

**THE PROPOSED AGRICULTURAL DEVELOPMENT ON PORTION 1
& 2 OF THE FARM KWAVE HOEK 52 AND THE REMAINING
EXTENT OF THE FARM SCHELM DRIFT 53, MAKANA LOCAL
MUNICIPALITY, EASTERN CAPE**

BIODIVERSITY / ECOLOGICAL ASSESSMENT

FOR

Habitat Link Consulting

BY



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DATE

7 August 2020

REVISION 1

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SPECIALIST REPORT DETAILS

This report has been prepared as per the requirements of the Environmental Impact Assessment Regulations and the National Environmental Management Act (Act 107 of 1998), any subsequent amendments and any relevant National and / or Provincial Policies related to biodiversity assessments. This also includes the minimum requirements as stipulated in the National Water Act (Act 36 of 1998), as amended in Water Use Licence Application and Appeals Regulations, 2017 Government Notice R267 in Government Gazette 40713 dated 24 March 2017, which also includes the minimum requirements for a Wetland Delineation Report.

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I, **Dr. Brian Michael Colloty** declare that this report has been prepared independently of any influence or prejudice as may be specified by the National Department of Environmental Affairs and or Department of Water and Sanitation



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1. Introduction

Habitat Link Consulting appointed EnviroSci (Pty) Ltd to conduct a biodiversity assessment as part of the Section 24G application being submitted for the clearance of indigenous vegetation for various activities (Figure 1) as well as assess other areas of the farm for future activities as part of an EIA that will also be submitted (Figure 2).

A number of the existing as well as proposed activities are within 100m of the Great Fish River and associated tributaries such as the Bampiespruit, thus these areas were also assessed with regard NEMA and National Water Act related activities in this assessment.

1.1 Aims and objectives

The aim of this report is to provide an assessment of the state and function of the terrestrial and aquatic habitats that were lost, together with an assessment of the potential issues posed by the present and future development. Where possible this report also provides means to avoid additional impacts or issues, such as where rehabilitation or alien invasive vegetation management is required. This was based on a site visit conducted on 15 May 2020.

1.2 Assumptions and Limitation

To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling.

Therefore, due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference. However, a concerted effort was made to assess as much of the potential site, as well as make use of any available literature, species distribution data and aerial photography, with particular focus on determining the type and importance of the vegetation that was cleared by the activities.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

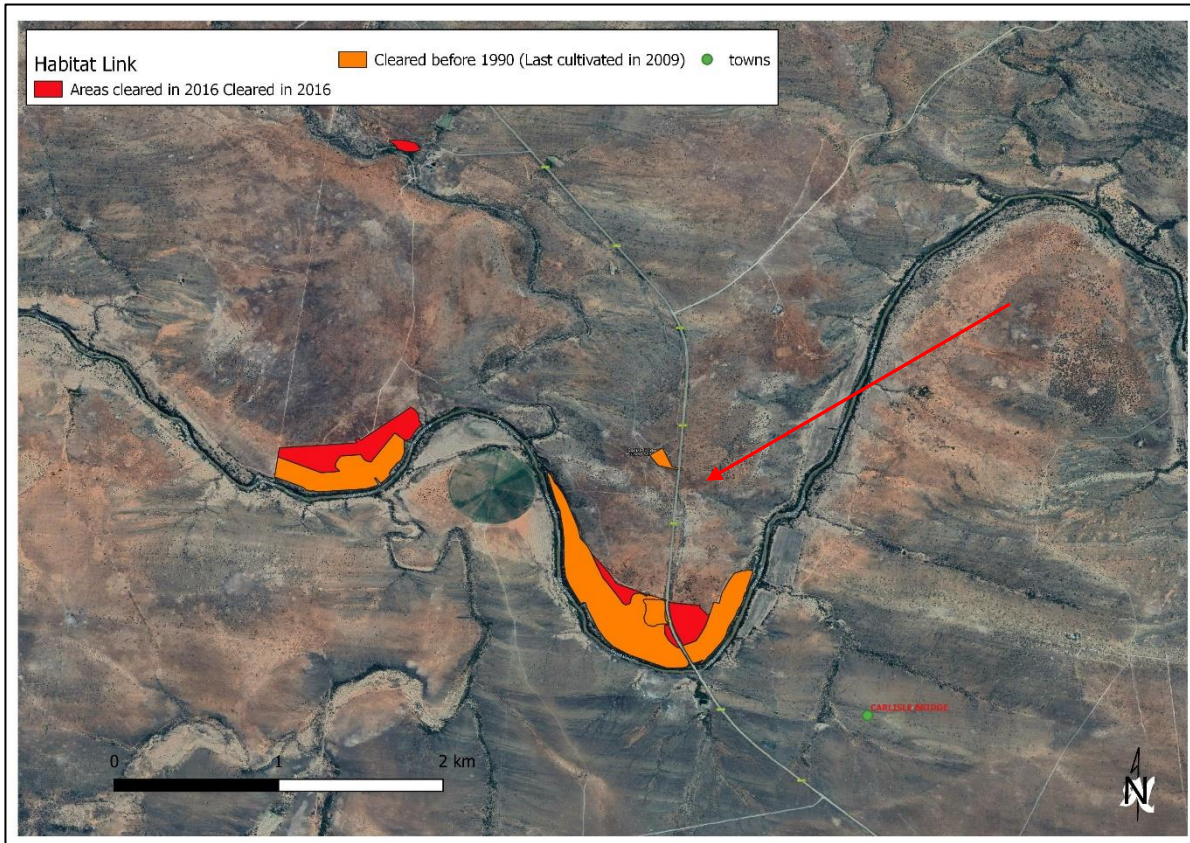


Figure 1: The disturbed areas assessed as part of the 24G Rectification Application noting those along the river banks are for agricultural use, and the remainder include a dam and farm school (red arrow)

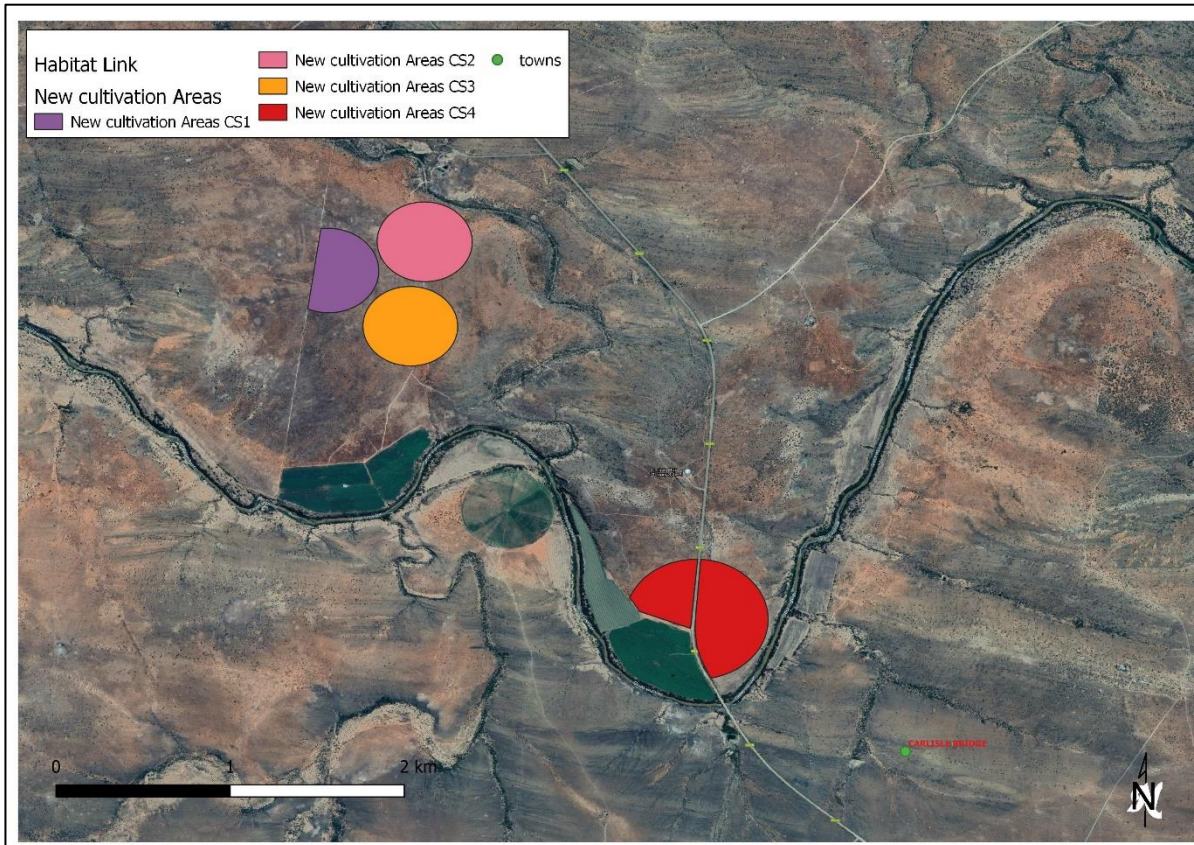


Figure 2: Proposed agricultural areas that will form part of a new EIA Application

2. Terms of Reference

The following scope of work and methods was used as the basis of this study to fulfil the above requirements:

A desktop and literature review of the area under investigation was conducted to collate as much information as possible prior to any detailed fieldwork. The purpose of the desktop assessment was to rank the level of ecological disturbance as a result of the development.

