AN ECOLOGICAL REPORT FOR THE PROPOSED MINING OF BORROW PITS IN THE CURRIES CAMP AND SOVERBY AREAS, BETWEEN UPINGTON AND KEIMOES, NORTHERN CAPE PROVINCE

Commissioned by
NSVT Consultants

October 2013

Compiled by

Johann du Preez PhD PrSciNat

ECO-CARE CONSULTANCY (PTY) LTD
ENVIRONMENTAL & BIODIVERSITY CONSULTANTS
PO BOX 11945
UNIVERSITAS
BLOEMFONTEIN
9321
greenrsa@gmail.com
Contact no.: 0823764404
Fax: 0866452222

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Three borrow pits, in the Eksteenskuil area, have been assessed for the type of plant communities, Red data species and protected species. No Red Data species were found at any of these sites, however a number of protected plant species were found. The shrub community that dominates these sites can be regarded as not sensitive. There are at the Curries Camp borrow pit1 and the Soverby borrow pit sensitive succulent communities. The mining may take place in the areas as indicated on the aerial photos. High run-off from the borrow pits could have a negative impact especially in terms of erosion.

It is recommended that

- It is recommended that a permit must be obtained for the removal of any of the protected species
- In case the sensitive areas are to be mined, permits must be obtained including for the protected species in terms of the Forest Act for the Shepherd's trees (Curries Camp borrow pit 1) and Camel thorn (Soverby borrow pit);
- an exercise to translocate the succulents and bulbous species in the development footprint is recommended.
- Erosion control measures must be applied at the disturbed areas at these borrow pits

DECLARATION OF INDEPENDENCE

I, Pieter Johannes du Preez, ID 6008215016087, declare that I:

- am the co-owner of EcoCare (Pty) Ltd;
- act as an independent specialist consultant in the field of botany, ecology and vegetation science;
- am assigned as specialist consultant by NSVT Consultants for this proposed project;
- do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference;
- have or will not have any vested interest in the proposed activity proceeding;
- have no and will not engage in conflicting interests in the undertaking of the activity;
- undertake to disclose to the client and the competent authority any material, information that have or may have the potential to influence the decision of the competent authority required in terms of the Environmental Impact Assessment Regulations 2006;
- will provide the client and competent authority with access to all information at my disposal, regarding this project, whether favourable or not.

Expertise:

I am a professional natural scientist registered with the South African Council for Natural Scientific Professions (SACNASP) (No 400271/07). My fields of practice are Botanical Science and Ecological Science.

Furthermore I have more than 35 years of experience as natural scientist in the abovementioned fields. I have published over 30 research articled in these fields.

PJ DU PREEZ

1. ASSIGNMENT AND TERMS OF REFERENCE

EcoCare (Pty) Ltd Environmental and Biodiversity Consultants was appointed by NSVT Consultants to undertake an independent assessment of the vegetation and flora and fauna of areas proposed for borrow pits along the Orange River. The material from the borrow pits will be used for the upgrading of existing irrigation canals on islands in the Orange River. A field survey was conducted on the 29 August 2013. This assignment is in accordance with the EIA Regulations (No. R. 545, Department of Environmental Affairs and Tourism, 18 June 2010) emanating from Part 5 of the National Environmental Management Act 1998 (Act No. 107 of 1998).

The assignment is interpreted as follows:

Compile a study on the vegetation and animal communities with special emphasis on the possible presence red data species on the proposed sites earmarked for the development.

2. RATIONALE

It is widely recognised that it is critical to conserve natural resources in order to maintain ecological processes and life support systems for plants, invertebrates, vertebrates and humans. An assessment of the environment before relevant authorities approve any development .is vital to ensure that sustainable development takes place. This is part of the legislation that protects the natural environment.

Acts such as the Environmental Conservation Act (Act 73 of 1989), the National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998) and the National Environmental Management Biodiversity Act, 2004. (Act 10 0f 2004) as well as the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA) ensure the protection of ecological processes, natural systems and natural beauty as well as the preservation of biotic diversity in the natural environment. It also ensures the protection of the environment against disturbance, deterioration, defacement or destruction as a result of man-made structures, installations, processes or products or human activities. A draft list of Threatened Ecosystems was published (Government Gazette 2009) as part of the National Environmental Management Biodiversity Act, 2004. (Act 10 of 2004). These Threatened Ecosystems are described by SANBI & DEAT (2009). The Northern Cape Nature

Conservation Act (Act 9 of 2009)(NCNCA) state that no specimen of a protected plant or animal may be, without a permit, be picked, imported, exported, transported, cultivated or traded.

