a small tributary of the Tsitsikamma River. The easternmost parts of the site drain into small tributaries of the Klipdrif River.

Detailed soil information is not available for broad areas of the Eastern Cape. As a surrogate, landtype data was used to provide a general description of soils in the study area (landtypes are areas with largely uniform soils, topography and climate). There are three landtypes in the study area, the Ca, Ha and Bb landtypes (Land Type Survey Staff, 1987). The Ca land type indicates land that qualifies as a plinthic catena, but which has, in upland positions, margalitic and/or duplex soils that together cover more than 10% of the total area.

The Ha land type indicates land types in which deep grey regic sands of the Fernwood form occupy more than 80% of the area. The southern half of the site falls within this land type (MacVicar et al. 1974).

The Bb land type indicates land in which red and/or yellow apedal soils (Hutton, Bainsvlei, Avalon, Glencoe and Pinedene forms) that are dystrophic and/or mesotrophic predominate over red and/or yellow apedal soils that are eutrophic, and in which red soils (mainly Hutton and Bainsvlei) are not widespread (MacVicar et al. 1974). A small piece of the north-eastern part of the site and the easternmost section of land (remaining portion of the Farm 678) falls within this land type.

Climate

The study area has warm summers and mild winters. The average daily minima for the coldest months are above freezing. There are, on average, three days of frost per year. The proximity of the coast ameliorates all climate extremes, but the site is in the first range of low mountains inland of the coast and is therefore affected by the proximity of these mountains.

A weak bimodal pattern of rainfall exists in the study area with a slightly higher proportion of spring and autumn rainfall. Rainfall may, however, fall at any time of the year. The mean annual rainfall in the study area is estimated to be approximately 650 mm (Dent *et al*. 1989). In grasslands, all areas with less than 400 mm are considered to be arid grasslands. The study area can therefore be considered to be relatively moist.

Landuse and landcover of the study area

Landcover data for the area (Fairbanks et al. 2000) indicates that a large proportion of the site has been cultivated. There are, however, areas of remaining natural habitat in patches on site, primarily associated with drainage lines (thicket), some rocky areas (fynbos) and the southern portions of the site that occur on dune sand. The natural parts of the landscape consist primarily of low grassy fynbos, thicket and woodland. The national landcover map (Fairbanks et al. 2000) indicates the presence of two thicket patches in the centre of the site, but this appears from aerial imagery to resemble alien trees. The identity of this will have to be confirmed in the field in the EIA phase of the process.

Broad vegetation types

Vegetation may be described at various hierarchical levels from Biome, to broad Vegetation Type and down to Plant Community level associated with local habitat conditions. There are three general descriptions of the vegetation in the study area. Acocks (1953) published the first comprehensive description of the vegetation of South Africa, which was updated in 1988. This was followed by an attempted improvement (Low & Rebelo 1998) which became widely used due to the inclusion of conservation evaluations for each vegetation type, but is often less rigorous than Acocks's original publication. More recently, a detailed map of the country was produced (Mucina *et al.*, 2005). A companion guide to this map (Mucina & Rutherford 2006), containing up-to-date species information and a comprehensive conservation assessment of all vegetation types, has just been published. The classification of the vegetation according to the most recent publication is given below.

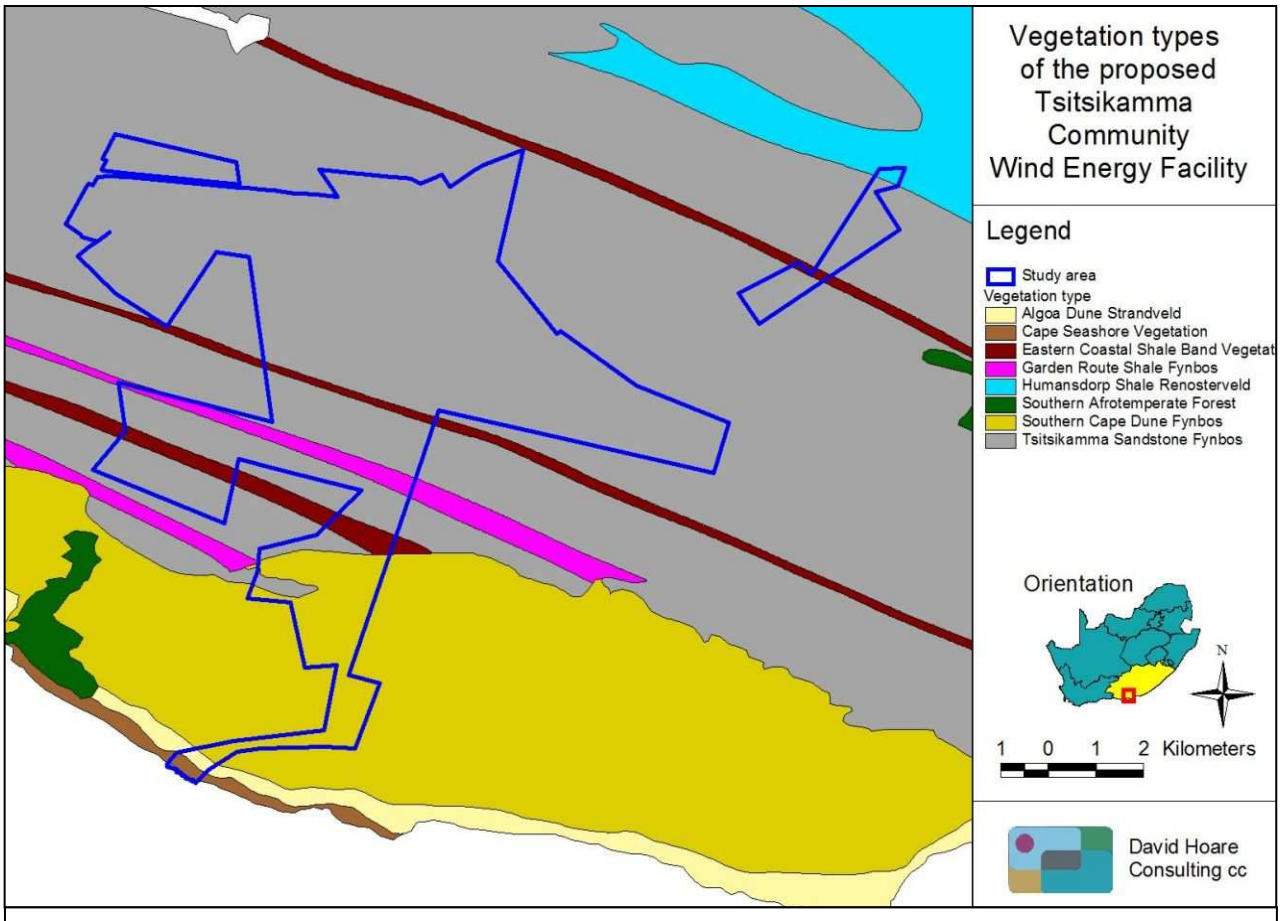

Figure 2: Vegetation types of the study site and surrounding areas.

According to this most recent vegetation map of the country (Mucina *et al.*, 2005) the study area falls primarily within two main vegetation types, i.e. ***Tsitsikamma Sandstone Fynbos*** and ***Southern Cape Dune Fynbos***, both of which which fall within the Fynbos Biome. There are also small areas of five other vegetation types apparently occurring on site, namely ***Eastern Coastal Shale Band Vegetation***, ***Garden Route Shale Fynbos***, ***Humansdorp Shale Renosterveld***, ***Algoa Dune Strandveld*** and ***Cape Seashore Vegetation***. There are areas of Southern Afrotemperate Forest indicated as occurring nearby, but none of this appears to occur on the site.

Tsitsikamma Sandstone Fynbos is found along the Tsitsikamma Mountains from Uniondale to Cape St Francis (Rebelo et al. 2006). This landscape consists of relatively low mountains with gentle to steep slopes. The vegetation type occurs on both the northern and southern slopes of the mountains. It is a medium-dense, tall proteoid shrubland over a dense, moderately tall ericoid-leaved shrubland (Rebelo et al. 2006). This vegetation type occurs in the northern half of the site under assessment (Figure 2), most of which is transformed by cultivation on site.

Southern Cape Dune Fynbos occurs in the Western and Eastern Cape from Wilderness and Buffels Bay near Knysna to Oyster Bay (Rebelo et al. 2006). The vegetation type occurs on the coastal dune cordons, often with steep slopes. It is a fynbos heath vegetation dominated by sclerophyllous shrubs with a rich restio undergrowth (Rebelo et al. 2006). This vegetation type occurs in the southern half of the site under assessment (Figure 2), which appears from aerial imagery to be largely intact on site.

Eastern Coastal Shale Band Vegetation occurs on the shale bands in the eastern Outeniqua, Langkloof, Tsitsikamma and Kareedouw Mountains and along the southern Cape coastal plains to around Oyster Bay (Rebelo et al. 2006). These shale bands form narrow strips 80 - 200 m wide that are smooth and relatively flat. The vegetation type ranges from thicket to renosterveld and fynbos, including all structural types, although they are often grassy in character (Rebelo et al. 2006). This vegetation type occurs in three narrow bands through the study area (Figure 2), all of which appear to have been transformed by cultivation.

Garden Route Shale Fynbos occurs primarily from Heidelberg to Plettenberg Bay, but also in patches along coastal platform shale bands south of the Tsitsikamma Mountains (Rebelo et al. 2006). The vegetation occurs on undulating hills and moderately undulating plains on coastal forelands. It is a tall, dense proteoid and ericaceous fynbos in wetter areas and graminoid fynbos in drier areas. Most shale areas are covered by afrotemperate forest so this fynbos is confined to flatter more extensive landscapes that are exposed to frequent fire. In the study area, this vegetation type is confined to a single narrow band that lies in an east-west direction through the centre of the site (Figure 2), which appears from aerial imagery to be completely transformed on site.

Humansdorp Shale Renosterveld occurs, across its geographic range, in three swathes, one of which extends from Jeffreys Bay near the coast inland past Humansdorp to the lower reaches of the Dieprivier near Two Streams (Rebelo et al. 2006). The vegetation type occurs on moderately undulating plains and undulating hills. It is a vegetation composed of low, medium dense graminoid, dense cuppressoid-leaved shrubland, dominated by renosterbos (Rebelo et al. 2006). There are both grassland shrubland and grassland forms of the renosterveld. Thicket patches are common on termitaria and fire-safe enclaves. This vegetation type occurs as a small sliver in the extreme northern part of the site (Figure 2), which appears from aerial imagery to be intact.

Algoa Dune Strandveld occurs in the Eastern Cape Province in a narrow coastal strip from the mouth of the Tsitsikamma River to the Sundays River mouth (Mucina *et al.*, 2006). It is found on dunes mainly outside the influence of salt spray. It is a dense thicket dominated by stunted trees, shrubs (often armed with spines and thorns), abundant lianas and sparse herbaceous and grassy undergrowth. It occurs on site in a short section along the coast, just inland of the shoreline (Figure 2).

Cape Seashore Vegetation occurs along the Eastern and Western Cape Province coasts from the Olifants River mouth on the Atlantic Ocean to East London on the Indian Ocean (Mucina *et al.*, 2006). It is found on beaches, coastal dunes, dune slacks and coastal cliffs. It may be an open, grassy, herbaceous and sometimes dwarf-shrubby, sometimes succulent vegetation, often dominated by single pioneer species. The plant communities present reflect the age of the substrate and natural disturbance regime, distance from the upper tidal mark and the exposure to prevailing winds. This vegetation occurs along the short section of shoreline on site (Figure 2), which consists of a mixture of rocky areas and dune sand.

Conservation status of broad vegetation types

The vegetation types of South Africa have been categorised according to their conservation status which is, in turn, assessed according to degree of transformation and rates of conservation. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. On a national scale these thresholds are as depicted in Table 1, as determined by best available scientific approaches (Driver et al. 2005). The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver et al. 2005).

Table 1: Determining ecosystem status (from Driver et al. 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)		
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

Tsitsikamma Sandstone Fynbos is classified in Mucina *et al*. (2006) as Vulnerable, with 40% conserved of a target of 23% and 33% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), does not list this vegetation type in any conservation category.

Southern Cape Dune Fynbos is classified in Mucina *et al*. (2006) as Least Threatened, with 16% conserved of a target of 36% and 17% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), does not list this vegetation type in any conservation category.

Eastern Coastal Shale Band Vegetation occurs is classified in Mucina *et al*. (2006) as Endangered, with 16% conserved of a target of 27% and 64% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under

the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists this vegetation type as Vulnerable.

Garden Route Shale Fynbos is classified in Mucina *et al*. (2006) as Endangered, with 5% conserved of a target of 23% and 54% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists this vegetation type as Vulnerable.

Humansdorp Shale Renosterveld is classified in Mucina *et al*. (2006) as Endangered, with none conserved of a target of 29% and 61% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists this vegetation type as Endangered.

Algoa Dune Strandveld is classified in Mucina *et al*. (2006) as Least Threatened, with 4% conserved of a target of 20% and 11% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), does not list this vegetation type in any conservation category, but coastal areas (within 1000 m of the shoreline) are protected under the Integrated Coastal Zone Management Act (Act No. 24 of 2008).

Cape Seashore Vegetation is classified in Mucina *et al*. (2006) as Least Threatened, with 45% conserved of a target of 20% and 2% transformed (Mucina et al. 2006). The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), does not list this vegetation type in any conservation category, but coastal areas (within 1000 m of the shoreline) are protected under the Integrated Coastal Zone Management Act (Act No. 24 of 2008).

Table 2: Conservation status of different vegetation types occurring in the study area, according to Driver *et al*. 2005 and Mucina *et al*. 2005.

Vegetation Type	Target (%)	Conserved (%)	Transformed (%)	Conservation status	
				Driver *et al*. 2005; Mucina *et al*., 2006	Draft Ecosystem List (NEMBA)
Tsitsikamma Sandstone Fynbos	23	40	33	Vulnerable	Not listed
Southern Cape Dune Fynbos	36	16	17	Least Threatened	Not listed
Eastern Coastal Shale Band Vegetation	27	16	64	Endangered	Vulnerable
Garden Route Shale Fynbos	23	5	54	Endangered	Vulnerable
Humansdorp Shale Renosterveld	29	0	61	Endangered	Endangered
Algoa Dune Strandveld	20	4	11	Least Threatened	Not listed
Cape Seashore Vegetation	20	45	2	Least Threatened	Not listed

The Cape Floristic Region

The study area occurs within the Cape Floristic Region (see Figure 3), which is recognised as one of the principal centres of diversity and endemism in Africa (van Wyk & Smith 2001). Moreover, it is one of the earth's 25 hotspots, i.e. geographical areas that contain the world's greatest plant and animal diversity while also being subjected to high levels of pressure from development and/or degradation (Mittermeier *et al*. 2000). The Cape Floristic region is also the only hotspot that encompasses an entire Floristic Kingdom. This region has the greatest extratropical concentration of plant species in the world, with 9000 plant species, 6210 of which are endemics (Cowling & Pierce 2000). Diversity and endemism are high at the generic and familial level as well, with five of South Africa's 12 endemic plant families.