Other relevant literature for e.g. South African National Biodiversity Institute (distribution databases), relevant Red Data books, ordinances and all systematic bioregional / conservation plans were also consulted.

Fieldwork was limited to visual sightings by means of transect walks and plot-based sampling, while particular attention was also paid to the occurrence of any remaining Red Data species or Protected species.

Vegetation units were sampled by means of the following techniques as per each site:

- Data collection was based on an adapted time-meander method where the sampler chooses routes and records a floristic inventory of the various vegetation units and microhabitats, and times these routes until no or very few new species are recorded. Unknown species are collected or photographed for identification at a later stage.
- Results from the data analysis provided a description of the dominant and typical species occurring on the site(s), and will include:
 - Threatened, endemic or rare species, with an indication of the relative functionality and conservation importance of the specific community in the area under investigation
 - Invasive or exotic species present in the area
 - The functional and conservation importance of all vegetation communities under investigation.

Aquatic systems

The affected aquatic systems were assessed as follows:

- The assessment was initiated with a review of the available information for the region and activities that had occurred. This will also include review of the development in relation to any conservation plans or assessments known for the area, e.g. Critical Biodiversity Area maps, National Waterbody Inventory etc.
- Determine the Present Ecological State of any waterbodies incl. wetlands, estimating their biodiversity, conservation importance with regard ecosystem services using recognised PES / EIS assessment methods to determine the state, importance and sensitivity of the respective systems
- Prepared a map demarcating the respective watercourses or wetland/s, within a 500m radius of the study area. This demonstrates, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the hydrological zone of influence while classifying the hydrogeomorphic type of the respective water courses / wetlands in relation to present land-use and their current state. The maps depicting demarcated waterbodies will be delineated to a scale of 1:10 000, following the methodology described by the DWS.
- Buffer zones were recommended using the Macfarlane & Bredin (2017) approach to indicate any No-go / Sensitive areas around any delineated aquatic zones should these be thought necessary, supported by any relevant legislation, e.g. any bioregional plans, conservation guidelines or best practice if still applicable.
- Assessed the potential impacts, based on a supplied methodology, including cumulative impacts and for construction (should any additional activities still be required, particularly if the construction was halted), operations and decommissioning phases.
- Provide mitigations regarding observed impacts, which could negatively affect demarcated wetland or water course areas.
- Supply the client with geo-referenced GIS shape files of the wetland / estuarine areas with buffers as required.

3. Project Description

3.1 Section 24 Rectification Application (Extracted from BID)

The cultivation was undertaken in 2016 and triggered listed activities that require an Environmental Authorisation (EA) in terms of the 2014 NEMA Environmental Impact Assessment (EIA) Regulations. The activities took place on a section of Portion 1 and Portion 2 of the Farm Kwade Hoek 52 and on the Remaining Extent of the Farm Schelm Drift 53, which is located approximately 50 km northwest of the town of Grahamstown, situated within the Makana Local Municipality, seated within the Sarah Baartman District Municipality, Eastern Cape province.

The study area consists of a combination of natural riverine vegetation associated with the Great Fish River, agricultural land and natural Karoo vegetation. The surrounding land uses include several existing irrigated pastures and natural areas. The purpose of the development was to utilise the previously cultivated land bordering the Great Fish River in order to grow and cultivate lucerne. During preparation of the land in 2016, the farmer extended the previously cultivated areas (56 hectares) and cleared an additional 21 hectares (ha) of indigenous vegetation. The total area that is currently under cultivation is thus approximately 77 ha. The previously cultivated areas were originally cleared in the late 1980s and were last cultivated in 2009.

In addition, an area to the north in close proximity to the Bampiespruit River, a tributary of the Great Fish River, was cleared in 2016. This area is in close proximity to the existing farm house and is within a tributary of the river, thus likely to have resulted in some deposition of sediment in the riverine area during clearance of vegetation.

The existing farm dam located further north, was constructed prior to 1997 and thus does not form part of this application. Several smaller artificial wetlands occur throughout the farm with one natural wetland located in the southern section in close proximity to the Great Fish River. All water utilised for the cultivation of the farmland is done so as per an existing water use licence (WUL) issued to the proponent by the Department of Water and Sanitation (DWS) in November 2019.

3.2 Proposed new agricultural activities (Extracted from BID)

The proposed development includes the clearance of approximately 150 ha of the 700-ha properties for the establishment of lucerne, as well as the routing of water pipelines for irrigation purposes. The area of cultivation will be laid out in several crop circles and will be separated by service tracks that will double as routes for the irrigation pipelines. It is anticipated the main service tracks amongst cultivated area will remain unpaved and no new access tracks leading to the orchards will be required as there are a number of existing tracks currently present within the property. It is proposed that there will be up to four (4) crop circles that will utilise circular sprinkler systems for irrigation of crops.

The existing area located to the south of the proposed development area is currently under cultivation subject to the outcome of a separate authorisation process. Water is abstracted from the Great Fish River and is reticulated via several pumps to be utilised on the farm. The Department of Water and Sanitation (DWS) have granted combined irrigation rights of 1 350 000 m³ per annum for the purpose of irrigation of 150 ha lucerne, as stated in the Water Use Licence (WUL).

The study area consists of a combination of natural riverine vegetation associated with the Great Fish River, agricultural land and natural Karoo vegetation. The surrounding land uses include several existing irrigated pastures and natural areas.

4. APPLICABLE LEGISLATION

4.1 Relevant legislation and policy

The following is pertinent to this study:

- Section 24 of The Constitution of the Republic of South Africa;
- Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998;
- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) inclusive of all amendments, as well as the NEM: Biodiversity Act;
- National Water Act, 1998 (Act No. 36 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983); and
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- Nature and Environmental Conservation Ordinance (No. 19 of 1974)
- National Forest Act (No. 84 of 1998)
- National Heritage Resources Act (No. 25 of 1999)

NEMA and the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) would also apply to this project. These Acts have categorised many invasive plants together with associated obligations on the land owner. Several Category 1 & 2 plants were observed in several areas of the site under investigation.

4.2 Provincial legislation and policy

Provincial Nature Conservation Ordinance (PNCO of 1974) – Protected Flora as listed in Schedule 3 and 4 where relevant. Any such species must be removed or relocated with the applicable permits in place, issued by DEDEAT.

Several were found within the study area and are indicated in Section 5 of the report.

Schedule 2 – applies to the protection of animals and any significant populations or species can also only be removed with the request permits. No indigenous animals other than a variety of birds were observed within the site, although several are anticipated to occur within the region.

5. Description of the affected environment

5.1 Vegetation and flora

Historic Vegetation Type Descriptions

The Vegetation Map for South Africa, Lesotho and Swaziland (VegMap) by Mucina & Rutherford (2009) is the most widely accepted classification of South Africa's vegetation (Figure 3). It includes information on the conservation status and indicator species for each recognised vegetation type in the country. This biodiversity planning product also forms the basis for the NEMBA list of Threatened Ecosystems. The 2018 version of the VegMap has recently been released. This version resulted in a comprehensive re-classification of the Thicket biome, affecting the vegetation types recorded on site.

A small area of Southern Karoo Riviere (AZ) occurs in the south-eastern area of the study site, along the Great Fish River. It has been impacted by existing cleared fields, as well as the proposed fields (Plate 1). The vegetation type can be found on recent sandy-clayey alluvial deposits rich in salt occurring on mudrocks and sandstones of the Adelaide Subgroup (Beaufort Group of the Karoo Supergroup), from the Buffels River in the Western Cape to south of Cradock in the Eastern Cape. Narrow riverine flats supporting a complex of *Vachellia karroo* or *Tamarix usneoides* thickets (up to 5 m tall), and fringed by tall *Salsola*-dominated shrubland (up to 1.5 m high), especially on heavier (and salt-laden) soils on very broad alluvia. Mesic thicket forms in the far eastern part of this region. The vegetation type is considered Least Threatened, with some 2% transformed by agriculture. The conservation target is 24% with only 1.5% protected in conservation areas.

The majority of the remaining southern section of the site along the Great Fish River is classified as Albany Broken Veld (NKI4), a Nama Karoo vegetation type. It occurs on mainly Glenrosa and/or Mispah soils with some red-yellow, apedal, drained soils, on shales and some sandstones within the Witteberg Group of the Cape Supergroup and the Beaufort, Ecca and Dwyka Groups of the Karoo Supergroup. It is found on low mountain ridges and hills with an open grassy karroid dwarf shrubland with scattered low trees (*Boscia oleoides*, *Euclea undulata*, *Pappea capensis*, *Schotia afra* var. *afra*) with a matrix of dwarf shrubs (*Becium burchellianum*, *Chrysocoma ciliata*) and grasses (*Eragrostis obtusa*), from the Zuurberg to Riebeeck East in the Eastern Cape. The vegetation type is considered Least Threatened, with 3% transformed for cultivation. It has a conservation target of 16%, with 12% currently conserved.