All components of the ecosystems (physical environment, vegetation, animals) of a site are interrelated and interdependent. A holistic approach is therefore imperative to effectively include the development, utilisation and where necessary conservation of the given natural resources in an integrated development plan, which will address all the needs of the modern human population (Bredenkamp & Brown 2001). It is therefore necessary to make a thorough inventory of the plant communities and biodiversity on the site, in order to evaluate the biodiversity and possible rare species. This inventory should then serve as a scientific and ecological basis for the planning exercises.

3. ASSUMPTIONS AND LIMITATIONS

3.1 Assumptions

- The vegetation on the development footprint will be destroyed.

3.2 Limitations

- The vegetation assessment was done during a dry period of the year.

4. STUDY AREA

4.1 Location

The borrow pits are located above the 1:100 year flood line of the Orange River. The Curries Camp 1 and 2 borrow pits are existing borrow pits that will be extended. The one at Soverby is a new borrow pit.

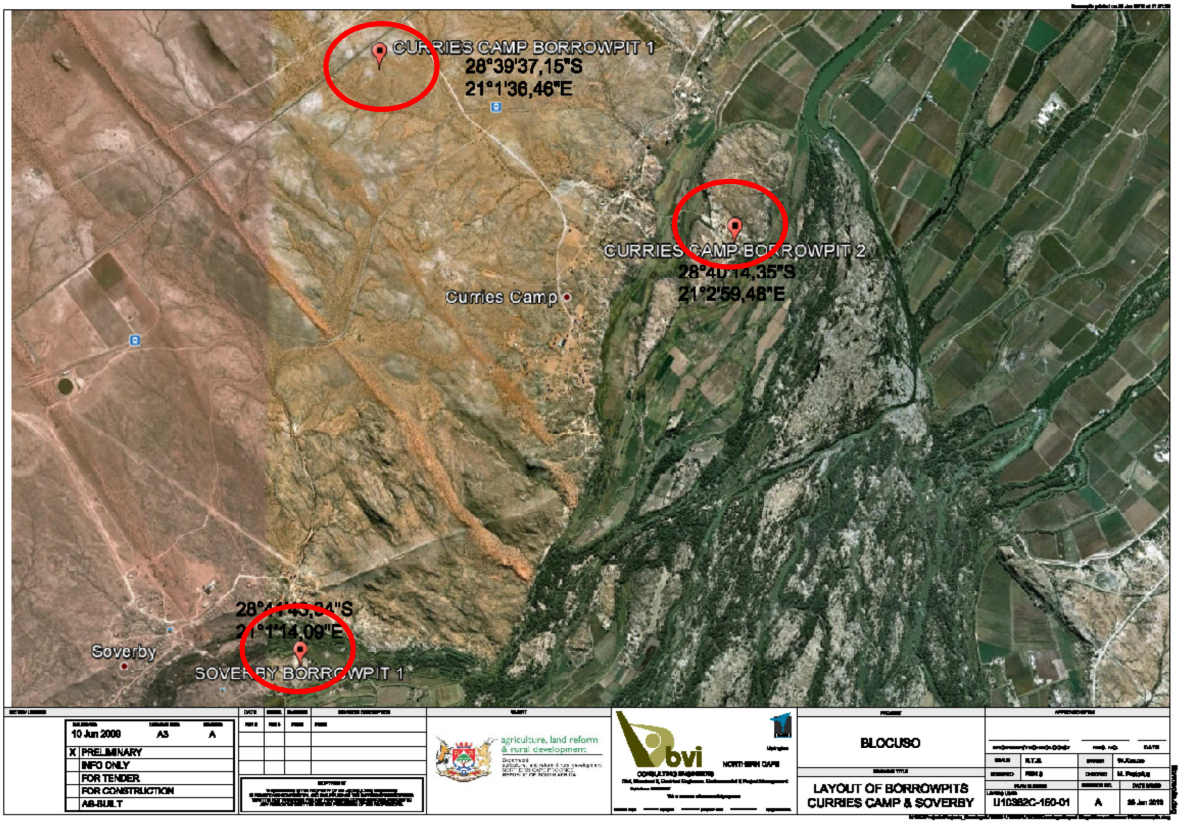

Figure 1: A map indicating the locality (red circle) of the proposed borrow pits.