The characteristic and most widespread vegetation of the Cape Floristic Region (CFR) is fynbos, consisting of hard-leaved, evergreen, fire-prone shrubs. Other vegetation types occurring in the CFR are Renosterveld, Succulent Karoo, Subtropical Thicket and Afromontane forest, although only Fynbos and Renosterveld are considered to be the main vegetation types in the CFR. Fynbos is associated with the nutrient poor soils of the Cape fold Belt mountains. It is very species rich, with over 75% of the CFR species associated with it, including all the endemic families and most of the endemic genera (van Wyk & Smith 2001). The vegetation type is characterized by a preponderance of Restionaceae, Ericaceae and Proteaceae and a paucity of annuals and grasses. Fynbos is rich in geophytes, notably from the families Liliaceae, Iridaceae and Orchidaceae, and is thought to harbour the richest geophyte flora in the world (Cowling & Richardson 1995). Many different types of Fynbos vegetation are recognised: a total of 78 fynbos and 38 renosterveld vegetation types have been mapped in the recently compiled vegetation map of South Africa (Mucina, Rutherford & Powrie 2005) of a total of 435 vegetation types of the whole country (more than a quarter of the total).

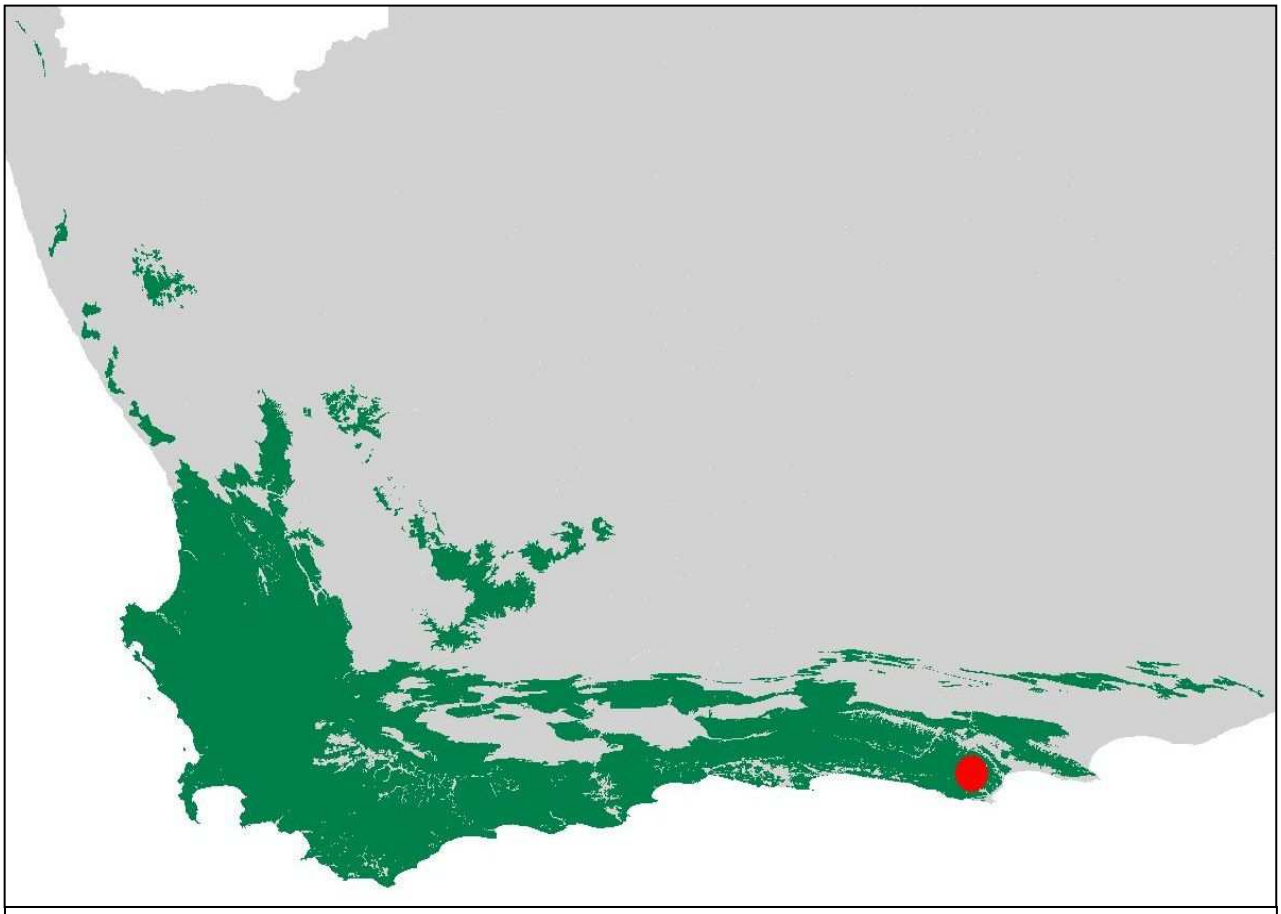

Figure 3: Relationship of the Fynbos Biome to the study area (red circle).

The Fynbos Biome and the CFR are largely concurrent and also match the boundaries of the two main vegetation types found in the Fynbos Biome, fynbos and renosterveld.

Permanent and complete transformation of habitat has affected 33% of the CFR hotspot, which includes the Oyster Bay site. Less than 20% of the total area covered by the CFR hotspot can be considered close to the pristine state in the sense that it is entirely free of alien plants and subjected to appropriate fire and grazing regimes (Cowling & Pierce 2000). The study area is within this hotspot area near its eastern end (see Figure 3) and, although the hotspot contains a wide variety of vegetation types, the study area contains a number of vegetation types that are typical of the areas of concern within the hotspot.

Red List plant species of the study area

Lists of plant species previously recorded in the quarter degree grids in which the study area is situated were obtained from the South African National Biodiversity Institute. These are listed in Appendix 1. Additional species that could occur in similar habitats, as determined from database searches and literature sources, but have not been recorded in these grids are also listed.

The species on this list were evaluated to determine the likelihood of any of them occurring on site. Of the species that are considered to occur within the geographical area under consideration, there were fifteen species recorded in the quarter degree grid in which the study area is located that are listed on the Red List that could occur in habitats that are available in the study area. According to IUCN Ver. 3.1 (IUCN, 2001) one of these is listed as Critically Endangered, two as Endangered, eight as Vulnerable and four as Near Threatened (see Table 3 for explanation of categories). All except three of these species are highly likely to occur on site; the site is at the locality where the species have been previously recorded or the species have been recorded just adjacent to the site in similar habitats.

Table 3: Explanation of IUCN Ver. 3.1 categories (IUCN, 2001), and Orange List categories (Victor & Keith, 2004).

IUCN / Orange List category	Definition	Class
EX	Extinct	Extinct
CR	Critically Endangered	Red List
EN	Endangered	Red List
VU	Vulnerable	Red List
NT	Near Threatened	Orange List
Declining	Declining taxa	Orange List
Rare	Rare	Orange List
Critically Rare	Rare: only one subpopulation	Orange List
Rare-Sparse	Rare: widely distributed but rare	Orange List
DDD	Data Deficient: well known but not enough information for assessment	Data Deficient
DDT	Data Deficient: taxonomic problems	Data Deficient
DDX	Data Deficient: unknown species	Data Deficient
LC	Least Concern	Least Concern

Red List animal species of the study area

All Red List vertebrates (mammals, reptiles, amphibians, fish) that could occur in the study area are listed in Appendix 2. Those vertebrate species with a geographical distribution that includes the study area and habitat preference that includes habitats available in the study

area are discussed further.

There are a number of mammal species of conservation concern that have a distribution that coincides with the study area. Only four of these are considered to have a possibility of occurring on site as a result of habitats available, i.e. the Brown Hyaena, the Fynbos Molden mole and the Natal Long-fingered Bat, all listed as Near Threatened[1], and Duthie's Golden Mole, listed as Vulnerable.

There are two reptile and no amphibian species of conservation concern that have a distribution that includes the study area and which could occur on site. The two reptile species are the Spotted Rock Snake (Rare) and the Yellow-bellied House Snake (Near Threatened). There are therefore no threatened (CR, EN or VU) reptile or amphibian species that are likely to occur on site (see Table 3 for explanation of conservation categories).

Protected trees

Tree species protected under the National Forest Act are listed in Appendix 3. Those that have a geographical distribution that includes the study area are *Curtisia dentata, Ocotea bullata, Pittosporum viridiflorum, Podocarpus falcatus, Podocarpus latifolius and Sideroxylon inerme* subsp. *inerme*.

Ocotea bullata occurs in montane forest. *Pittosporum viridiflorum* occurs along forest margins, in bush-clumps and in bushveld, often in rocky outcrops. *Podocarpus falcatus* is found in Afromontane forest. *Podocarpus latifolius* is found in coastal and Afromontane forest. *Sideroxylon inerme* subsp. *inerme* usually only occurs in coastal areas, in dune thicket and forest, but may also occur on termitaria in bushveld.

Based on habitat preferences, any of these species could occur on or near the site. *Sideroxylon inerme* subsp. *inerme*, *Pittosporum viridiflorum*, *Podocarpus falcatus* and *Podocarpus latifolius* have been previously recorded in the grid in which the study site is located, as well as surrounding grids (see Appendix 4). If any of these species occur in the study area, the most likely places would be in the thicket in the drainage lines or in woodland patches.

Other features of conservation concern

There have been a number of regional conservation assessments produced within the Eastern Cape Province, including the following:

- Subtropical Thicket Ecosystem Programme (STEP)
- Succulent Karoo Ecosystems Programme (SKEP)
- National Spatial Biodiversity Assessment (NSBA)
- Eastern Cape Biodiversity Conservation Plan (ECBCP).

These studies identify patterns and processes that are important for maintaining biodiversity in the region. Unfortunately, many of these studies have been done using coarse scale satellite imagery that does not provide spatial or spectral accuracy at the scale of the present study. They are, however, useful for understanding broad issues and patterns within the area. The

[1] Note that there are a number of species previously listed in a threatened category that, according to the IUCN, are now listed as Least Concern (see Appendix 2).

ECBCP has integrated all previous studies and is a useful reference for identifying conservation issues in the study area and surrounds.

The ECBCP identifies Critical Biodiversity Areas (CBAs), which are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning (Berliner & Desmet 2007). The ECBCP identifies CBAs at different levels with decreasing biodiversity importance, as follows:

1. PA: Protected areas.
2. CBA 1: CR vegetation types and irreplaceable biodiversity areas (areas definitely required to meet conservation targets).
3. CBA 2: EN vegetation types, ecological corridors, forest patches that do not fall into CBA 1, 1 km coastal buffer, irreplaceable biodiversity areas that do not fall into CBA 1.
4. CBA 3: VU vegetation types.

Within and around the study area, the ECBCP identifies CBAs at three levels that occur within the study area and surroundings (Figure 4). The CBA 1 areas that fall within the study site are vegetation types of high conservation value, in this case Eastern Coastal Shale Band Vegetation, Garden Route Shale Fynbos and Humansdorp Shale Renosterveld, all classified as Endangered. The CBA 2 areas that fall within the study site are corridor areas and vegetation identified in the STEP project as being important (Southern Cape Dune Fynbos). The corridor areas are important for a number of reasons, including the maintenance of ecological processes. The CBA 3 areas that fall within the study site are vegetation types of conservation importance (in this case Tsitsikamma Sandstone Fynbos). Despite the site falling into these

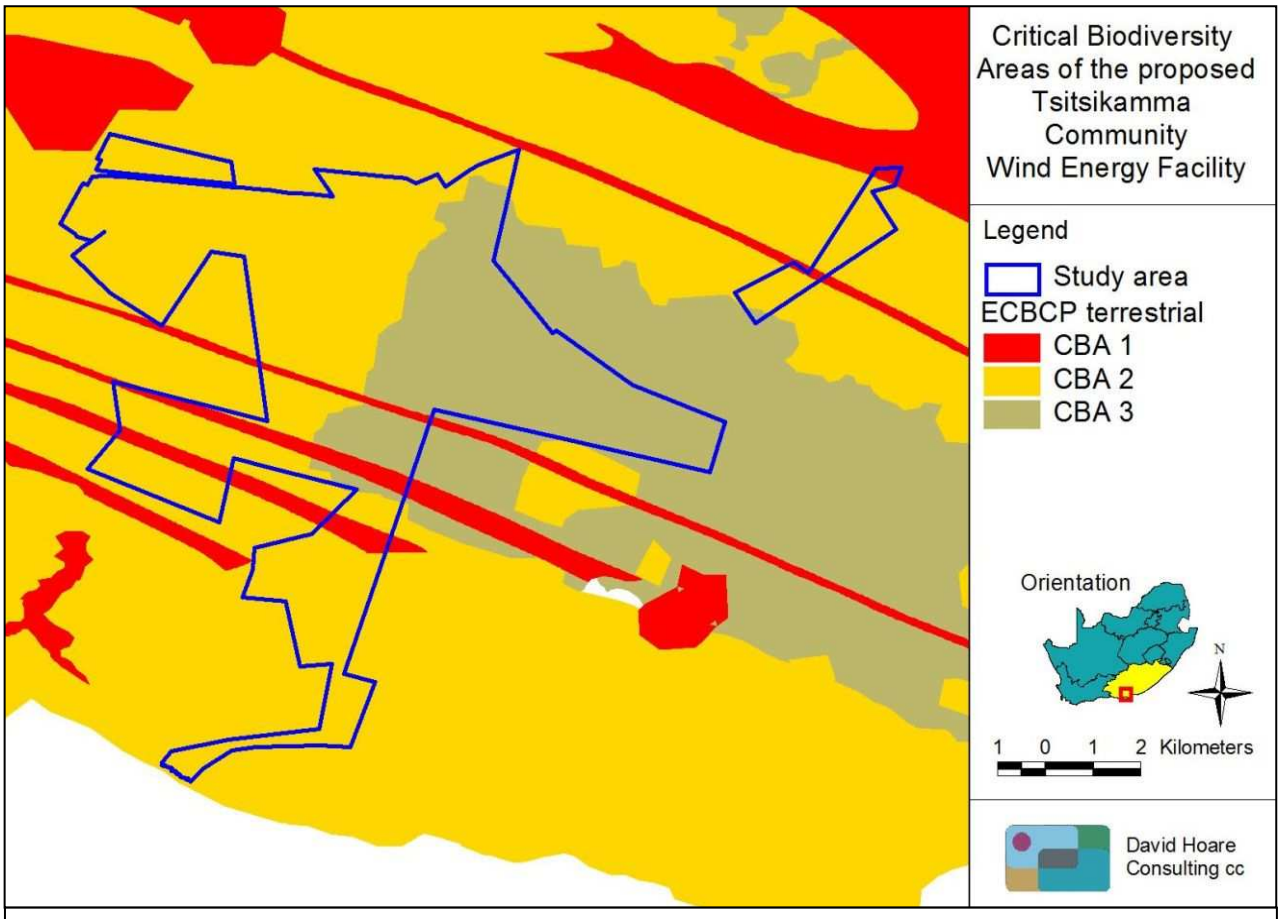

Figure 4: Important biodiversity areas of the study area (from ECBCP).