Doubledrift Karroid Thicket (AT24), an Albany Thicket mosaic vegetation type, covers the majority of the site. This vegetation type occurs in the Eastern Cape Province, occurring in fragmented bands in the broad valley between the Zuurberg Mountains and Great Escarpment, from south of Somerset East toward Xheshi near the lower reaches of the Keiskamma River, on gently undulating plains and dissected hilltops. It comprises a mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of grassy karroid shrubland, with the grass component more prominent in moister sites (eastward) and the karroid shrub component more prominent in drier sites (westward). The bush clumps comprise trees and woody shrubs typical of AT32 Fish Valley Thicket (*Euphorbia tetragona*, *Pappea capensis*), and are often edged with *Portulacaria afra*. In many areas of Doubledrift Karroid Thicket, the previous skirting occurrence of *Portulacaria afra* in the thicket clumps are nowadays only evident in a circular ring of weedy grasses, often in combination with *Aloe striata*, amongst and around a stand of a few *Euphorbia tetragona* and *Pappea capensis* trees. It occurs predominantly on the Middleton and Koonap Formations in the Dwyka Group. It is considered a Least Threatened Vegetation Type, with 12% transformed by mostly overgrazing. It is considered to be poorly protected, with a conservation target of 19%.

The cultivated fields in the east would have cleared Southern Karoo Riviere, and very little of this vegetation type remains in the area. Areas of Albany Broken Veld were cleared for the cultivated fields in the west. Remnants of this vegetation type remains on the slopes that neighbour the cleared areas. On the upper slopes and flat areas, Doubledrift Karroid Thicket occurs. CS1, 2 and 3 would result in the loss of Doubledrift Karroid Thicket, whereas CS4 is within Southern Karoo Riviere and Albany Broken Veld.

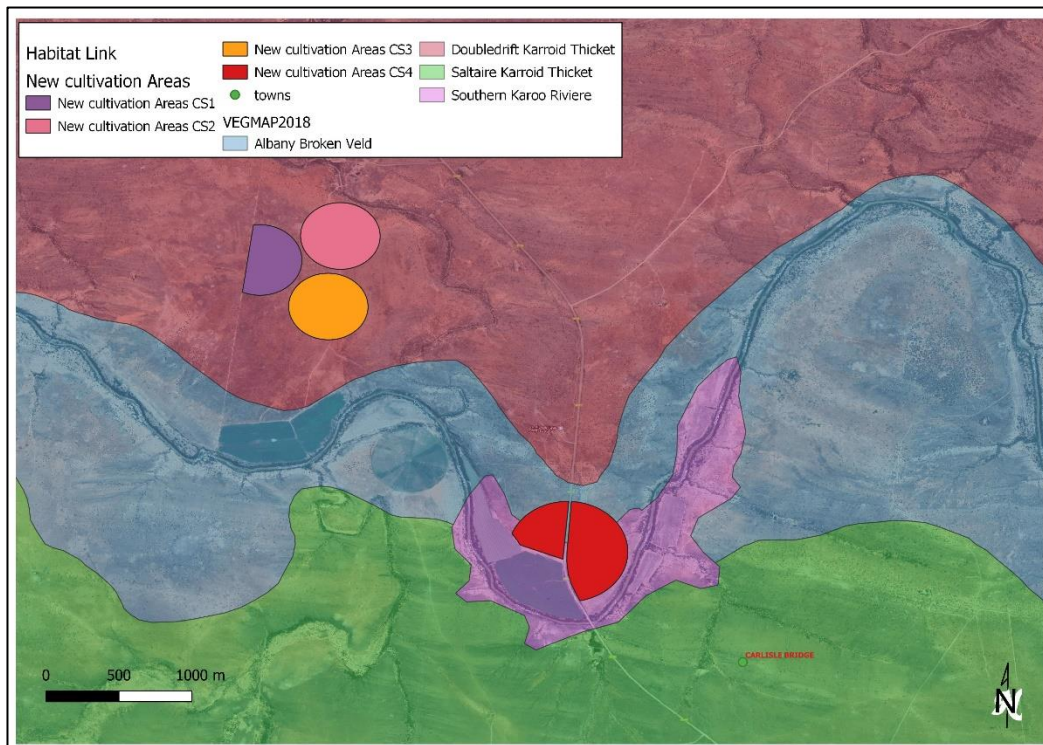


Figure 3: Vegetation types found within the study area, according to Mucina & Rutherford (2018).

Current Vegetation Types

A number of transects were done through a representative portion of the area to determine what vegetation would have been impacted by the historic clearing for cultivation, as well as for the proposed clearing (Figure 4). The remaining vegetation on site can be subdivided into a number of units (Figure 5).

Areas previously cleared for cultivation, the **cultivated fields**, are dominated by lucerne (*Medicago sativa*) and a variety of indigenous pioneer plants (*Aizoon glinoides*, *Euphorbia prostrata*), grasses (*Avena sativa*, *Cynodon dactylon*, *Panicum maximum*), and alien species, some declared invaders (*Datura ferox*, *Opuntia robusta*, *Salsola kali*, *Tithonia diversifolia*) (Plate 1).

A medium to dense **riparian woodland** extends along the banks of the Great Fish River and Baampiespruit, dominated by sedges and grasses (*Cynodon dactylon*, *Cyperus textilis*, *Phragmites australis*) on the river edge, tall trees on the steep banks (*Searsia lancea*, *Combretum caffrum*), and thicket trees and shrubs on the upper slope of the banks (*Azima tetraacantha*, *Buddleja saligna*, *Ehretia rigida*, *Gymnosporia heterophylla*, *Lycium* spp., *Olea europea* subsp. *africana*, *Vachellia karroo*, *Ziziphus mucronata*) (Plate 2). Climbers, including *Asparagus* spp. and *Cynanchum* spp., dwarf shrubs (*Felicia* spp.), and grasses (*Panicum deustum*, *P. maximum*) and succulents (*Drosantherum hispidum*, *Malephora lutea*) occur in the open patches and disturbed margins of the woodland. A single *Boscia oleoides* was found, a protected species.

Inland of this, the previous Southern Karoo Riviere, Albany Broken Veld and Doubledrift Karroid Thicket has been moderately to severely degraded to become a **Karoo dwarf shrubland** (Plate 3). This vegetation is dominated by pioneer and ephemeral grass species (*Aristida congesta* subsp. *congesta*, *Eragrostis obtusa*, *Tragus berteronianus*), and dwarf woody shrubs (*Anthospermum spathulatum* subsp. *uitenhagense*, *Blepharis capensis*, *Chrysocoma ciliata*, *Eriocephalus africanus*, *Felicia* spp., *Hermannia coccocarpa*, *H. cuneifolia* Jacq. var. *cuneifolia*, *Lasiosiphon meisnerianus*, *Leonotis pentadentata*, *Ocimum burchellianum*, and *Pentzia incana*). A number of succulent shrubs such as *Bulbine asphodeloides*, *Delosperma multiflorum*, *Drosantherum hispidum*, *D. lique*, *Trichodiadema pomeradianum*, occur as well. A few bulbs, namely *Drimia anomalum*, *D. altissima*, *Eriospermum brevipes*, *Moraea polystachya* are common. A number of tall shrubs and trees are present as short and species poor bushclumps. These are *Carissa bispinosa*, *Euclea undulata*, *Grewia robusta*, *Gymnosporia* spp.,

Lycium spp., *Pappea capensis*, *Rhigozum obovatum*, and *Searsia longispina*. *Boophane disticha* is quite common in certain patches of the vegetation that are not highly degraded, as well as *Pachypodium succulentum*. *Agave sisalana* and the various *Opuntia* spp. on site occur in the vegetation type.

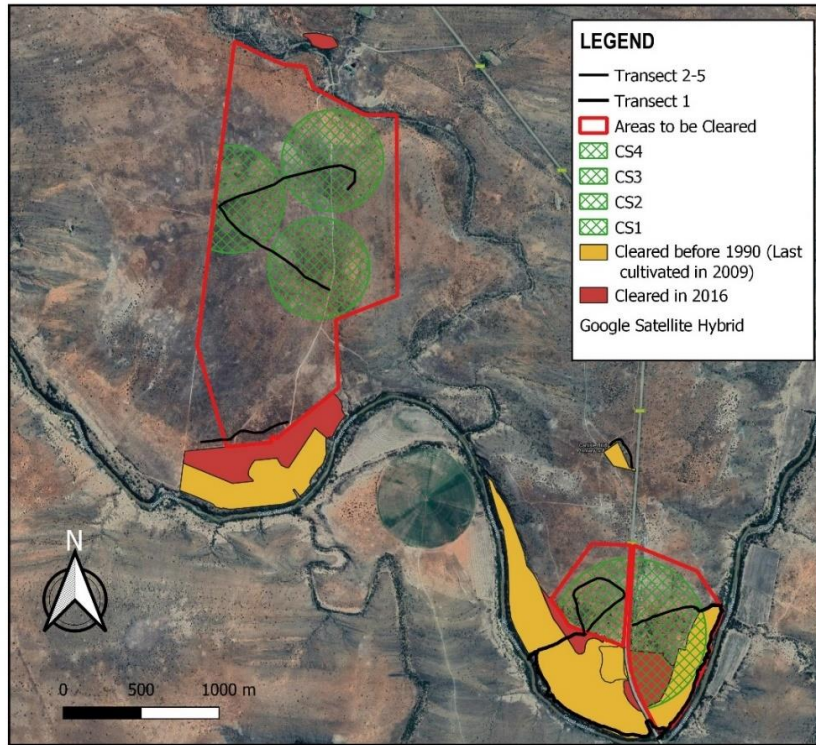


Figure 4: Locality map indicating the transects walked to identify the state of the vegetation and location of SCCs.