Table 1: GPS coordinates for borrow pits.

Borrow pit	GPS coordinates (S)	GPS coordinates (E)
Curries Camp borrow pit 1	28° 39’ 37.15 S	21° 01’ 36.46 E
Curries Camp borrow pit 2	28° 40’ 14.35 S	21° 02’ 59.48 E
Soverby borrow pit 1	28° 41’ 43.34 S	21° 01’ 14.09 E

5. METHODS

In order to compile the biodiversity study, the following had to be done:

5.1 Preliminary preparations:

Obtain all relevant maps, aerial and or satellite images of the study area. Collect information on the natural environment of the concerned area. This includes a Red data species list for the flora.

5.2 Vegetation and habitat survey:

5.2.1 In each vegetation type / plant community on site:

- Determine relatively homogeneous potential ecological units / plant communities / ecosystems on aerial photographs.
- List the plant species (trees, shrubs, grasses and herbaceous species of special interest) present in each ecological unit for plant community and ecosystem description.
- Identify potential red data plant species, possible encroacher species and exotic plant species.

5.2.2 Plant community delimitation and description

- Process data (vegetation and habitat) to determine vegetation types / ecosystems on an ecological basis.
- Describe the habitat and vegetation
- Prepare a vegetation map of the area if more than one plant community is present.
- Prepare an ecosystem sensitivity map for the planning of the development.

5.3 Animal communities

- To scan the site for signs of animals species (herpetofauna, birds and mammals) and to list them.
- Identify Red data animal species

5.4 General

- Identify and describe ecologically sensitive areas.
- Identify problem areas in need of special treatment or management, e.g. bush encroachment, erosion, degraded areas, reclamation areas.
- Make recommendations on aspects that should be monitored during development.

5.6 Conservation Priority / Sensitivity

The following **conservation priority** / **sensitivity** categories were used for each site:

High: Ecologically sensitive and valuable land with high species richness and/or sensitive ecosystems or red data species that should be conserved and no developed allowed.

Medium-high: Land where sections are disturbed but which is in general ecologically sensitive to development/disturbances.

Medium: Land on which low impact development with limited impact on the vegetation / ecosystem could be considered for development. It is recommended that certain portions of the natural vegetation be maintained as open space.

Medium-low: Land of which small sections could be considered to conserve but where the area in general has little conservation value.

Low: Land that has little conservation value and that could be considered for developed with little to no impact on the vegetation.

5.7 Species Richness

Species Richness is interpreted as follows: Number of indigenous species recorded in the sample plots representing the plant community. Alien woody species and weeds are not included.

Table 2: Species richness categories

Number of species	Species richness category
1 – 24	Low
25 – 39	Medium
40 – 59	High
60+	Very high

6. RESULTS: VEGETATION AND FLORA

6.1 Vegetation Types – general description

The borrow pits occur in the vegetation type that is called the the Northern Upper Karoo (NKu3)(Mucina & Rutherford 2006). The ground layer is dominated by karroid vegetation mixed with grassy patches. Shrubs present are *Rhigozum trichotomum, Lycium cinereum* and *L. villosum.* The vegetation is dominated by low shrubs such as *Rhigozum trichotomum, Phaeoptilum spinosum, Lycium cinereum, Lycium boscifolium, Tetragonia arbuscula, Salsola tuberculata, Eriocephalus spinecens.* Large bare patches occur scattered between the vegetation. Along the Orange River the vegetation has affinities with the Upper Gariep Alluvial Vegetation (AZa4). This riparian vegetation is dominated by trees such as Sweet Thorn (*Acacia karroo*), Common karee (*Searsia lancea*), White karee (*Searsia pendulina*), and Buffalo Thorn (*Ziziphus mucronata*) but also the exotic invader Prosopis (*Prosopis grandulosa*).