CBAs the vegetation is largely transformed due to cultivation, except for the southern third of the site.

Preliminary sensitivity assessment

The preliminary sensitivity assessment identifies at a high (regional) level those parts of the study area that have high conservation value or that may be sensitive to disturbance. Areas containing untransformed natural vegetation, high diversity or habitat complexity, Red List organisms or systems vital to sustaining ecological functions are considered sensitive. In contrast, any transformed area that has no importance for the functioning of ecosystems is considered to have low sensitivity. The information provided in the preceding sections was used to compile a preliminary map of remaining natural habitats and areas important for maintaining ecological processes in the study area. Broad scale mapping was used to provide information on the location of sensitive features. There are a number of features that need to be taken into account in order to evaluate sensitivity in the study area. These include the following:

1. vegetation of conservation importance: this is based primarily on the ECBCP assessment (see Figure 4), the Draft Ecosystem List and the fact that the site falls within the Cape Floristic Region;
2. perennial and non-perennial rivers and streams and wetlands: this represents a number of ecological processes including groundwater dynamics, hydrological processes, nutrient cycling and wildlife dispersal;
3. potential occurrence of populations of Red List organisms, including flora and fauna that have been evaluated as having a high chance of occurring within remaining natural

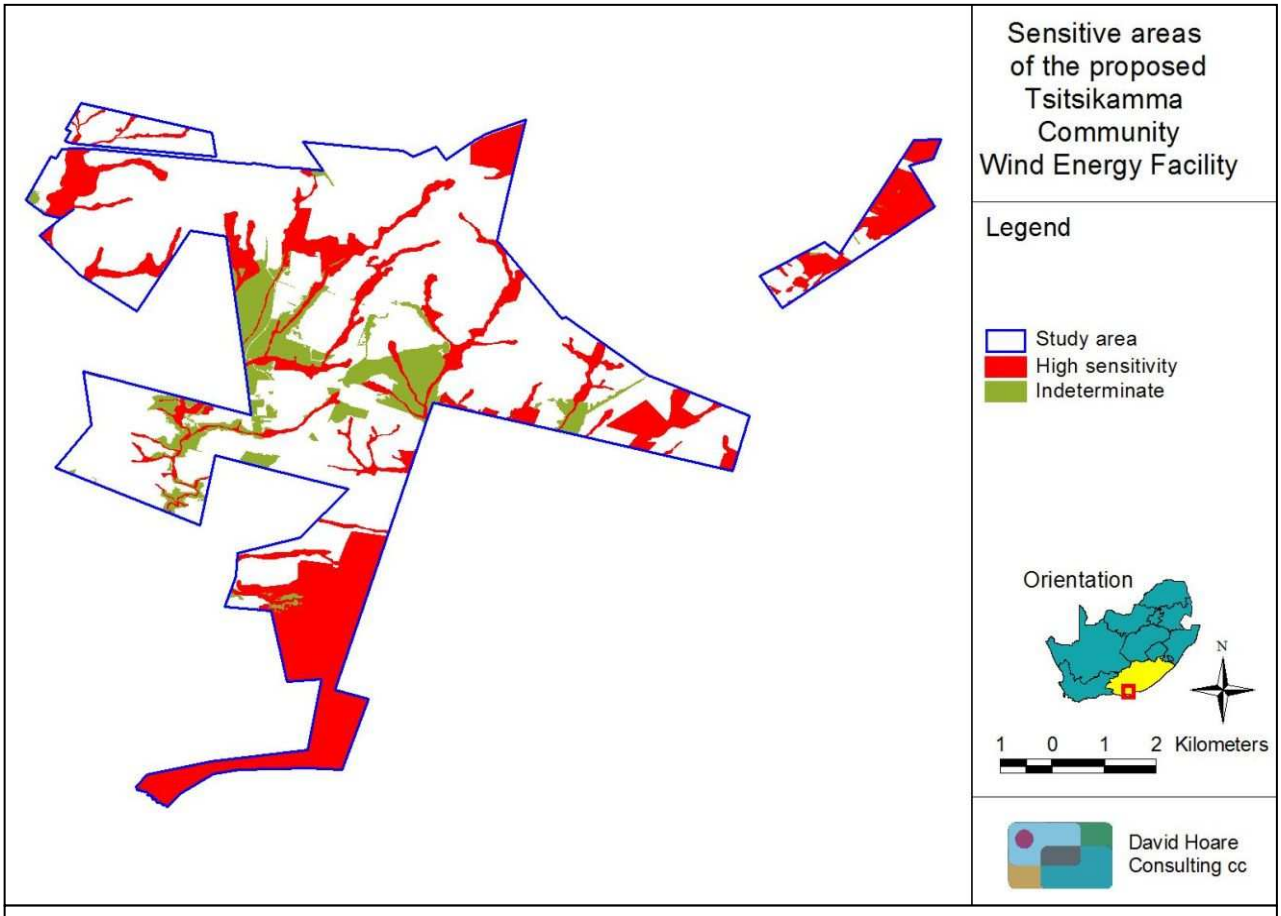

Figure 5: Preliminary sensitivity within different parts of the study area.

habitats within the study area.
4. estuaries and estuarine habitats that occur off-site, but which may be affected by activities on site.

These factors have all been taken into account in mapping potentially sensitive areas within the study area. These are mapped in Figure 5. This map shows the remaining natural vegetation on site and wetlands and drainage lines to have HIGH sensitivity and conservation value (Figure 5). The area of vegetation dunes in the southern part of the site is classified as having VERY HIGH sensitivity and conservation value. The area in the centre of the site dominated be trees has been classified as UNDETERMINED (Figure 5), as a large proportion of these woodlands are probably alien trees. The identity of this area will be determined in the field, but it must be taken into consideration that parts of these areas are natural and therefore sensitive.

It is important to note that this ecological sensitivity assessment is based on a desktop study and that it identifies regional issues that apply to the site. The sensitivity assessment must be refined during fieldwork to be undertaken during the EIA phase of the project. The refinement will identify specific areas on site that are sensitive, taking the regional assessment into account.

RELEVANT LEGISLATIVE AND PERMIT REQUIREMENTS

Relevant legislation is provided in this section to provide a description of the key legal considerations of importance to the proposed project. The applicable legislation is listed below.

Legislation

National Environmental Management Act, Act No. 107 of 1998 (NEMA)

NEMA requires, inter alia, that:

- "development must be socially, environmentally, and economically sustainable",
- "disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied." ,
- "a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions",

NEMA states that "the environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage."

Environment Conservation Act No 73 of 1989 Amendment Notice No R1183 of 1997

The ECA states that:

Development must be environmentally, socially and economically sustainable. Sustainable development requires the consideration of inter alia the following factors:

- that pollution and degradation of the environment is avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
- that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; and
- that negative impacts on the environment and on peoples' environmental rights be anticipated and prevented, and where they cannot be altogether prevented are minimised and remedied.

The developer is required to undertake Environmental Impact Assessments (EIA) for all projects listed as a Schedule 1 activity in the EIA regulations in order to control activities which might have a detrimental effect on the environment. Such activities will only be permitted with written authorisation from a competent authority.

National Forests Act (Act no 84 of 1998)

Protected trees

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that ' no person may cut, damage, disturb, destroy or remove any *protected tree*, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.

Forests

Prohibits the destruction of indigenous trees in any natural forest without a licence.

National Environmental Management: Biodiversity Act (Act No 10 of 2004)

In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).

- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

Conservation of Agricultural Resources (Act No. 43 of 1983) as amended in 2001

Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.

Integrated Coastal Zone Management Act (Act No. 24 of 2008)

The purpose of the Act is to establish a system of integrated coastal and estuarine management in the Republic, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and economically sustainable; to define rights and duties in relation to coastal areas; to determine the responsibilities of organs of state in relation to coastal areas; to prohibit incineration at sea; to control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment; to give effect to South Africa's international obligation in relation to coastal matters; and to provide for matters connected therewith. The Act provides for integrated management of the coastal zone and contains a number of Chapters dealing with various components. Those that may affect the current project are as follows:

- A coastal protection zone is defined in which development is restricted or controlled. A relatively arbitrary distance of 1000 m is defined in the act as constituting this coastal protection zone, but sections of the act (sections 26 to 29) set out procedures whereby the various coastal areas may be specifically demarcated on a case-by-case basis.
- Assessing the environmental impact of activities which may detrimentally affect the coastal zone will be done in terms of the general environmental impact assessment regulations which were promulgated in terms of Chapter 5 of NEMA. Section 63 of Act 24 of 2008 provides the factors and criteria which the competent authority must consider when issuing environmental authorisations for activities affecting the coastal zone.

IDENTIFICATION OF RISKS AND POTENTIAL IMPACTS

Potential issues relevant to potential impacts on the ecology of the study area include the following:

- Impacts on biodiversity: this includes any impacts on populations of individual species of concern (flora and fauna), including protected species, and on overall species richness. This includes impacts on genetic variability, population dynamics, overall species existence or health and on habitats important for species of concern.
- Impacts on sensitive habitats: this includes impacts on any sensitive or protected habitats, including, for example, indigenous forest, thicket and wetland vegetation, that leads to direct or indirect loss of such habitat.
- Impacts on ecosystem function: this includes impacts on any processes or factors that maintain ecosystem health and character, including the following:
    - disruption to nutrient-flow dynamics;
    - impedance of movement of material or water;
    - habitat fragmentation;
    - changes to abiotic environmental conditions;
    - changes to disturbance regimes, e.g. increased or decreased incidence of fire;
    - changes to successional processes;
    - effects on pollinators;
    - increased invasion by alien plants.

  Changes to factors such as these may lead to a reduction in the resilience of plant communities and ecosystems or loss or change in ecosystem function.
- Secondary and cumulative impacts on ecology: this includes an assessment of the impacts of the proposed project taken in combination with the impacts of other known projects for the area or secondary impacts that may arise from changes in the social, economic or ecological environment.
- Impacts on the economic use of vegetation: this includes any impacts that affect the productivity or function of ecosystems in such a way as to reduce the economic value to users, e.g. reduction in grazing capacity, loss of harvestable products. It is a general consideration of the impact of a project on the supply of so-called ecosystem goods and services.

A number of direct risks to ecosystems would result from construction of the proposed WEF, as follows:

- Clearing of land for construction.
- Construction of access roads.
- Establishment of borrow and spoil areas.
- Chemical contamination of the soil by construction vehicles and machinery.
- Operation of construction camps.
- Storage of materials required for construction.

Description of potential impacts

Major potential impacts are described briefly below. These are compiled from a generic list of possible impacts derived from previous projects of this nature and from a literature review of the potential impacts of wind energy facilities on the ecological environment. There are two major ways that wind-energy development may influence ecosystem structure and functioning—through direct impacts on individual organisms and through impacts on habitat structure and functioning. The most important potential negative ecological impacts of a WEF

are related to bird and bat mortality and loss of habitat. The most important positive environmental impact of a WEF is related to decreased dependency on coal power. Potential impacts are discussed in more detail below:

Impact 1: Impacts on bats

Nature: Bird and bat deaths are one of the most controversial biological issues related to wind turbines. The deaths of birds and bats at wind farm sites have raised concerns by conservation agencies internationally. In order to address this issue in South Africa, the Endangered Wildlife Trust (EWT) and BirdLife South Africa (BLSA) have combined efforts to lobby for the appropriate consideration of the potential negative effects of wind energy production.

Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echo-location allows them to detect moving objects very well. A recent study in America has found that the primary cause for mortality is a combination of direct strikes and barotrauma (bats are killed when suddenly passing through a low air pressure region surrounding the turbine blade tips causing low pressure damage to the bat's lungs, Baerwald *et al*. 2008). The relative importance of this impact on bat populations depends on which species are likely to be affected, the importance of the site for those species and whether the site is within a migration corridor for particular bat species.

The most vulnerable species are those that are already classified as threatened species, including those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species unless the impact occurs across a wide area that co-incides with their overall distribution range. Loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:

1. fragmentation of populations of affected species;
2. reduction in area of occupancy of affected species; and
3. loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances.

It has been evaluated that there is one Near Threatened bat species that could occur site or in the surrounding areas, the Natal Long-fingered Bat. This species is most likely to be affected by the operation of the WEF to a greater extent than the construction of the WEF.

Extent: The impact will occur at the site of the proposed WEF, but will have an impact at a more regional level, since it affects entire populations of the affected species and may affect migration routes of the species.

Potential significance: The suitability of the site for these species can only be assessed by assessing the habitat on site in some detail within the EIA phase of the process. However, due to the near threatened status of the species concerned, the long duration of the impact and the regional effect of the impact, it could potentially be of medium to high significance.

Impact 2: Impacts on other threatened animals

Nature: Threatened animal species are affected primarily by the overall loss of habitat, since direct construction impacts can often be avoided due to movement of individuals from the path of construction.

Threatened species include those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened animal species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:

1. fragmentation of populations of affected species;
2. reduction in area of occupancy of affected species; and
3. loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species' overall survival chances.

It has been evaluated that there are three mammal species of conservation concern that could potentially be affected by the proposed wind energy facility, i.e. the Brown Hyaena and the Fynbos Golden Mole, listed as Near Threatened, and Duthie's Golden Mole, listed as Vulnerable. In addition, there is one near threatened reptile species that has a distribution that includes the study area and which could occur on site, i.e. the Yellow-bellied House Snake.

The Brown Hyaena is a mobile animal that is likely to avoid the site during construction and re-appear afterwards. This species is therefore unlikely to be affected by construction of the proposed infrastructure.

The two mole species are not mobile and, if they occur on site, are likely to be affected by the construction of infrastructure since they are largely unable to move away during construction and are dependent on habitat remaining intact. The Fynbos Golden Mole is found in lowland fynbos and Knysna forest, also in urban areas. It prefers sandy soils with a deep litter layer. The dune area in the southern part of the site is the most suitable habitat on site for this species. Duthie's Golden Mole occurs in alluvial sand and sandy loam. The dune area in the southern part of the site is highly suitable habitat for this species. The threatened status of Duthie's Golden Mole (classified as Vulnerable) and the narrow distribution of the species indicates that impacts on any populations could have a significant negative impact on the overall conservation status of the species.

The Yellow-bellied House Snake is unlikely to be able to move away during the construction phase, or is dependent on habitats on site remaining intact. This species, although listed as Near Threatened, occurs throughout a wide part of South Africa and is very unlikely to be significantly affected by the complete loss of the site, which constitutes a very small fraction of its potential overall range. This species is therefore unlikely to be affected by construction of the proposed infrastructure.

Extent: The impact will occur at the site of the proposed WEF. It could potentially have an effect at a more regional level, since it could affect entire populations of affected species, depending on the species.

Potential significance: The potential duration of the impact on these species is probably long-term to permanent due to the fact that potentially affected populations are likely to be completely displaced during construction. The suitability of the site for these species can only be assessed by assessing the habitat on site in some detail. However, due to the long duration and potentially high magnitude of the impact on potentially affected species, the impact is likely to be of high significance.

Impact 3: Impacts on threatened plants

Plant species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities, but are also affected by overall loss of habitat.