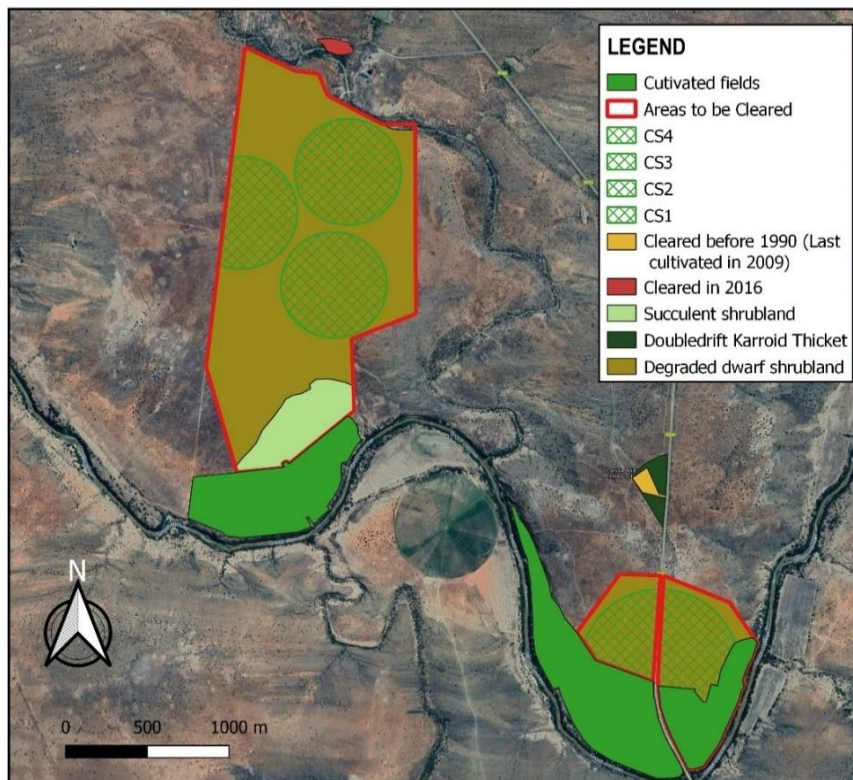


Figure 5: The remaining vegetation types of the proposed area to be impacted by cultivation (red polygons), as well as the existing cleared areas, including areas cleared in 1990, 2016 and currently cultivated fields.

It is difficult to identify where the historic boundary between the Nama Karoo and Thicket vegetation was, due to the high level of degradation (Plate 5). Most Thicket bushclumps, which form a component of both biomes, have been severely reduced to mostly consisting of single or a few species of low height. A single *Portulacaria afra* was identified in the north-western proposed fields, and it was reduced to a few cms from the ground.

On the western side of the property, in the area previously identified as Albany broken veld, a **succulent dwarf shrubland**, dominated by succulent species is found (Plate 4). Species composition is similar to the karoo shrubland that occurs across most of the remainder of the site, but the diversity and cover of succulent species is higher, including species such as *Bulbine narcissifolia*, *Glottiphyllum grandiflorum* and *Anacampseros arachnoides*. *Mestoklema* sp. occurs here, as well as *Trichodiadema decorum*,

Although separate from the scope of these agriculture applications, the Carlisle Bridge school site is surrounded by mostly lightly degraded Thicket mosaic, described as **Doubledrift Karroid Thicket**, with many intact and species rich bushclumps, a high cover of succulent species, including *Portulacaria afra*, *Aloe spp.*, *Crassula spp.*, *Euphorbia spp.* and *Cussonia spicata* (Plate 6). The matrix dwarf shrubland is dominated by the same annual grasses and woody shrubs found in the surrounding agricultural land, indicating historic high grazing pressure. However, perennial grasses of high grazing value (*Digitaria eriantha*, *Panicum maximum*) are more common, and there is a greater cover of woody dwarf shrubs and succulent shrubs (*Gasteria bicolor*). Bulbs such as *Haemanthus albiflos*, *Sansevieria hyacinthoides*, Common climbers present include *Cyphostemma quinatum* and *Rhoicissus tridentata*.



Plate 1: A view of the lucerne fields neighbouring the riparian woodland along the Great Fish River



Plate 2: A view of the riparian woodland on the steep banks of the Great Fish River



Plate 3: The karroid dwarf shrubland neighbouring the cultivated areas in the east



Plate 4: The transition from the existing fields, to the succulent shrubland, to the degraded Thicket with bushclumps in the background



Plate 5: A view of the access road through the degraded Doubledrift Karroid Thicket, reduced to a grassy dwarf shrubland with a high cover of annual grasses.



Plate 6: Doubledrift Karroid Thicket surrounding the Carlisle Bridge School site (neighbouring property), rich in succulent plants and intact bushclumps

5.2 Fauna

With regard faunal diversity, a detailed review of past literature as well as spatial species databases / atlases was conducted to produce a species checklist prior to the field work being conducted (Appendix 1). The species observed were limited to invertebrates, birds and reptiles as shown in Table 1.

Faunal diversity observed due to the state and size of the site was thus low, when compared to the anticipated species known to occur in the region. The animals thus observed were mostly birds, small insects and evidence of small buck (spoor), Kudu, Scrub hares and Porcupines (quills).

No species of special concern (IUCN Red Data species) were observed, but all are listed under the PNCO as protected, as these are indigenous to South Africa.

Table 1: Faunal species observed within the site

Taxon	Common Name	Conservation status and habitat	Site observation
Invertebrates			
<i>Dira clytus</i>	Cape autumn widow	Least Concern (SABCA 2013)	Flying or feeding within site
<i>Acraea horta</i>	Garden Acraea	Least Concern (SABCA 2013)	
<i>Junonia hierta cebrene</i>	Yellow pansy	Least Concern (SABCA 2013)	
<i>Locusta pardalina</i>	Brown locust	Least Concern	
<i>Belenois aurota</i>	Brown veined white	Least Concern (SABCA 2013)	
Birds			
<i>Euplectes capensis</i>	Bishop, Yellow	RDB, 2015 Least Concern	Flyover heading to river
<i>Corvus albus</i>	Crow, Pied	RDB, 2015 Least Concern	Scavenging near tents
<i>Streptopelia senegalensis</i>	Dove, Laughing	RDB, 2015 Least Concern	Feeding within site
<i>Bubulcus ibis</i>	Egret, Cattle	RDB, 2015 Least Concern	Flyover

<i>Bostrychia hagedash</i>	Ibis, Hadedda	RDB, 2015 Least Concern	Feeding within site
<i>Passer melanurus</i>	Sparrow, Cape	RDB, 2015 Least Concern	Feeding within site
<i>Nectarinia [Cinnyris] veroxii</i>	Grey (Mouse-coloured) Sunbird	RDB, 2015 Least Concern	Feeding within site
<i>Pycnonotus capensis</i>	Cape Bulbul	RDB, 2015 Least Concern	Feeding within site
<i>Alopochen aegyptiacus</i>	Egyptian Goose	RDB, 2015 Least Concern	Flyover
<i>Motacilla capensis</i>	Cape Wagtail	RDB, 2015 Least Concern	Feeding within site
<i>Ardea cinerea</i>	Grey Heron	RDB, 2015 Least Concern	Feeding within site
<i>Turtur chalcospilos</i>	Emerald-spotted Wood Dove	RDB, 2015 Least Concern	Calling within site
<i>Lamprotornis nitens</i>	Cape Starling	RDB, 2015 Least Concern	Feeding within site
<i>Nectarinia famosa</i>	Malachite Sunbird	RDB, 2015 Least Concern	Feeding within site
<i>Upupa africana</i>	African Hoopoe	RDB, 2015 Least Concern	Feeding within site
Reptiles			
<i>Bitis arietans</i>	Puff Adder	Least Concern (ARRSA, 2014) Widespread	Road kill on Bedford Rd
Mammals			
<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern (RDB, 2017) PNCO only	Quills observed in several areas of the study area
<i>Tragelaphus strepsiceros</i>	Greater Kudu	Least Concern (RDB, 2017) PNCO only	Three females foraging in the Bampiespruit riparian vegetation
<i>Lepus saxatilis</i>	Scrub Hare	Least Concern (RDB, 2017) PNCO only	Various individuals or scat located throughout the study area

Where:

ARRSA = Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. 2014. Edited by Michael F. Bates, William R. Branch, Aaron M. Bauer, Marius Burger, Johan Marais, Graham J. Alexander & Marianne S. de Villiers. SANBI, Pretoria.

RDB, 2015 = Taylor MR, Peacock F, Wanless RM (eds) 2015. The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

SABCA = Mecenero, S., J.B. Ball, D.A. Edge, M.L. Hamer, G.A. Hening, M. Krüger, E.L. Pringle, R.F. Terblanche & M.C. Williams (eds). 2013. Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red List and atlas. Saffronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town.

RDB, 2017 = Matthew C, & Roxburgh, L., Do Linh San, E., I & Raimondo, D., & Davies-Mostert, Harriet. (2017). The Red List of Mammals of South Africa, Swaziland and Lesotho 2016.