Acts such as the Environmental Conservation Act (Act 73 of 1989), the National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998) and the National Environmental Management Biodiversity Act, 2004. (Act 10 0f 2004) as well as the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA) ensure the protection of ecological processes, natural systems and natural beauty as well as the preservation of biotic diversity in the natural environment. It also ensures the protection of the environment against disturbance, deterioration, defacement or destruction as a result of man-made structures, installations, processes or products or human activities. A draft list of Threatened Ecosystems was published (Government Gazette 2009) as part of the National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004). These

Threatened Ecosystems are described by SANBI & DEAT (2009). The Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA) state that no specimen of a protected plant or animal may be, without a permit, be picked, imported, exported, transported, cultivated or traded.

6.2 SITES:

A CURRIES CAMP: BORROW PIT 1

Plant communities

A shrub community occur on the rocky outcrop of borrow pit 1. Species include *Acacia mellifera* and *Cadaba aphylla* as well as protected species such *as Boscia foetida* and the protected tree *Boscia albitrunca*. A number of succulents such as *Aloe claviflora* and *Euphorbia braunsii* were also noted to occur on northern site of the borrow pit. Other species include the grasses *Aristida congesta, Stipagrostis obtusa, Enneapogon scaber* and *E. scoparius.*

Table 3: Sensitivity analysis of Curries Camp borrow pit 1

Community	Species richness	Conservation priority
Aloe calviflora – Stipagrostis ciliata community	Low	Medium (north of borrow pit) Rest is low

Plant Species of Importance

a) Red Listed species

No Red Listed plants species were noted.

b) Protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA)

Succulents such as *Aloe claviflora* and *Euphorbia braunsii* were also noted to occur on northern site of the borrow pit.

c) Protected tree species in terms of the Forest Act (Act 84 of 1998)

The Shepherd's Tree (*Boscia albitrunca*) occurs on northern side of existing borrow pit.

Animal Communities

The vegetation is relatively homogenous throughout the study area. Large area of the site is disturbed due to previous mining of the borrow pit. No areas of faunal significance or sensitivity within the natural habitat were observed within the study area.

Animal Species of Importance

a) Red Listed Fauna Species

No Red Listed animal species were noted.

b) Protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA)

No signs of any protected animal species were noted.