Threatened species include those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations. Consequences may include:

1. fragmentation of populations of affected species;
2. reduction in area of occupancy of affected species; and
3. loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species' overall survival chances.

There are twelve Red List plant species that have a geographic distribution that includes the site and which have a high chance of occurring in the study area. This includes two species classified as Endangered, seven as Vulnerable and three as Near Threatened. There is also one Critically Endangered species, one Vulnerable species and two Near Threatened species that have a medium probability of occurring on site. Most of the species that have a high probability of occurring on site would probably occur within the dune habitat in the southern part of the site.

Extent: The impact will occur at the site of the proposed WEF, but will have an impact at a global level, since it potentially affects the global status of a number of affected species that are in threatened categories. For plant populations, the location of infrastructure is critical.

Potential significance: The site is almost certain to harbour some or all of these species. Due to the conservation status and distribution of the species concerned and the regional effect of the impact, it could potentially be of high significance.

Impact 4: Impacts on protected tree species

There are a number of tree species that are protected according to Government Notice no. 1012 under section 12(I)(d) of the National Forests Act, 1998 (Act No. 84 of 1998). In terms of section1 5(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 forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated".

A number of species have a geographic distribution that includes the study area appear on this list, including the following: *Curtisia dentata, Ocotea bullata, Pittosporum viridiflorum,*

Podocarpus falcatus, Podocarpus latifolius and Sideroxylon inerme subsp. *inerme*. They all occur primarily in forest or woodland habitat or in drainage lines. Based on the assessment of available habitat, *Sideroxylon inerme* is considered to be highly likely to occur on site and the remaining species could occur on site.

Extent: The impact will occur at the site of the proposed WEF. It may affect single individuals of protected species.

Potential significance: The possible presence of these species on site can only be assessed by assessing the habitat on site in some detail. *Sideroxylon inerme* is highly likely to occur on site and may be present in relatively large numbers in the woodland in the drainage lines. Due to the potentially large number of individuals that are likely to be affected, the impact could be of medium significance. A permit would need to be obtained for any protected trees that are affected, so a legal obligation remains irrespective of the significance of the impact.

Impact 5: Impacts on indigenous natural vegetation (terrestrial)

Construction of infrastructure may lead to direct loss of vegetation. This will lead to localised or more extensive reduction in the overall extent of fynbos vegetation. Where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Consequences of the impact occurring may include:

1. negative change in conservation status of habitat (Driver et al. 2005);
2. increased vulnerability of remaining portions to future disturbance;
3. general loss of habitat for sensitive species;
4. loss in variation within sensitive habitats due to loss of portions of it;
5. general reduction in biodiversity;
6. increased fragmentation (depending on location of impact);
7. disturbance to processes maintaining biodiversity and ecosystem goods and services; and
8. loss of ecosystem goods and services.

The remaining natural vegetation on site is classified as Endangered, Vulnerable or Least Threatened. The site also falls within the Cape Floristic Region and affects areas classified as important corridors or habitats in the ECBCP.

Extent: The impact will occur at the site of the proposed WEF, but will have an impact at a more regional level, since it potentially affects areas classified regionally as having high conservation value (i.e. Cape Floristic Region and a CBA2 and CBA1 of the ECBCP). The construction of wind turbines and associated infrastructure will possibly affect a significant proportion of natural vegetation on site, depending on the location of the infrastructure. Large parts of the site are transformed by agriculture and infrastructure placed within theses areas will not have an impact on indigenous natural vegetation.

Potential significance: The proportion of the site containing vegetation in a moderate to good condition needs to be established before this impact can be properly assessed. If indigenous natural vegetation is significantly adversely affected, the potential significance of this impact could potentially be of high significance at a local (site) or regional scale.

Impact 6: Impacts on wetlands

Construction may lead to some direct or indirect loss of or damage to seasonal marsh wetlands or drainage lines or impacts that affect the catchment of these wetlands. This will lead to localised loss of wetland habitat and may lead to downstream impacts that affect a greater extent of wetlands or impact on wetland function. Where these habitats are already

stressed due to degradation and transformation, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Physical alteration to wetlands can have an impact on the functioning of those wetlands. Consequences may include:

1. increased loss of soil;
2. loss of or disturbance to indigenous wetland vegetation;
3. loss of sensitive wetland habitats;
4. loss or disturbance to individuals of rare, endangered, endemic and/or protected species that occur in wetlands;
5. fragmentation of sensitive habitats;
6. impairment of wetland function;
7. change in channel morphology in downstream wetlands, potentially leading to further loss of wetland vegetation; and
8. reduction in water quality in wetlands downstream of road.

The site contains a number of streams and drainage lines in which wetlands occur. More importantly, one of the major wetland systems on site constitutes part of the catchment for two estuaries on the coast down stream of the site (the Tsitsikamma and Krom River estuaries).

Extent: The impact will occur at the site of the proposed WEF, but could have downstream impacts. The extent of the potential impact is therefore on the site and surroundings.

Potential significance: The potential significance of this impact may be moderate to high due to the sensitivity of wetlands to disturbance thus leading to impacts of potentially high magnitude. An understanding of the location of wetlands on the site could ensure that mitigation measures could be put in place to avoid or reduce the potential impact to a low significance or to position infrastructure where it would not impact on these systems. There is a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource.

Impact 7: Change in runoff and drainage patterns

Infrastructure and roads crossing landscapes cause local hydrological and erosion effects resulting in major peak-flow and sediment impacts (Forman & Alexander 1998). This may occur around construction sites, but also in areas where the infiltration rates of the landscape are changed due to an impermeable surface being constructed. Increased runoff associated with infrastructure may increase the rates and extent of erosion, reduce percolation and aquifer recharge rates, alter channel morphology and increase stream discharge rates. Consequences may include:

1. increased loss of soil;
2. loss of or disturbance to indigenous vegetation, especially in wetlands;
3. loss of sensitive habitats, especially in wetlands;
4. loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
5. fragmentation of sensitive habitats;
6. impairment of wetland function;
7. change in channel morphology in downstream wetlands, potentially leading to loss of wetland vegetation; and
8. reduction in water quality in wetlands downstream of road.

There are both steep slopes and wetlands potentially occurring on site and an estuary occurring downstream.

Extent: The impact will occur at the site of the proposed WEF, but may also affect downstream and down-slope areas. The potential impact may therefore occur at a scale of the site and surrounding areas.

Potential significance: The potential significance of this impact depends almost entirely on ecological processes and patterns that may be affected, should this impact take place. The potential significance therefore depends on a better understanding of the ecology of the site. The impact could potentially be of moderate to high significance, if the sensitivity of the affected systems that could be affected is taken into account.

Impact 8: Establishment and spread of declared weeds and alien invader plants

Major factors contributing to invasion by alien invader plants includes high disturbance. Exotic species are often more prominent near infrastructural disturbances than further away (Gelbard & Belnap 2003, Watkins *et al*. 2003). Consequences of this may include:

1. loss of indigenous vegetation;
2. change in vegetation structure leading to change in various habitat characteristics;
3. change in plant species composition;
4. change in soil chemical properties;
5. loss of sensitive habitats;
6. loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
7. fragmentation of sensitive habitats;
8. change in flammability of vegetation, depending on alien species;
9. hydrological impacts due to increased transpiration and runoff; and
10. impairment of wetland function.

It is not known what alien plants occur on site. A checklist of species previously recorded in the grid in which the site is located indicates that the following species are likely to invade the site, given the right conditions: *Acacia cyclops*, *Acacia saligna*, *Acacia mearnsii*, *Datura stramonium*, *Hakea sericea* and *Pinus pinaster*. The potential therefore exists for extensive and diverse invasion of the site. The habitats most likely to be affected are watercourses, strandveld and fynbos.

Extent: The impact will occur at the site of the proposed WEF, but could potentially spread extensively into the surrounding landscape, depending on the habitat and the alien species that could potentially invade the site. The impact will therefore be evaluated at a scale of site and surroundings or regional.

Potential significance: There is a moderate likelihood that alien species will spread on site in the absence of control measures. It is likely to be a long-term impact with potentially high magnitude of impact on local ecosystems. The impact could therefore potentially be of moderate to high significance. Standard control measures, if put in place, would adequately control this impact and reduce the significance to low.

DISCUSSION AND CONCLUSIONS

There are four vegetation type that occurs on site, namely *Tsitsikamma Sandstone Fynbos* (classified as Vulnerable), *Southern Cape Dune Fynbos* (classified as Least Threatened), *Eastern Coastal Shale Band Vegetation* (classified as Endangered), *Garden Route Shale Fynbos* (classified as Endangered), Humansdorp Shale Renosterveld (classified as Endangered), Algoa Dune Strandveld (classified as Least Threatened, but protected under national legislation) and Cape Seashore Vegetation (classified as Least Threatened, but protected under national legislation). The vegetation on site has been classified at a Provincial level, through the Eastern Cape Biodiversity Conservation Plan (ECBCP), as having elevated conservation value. Some parts of the site are considered to have higher conservation value than others. The area is also within the Cape Floristic Region, one of the earth's 25 hotspots.

Other factors that may lead to parts of the study area having high ecological sensitivity are the potential presence of wetlands within the drainage lines on site, potential presence of erodable substrates, the potential presence of various plant and animal species of conservation concern, and protected trees. The actual presence of these features on site will have to be determined during detailed field surveys to be undertaken during the EIA phase of the project.

Drainage lines (wetlands) represent particularly vital natural corridors as they function both as wildlife habitat, providing resources needed for survival, reproduction and movement, and as biological corridors, providing for movement between habitat patches. Both functions are potentially critical to conservation of biological diversity as the landscape becomes increasingly fragmented into smaller, more isolated patches (Rosenberg *et al.*, 1997).

The drainage lines on site drain into two main systems that lead to the sea via the Klipdrif and Tsitsikamma Rivers. The site constitutes part of the catchment for these rivers. The mouths of the rivers have an estuary, which is considered to be very sensitive and is shown as having high conservation value and sensitivity in the ECBCP. The potential impacts of activities on site on these river systems need to be carefully managed. It is especially important that the estuaries are not affected by activities on site.

There are eight tree species that are protected under the National Forests Act that have a geographic distribution that includes this area (*Curtisia dentata, Ocotea bullata, Pittosporum viridiflorum, Podocarpus falcatus, Podocarpus latifolius*, *Prunus africana and Sideroxylon inerme* subsp. *inerme*) (Appendix 3), all of which have a moderate likelihood of occurring on site and one, *Sideroxylon inerme* (white milkwood), has a high likelihood of occurring on site. Any impacts on individuals of any of these species require a permit from the relevant National Department.

Parts of the site are still in natural condition or considered to be natural vegetation; while a large proportion of the site appears from aerial imagery to be transformed due to agriculture. The condition of the vegetation will be determined during detailed field surveys to be undertaken during the EIA phase of the project. Any degraded areas on site are likely to be classified as having low sensitivity and conservation value, although few such areas could be discerned from aerial photography, and largely correlate with cultivated areas on the site.

There are fifteen plant species of conservation concern that could occur in available habitats in the study area. This includes one species classified as Critically Endangered, two species classified as Endangered, eight as Vulnerable and four as Near Threatened. This is a critical ecological concern on this site. The area of dunes in the southern part of the site appears to be

key habitat for many of these species, although there are some species that may occur in other localities on site.

There are five animal species of conservation concern that may occur in habitats within the study area or that may be affected by the proposed WEF. This includes one species classified as Vulnerable (VU) and four as Near Threatened. The suitability of habitats for these species will have to be confirmed during the field survey of the site during the EIA. Preliminary habitat requirements are provided in the appendices to this report. The area of dunes in the southern part of the site appears to be key habitat for many of these species.

A risk assessment was undertaken which identified eight main potential impacts on the ecological receiving environment. The significance of these impacts will be assessed during the EIA phase after collection of relevant field data. The identified potential negative impacts are the following (with potential significance without mitigation measures given in brackets):

1. Impacts on bats (MEDIUM to HIGH).
2. Impacts on threatened animals (HIGH).
3. Impacts on threatened plants (VERY HIGH).
4. Impacts on protected tree species (MEDIUM).
5. Impacts on indigenous natural vegetation (HIGH).
6. Impacts on wetlands and estuary (HIGH).
7. Change in runoff and drainage patterns (MEDIUM to HIGH).
8. Establishment and spread of declared weeds and alien invader plants (HIGH).

Summary of proposed EIA methodology

The following assessments will be done during the EIA phase in order to properly assess potential impacts on the ecological receiving environment by the proposed WEF:

- The presence and distribution of wetlands and drainage lines on site will be confirmed. This will be done primarily using aerial photograph interpretation, but will be confirmed in the field using topographic and floristic indicators.
- Searches will be undertaken in the thicket in the drainage lines to determine whether any protected trees occur on site or not. The species that is likely to occur on site is *Sideroxylon inerme*, but other species may also occur.
- The presence of species of concern will be evaluated during the EIA phase. This will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. The lists provided in this Scoping Report will form the basis for those assessments and surveys. Particular attention will be paid to those species classified as threatened (VU, EN or CR) or Critically Rare, including ten plant species (*Osteospermum pterigoideum*, *Erica glandulosa* subsp. *fourcadei*, *Erica glumiflora*, *Erica humansdorpensis*, *Erica zeyheriana*, *Bobartia macrocarpa*, *Disa lugens* var. *lugens*, *Rapanea gilliana*, *Satyrium princeps*, *Pentaschistis longipes* and *Selago rotundifolia*) and one animal species, Duthie's Golden Mole. There are also a number of plant and animal species classified as Near Threatened that could occur on site, including the plants, *Curtisia dentata*, *Pauridia minuta*, *Psoralea repens* and *Protea coronata*, and the animals, the Brown Hyaena, the Natal Long-fingered Bat, the Fynbos Golden mole and the Yellow-bellied House Snake.

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Appendix 1: Plant species of conservation importance that have historically been recorded in the study area.