The DEA Screening Tool, indicated that the study area is located within a Medium Sensitivity area with regards Animal species, due to the potential presence of the butterfly *Lepidochrysops victori* (Victor's Blue) of the Lycaenidae family. This species, which is considered Vulnerable, is usually visible between mid-February to the end of March. The larvae feed on *Selago corymbosa* (Woodall, 2005), which was not found on site, in particular within the proposed cultivation areas.

Species records for this butterfly are only known from four areas associated with the Groot Winterberg range in the Eastern Cape, of which this assessment area does not form part.

5.3 Aquatic environment

The study area is located within the Q91B Great Fish River quaternary catchment as shown in Figure 6, within the Drought Corridor Ecoregion of the Mzimvubu-Tsitsikamma Water Management Area (WMA).

Several waterbodies are also shown in the National Wetland Inventory (NWI) Version 5 released by van Deventer *et al.* (2020) (Figure 7). The presence of riverine wetlands was confirmed during the site visit along the banks of the Great Fish River, while the artificial dams observed within the properties contained no wetland elements. The remaining areas of the riverine systems were dominated by riparian woodlands, as previously described in this report. These riparian zones were highlighted by the DEA Screening Tool as having a Very High Sensitivity. These areas have been avoided in the past by the current activities, but based on the riverine buffer model by MacFarlane & Bredin (2017), the newly proposed areas should be placed 120m from the Braampiespruit in particular (see conservation importance / state rating rational below). Cultivation area CS2, is thus located within the buffer area.

The wetland areas along the Great Fish River were dominated by several plant species mostly associated with the Reed and Cyperaceae (Nut grass) family and included the following species (Plate 7):

<i>Cyperus textilis</i>	<i>Helichrysum cymosum</i>
<i>Ficinia litoralis</i>	<i>Scirpus nodusis</i>
<i>Tetraria cuspidate</i>	<i>Eipschoenus gracilis</i>
<i>Elegia spp</i>	<i>Phragmites australis</i>
<i>Carpha spp</i>	<i>Typha capensis</i>

No aquatic species of special concern were observed within the study areas. Any of the cleared areas within 500m of the riverine wetlands would have required a Section 21c & i authorisation, while the proposed cultivation areas are more than 500m from any wetlands and would not require any authorisation with regard to wetland boundaries.

Past and proposed activities have and will avoid any watercourses within the study area as shown in Figure 8, and therefore none of the current or proposed activities would require any water course crossings as the infrastructure is already in place. Only the proposed 120m buffer is reiterated, which should be avoided along the Braampiespruit tributary.

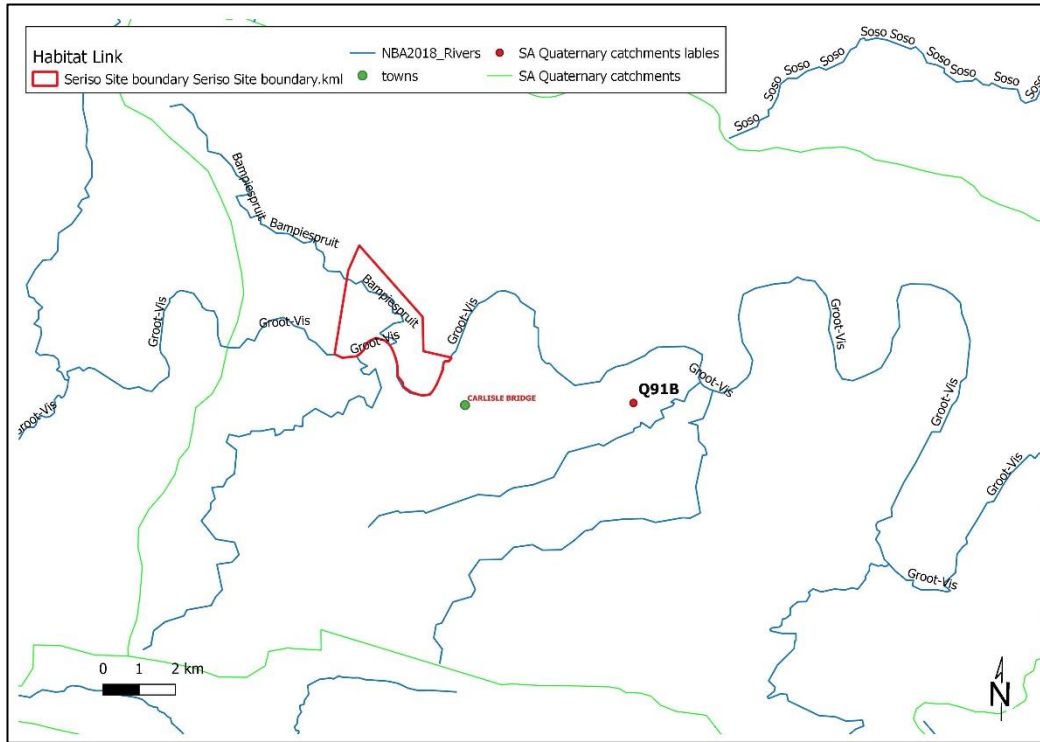


Figure 6: Project locality indicating the various quaternary catchments and mainstem rivers (Source DWS, NWI and NGI)



Plate 7: A view of the riverine wetland (red arrow) below site boundary, dominated by reeds and small sedges on both banks situated on the river bed and below the riparian woodlands