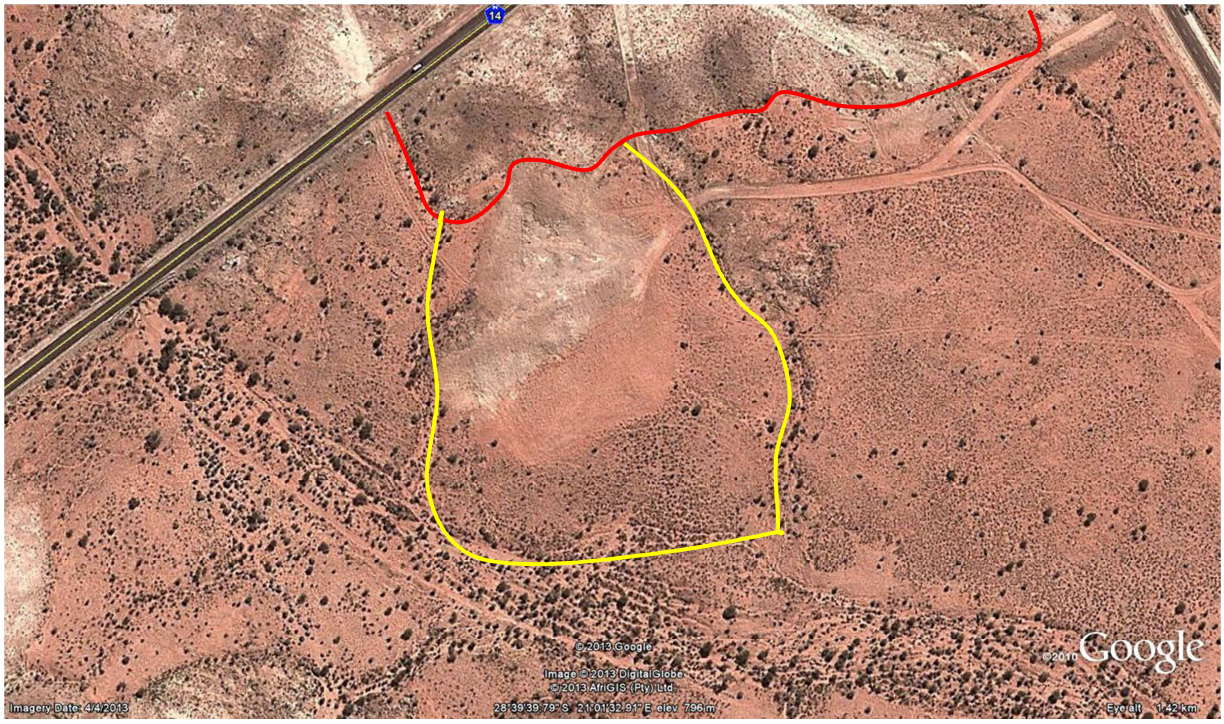

Figure 2: A Google Earth photo of the Curries Camp borrow pit 1. The area marked in red is a sensitive area and must not be mined. Yellow are is suitable for mining

Figure 3: A view of Curries Camp borrow pit 1. It is an existing borrow pit that has been rehabilitated (area in foreground).

Figure 4: Another view of the Curries Camp borrow pit 1. In the foreground are individuals of *Aloe claviflora*, a protected species – they are on northern side (N14 side) of borrow pit.

Figure 5: A Euphorbia (*Euphorbia braunsii)* also situated north of borrow pit

Figure 6: A Shepherd's tree (*Boscia albitrunca)*(arrow) also situated north of borrow pit.

B: CURRIES CAMP: BORROW PIT 2

Plant communities

A shrub community occur on the rocky outcrop of borrow pit 2. Species include *Acacia mellifera Galenia fruticosa* and the invader *Prosopis grandulosa*. A number of succulents such as *Zygophyllum flexuosum* and *Giseikia phanacioides* were also noted to occur around the site. Other species include the grasses *Aristida congesta, Enneapogon scaber E. scoparius* and *Stipagrostis obtusa,*

This is largely a disturbed site were human activity impacted the site.

Table 4: Sensitivity analysis of Curries Camp borrow pit 2

Community	Species richness	Conservation priority
Acacia mellifera – Giseikia paharnacioides community	Low	Low

Plant Species of Importance

a) Red Listed species

No Red Listed plants species were noted.

b) Protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA)

No listed plants species were noted.

c) Protected tree species in terms of the Forest Act (Act 84 of 1998)

No listed plants species were noted.

Animal Communities

Due to the presences of humans in the area no areas of faunal significance or sensitivity within the natural habitat were observed within the study area.

Animal Species of Importance

a) Red Listed Fauna Species

No Red Listed animal species were noted.

b) Protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA)

No signs of any protected animal species were noted.

Figure 7: A view of Curries Camp borrow pit 2 (yellow area). It is a disturbed area.

Figure 8: A view of Curries Camp borrow pit 2. It is a disturbed area.

Figure 9: Another view of the Curries Camp borrow pit 2. The concrete circle is situated at the borrow pit site. Note the numerous individuals of Black thorn (*Acacia mellifera*).

C SOVERBY BORROW PIT:

Plant communities

A shrub community occur on the rocky outcrop of the Soverby borrow pit. Shrub species include *Acacia mellifera* and the invader *Prosopis grandulosa* as well as the Camel Thorn (*Acacia erioloba*) a protected species. A number of succulents such as *Aloe claviflora* and *Aloe garipiena* were also noted on the northern and western sides of the existing borrow pit. Other species include the grasses *Aristida congesta, Stipagrostis obtusa, Enneapogon scaber* and *E. scoparius.*

Table 4: Sensitivity analysis of Soverby borrow pit.

Community	Species richness	Conservation priority
Acacia mellifera – Prosopis grandulosa community	Low	Medium (north and west of borrow pit)

Plant Species of Importance

a) Red Listed species

No Red Listed plants species were noted.

b) Protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA)

Succulents such as *Aloe claviflora* and *Aloe gariepensis* were also noted to occur on northern and western sides of the borrow pit.

c) Protected tree species in terms of the Forest Act (Act 84 of 1998)

The Camel Thorn (*Acacia erioloba*) occurs on northern side of existing borrow pit.