*IUCN (3.1) Categories:
VU = Vulnerable
EN = Endangered
CR = Critically Endangered
NT = Near Threatened

Table A: Threatened, Near Threatened and Declining plant species that have been previously recorded in the study area

Taxon	Habitat	Global IUCN (3.1) category*	Likelihood of occurrence
Bobartia macrocarpa	Flat open grassy patches, Kareedouw to Grahamstown. Previously recorded at Kruisfontein on road verge near Kromhout Farm near Oyster Bay. 34° 07'S, 24° 37'E. Cultivated land, grazed, disturbed. Grassy Fynbos. Remnant on road verge, very little habitat left.	VU	**HIGH**, previously recorded just to east of site in similar habitat as that found on site.
Curtisia dentata	At a range of altitudes in evergreen forest, on grassy mountain slopes and as a small bushy tree in coastal scrub forest.	NT	**HIGH**, geographical distribution includes study area. Suitable habitat may occur on site.
Dioscorea elephantipes	Rocky (quartzites and shales) east facing hillsides. In this region it is found in the Gamtoos River valley. In wooded kloof, Duineveld, Slang River. (1877)	Declining	**LOW**
Disa lugens var. lugens	Found in acidic as well as alkaline sands. Sea level to 1450 m. Found on coastal lowlands as well as mountain slopes and plateaus. Cape Peninsula to Cathcart, mountains and coast. Previously found near Oyster Bay in the vicinity of White Point.	EN	**HIGH**, previously recorded from Oyster Bay in dune habitat that is found in southern part of site.
Erica glumiflora	Stabilised sand dunes, often on calcrete (limestone) near coast. Wilderness to East London.	VU	**HIGH**, previously recorded at Klipdrift
Erica zeyheriana	Remnant lowland grassy fynbos on sand, Oyster Bay to Port Elizabeth. Previously recorded at: • Slang Rivier, duine veld • West of Oyster bay, north of Beacon 97. Deep acid soil. Hump in ploughed fields. Locally abundant. • W of Oyster Bay, NW of Beacon 97. Fixed dunes, deep acid sand, short fynbos on S side. • Dunes west of Oyster Bay. Klippe Drift 722. Low ridge SSW of	VU	**HIGH**, previously recorded near to site in similar habitat as found on site

Taxon	Habitat	Global IUCN (3.1) category*	Likelihood of occurrence
	farmstead. S 34°08.753' x E 24°34.035'.		
Erica glandulosa subsp. fourcadei	Humansdorp to Mossel Bay, on coastal forelands and low mountain slopes. Coastal dunes and sandy soils, coastal cliffs and shallow soils on TMS. In study area, found on peaty sandy flats with short fynbos.	VU	**HIGH**, previously recorded near Humansdorp at Kromrivier in habitat similar to that found in the southern part of the site. Found in both grids in which study area is located.
Erica humansdorpensis	Humansdorp. 8km W of Humansdorp turnoff from the N2 and at Clarkson. Appears to occur on low mountain slopes and footslopes on coastal side of Tsitsikamma range.	CR	**MEDIUM**, could occur in area near N2 in northern part of study area.
Eulophia speciosa	Coastal areas from Sedgefield in the Western Cape to KZN north coast and inland from KZN onto the Highveld. In area that includes study area, found on coastal sands.	Declining	**HIGH**, suitable habitat in dune area in south of site.
Gasteria nitida var. armstrongii	Coastal renosterveld of lower Gamtoos valley. Old river bed.	CR	**LOW**, previously recorded 10 km W of Gamtoos River.
Leucadendron conicum	Coastal mountain ranges from Van Stadens Mountain near Port Elizabeth to Langeberg inland of Albertinia.	NT	**LOW**
Osteospermum pterigoideum	Low sandstone slopes near Humansdorp.	EN	**HIGH**, previously recorded 18 miles W of Humansdorp, which is approximately the northern parts of the site.
Pauridia minuta	Langebaan to Riversdale. Previously recorded at: • N of Mpofu Dam & W of road from Humansdorp to the dam wall, situated close to the entrance gate to the dam property. DWAF property • 34°05'03.6" S; 24°41'31.0" E • 11 MI. W. OF HUMANSDORP	NT	**MEDIUM**, previously recorded to east of site in habitat that may be similar to that found on site
Pentaschistis longipes	Restricted to stabilized sand dunes around Humansdorp, usually near trees. Previously found at Brakkeduine near Oyster Bay. 34º10'16"S 24º39'46"E	VU	**HIGH**, previously recorded from Oyster Bay in dune habitat that is the same as that found in the extreme southern part of site.
Protea coronata	Cape Peninsula to Kouga centres of endemism. A variety of habitats, but especially Shale and Granite Fynbos in moist, south-facing situations. WITTE ELS BOSCH	NT	**MEDIUM**, suitable habitat may occur on site.
Psoralea repens	Eastern and Western Cape coastal areas from Saldanha Bay on the Atlantic coast to Alexandria east of Port Elizabeth. Coastal dunes.	NT	**HIGH**, suitable habitat occurs in southern part of site.
Rapanea gilliana	From Kliprivier Mouth, or Slangbaai, (just west of Cape St Francis) to Port Alfred. Coastal sand dunes.	EN	**HIGH**, previously recorded from Slangbaai in dune habitat that is found in southern part of site.

Taxon	Habitat	Global IUCN (3.1) category*	Likelihood of occurrence
	Duineveld scrub on coast. Slangbaai.		
Satyrium princeps	Restricted coastal distribution between Wilderness in the southern Cape to Port Alfred in the Eastern Cape, seldom above altitudes of 150 m. Amongst bushes in open places on fixed dunes close to the shoreline. Previously found at Klipdrift. 34º7'52"S 24º33'27"E	VU	**HIGH**, previously recorded 5 km east of site in dune habitat similar to that found in the southern part of the site.
Selago rotundifolia	Knysna to Port Elizabeth, grassy fynbos flats and possibly also forest margins. Previously found near Klipdrift.	VU	**MEDIUM**, previously recorded from Klipdrift and suitable habitat may occur in southern part of site.

* Conservation Status Category assessment according to IUCN Ver. 3.1 (IUCN, 2001), as evaluated by the Threatened Species Programme of the South African National Biodiversity Institute in Pretoria

Appendix 2: Vertebrate species 0f conservation concern with a geographical distribution that includes the current study area.
(included are species previously listed, but currently considered to be Least Concern)

MAMMALS

Common name	Order/ Family	Taxon	Habitat[1]	Status[2]	Likelihood of occurrence
ARTIODACTYLA / PERISSODACTYLA					
Oribi	Artiodactyla / Bovidae	*Ourebia ourebi*	Open grasslands with gentle topography at lower altitudes. Mosaic of tall and short grasses required to meet resting and feeding requirements.	LC, (was EN)	**LOW**, previously recorded in grid to east, but no suitable habitat on site
Blue duiker	Artiodactyla / Bovidae	*Philantomba monticola*	Coastal and afromontane forests as well as coastal thickets, selective forager in litter and fruits	LC, (was VU)	**HIGH**, previously recorded in grid to east and north-west
CARNIVORA					
Brown hyena	Carnivora / Hyaenidae	*Hyaena brunnea*	Savanna, urban areas, scavenger	NT	**MEDIUM**, previously recorded in grid to north.
Honey badger	Carnivora / Mustelidae	*Mellivora capensis*	Wide variety of habitats. Probably only in natural habitats.	LC, (was NT)	**HIGH**, previously recorded in grid & neighbouring grids
African weasel	Carnivora / Mustelidae	*Poecilogale albinucha*	Moist grassland or woodland with more than 700 mm rainfall per year and where flourishing populations of small rodents occur. Grassland, scrub woodland. The distribution range of this animal covers the west coast of South Africa from Garies southward into the western Cape coastal belt, east and north-east Northern Cape, and all other provinces	LC, (was DD)	**MEDIUM**, not previously recorded in grids, but overall geographical distribution includes this area.
CHIROPTERA					
Lesser woolly bat	Chiroptera / Vespertilionidae	*Kerivoula lanosa*	Afromontane and riparian forest. Insectivore.	LC, (was NT)	**MEDIUM**, not previously recorded in grid, but overall geographical distribution includes this area.
Lesser long-fingered bat	Chiroptera / Vespertilionidae	*Miniopterus fraterculus*	Savanna, shrubland Afromontane and coastal forest. Cave-dwelling aerial insectivore	LC, (was NT)	**HIGH**, not previously recorded in grid, but overall geographical distribution includes this area.
Natal long-fingered bat	Chiroptera / Vespertilionidae	*Miniopterus natalensis*	Caves and sub-terranean habitats in Fynbos, savanna, woodland, succulent and Nama Karoo, grassland; cave-dwelling aerial insectivore.	NT	**HIGH**, previously recorded in neighbouring grid to north.
Temminck's hairy bat	Chiroptera / Vespertilionidae	*Myotis tricolor*	Caves in forests, shrubland, savanna, grassland, mountains; cave-dwelling aerial insectivore.	LC, (was NT)	**MEDIUM**, site within distribution range, but no

Common name	Order/ Family	Taxon	Habitat[1]	Status[2]	Likelihood of occurrence
					records in grid or neighbouring grids.
Cape horseshoe bat	Chiroptera / Rhinolophidae	*Rhinolophus capensis*	Caves and subterranean habitats; fynbos, shrubland and Nama-karoo in western and south-western parts of South Africa	LC, (was NT)	**HIGH**, previously recorded in grid
Geoffroy's horseshoe bat	Chiroptera / Rhinolophidae	*Rhinolophus clivosus*	Caves and subterranean habitats; fynbos, shrubland, grassland, succulent and Nama-karoo; insectivore	LC, (was NT)	**MEDIUM**, not previously recorded in grid, but overall geographical distribution includes this site & recorded in grid to north.
INSECTIVORA					
Fynbos golden mole	Insectivora / Chrysochloridae	*Amblysomus corriae*	Lowland fynbos and Knysna forest, also in urban areas. Prefers sandy soils with deep litter layer.	NT	**HIGH**, recorded in grid, substrate properties on site suitable for this species.
Hottentott's Golden Mole	Insectivora / Chrysochloridae	*Amblysomus hottentotus*	Subterranean habitats; mainly Eastern Cape and KwaZulu-Natal; savanna, grassland and fynbos.	LC, (was DD)	**LOW**, just outside western edge of distribution, previously recorded in nearby grid (to east)
Duthie's Golden Mole	Insectivora / Chrysochloridae	*Chlorotalpa duthieae*	Alluvial sand and sandy loam	VU (was LC)	**HIGH**, previously recorded in grid and neighbouring grid to west and east, substrate properties on site suitable for this species.
Reddish-grey musk shrew	Insectivora / Soricidae	*Crocidura cyanea*	Wide variety of habitats. Nocturnal, terrestrial.	LC, (was DD)	**MEDIUM**, not previously recorded in grids, but overall geographical distribution includes this area.
Greater musk shrew	Insectivora / Soricidae	*Crocidura flavescens*	Wide variety of habitats, but favours some cover. Also urban areas, disturbed areas.	LC, (was DD)	**MEDIUM**, previously recorded in neighbouring grid.
Forest shrew	Insectivora / Soricidae	*Myosorex varius*	Wide variety of vegetation types, usually primary. Terrestrial habitats adjacent to wetlands; forest	LC, (was DD)	**MEDIUM**, previously recorded in neighbouring grid.
Least dwarf shrew	Insectivora / Soricidae	*Suncus infinitesimus*	Terrestrial, nocturnal	LC, (was DD)	**MEDIUM**, previously recorded in neighbouring grid.
Woodland mouse	Insectivora / Soricidae	*Grammomys dolichurus*	Riverine forest, thickets and woodland, terrestrial,	LC, (was DD)	**MEDIUM**, not previously

Common name	Order/ Family	Taxon	Habitat[1]	Status[2]	Likelihood of occurrence
			arboreal		recorded in grids, but overall geographical distribution includes this area.

[1]Distribution according to Friedmann & Daly 2004.
[2]Status according to IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3. (www.iucnredlist.org). Downloaded on 09 November 2010.

AMPHIBIANS

Common name	Species	Habitat	Status[2]	Likelihood of occurrence
Eastern Leopard Toad	*Amietophrynus pardalis*	Thornveld and open savanna in the Eastern Cape. Breed in open water and forage some distance from the water.	Declining	**LOW**, within distribution range, but habitats on site not suitable.

[2]Status according to du Preez & Carruthers 2009.

REPTILES

Common name	Species	Habitat[3]	Status	Likelihood of occurrence
Elandsberg Dwarf Chameleon	*Bradypodion taeniabronchum*	Montane fynbos.	CR	**LOW**, within distribution range, but habitats on site not suitable.
Peringey's Coastal Leaf-toed Gecko	*Craptactites peringueyi*	Livs among clumps of salt marsh vegetation, known from the lower reaches of the Kromme River and Chelsea Point near Port Elizabeth.	DD	**LOW**, within distribution range, but habitats on site not suitable.
Spotted rock snake	*Lamprophis guttatus*	Rocky habitats under exfoliating rock flakes and in narrow rock crevices. Found in fynbos, karoo scrub, grassland, moist savanna and lowland forest.	Rare[3]	**MEDIUM**, within overall distribution range and habitats may be available on site in restricted areas.
Yellowbellied house snake	*Lamprophis fuscus*	Old termitaria and under stones, underground. Found throughout more mesic parts of South Africa (Cape, east coast, Highveld).	NT[4]	**MEDIUM**, previously recorded in neighbouring grid, within overall distribution range and habitats may be available on site.

[3]Status according to Branch 1988.
[4]Status according to IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3. (www.iucnredlist.org). Downloaded on 09 November 2010.

Appendix 3: List of protected tree species (National Forests Act).

Acacia erioloba	*Acacia haematoxylon*
Adansonia digitata	*Afzelia quanzensis*
Balanites subsp. *maughamii*	*Barringtonia racemosa*
Boscia albitrunca	*Brachystegia spiciformis*
Breonadia salicina	*Bruguiera gymnhorrhiza*
Cassipourea swaziensis	*Catha edulis*
Ceriops tagal	*Cleistanthus schlectheri* var. *schlechteri*
Colubrina nicholsonii	*Combretum imberbe*
Curtisia dentata	*Elaedendron transvaalensis*
Erythrophysa transvaalensis	*Euclea pseudebenus*
Ficus trichopoda	*Leucadendron argenteum*
Lumnitzera racemosa var. *racemosa*	*Lydenburgia abottii*
Lydenburgia cassinoides	*Mimusops caffra*
Newtonia hildebrandtii var. *hildebrandtii*	*Ocotea bullata*
Ozoroa namaquensis	*Philenoptera violacea* (*Lonchocarpus capassa*)
Pittosporum viridiflorum	*Podocarpus elongatus*
Podocarpus falcatus	*Podocarpus henkelii*
Podocarpus latifolius	*Protea comptonii*
Protea curvata	*Prunus africana*
Pterocarpus angolensis	*Rhizophora mucronata*
Sclerocarya birrea subsp. *caffra*	*Securidaca longependunculata*
Sideroxylon inerme subsp. *inerme*	*Tephrosia pondoensis*
Warburgia salutaris	*Widdringtonia cedarbergensis*
Widdringtonia schwarzii	

Curtisia dentata, Ocotea bullata, Pittosporum viridiflorum, Podocarpus falcatus, Podocarpus latifolius and Sideroxylon inerme subsp. *inerme* have a geographical distribution that coincides with the study area.

Appendix 4: Checklist of plant species recorded during previous botanical surveys in the quarter degree in which the study area is located and the immediately adjacent grid to the south.