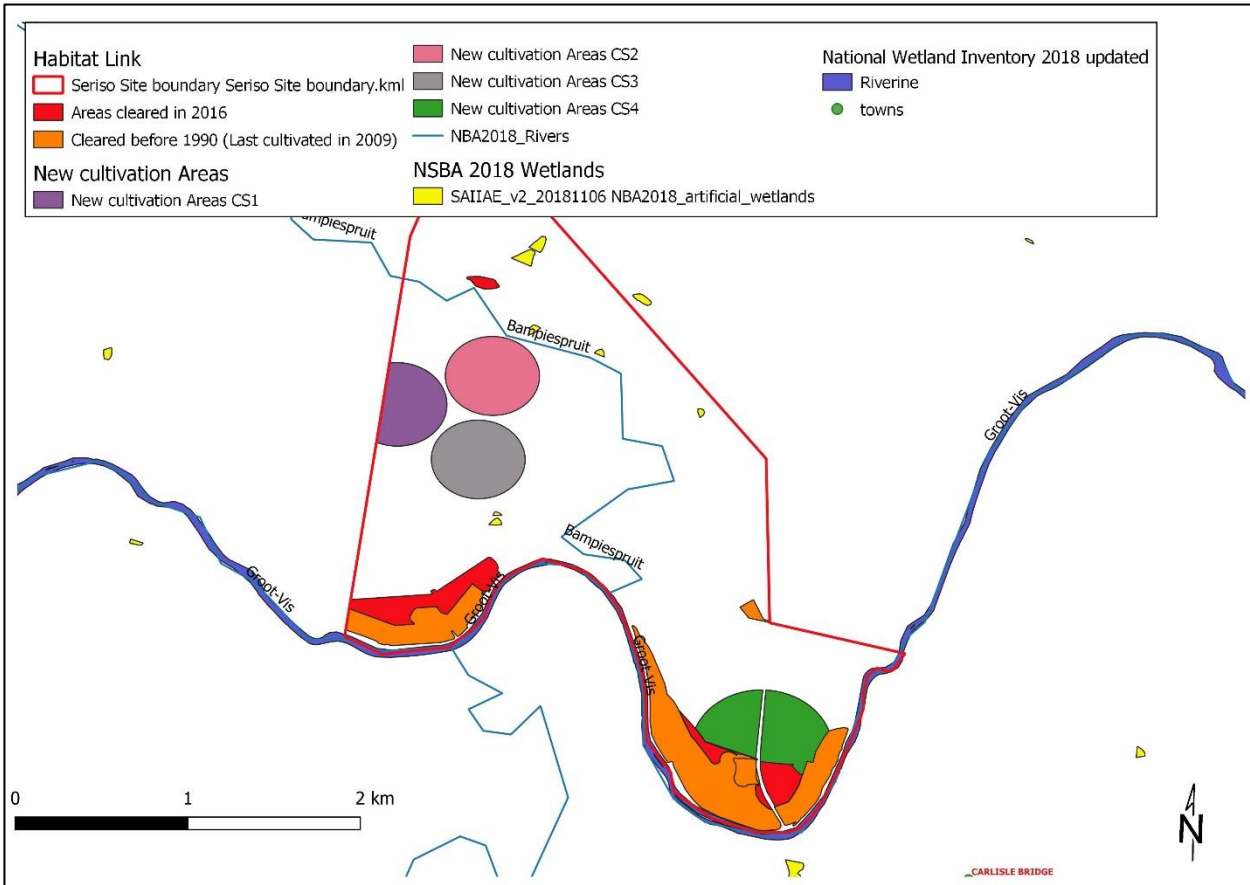


Figure 7: Extent of riverine wetland confirmed during this assessment

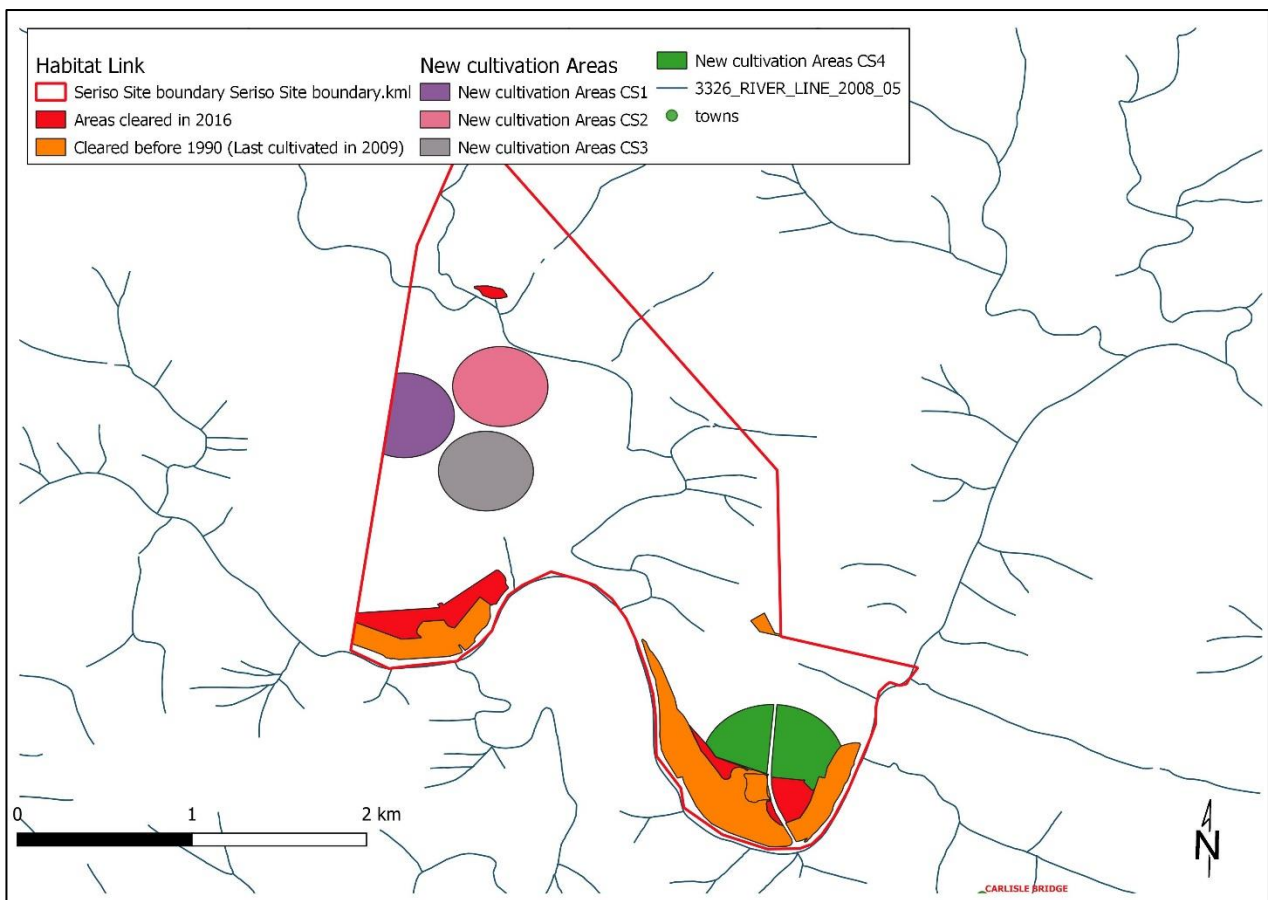


Figure 8: Known water courses within the region

5.4 Present Ecological State and conservation importance (Aquatic environment)

The PES of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores have been revised for the country and based on the new models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014 and to an extent revised in the National Spatial Biodiversity Assessment, 2018 data, released 2019). The new PES system also incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

The PES for the study river systems inclusive the riverine wetlands (Subquaternary catchment 9029) was rated as follows (DWS, 2014 /NSBA, 2018) where B = Largely Natural & C = Moderately Modified:

Subquaternary Catchment Number	Present Ecological State	Ecological Importance	Ecological Sensitivity
8223 Fish River	C	Moderate	Moderate
8144 Fish River	C	Moderate	Moderate
8189 Fish River	C	Moderate	Moderate
8135 Baampiespruit	B	High	High

These scores were adjusted by observations made in the field, due to the current impacts such as:

- Alien vegetation
- Vegetation clearing
- Impoundments (several above and below the site), and
- Agricultural return flow from the various pivot irrigation systems;

The Ecological Importance and Sensitivity Score were rated as Moderate & High (Baampiespruit) by DWS for the Subquaternary catchments (2014), due to the importance of the habitat they provide (fish & invertebrates), filter pollutants and support the downstream systems, while forming part of an Aquatic Critical Biodiversity Area under the ECBCP, as shown in Figure 9. This would be substantiated by information collected in the field and the presence of the riverine wetlands observed that would mitigate impacts such as agricultural return flows and trap any sediments within runoff. It is however important to highlight the intact nature of the systems along the Baampiespruit, one of the most natural riparian woodlands observed within the greater region.

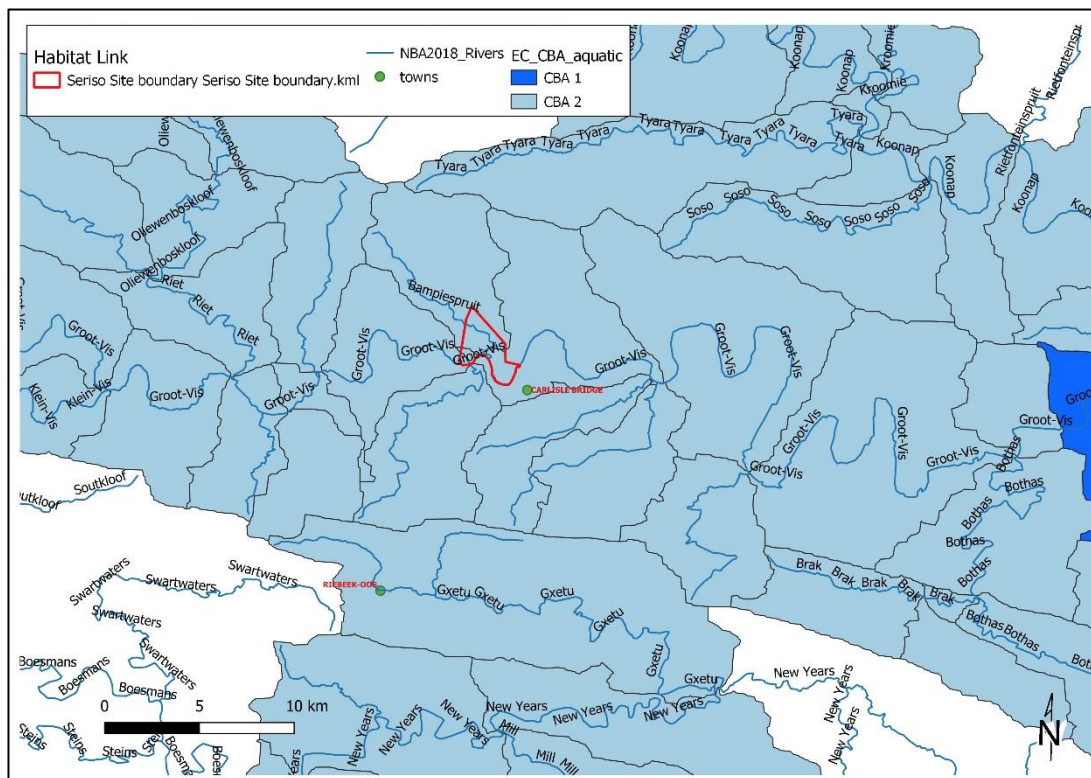


Figure 9: NFEPA Priority Ecosystem Areas

5.4 Alien Invasive Species

There were 19 non indigenous plant species recorded from the development site (Table 2), of which 11 are declared invaders under the National Environmental Management: Biodiversity Act No. 10 of 2004 – Alien and Invasive Species Lists (published 29 July 2016). Invasives categorised as Category 1b are *Argemone ochroleuca*, *Arundo donax*, *Datura ferox*, *Nicotiana glauca*, *Opuntia aurantiaca*, *Opuntia ficus-indica*, *O. microdasys*, *O. robusta*, *Salsola kali* and *Tithonia diversifolia*. Category 2 Invasive species is *Agave sisalana*.

Table 2: Alien Invasive Species recorded on study site

FAMILY	SPECIES	AIPs
AGAVACEAE	<i>Agave sisalana</i> Perrine	2
PAPAVERACEAE	<i>Argemone ochroleuca</i> Sweet	1b
POACEAE	<i>Arundo donax</i> L.	1b
SOLANACEAE	<i>Datura ferox</i> L.	1b
SOLANACEAE	<i>Nicotiana glauca</i> Graham	1b
CACTACEAE	<i>Opuntia aurantiaca</i> Lindl.	1b
CACTACEAE	<i>Opuntia ficus-indica</i> (L.) Mill.	1b
CACTACEAE	<i>Opuntia microdasys</i> (Lehm.) Pfeiff.	1b
CACTACEAE	<i>Opuntia robusta</i> J.C.Wendl. ex Pfeiff. [1a
AMARANTHACEAE	<i>Salsola kali</i> L.	1b
ASTERACEAE	<i>Tithonia diversifolia</i> (Hemsl.) A. Gray	1b

5.5 Conservation Importance of Terrestrial Environment

The Eastern Cape Biodiversity Conservation Plan (Berliner *et al.* 2007a) is a regional systematic biodiversity conservation plan for the Eastern Cape (Figure 10). The plan set certain development guidelines based on

calculated biodiversity score for different landscapes. Basically, the terrestrial areas covered by the plan are designated as Critical Biodiversity 1, 2, or 3 areas, each with specific development recommendations.