Animal Communities

The vegetation is relatively homogenous throughout the study area. Large area of the site is disturbed due to previous mining of the borrow pit. No areas of faunal significance or sensitivity within the natural habitat were observed within the study area.

Animal Species of Importance

a) Red Listed Fauna Species

No Red Listed animal species were noted.

b) Protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)(NCNCA)

No signs of any protected animal species were noted.

Figure 10: A view of Soverby borrow pit. It is a disturbed area. The area to the left of the red line is a sensitive area and must not be mined. In terms of plant and animal sensitivity, the area to the right of the red line was found to be suitable to be mined.

Figure 11: A view of Soverby borrow pit. It is an existing borrow pit that has not been rehabilitated (area in foreground).

Figure 12: Another view of the Soverby borrow pit.

Figure 13: A Gariep aloe (*Aloe gariepensis)* that occur on the northern as western side of the borrow pit

Figure 5: A Camel thorn (*Acacia erioloba)* situated on northern edge of the existing borrow pit

7. GENERAL DISCUSSION AND CONCLUSION: BIODIVERSITY STUDY

Of the three borrow pits two are old ones. The two existing ones namely the Soverby and Curries camp borrow pit 1 do have both sensitive plant communities bordering them. The Curries Camp borrow pit 2 is a new site but it does not have any protected species or sensitive plant communities.. No Red Data species occur on any of the sites.

Should the development occur in the study area, the vegetation of the footprint area of the proposed development will be destroyed along with its specific species richness. The footprint of the proposed development is relatively small in terms of the regional context and the plant communities have a relatively low biodiversity conservation importance in a local, regional or national context.

7.1 Recommendations

It is recommended that

- It is recommended that a permit must be obtained for the removal of any of the protected species
- In case the sensitive areas are to be mined, permits must be obtained including for the protected species in terms of the Forest Act for the Shepherd's trees (Curries Camp borrow pit 1) and Camel thorn (Soverby borrow pit);
- an exercise to translocate the succulents and bulbous species in the development footprint is recommended.
- Erosion control measures must be applied at the disturbed areas at these borrow pits

8. REFERENCES

Bredenkamp, G.J. & Brown, L.R. 2001. Vegetation – A reliable ecological basis for environmental planning. Urban Green file Nov-Dec 2001: 38-39.

Henderson, L. 2001. Alien weeds and invasive plants. ATC, Pretoria.

Low, A.B. & Rebelo, A.G. (eds) 1996 Vegetation of South Africa, Lesotho and Swaziland. Dept Environmental Affairs & Tourism, Pretoria.

Mucina, L, & Rutherford, M.C. (Eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Mucina, L., Bredenkamp, G.J., Hoare, D.B. & McDonald, D.J. 2000. A National vegetation database for South Africa. South Africa Journal of Science 96:497-498.

Mueller-Dombois, D. & Ellenberg, H. 1974. Aims and methods of vegetation ecology. Wiley, New York.

Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C. Kamundi, D.A. & Manyama, P.A. (Eds.). 2009. Red list of South African plants 2009. *Strelitzia* 25:1-668.

SANBI & DEAT. 2009. Threatened Ecosystems in South Africa: Descriptions and Maps. DRAFT for Comment. South African National Biodiversity Institute, Pretoria, South Africa.

The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)

The Environmental Conservation Act, 1989 (Act No. 73 of 1989)

The Natural Forests Act, 1998. (Act 84 of 1998).

The National Environment Management Act, 1998 (Act No. 107 of 1998)

The National Environmental Management Biodiversity Act, 2004. (Act 10 0f 2004). Government Gazette RSA Vol. 467, 26436, Cape Town, June 2004.

The National Environmental Management Biodiversity Act, 2004. (Act 10 of 2004).

Draft List of Threatened Ecosystems. Government Gazette RSA Vol. 1477, 32689, Cape Town, 6 Nov 2009.

The Natural Scientific Professions Act (Act 27 of 2003)

Van Wyk, B.E., Van Oudtshoorn, B. & Gericke, N. 1997. Medicinal plants of South Africa. Briza, Pretoria.

Westhoff, V. & Van der Maarel, E. 1978. The Braun-Blanquet approach. In: Whittaker, R.H. (ed.) Classification of plant communities. W. Junk, The Hague.