Family	Species	Threat status
FABACEAE	Acacia longifolia (Andrews) Willd.	Exotic
FABACEAE	Acacia pycnantha Benth.	Exotic
FABACEAE	Acacia saligna (Labill.) H.L.Wendl.	Exotic
EUPHORBIACEAE	Acalypha capensis (L.f.) Prain & Hutch.	LC
POACEAE	Acroceras macrum Stapf	LC
ORCHIDACEAE	Acrolophia capensis (P.J.Bergius) Fourc.	LC
ORCHIDACEAE	Acrolophia micrantha (Lindl.) Pfitzer	LC
EUPHORBIACEAE	Adenocline pauciflora Turcz.	LC
PTERIDACEAE	Adiantum capillus-veneris L.	LC
AGAPANTHACEAE	Agapanthus praecox Willd. subsp. praecox	LC
RUTACEAE	Agathosma apiculata G.Mey.	LC
RUTACEAE	Agathosma cerefolium (Vent.) Bartl. & H.L.Wendl.	LC
RUTACEAE	Agathosma dielsiana Schltr. ex Dummer	LC
RUTACEAE	Agathosma hirta (Lam.) Bartl. & H.L.Wendl.	LC
RUTACEAE	Agathosma ovata (Thunb.) Pillans	LC
HYACINTHACEAE	Albuca nelsonii N.E.Br.	LC
OROBANCHACEAE	Alectra sessiliflora (Vahl) Kuntze var. sessiliflora	LC
APIACEAE	Alepidea capensis (P.J.Bergius) R.A.Dyer var. capensis	LC
FABACEAE	Amphithalea fourcadei Compton	LC
PRIMULACEAE	Anagallis arvensis L. subsp. arvensis	Exotic
BORAGINACEAE	Anchusa capensis Thunb.	LC
POACEAE	Andropogon eucomus Nees	LC
RUBIACEAE	Anthospermum aethiopicum L.	LC
RUBIACEAE	Anthospermum herbaceum L.f.	LC
RUBIACEAE	Anthospermum spathulatum Spreng. subsp. spathulatum	LC
RUBIACEAE	Anthospermum spathulatum Spreng. subsp. uitenhagense Puff	LC
ASTERACEAE	Arctotheca calendula (L.) Levyns	LC
ASTERACEAE	Arctotheca populifolia (P.J.Bergius) Norl.	LC
ASTERACEAE	Arctotis discolor (Less.) Beauverd	LC
FABACEAE	Argyrolobium tuberosum Eckl. & Zeyh.	LC
IRIDACEAE	Aristea bakeri Klatt	LC
IRIDACEAE	Aristea ensifolia J.Muir bis	LC
FABACEAE	Aspalathus angustifolia (Lam.) R.Dahlgren subsp. angustifolia	LC
FABACEAE	Aspalathus asparagoides L.f. subsp. rubro-fusca (Eckl. & Zeyh.) R.Dahlgren	LC
FABACEAE	Aspalathus biflora E.Mey. subsp. biflora	LC
FABACEAE	Aspalathus cerrhantha Eckl. & Zeyh.	LC
FABACEAE	Aspalathus chortophila Eckl. & Zeyh.	LC
FABACEAE	Aspalathus ciliaris L.	LC
FABACEAE	Aspalathus collina Eckl. & Zeyh. subsp. collina	LC
FABACEAE	Aspalathus hispida Thunb. subsp. hispida	LC
FABACEAE	Aspalathus kougaensis (Garab. ex R.Dahlgren) R.Dahlgren	LC

Family	Species	Threat status
FABACEAE	Aspalathus rubens Thunb.	LC
FABACEAE	Aspalathus setacea Eckl. & Zeyh.	LC
FABACEAE	Aspalathus spicata Thunb.	LC
FABACEAE	Aspalathus spinosa L. subsp. spinosa	LC
FABACEAE	Aspalathus subtingens Eckl. & Zeyh.	LC
FABACEAE	Aspalathus tenuissima R.Dahlgren	LC
FABACEAE	Aspalathus teres Eckl. & Zeyh. subsp. teres	LC
FABACEAE	Aspalathus teres Eckl. & Zeyh. subsp. thodei R.Dahlgren	LC
ASPARAGACEAE	Asparagus scandens Thunb.	LC
ASPLENIACEAE	Asplenium adiantum-nigrum L. var. solidum (Kunze) J.P.Roux	LC
ASPLENIACEAE	Asplenium aethiopicum (Burm.f.) Bech.	LC
ASPLENIACEAE	Asplenium capense (Kunze) Bir, Fraser-Jenk. & Lovis	Exotic
ASPLENIACEAE	Asplenium lunulatum Sw.	LC
ASPLENIACEAE	Asplenium rutifolium (P.J.Bergius) Kunze	LC
APOCYNACEAE	Astephanus zeyheri Turcz.	LC
ASTERACEAE	Aster bakerianus Burtt Davy ex C.A.Sm.	LC
ASTERACEAE	Athanasia dentata (L.) L.	LC
ASTERACEAE	Athanasia linifolia Burm.	LC
ASTERACEAE	Athanasia trifurcata (L.) L.	LC
ASTERACEAE	Athrixia heterophylla (Thunb.) Less. subsp. sessilifolia (DC.) Kroner	LC
POACEAE	Avena fatua L.	Exotic
POACEAE	Avena sativa L.	Exotic
IRIDACEAE	Babiana patersoniae L.Bolus	LC
BRUNIACEAE	Berzelia abrotanoides (L.) Brongn.	LC
BRUNIACEAE	Berzelia intermedia (D.Dietr.) Schltdl.	LC
IRIDACEAE	Bobartia macrocarpa Strid	VU
IRIDACEAE	Bobartia macrospatha Baker subsp. macrospatha	LC
IRIDACEAE	Bobartia orientalis J.B.Gillett subsp. orientalis	LC
ASTERACEAE	Brachylaena glabra (L.f.) Druce	LC
POACEAE	Brachypodium flexum Nees	LC
POACEAE	Bromus catharticus Vahl	Exotic
BRUNIACEAE	Brunia noduliflora Goldblatt & J.C.Manning	LC
AMARYLLIDACEAE	Brunsvigia striata (Jacq.) Aiton	LC
BUDDLEJACEAE	Buddleja salviifolia (L.) Lam.	LC
ASPHODELACEAE	Bulbine frutescens (L.) Willd.	LC
RUBIACEAE	Burchellia bubalina (L.f.) Sims	Exotic
HEMEROCALLIDACEAE	Caesia contorta (L.f.) T.Durand & Schinz	LC
RESTIONACEAE	Cannomois scirpoides (Kunth) Mast.	LC
RESTIONACEAE	Cannomois virgata (Rottb.) Steud.	LC
RUBIACEAE	Canthium inerme (L.f.) Kuntze	LC
RUBIACEAE	Canthium spinosum (Klotzsch) Kuntze	LC
BRASSICACEAE	Cardamine africana L.	LC
APOCYNACEAE	Carissa macrocarpa (Eckl.) A.DC.	LC
RUBIACEAE	Carpacoce spermacocea (Rchb.f.) Sond. subsp. spermacocea	LC
CELASTRACEAE	Cassine parvifolia Sond.	LC

Family	Species	Threat status
CELASTRACEAE	Cassine schinoides (Spreng.) R.H.Archer	LC
APIACEAE	Centella asiatica (L.) Urb.	LC
APIACEAE	Centella eriantha (Rich.) Drude var. orientalis Adamson	LC
APIACEAE	Centella virgata (L.f.) Drude var. virgata	LC
DIPSACACEAE	Cephalaria humilis (Thunb.) Roem. & Schult.	LC
CARYOPHYLLACEAE	Cerastium capense Sond.	LC
ORCHIDACEAE	Ceratandra grandiflora Lindl.	LC
SOLANACEAE	Cestrum laevigatum Schltdl.	Exotic
SCROPHULARIACEAE	Chaenostoma cordatum (Thunb.) Benth.	LC
SCROPHULARIACEAE	Chaenostoma polyanthum Benth.	LC
ACANTHACEAE	Chaetacanthus setiger (Pers.) Lindl.	LC
IRIDACEAE	Chasmanthe aethiopica (L.) N.E.Br.	LC
SINOPTERIDACEAE	Cheilanthes capensis (Thunb.) Sw.	LC
GENTIANACEAE	Chironia baccifera L.	LC
GENTIANACEAE	Chironia melampyrifolia Lam.	LC
GENTIANACEAE	Chironia peduncularis Lindl.	LC
ANTHERICACEAE	Chlorophytum comosum (Thunb.) Jacques	LC
ASTERACEAE	Chrysanthemoides monilifera (L.) Norl. subsp. pisifera (L.) Norl.	LC
ROSACEAE	Cliffortia burchellii Stapf	LC
ROSACEAE	Cliffortia ferruginea L.f.	LC
ROSACEAE	Cliffortia graminea L.f. var. graminea	LC
ROSACEAE	Cliffortia ilicifolia L. var. ilicifolia	LC
ROSACEAE	Cliffortia linearifolia Eckl. & Zeyh.	LC
ROSACEAE	Cliffortia odorata L.f.	LC
ROSACEAE	Cliffortia ramosissima Schltr.	LC
ROSACEAE	Cliffortia serpyllifolia Cham. & Schltdl.	LC
ROSACEAE	Cliffortia stricta Weim.	LC
EUPHORBIACEAE	Clutia affinis Sond.	LC
RUTACEAE	Coleonema pulchellum I.Williams	LC
MESEMBRYANTHEMACEAE	Conicosia pugioniformis (L.) N.E.Br. subsp. muiri (N.E.Br.) Ihlenf. & Gerbaulet	LC
ASTERACEAE	Conyza bonariensis (L.) Cronquist	Exotic
ASTERACEAE	Corymbium africanum L. subsp. africanum	LC
ASTERACEAE	Cotula coronopifolia L.	LC
ASTERACEAE	Cotula sericea L.f.	LC
ASTERACEAE	Cotula turbinata L.	LC
CRASSULACEAE	Crassula ericoides Haw. subsp. ericoides	LC
CRASSULACEAE	Crassula expansa Dryand. subsp. filicaulis (Haw.) Toelken	LC
CRASSULACEAE	Crassula pellucida L. subsp. marginalis (Dryand. in Aiton) Toelken	LC
CRASSULACEAE	Crassula pellucida L. subsp. pellucida	LC
CRASSULACEAE	Crassula rubricaulis Eckl. & Zeyh.	LC
CRASSULACEAE	Crassula spathulata Thunb.	LC
ASTERACEAE	Cullumia decurrens Less.	LC
ASTERACEAE	Cullumia setosa (L.) R.Br. var. setosa	LC
CUNONIACEAE	Cunonia capensis L.	LC

Family	Species	Threat status
CORNACEAE	Curtisia dentata (Burm.f.) C.A.Sm.	NT
ARALIACEAE	Cussonia spicata Thunb.	LC
ARALIACEAE	Cussonia thyrsiflora Thunb.	LC
CYPERACEAE	Cyperus congestus Vahl	LC
CYPERACEAE	Cyperus laevigatus L.	LC
CYPERACEAE	Cyperus sphaerospermus Schrad.	LC
CYPERACEAE	Cyperus textilis Thunb.	LC
CYPERACEAE	Cyperus thunbergii Vahl	LC
AMARYLLIDACEAE	Cyrtanthus clavatus (L'Hér.) R.A.Dyer	DDT
AMARYLLIDACEAE	Cyrtanthus loddigesianus (Herb.) R.A.Dyer	LC
APIACEAE	Dasispermum suffruticosum (P.J.Bergius) B.L.Burtt	LC
ACANTHACEAE	Dicliptera extenta S.Moore	LC
IRIDACEAE	Dierama pendulum (L.f.) Baker	LC
DIOSCOREACEAE	Dioscorea elephantipes (L'Hér.) Engl.	Declining
RUTACEAE	Diosma hirsuta L.	LC
FABACEAE	Dipogon lignosus (L.) Verdc.	LC
ORCHIDACEAE	Disa chrysostachya Sw.	LC
ORCHIDACEAE	Disa lugens Bolus var. lugens	EN
ORCHIDACEAE	Disa racemosa L.f.	LC
FUMARIACEAE	Discocapnos mundii Cham. & Schltdl. subsp. mundii	LC
ASTERACEAE	Disparago tortilis (DC.) Sch.Bip.	Exotic
SALICACEAE	Dovyalis rotundifolia (Thunb.) Thunb. & Harv.	LC
MESEMBRYANTHEMACEAE	Drosanthemum candens (Haw.) Schwantes	LC
DROSERACEAE	Drosera aliciae Raym.-Hamet	LC
DROSERACEAE	Drosera cistiflora L.	LC
POACEAE	Ehrharta calycina Sm.	LC
POACEAE	Ehrharta rupestris Nees ex Trin. subsp. tricostata (Stapf) Gibbs Russ.	LC
POACEAE	Ehrharta villosa J.H.Schult. var. maxima Stapf	LC
RESTIONACEAE	Elegia asperiflora (Nees) Kunth	LC
RESTIONACEAE	Elegia fistulosa Kunth	LC
RESTIONACEAE	Elegia thyrsifera (Rottb.) Pers.	LC
POACEAE	Elionurus muticus (Spreng.) Kunth	LC
RUTACEAE	Empleurum unicapsulare (L.f.) Skeels	LC
ONAGRACEAE	Epilobium hirsutum L.	LC
CYPERACEAE	Epischoenus quadrangularis (Boeck.) C.B.Clarke	LC
POACEAE	Eragrostis capensis (Thunb.) Trin.	LC
POACEAE	Eragrostis chloromelas Steud.	LC
POACEAE	Eragrostis curvula (Schrad.) Nees	LC
ERICACEAE	Erica adaequata Tausch	DDT
ERICACEAE	Erica articularis L. var. articularis	LC
ERICACEAE	Erica caffra L. var. caffra	LC
ERICACEAE	Erica canaliculata Andrews	LC
ERICACEAE	Erica cerinthoides L. var. cerinthoides	LC
ERICACEAE	Erica chamissonis Klotzsch ex Benth. var. chamissonis	LC

Family	Species	Threat status
ERICACEAE	Erica chloroloma Lindl.	LC
ERICACEAE	Erica condensata Benth. var. condensata	LC
ERICACEAE	Erica copiosa J.C.Wendl. var. copiosa	LC
ERICACEAE	Erica cordata Andrews var. arachnoidea (Klotzsch) Dulfer	DDT
ERICACEAE	Erica cubica L. var. cubica	LC
ERICACEAE	Erica curviflora L.	LC
ERICACEAE	Erica curviflora L. var. curviflora	Exotic
ERICACEAE	Erica densifolia Willd.	LC
ERICACEAE	Erica diaphana Spreng.	LC
ERICACEAE	Erica discolor Andrews var. discolor	LC
ERICACEAE	Erica fuscescens (Klotzsch) E.G.H.Oliv.	LC
ERICACEAE	Erica glandulosa Thunb. subsp. fourcadei (L.Bolus) E.G.H.Oliv. & I.M.Oliv.	VU
ERICACEAE	Erica glandulosa Thunb. subsp. glandulosa	LC
ERICACEAE	Erica glumiflora Klotzsch ex Benth.	VU
ERICACEAE	Erica gracilis J.C.Wendl.	LC
ERICACEAE	Erica hispidula L. var. hispidula	LC
ERICACEAE	Erica humansdorpensis Compton	CR
ERICACEAE	Erica inconstans Zahlbr.	VU
ERICACEAE	Erica lanata Andrews	LC
ERICACEAE	Erica leucopelta Tausch var. leucopelta	LC
ERICACEAE	Erica maesta Bolus var. maesta	LC
ERICACEAE	Erica mauritanica L.	LC
ERICACEAE	Erica nabea Guthrie & Bolus	LC
ERICACEAE	Erica nemorosa Klotzsch ex Benth.	LC
ERICACEAE	Erica nutans J.C.Wendl.	LC
ERICACEAE	Erica opulenta (J.C.Wendl. ex Klotzsch) Benth.	LC
ERICACEAE	Erica pectinifolia Salisb. var. pectinifolia	LC
ERICACEAE	Erica peltata Andrews	LC
ERICACEAE	Erica petraea Benth.	LC
ERICACEAE	Erica scabriuscula Lodd.	LC
ERICACEAE	Erica seriphiifolia Salisb.	LC
ERICACEAE	Erica sessiliflora L.f.	LC
ERICACEAE	Erica simulans Dulfer var. simulans	LC
ERICACEAE	Erica simulans Dulfer var. tetragona (Bolus) Dulfer	DDT
ERICACEAE	Erica sparrmanii L.f.	LC
ERICACEAE	Erica sparsa Lodd. var. sparsa	LC
ERICACEAE	Erica speciosa Andrews	LC
ERICACEAE	Erica subdivaricata P.J.Bergius	LC
ERICACEAE	Erica tenella Andrews var. tenella	LC
ERICACEAE	Erica tenuis Salisb.	LC
ERICACEAE	Erica tetragona L.f.	LC
ERICACEAE	Erica thamnoides E.G.H.Oliv.	LC
ERICACEAE	Erica triceps Link	LC
ERICACEAE	Erica uberiflora E.G.H.Oliv.	LC
ERICACEAE	Erica zeyheriana (Klotzsch) E.G.H.Oliv.	VU