The ECBCP systematic conservation assessment has identified critically endangered vegetation types (ecosystems); areas essential for meeting biodiversity targets for biodiversity features (SA vegetation types, expert mapped priority areas); and there could be critically endangered forest patches in terms of the National Forest Agreement, as well as forest clusters that have been identified as critical in the forestry planning process (Berliner *et al.* 2007). The proposed development falls within the Terrestrial Critical Biodiversity (CBA) Area 2 – T2, indicated by the Eastern Cape Biodiversity Conservation Plan (2007b).

Within the Terrestrial CBA 2 T2 areas, there are Biodiversity Land Management Class (BLMC) that are included (Berliner *et al.* 2007b). Mainly, BLMC 1 for natural landscapes and BLMC 2 which are for near-natural landscapes. Each BLMC has specific land use objectives, with the land BLMC 1 being used to maintain the biodiversity in a state that is as natural as possible; and to manage the land in such a way where there is no biodiversity loss. It is recommended that land in BLMC 2 is maintained in a near natural state with minimal loss of the ecosystem integrity. In addition, there should be no transformation of the natural habitat should be permitted. The site falls in a BLMC2 area.

The site is not near to any conservation areas or protected areas, and does not fall within an area identified in the National Protected Area Expansion Strategy (Figure 10).

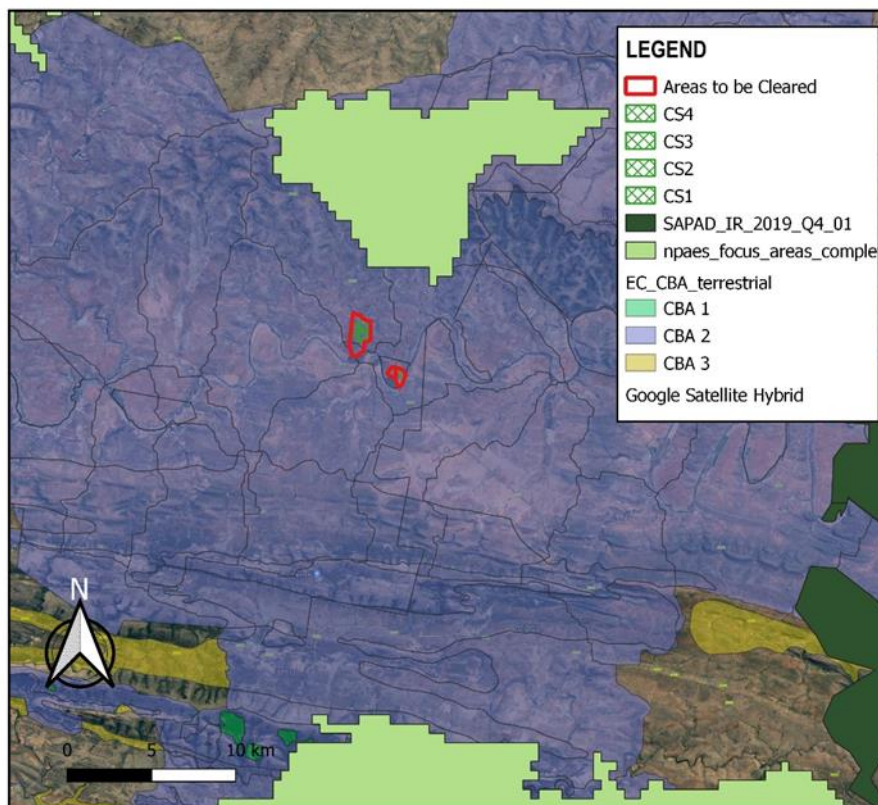


Figure 10: Map identifying the terrestrial conservation sensitivities of the project site

6. Permit requirements

In terms of Water Use Authorisation these applications are in the process of being submitted, but would also need the inclusion of any activities with regard Section 21 c & i water uses.

It is recommended that all Threatened or Protected Species remain in situ, and are not removed. “Search and Rescue” has a low success rate, and does little to preserve the habitat of the species. However, certain protected

species are in reality exceptionally common and in no risk of extinction, and their removal will not increase that risk. This is especially true for when a whole family is protected.

No plant species protected under the NFA and NEM:BA were identified in this survey. Permits will be required, in terms of NCO and ECA from the competent authority DEDEAT, for the species in Table 3.

Table 3: List of Protected Species recorded on study site.

FAMILY	SPECIES	Threat status	NFA	NECO	ToPs	ECECB
AIZOACEAE	<i>Delosperma multiflorum</i> L.Bolus	LC		Sch 4		Sch 5
AIZOACEAE	<i>Drosanthemum hispidum</i> (L.) Schwantes	LC		Sch 4		Sch 5
AIZOACEAE	<i>Glottiphyllum grandiflorum</i> (Haw.) N.E.Br.	LC		Sch 4		Sch 5
AIZOACEAE	<i>Lampranthus</i> sp.			Sch 4		Sch 5
AIZOACEAE	<i>Malephora lutea</i> (Haw.) Schwantes	LC		Sch 4		Sch 5
AIZOACEAE	<i>Mesembryanthemum</i> sp. (<i>Psilocaulon</i> group)			Sch 4		Sch 5
AIZOACEAE	<i>Mestoklema</i> sp.			Sch 4		Sch 5
AIZOACEAE	<i>Trichodiadema decorum</i> (N.E.Br.) Stearn ex H.Jacobsen	DDD		Sch 4		Sch 5
AIZOACEAE	<i>Trichodiadema pomeridianum</i> L.Bolus	LC		Sch 4		Sch 5
AMARYLLIDACEAE	<i>Boophone disticha</i> (L.f.) Herb.	LC		Sch 4		Sch 5
AMARYLLIDACEAE	<i>Haemanthus albiflos</i> Jacq.	LC		Sch 4		Sch 5
APOCYNACEAE	<i>Carissa bispinosa</i> (L.) Desf. Ex Brenana	LC		Sch 4		Sch 5
APOCYNACEAE	<i>Cynanchum ellipticum</i> (Harv.) R.A.Dyer	LC		Sch 4		Sch 5
APOCYNACEAE	<i>Cynanchum viminale</i> (L.) Bassi subsp. <i>viminale</i>	LC		Sch 4		Sch 5
APOCYNACEAE	<i>Pachypodium succulentum</i> (Jacq.) Sweet	LC		Sch 4		Sch 5
ASPHODELACEAE	<i>Aloe africana</i> Mill.	LC		Sch 4		Sch 5
ASPHODELACEAE	<i>Aloe micracantha</i> Haw.	LC		Sch 4		Sch 5
ASPHODELACEAE	<i>Aloe microstigma</i> Salm-Dyck	LC		Sch 4		Sch 5
ASPHODELACEAE	<i>Aloe speciosa</i> Baker	LC		Sch 4		Sch 5
ASPHODELACEAE	<i>Aloiampelos tenuior</i> (Haw.) Klopper & Gideon F.Sm.	LC		Sch 4		Sch 5
ASPHODELACEAE	<i>Gasteria bicolor</i> Haw. var. <i>bicolor</i>	LC				Sch 5
COMBRETACEAE	<i>Combretum caffrum</i> (Eckl. & Zeyh.) Kuntze	LC				Sch 5
GERANIACEAE	<i>Pelargonium</i> cf. <i>schizopetalum</i> Sweet	LC				Sch 5
IRIDACEAE	<i>Moraea polystachya</i> (Thunb.) Ker Gawl.	LC		Sch4		Sch 5
OLEACEAE	<i>Olea europaea</i> L. subsp. <i>africana</i> (Mill.) P.S.Green	LC				Sch 5
SAPINDACEAE	<i>Pappea capensis</i> Eckl. & Zeyr	LC				Sch 5
SCHROPHULARIACEAE	<i>Buddleja saligna</i> Willd.	LC				Sch 5

Where LC = Least Concern & DDD = Data Deficient

7. Site Sensitivity

The site occurs within a CBA2 (ECBCP 2009), and should be maintained in a near natural landscape. However, all vegetation types in the area are Least Concern, and the majority of the site is moderately to severely degraded by overgrazing, and transformed by cultivation. Albany thicket has a low resilience to degradation, and restoration of degraded areas is difficult and expensive.

A Data Deficient species, namely *Trichodiadema decorum*, was recorded on site. According to the SANBI Guidelines for Data Deficient species, the subpopulation should be well surveyed and the data sent to the Threatened Species Programme. The species will be reassessed and the new status of the species, with a recommendation, will be provided within a short timeframe. However, the species was only identified after the site survey, and the subpopulation was not surveyed. It is recommended that this is done before clearance of the site for agriculture.