Family	Species	Threat status
ASTERACEAE	Eriocephalus africanus L. var. paniculatus (Cass.) M.A.N.Müll.,P.P.J.Herman & Kolberg	LC
ERIOSPERMACEAE	Eriospermum dielsianum Poelln. subsp. molle P.L.Perry	LC
FABACEAE	Erythrina caffra Thunb.	LC
EBENACEAE	Euclea polyandra (L.f.) E.Mey. ex Hiern	LC
EBENACEAE	Euclea racemosa Murray subsp. macrophylla (E.Mey. ex A.DC.) F.White	LC
ORCHIDACEAE	Eulophia speciosa (R.Br. ex Lindl.) Bolus	Declining
ASTERACEAE	Euryops munitus (L.f.) B.Nord.	LC
ASTERACEAE	Felicia amelloides (L.) Voss	LC
ASTERACEAE	Felicia echinata (Thunb.) Nees	LC
ASTERACEAE	Felicia westae (Fourc.) Grau	DDD
CYPERACEAE	Ficinia acuminata (Nees) Nees	LC
CYPERACEAE	Ficinia deusta (P.J.Bergius) Levyns	LC
CYPERACEAE	Ficinia gracilis Schrad.	LC
CYPERACEAE	Ficinia trispicata (L.f.) Druce	LC
MORACEAE	Ficus sur Forssk.	LC
CYPERACEAE	Fuirena hirsuta (P.J.Bergius) P.L.Forbes	LC
ASPHODELACEAE	Gasteria acinacifolia (J.Jacq.) Haw.	LC
ASPHODELACEAE	Gasteria nitida (Salm-Dyck) Haw. var. armstrongii (Schönland) Van Jaarsv.	CR
ASTERACEAE	Gazania krebsiana Less. subsp. arctotoides (Less.) Roessler	LC
ASTERACEAE	Gazania krebsiana Less. subsp. krebsiana	LC
ASTERACEAE	Gazania rigens (L.) Gaertn. var. uniflora (L.f.) Roessler	LC
IRIDACEAE	Geissorhiza heterostyla L.Bolus	LC
GERANIACEAE	Geranium incanum Burm.f. var. multifidum (Sweet) Hilliard & B.L.Burtt	LC
ASTERACEAE	Gerbera cordata (Thunb.) Less.	LC
ASTERACEAE	Gerbera piloselloides (L.) Cass.	LC
ASTERACEAE	Gerbera tomentosa DC.	LC
IRIDACEAE	Gladiolus gueinzii Kunze	LC
IRIDACEAE	Gladiolus involutus D.Delaroche	LC
IRIDACEAE	Gladiolus permeabilis D.Delaroche subsp. permeabilis	LC
THYMELAEACEAE	Gnidia coriacea Meisn.	LC
APOCYNACEAE	Gomphocarpus physocarpus E.Mey.	LC
APOCYNACEAE	Gonioma kamassi E.Mey.	LC
OROBANCHACEAE	Graderia scabra (L.f.) Benth.	LC
MALVACEAE	Grewia occidentalis L. var. occidentalis	LC
CELASTRACEAE	Gymnosporia nemorosa (Eckl. & Zeyh.) Szyszyl.	LC
ORCHIDACEAE	Habenaria falcicornis (Burch. ex Lindl.) Bolus subsp. falcicornis	LC
OROBANCHACEAE	Harveya capensis Hook.	LC
OROBANCHACEAE	Harveya purpurea (L.f.) Harv. ex Hook. subsp. purpurea	LC
SCROPHULARIACEAE	Hebenstretia robusta E.Mey.	LC
ASTERACEAE	Helichrysum albanense Hilliard	LC
ASTERACEAE	Helichrysum anomalum Less.	LC
ASTERACEAE	Helichrysum asperum (Thunb.) Hilliard & B.L.Burtt var. comosum (Sch.Bip.) Hilliard	LC
ASTERACEAE	Helichrysum asperum (Thunb.) Hilliard & B.L.Burtt var. glabrum Hilliard	LC
ASTERACEAE	Helichrysum aureum (Houtt.) Merr. var. monocephalum (DC.) Hilliard	LC

Family	Species	Threat status
ASTERACEAE	Helichrysum crispum (L.) D.Don	LC
ASTERACEAE	Helichrysum cymosum (L.) D.Don subsp. cymosum	LC
ASTERACEAE	Helichrysum felinum Less.	LC
ASTERACEAE	Helichrysum gymnocomum DC.	LC
ASTERACEAE	Helichrysum herbaceum (Andrews) Sweet	LC
ASTERACEAE	Helichrysum litorale Bolus	LC
ASTERACEAE	Helichrysum nudifolium (L.) Less. var. nudifolium	LC
ASTERACEAE	Helichrysum petiolare Hilliard & B.L.Burtt	LC
ASTERACEAE	Helichrysum rosum (P.J.Bergius) Less. var. arcuatum Hilliard	LC
ASTERACEAE	Helichrysum spiralepis Hilliard & B.L.Burtt	LC
ASTERACEAE	Helichrysum teretifolium (L.) D.Don	LC
ASTERACEAE	Helichrysum tinctum (Thunb.) Hilliard & B.L.Burtt	LC
BRASSICACEAE	Heliophila elongata (Thunb.) DC.	LC
BRASSICACEAE	Heliophila glauca Burch. ex DC.	LC
MALVACEAE	Hermannia althaeoides Link	LC
MALVACEAE	Hermannia hyssopifolia L.	LC
MALVACEAE	Hermannia velutina DC.	LC
MALVACEAE	Hibiscus diversifolius Jacq. subsp. diversifolius	LC
MALVACEAE	Hibiscus diversifolius Jacq. subsp. rivularis (Bremek. & Oberm.) Exell var. rivularis	Exotic
MALVACEAE	Hibiscus trionum L.	Exotic
ASTERACEAE	Hippia frutescens (L.) L.	LC
ORCHIDACEAE	Holothrix parviflora (Lindl.) Rchb.f.	LC
ORCHIDACEAE	Holothrix schlechteriana Schltr. ex Kraenzl.	LC
OROBANCHACEAE	Hyobanche sanguinea L.	LC
FABACEAE	Hypocalyptus coluteoides (Lam.) R.Dahlgren	LC
FABACEAE	Hypocalyptus oxalidifolius (Sims) Baill.	LC
RESTIONACEAE	Hypodiscus argenteus (Thunb.) Mast.	LC
DENNSTAEDTIACEAE	Hypolepis sparsisora (Schrad.) Kuhn	LC
FABACEAE	Indigofera denudata L.f.	LC
FABACEAE	Indigofera flabellata Harv.	LC
FABACEAE	Indigofera heterophylla Thunb.	LC
FABACEAE	Indigofera pappei Fourc.	LC
FABACEAE	Indigofera poliotes Eckl. & Zeyh.	LC
FABACEAE	Indigofera rhodantha Fourc.	Exotic
FABACEAE	Indigofera stricta L.f.	LC
FABACEAE	Indigofera sulcata DC.	LC
FABACEAE	Indigofera verrucosa Eckl. & Zeyh.	LC
ASTERACEAE	Inulanthera dregeana (DC.) Källersjö	LC
CYPERACEAE	Isolepis cernua (Vahl) Roem. & Schult. var. cernua	LC
CYPERACEAE	Isolepis marginata (Thunb.) A.Dietr.	LC
CYPERACEAE	Isolepis natans (Thunb.) A.Dietr.	LC
CYPERACEAE	Isolepis striata (Nees) Kunth	LC
SCROPHULARIACEAE	Jamesbrittenia microphylla (L.f.) Hilliard	LC
JUNCACEAE	Juncus dregeanus Kunth subsp. dregeanus	LC

Family	Species	Threat status
JUNCACEAE	Juncus kraussii Hochst. subsp. kraussii	LC
JUNCACEAE	Juncus lomatophyllus Spreng.	LC
CUCURBITACEAE	Kedrostis nana (Lam.) Cogn. var. nana	LC
RANUNCULACEAE	Knowltonia vesicatoria (L.f.) Sims subsp. humilis H.Rasm.	LC
POACEAE	Koeleria capensis (Steud.) Nees	LC
URTICACEAE	Laportea peduncularis (Wedd.) Chew subsp. peduncularis	LC
HALORAGACEAE	Laurembergia repens (L.) P.J.Bergius subsp. brachypoda (Welw. ex Hiern) Oberm.	LC
CELASTRACEAE	Lauridia tetragona (L.f.) R.H.Archer	LC
ANACARDIACEAE	Laurophyllus capensis Thunb.	LC
LAMIACEAE	Leonotis leonurus (L.) R.Br.	LC
MYRTACEAE	Leptospermum laevigatum (Gaertn.) F.Muell.	Exotic
FABACEAE	Lessertia kensitii L.Bolus	DDT
PROTEACEAE	Leucadendron conicum (Lam.) I.Williams	NT
PROTEACEAE	Leucospermum cuneiforme (Burm.f.) Rourke	LC
PLUMBAGINACEAE	Limonium scabrum (Thunb.) Kuntze var. scabrum	LC
LINACEAE	Linum aethiopicum Thunb.	LC
FABACEAE	Liparia hirsuta Thunb.	LC
LOBELIACEAE	Lobelia cuneifolia Link & Otto var. cuneifolia	LC
LOBELIACEAE	Lobelia erinus L.	LC
LOBELIACEAE	Lobelia neglecta Roem. & Schult.	LC
LOBELIACEAE	Lobelia pubescens Dryand. ex Aiton var. pubescens	LC
POACEAE	Lolium multiflorum Lam.	Exotic
POACEAE	Lolium temulentum L.	Exotic
FABACEAE	Lotononis azurea (Eckl. & Zeyh.) Benth.	LC
SCROPHULARIACEAE	Manulea obovata Benth.	LC
CELASTRACEAE	Maytenus oleoides (Lam.) Loes.	LC
CELASTRACEAE	Maytenus peduncularis (Sond.) Loes.	LC
OROBANCHACEAE	Melasma scabrum P.J.Bergius var. scabrum	LC
POACEAE	Merxmuellera cincta (Nees) Conert subsp. cincta	LC
ASTERACEAE	Metalasia muricata (L.) D.Don	LC
ASTERACEAE	Metalasia pungens D.Don	LC
ASTERACEAE	Metalasia trivialis P.O.Karis	LC
IRIDACEAE	Micranthus alopecuroides (L.) Rothm.	LC
LOBELIACEAE	Monopsis acrodon E.Wimm.	LC
LOBELIACEAE	Monopsis simplex (L.) E.Wimm.	LC
LOBELIACEAE	Monopsis unidentata (Dryand.) E.Wimm. subsp. unidentata	LC
GERANIACEAE	Monsonia emarginata (L.f.) L'Hér.	LC
IRIDACEAE	Moraea tricuspidata (L.f.) G.J.Lewis	LC
MYRICACEAE	Morella cordifolia (L.) Killick	LC
MYRICACEAE	Morella quercifolia (L.) Killick	LC
POLYGALACEAE	Muraltia alopecuroides (L.) DC.	LC
POLYGALACEAE	Muraltia ericaefolia DC.	LC
POLYGALACEAE	Muraltia satureioides DC. var. satureioides	LC
POLYGALACEAE	Muraltia squarrosa (L.f.) DC.	LC

Family	Species	Threat status
ASTERACEAE	Nidorella auriculata DC.	LC
APIACEAE	Notobubon ferulaceum (Thunb.) Magee	Exotic
APIACEAE	Notobubon gummiferum (L.) Magee	Exotic
NYMPHAEACEAE	Nymphaea nouchali Burm.f. var. zanzibariensis (Casp.) Verdc.	LC
ASTERACEAE	Oedera capensis (L.) Druce	LC
ASTERACEAE	Oedera imbricata Lam.	LC
OLEACEAE	Olea capensis L. subsp. capensis	LC
OLEACEAE	Olea europaea L. subsp. africana (Mill.) P.S.Green	LC
OLEACEAE	Olea exasperata Jacq.	LC
OLINIACEAE	Olinia ventosa (L.) Cufod.	LC
APOCYNACEAE	Oncinema lineare (L.f.) Bullock	LC
POACEAE	Oplismenus hirtellus (L.) P.Beauv.	LC
POACEAE	Oplismenus undulatifolius (Ard.) Roem. & Schult.	LC
HYACINTHACEAE	Ornithogalum tenuifolium F.Delaroche subsp. tenuifolium	LC
ASTERACEAE	Osteospermum junceum P.J.Bergius	LC
ASTERACEAE	Osteospermum pterigoideum Klatt	EN
SANTALACEAE	Osyris compressa (P.J.Bergius) A.DC.	LC
FABACEAE	Otholobium carneum (E.Mey.) C.H.Stirt.	Rare
FABACEAE	Otholobium heterosepalum (Fourc.) C.H.Stirt.	Rare
FABACEAE	Otholobium polyphyllum (Eckl. & Zeyh.) C.H.Stirt.	LC
FABACEAE	Otholobium prodiens C.H.Stirt.	LC
FABACEAE	Otholobium stachyerum (Eckl. & Zeyh.) C.H.Stirt.	LC
ASTERACEAE	Othonna quinquedentata Thunb.	LC
OXALIDACEAE	Oxalis caprina L.	LC
OXALIDACEAE	Oxalis corniculata L.	Exotic
OXALIDACEAE	Oxalis imbricata Eckl. & Zeyh. var. violacea R.Knuth	LC
OXALIDACEAE	Oxalis incarnata L.	LC
OXALIDACEAE	Oxalis polyphylla Jacq. var. polyphylla	LC
OXALIDACEAE	Oxalis purpurea L.	LC
OXALIDACEAE	Oxalis smithiana Eckl. & Zeyh.	LC
THYMELAEACEAE	Passerina montivaga C.L.Bredenkamp & A.E.van Wyk	LC
THYMELAEACEAE	Passerina rigida Wikstr.	LC
HYPOXIDACEAE	Pauridia minuta (L.f.) T.Durand & Schinz	NT
GERANIACEAE	Pelargonium alchemilloides (L.) L'Hér.	LC
GERANIACEAE	Pelargonium capitatum (L.) L'Hér.	LC
GERANIACEAE	Pelargonium cordifolium (Cav.) Curtis	LC
GERANIACEAE	Pelargonium graveolens L'Hér.	LC
GERANIACEAE	Pelargonium papilionaceum (L.) L'Hér.	LC
GERANIACEAE	Pelargonium pulverulentum Colvill ex Sweet	LC
GERANIACEAE	Pelargonium radulifolium (Eckl. & Zeyh.) Steud.	LC
PENAEACEAE	Penaea cneorum Meerb. subsp. gigantea R.Dahlgren	LC
PENAEACEAE	Penaea cneorum Meerb. subsp. lanceolata R.Dahlgren	LC
PENAEACEAE	Penaea cneorum Meerb. subsp. ovata (Eckl. & Zeyh. ex A.DC.) R.Dahlgren	LC
POACEAE	Pentaschistis colorata (Steud.) Stapf	LC
POACEAE	Pentaschistis heptamera (Nees) Stapf	LC

Family	Species	Threat status
POACEAE	Pentaschistis longipes Stapf	VU
POACEAE	Pentaschistis pallida (Thunb.) H.P.Linder	LC
POLYGONACEAE	Persicaria attenuata (R.Br.) Soják subsp. africana K.L.Wilson	LC
RHAMNACEAE	Phylica abietina Eckl. & Zeyh.	LC
RHAMNACEAE	Phylica aemula Schltr. var. multibracteolata Pillans	LC
RHAMNACEAE	Phylica axillaris Lam. var. axillaris	LC
RHAMNACEAE	Phylica axillaris Lam. var. lutescens (Eckl. & Zeyh.) Pillans	LC
RHAMNACEAE	Phylica axillaris Lam. var. microphylla (Eckl. & Zeyh.) Pillans	LC
RHAMNACEAE	Phylica gnidioides Eckl. & Zeyh.	LC
RHAMNACEAE	Phylica humilis Sond.	LC
RHAMNACEAE	Phylica litoralis (Eckl. & Zeyh.) D.Dietr.	LC
RHAMNACEAE	Phylica odorata Schltr.	LC
RHAMNACEAE	Phylica paniculata Willd.	LC
RHAMNACEAE	Phylica pinea Thunb.	LC
RHAMNACEAE	Phylica rubra Willd. ex Roem. & Schult.	LC
RHAMNACEAE	Phylica strigulosa Sond.	VU
RUBIACEAE	Phylohydrax carnosa (Hochst.) Puff	LC
RESTIONACEAE	Platycaulos callistachyus (Kunth) H.P.Linder	LC
RESTIONACEAE	Platycaulos compressus (Rottb.) H.P.Linder	LC
CUNONIACEAE	Platylophus trifoliatus (L.f.) D.Don	LC
ASTERACEAE	Plecostachys serpyllifolia (P.J.Bergius) Hilliard & B.L.Burtt	LC
LAMIACEAE	Plectranthus fruticosus L'Hér.	LC
LAMIACEAE	Plectranthus laxiflorus Benth.	LC
POLYPODIACEAE	Pleopeltis macrocarpa (Bory ex Willd.) Kaulf.	LC
POACEAE	Poa annua L.	Exotic
POACEAE	Poa pratensis L.	Exotic
FABACEAE	Podalyria cuneifolia Vent.	LC
FABACEAE	Podalyria glauca DC.	LC
FABACEAE	Podalyria myrtillifolia (Retz.) Willd.	LC
PODOCARPACEAE	Podocarpus falcatus (Thunb.) R.Br. ex Mirb.	LC
PODOCARPACEAE	Podocarpus latifolius (Thunb.) R.Br. ex Mirb.	LC
POLYGALACEAE	Polygala bracteolata L.	LC
POLYGALACEAE	Polygala ericaefolia DC.	LC
POLYGALACEAE	Polygala fruticosa P.J.Bergius	LC
POLYGALACEAE	Polygala myrtifolia L. var. myrtifolia	LC
POLYGALACEAE	Polygala refracta DC.	LC
POLYGALACEAE	Polygala wittebergensis Compton	LC
POLYGONACEAE	Polygonum undulatum (L.) P.J.Bergius	LC
CAMPANULACEAE	Prismatocarpus campanuloides (L.f.) Sond. var. campanuloides	LC
PROTEACEAE	Protea coronata Lam.	NT
PROTEACEAE	Protea cynaroides (L.) L.	LC
PROTEACEAE	Protea eximia (Salisb. ex Knight) Fourc.	LC
PROTEACEAE	Protea mundii Klotzsch	LC
PROTEACEAE	Protea neriifolia R.Br.	LC
PROTEACEAE	Protea tenax (Salisb.) R.Br.	LC

Family	Species	Threat status
FABACEAE	Psoralea affinis Eckl. & Zeyh.	LC
FABACEAE	Psoralea arborea Sims	LC
FABACEAE	Psoralea oligophylla Eckl. & Zeyh.	LC
FABACEAE	Psoralea oreophila Schltr.	Rare
FABACEAE	Psoralea plauta C.H.Stirt.	LC
FABACEAE	Psoralea repens L.	NT
FABACEAE	Psoralea verrucosa Willd.	LC
RUBIACEAE	Psydrax obovata (Eckl. & Zeyh.) Bridson subsp. obovata	LC
CELASTRACEAE	Pterocelastrus tricuspidatus (Lam.) Walp.	LC
ASTERACEAE	Pteronia stricta Aiton var. longifolia E.Phillips	LC
ASTERACEAE	Pteronia teretifolia (Thunb.) Fourc.	LC
ORCHIDACEAE	Pterygodium alatum (Thunb.) Sw.	LC
ORCHIDACEAE	Pterygodium volucris (L.f.) Sw.	LC
RANUNCULACEAE	Ranunculus multifidus Forssk.	Exotic
MYRSINACEAE	Rapanea gilliana (Sond.) Mez	EN
RESTIONACEAE	Rhodocoma fruticosa (Thunb.) H.P.Linder	LC
RESTIONACEAE	Rhodocoma gigantea (Kunth) H.P.Linder	LC
SANTALACEAE	Rhoiacarpos capensis (Harv.) A.DC.	LC
VITACEAE	Rhoicissus tridentata (L.f.) Wild & R.B.Drumm. subsp. tridentata	Exotic
FABACEAE	Rhynchosia argentea (Thunb.) Harv.	LC
FABACEAE	Rhynchosia capensis (Burm.f.) Schinz	LC
FABACEAE	Rhynchosia microscias Benth. ex Harv.	LC
CAMPANULACEAE	Roella spicata L.f. var. burchellii Adamson	LC
IRIDACEAE	Romulea dichotoma (Thunb.) Baker	LC
IRIDACEAE	Romulea setifolia N.E.Br. var. setifolia	LC
RUBIACEAE	Rubia cordifolia L. subsp. conotricha (Gand.) Verdc.	LC
RUBIACEAE	Rubia petiolaris DC.	LC
ROSACEAE	Rubus affinis Wight & Arn.	Exotic
ROSACEAE	Rubus fruticosus L.	Exotic
ROSACEAE	Rubus pinnatus Willd.	LC
ROSACEAE	Rubus rigidus Sm.	LC
POLYGONACEAE	Rumex acetosella L. subsp. angiocarpus (Murb.) Murb.	Exotic
POLYGONACEAE	Rumex crispus L.	Exotic
POLYGONACEAE	Rumex sagittatus Thunb.	LC
LAMIACEAE	Salvia africana-lutea L.	LC
THEOPHRASTACEAE	Samolus porosus (L.f.) Thunb.	LC
THEOPHRASTACEAE	Samolus valerandi L.	LC
APIACEAE	Sanicula elata Buch.-Ham. ex D.Don	LC
ORCHIDACEAE	Satyrium acuminatum Lindl.	LC
ORCHIDACEAE	Satyrium bracteatum (L.f.) Thunb.	LC
ORCHIDACEAE	Satyrium parviflorum Sw.	LC
ORCHIDACEAE	Satyrium princeps Bolus	VU
DIPSACACEAE	Scabiosa albanensis R.A.Dyer	LC
DIPSACACEAE	Scabiosa columbaria L.	LC
GOODENIACEAE	Scaevola plumieri (L.) Vahl	LC

Family	Species	Threat status
FABACEAE	Schotia afra (L.) Thunb. var. afra	LC
ANACARDIACEAE	Searsia dentata (Thunb.) F.A.Barkley	LC
ANACARDIACEAE	Searsia glauca (Thunb.) Moffett	LC
ANACARDIACEAE	Searsia laevigata (L.) F.A.Barkley var. laevigata forma laevigata	Exotic
ANACARDIACEAE	Searsia lucida (L.) F.A.Barkley forma lucida	Exotic
ANACARDIACEAE	Searsia lucida (L.) F.A.Barkley forma scoparia (Eckl. & Zeyh.) Moffett	Exotic
ANACARDIACEAE	Searsia tomentosa (L.) F.A.Barkley	LC
GENTIANACEAE	Sebaea stricta (E.Mey.) Gilg	LC
GENTIANACEAE	Sebaea zeyheri Schinz subsp. acutiloba (Schinz) Marais	LC
APOCYNACEAE	Secamone alpini Schult.	LC
SCROPHULARIACEAE	Selago canescens L.f.	LC
SCROPHULARIACEAE	Selago corymbosa L.	LC
SCROPHULARIACEAE	Selago luxurians Choisy	LC
SCROPHULARIACEAE	Selago rotundifolia L.f.	VU
ASTERACEAE	Senecio burchellii DC.	LC
ASTERACEAE	Senecio carnosus Thunb.	LC
ASTERACEAE	Senecio crenatus Thunb.	LC
ASTERACEAE	Senecio glastifolius L.f.	LC
ASTERACEAE	Senecio inaequidens DC.	LC
ASTERACEAE	Senecio lineatus (L.f.) DC.	LC
ASTERACEAE	Senecio madagascariensis Poir.	LC
ASTERACEAE	Senecio oederiifolius DC.	LC
ASTERACEAE	Senecio othonniflorus DC.	LC
ASTERACEAE	Senecio paniculatus P.J.Bergius	LC
ASTERACEAE	Senecio rigidus L.	LC
ASTERACEAE	Senecio thunbergii Harv.	DDT
FABACEAE	Senna multiglandulosa (Jacq.) H.S.Irwin & Barneby	Exotic
POACEAE	Setaria sphacelata (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss var. sphacelata	LC
POACEAE	Setaria sphacelata (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss var. torta (Stapf) Clayton	LC
SOLANACEAE	Solanum linnaeanum Hepper & Jaeger	LC
MALVACEAE	Sparrmannia africana L.f.	LC
HYPOXIDACEAE	Spiloxene serrata (Thunb.) Garside var. serrata	LC
POACEAE	Sporobolus africanus (Poir.) Robyns & Tournay	LC
LAMIACEAE	Stachys scabrida Skan	LC
LAMIACEAE	Stachys thunbergii Benth.	LC
THYMELAEACEAE	Struthiola argentea Lehm.	LC
THYMELAEACEAE	Struthiola macowanii C.H.Wright	LC
FABACEAE	Sutherlandia frutescens (L.) R.Br.	LC
ASTERACEAE	Syncarpha argentea (Thunb.) B.Nord.	LC
ASTERACEAE	Syncarpha eximia (L.) B.Nord.	LC
ASTERACEAE	Syncarpha milleflora (L.f.) B.Nord.	LC
ASTERACEAE	Syncarpha striata (Thunb.) B.Nord.	LC
ASTERACEAE	Tarchonanthus littoralis P.P.J.Herman	LC
SCROPHULARIACEAE	Teedia lucida (Sol.) Rudolphi	LC

Family	Species	Threat status
FABACEAE	Tephrosia grandiflora (Aiton) Pers.	LC
AIZOACEAE	Tetragonia decumbens Mill.	LC
CYPERACEAE	Tetraria bromoides (Lam.) Pfeiff.	LC
CYPERACEAE	Tetraria microstachys (Vahl) Pfeiff.	LC
CYPERACEAE	Tetraria robusta (Kunth) C.B.Clarke	LC
RESTIONACEAE	Thamnochortus cinereus H.P.Linder	LC
POACEAE	Themeda triandra Forssk.	LC
SANTALACEAE	Thesium foliosum A.DC.	LC
SANTALACEAE	Thesium penicillatum A.W.Hill	LC
SANTALACEAE	Thesium virgatum Lam.	LC
POACEAE	Thinopyrum distichum (Thunb.) A.Löve	Exotic
ASPHODELACEAE	Trachyandra affinis Kunth	LC
POACEAE	Tribolium hispidum (Thunb.) Desv.	LC
POACEAE	Tribolium uniolae (L.f.) Renvoize	LC
HAMAMELIDACEAE	Trichocladus crinitus (Thunb.) Pers.	LC
FABACEAE	Trifolium burchellianum Ser. subsp. burchellianum	LC
POACEAE	Tristachya leucothrix Trin. ex Nees	LC
IRIDACEAE	Tritoniopsis antholyza (Poir.) Goldblatt	LC
ALLIACEAE	Tulbaghia violacea Harv. var. violacea	LC
ASTERACEAE	Ursinia anethoides (DC.) N.E.Br.	LC
ASTERACEAE	Ursinia scariosa (Aiton) Poir. subsp. scariosa	LC
ASTERACEAE	Ursinia scariosa (Aiton) Poir. subsp. scariosa	LC
LENTIBULARIACEAE	Utricularia bisquamata Schrank	LC
ASTERACEAE	Vellereophyton vellereum (R.A.Dyer) Hilliard	LC
FABACEAE	Vigna frutescens A.Rich. subsp. frutescens var. frutescens	LC
MENYANTHACEAE	Villarsia capensis (Houtt.) Merr.	LC
FABACEAE	Virgilia divaricata Adamson	LC
HAEMODORACEAE	Wachendorfia thyrsiflora Burm.	LC
CAMPANULACEAE	Wahlenbergia capillacea (L.f.) A.DC. subsp. capillacea	LC
CAMPANULACEAE	Wahlenbergia procumbens (Thunb.) A.DC.	LC
CAMPANULACEAE	Wahlenbergia rubens (H.Buek) Lammers var. rubens	LC
CAMPANULACEAE	Wahlenbergia rubioides (Banks ex A.DC.) Lammers var. rubioides	LC
IRIDACEAE	Watsonia pillansii L.Bolus	LC
IRIDACEAE	Watsonia zeyheri L.Bolus	LC
COLCHICACEAE	Wurmbea stricta (Burm.f.) J.C.Manning & Vinn.	LC
ARACEAE	Zantedeschia aethiopica (L.) Spreng.	LC
CUCURBITACEAE	Zehneria scabra (L.f.) Sond. subsp. scabra	LC