A *Mestoklema* sp. occurs on site as well. This is potentially *M. albanicum*, a Near Threatened (NT) species, but could be an alternative species as well. It is very difficult to tell when the plant is not in flower. The SANBI guidelines for species that are classified as Near Threatened by the D criterion states that:

“Currently known from fewer than 10 locations, therefore preferably recommend no loss of habitat. Should loss of this species' habitat be considered, then an offset that includes conserving another viable subpopulation (in terms of the Protected Areas Act) should be implemented, provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.”

An offset area potentially needs to be identified where *Mestoklema albanicum* is found. Although the area is identified as a CBA2 by ECBCP, an alternative site would be preferable due to the level of degradation

The DEA Screening Report indicated the possible presence of two Sensitive plant species, namely **Sensitive Plant Species 275 and 491**. Both species are threatened by overcollection for the muti and horticultural trade. Both species occur are Listed as Vulnerable. Neither were identified on site during the site assessment, and will most likely not occur in the proposed cultivated areas, as they would be associated with Thicket and Thicket mosaic vegetation types in the area that are in good condition.

A number of Protected plant species occur on site, increasing the sensitivity of the site. Translocation of Threatened species cannot be considered as a mitigation measure that reduces the severity of an impact, as it results in the loss of habitat for that species, and is often not successful. Protected species that required a permit may be translocated, as these are often fairly common species that are not Threatened. Due to the number of SCCs and Protected species on site, the majority of the site is considered to have a sensitivity rating of Moderate.

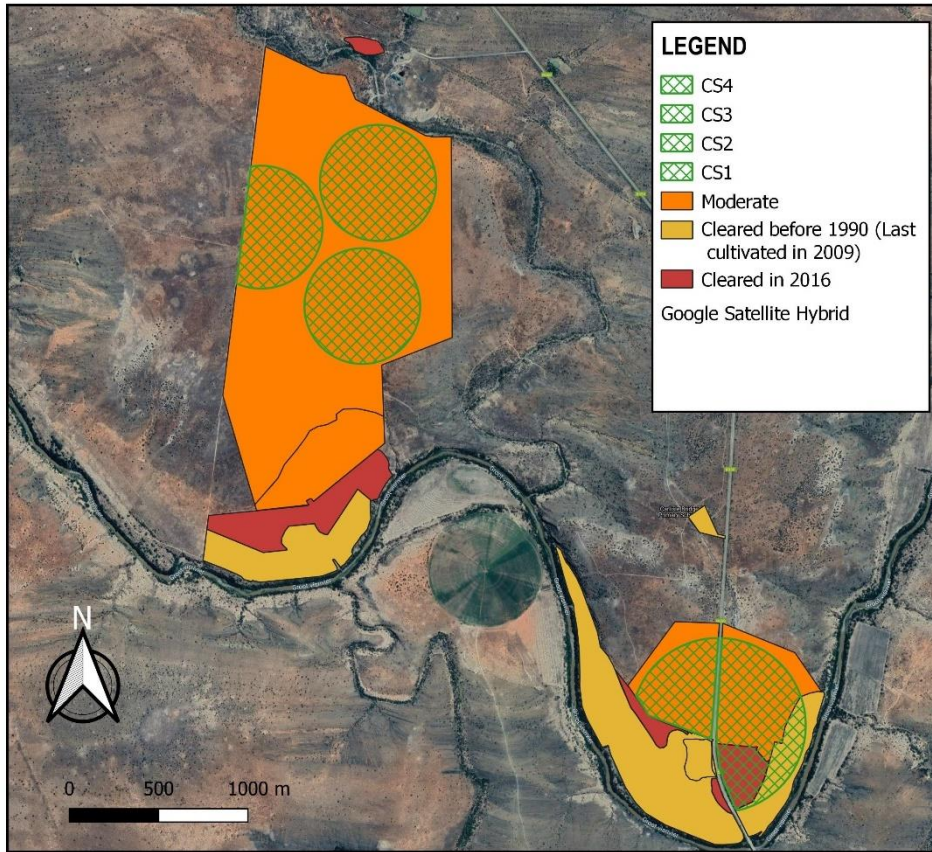


Figure 11: Sensitivity of the terrestrial vegetation impacted by the proposed cultivated fields.

8. Impact Assessment

During the impact assessment a number of potential key issues / impacts were identified, and these were assessed based on the methodology supplied by Habitat Link Consulting:

Current activities (S24 Rectification)

- Impact 1: Loss of terrestrial vegetation or habitats, replaced with agricultural lands
- Impact 2: Loss of terrestrial Species of Conservation Concern and Threatened or Protected Species
- Impact 3: Loss of aquatic riverine and wetland habitat
- Impact 4: Habitat fragmentation (aquatic and terrestrial)
- Impact 5: Impact on baseflow hydrology
- Impact 6: Increase in sedimentation and erosion
- Impact 7: Risks on the aquatic environment due to water quality impacts
- Impact 8: Cumulative impacts

Proposed activities (future clearing)

- Impact 1: Loss of terrestrial vegetation or habitats, replaced with agricultural lands
- Impact 2: Loss of terrestrial Species of Conservation Concern and Threatened or Protected Species
- Impact 3: Loss of aquatic riverine and wetland habitat
- Impact 4: Habitat fragmentation (aquatic and terrestrial)
- Impact 5: Impact on baseflow hydrology
- Impact 6: Increase in sedimentation and erosion
- Impact 7: Risks on the aquatic environment due to water quality impacts
- Impact 8: Cumulative impacts

The impact of clearing the natural vegetation for the existing fields cannot be directly assessed, as little to no natural vegetation remains within the footprint of the fields. However, this impact can be inferred by assessing the surrounding vegetation that is assumed to be similar to that cleared, with the exception of small portions that form part of the previous Carlisle Cricket Fields (west of the public road).

Current activities (S24 Rectification)

8.1: Impact 1: Loss of terrestrial vegetation or habitats – Direct Negative Impact

Environmental Impact: The past clearing of natural vegetation for proposed cultivation and grazing within natural veld that remains		Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term as an operational phase impact.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised within any areas that still contain any natural vegetation. • A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers • The remaining succulent shrubland should be conserved as an offset area, and to preserve habitat connectivity • The remaining Doubledrift Karroid Thicket should be grazed at appropriate stocking densities to avoid further degradation by overgrazing and to preserve species diversity 			
Impact Significance							
Without Mitigation:	Extent Local (2)	Duration Permanent (5)	Severity High (8)	Reversibility Partly (0.5)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance High (80)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (4)	Reversibility Completely (0.5)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (30)
Potential to Mitigate: Low or Unmitigatable				Assessment Confidence: Complete			

8.2: Impact 2: Loss of terrestrial plant Species of Conservation Concern and Protected Species – Direct Negative Impact

Environmental Impact: The loss of SCCs and Protected Plant species and their associated habitat for cultivation		Activity/Aspect & Impact Source: The clearance of natural vegetation, even if degraded, has resulted in the permanent loss of SCCs, and their associated habitat. Sensitive Species are slow growing and natural recolonization is highly unlikely.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers • The remaining succulent shrubland should be conserved as an offset area • Translocate all Protected species to an area of the farm that will be protected from overgrazing and clearing that are located within any active farming areas • Decommissioning of the cultivated fields will require active rehabilitation to restore the biodiversity and ecosystem function of the site, including re-introduction of species 			
Impact Significance							
Without Mitigation:	Extent Local (2)	Duration Long-term (5)	Severity High (8)	Reversibility Irreversible (1)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance High (82.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.3: Impact 3: Loss of aquatic riverine and wetland habitat – Direct Impact

Environmental Impact: The clearing of vegetation for the present day farming area		Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term as an operational phase impact. However the affected habitat is well outside any of the riparian zones if the proposed buffer is adhered to.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers 			
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.4: Impact 4: Habitat fragmentation (aquatic and terrestrial) – direct construction impact

Environmental Impact: Based on the information contained within the ECBCP, the study area is within Critical Biodiversity Areas. The clearing did result in fragmentation of terrestrial habitats (the sites are still surrounded by large tracts of natural vegetation however the aquatic environment was not adversely impacted with regard riparian habitat continuity and any wetland habitat has remained.		Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term as an operational phase impact.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers 			
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Impact Significance							
Without Mitigation:	Extent	Duration	Severity	Reversibility	Irreplaceable Loss	Probability	Impact Significance
	Site (1)	Long-term (4)	Moderate (4)	Completely (0)	Partly (0.5)	Definite (5)	Moderate (47.5)
With Mitigation:	Extent	Duration	Severity	Reversibility	Irreplaceable Loss	Probability	Impact Significance
	Site (1)	Long-term (4)	Minor (2)	Completely (0)	Partly (0.5)	Probable (3)	Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.5 Impact 5: Increase in sedimentation and erosion – direct operational phase

Environmental Impact: Vegetation clearing, results in an increase in runoff, with an increase in erosion and sedimentation impacts downstream. This coupled to the creation of additional roads / access tracks may have increased the amount of siltation in the river	Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term as an operational phase impact.	Proposed Mitigation: <ul style="list-style-type: none"> A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers Suitable stormwater management must be included in the steep access roads. 					
Impact Significance							
Without Mitigation:	Extent	Duration	Severity	Reversibility	Irreplaceable Loss	Probability	Impact Significance
	Site (1)	Long-term (4)	Moderate (4)	Completely (0)	Partly (0.5)	Definite (5)	Moderate (47.5)
With Mitigation:	Extent	Duration	Severity	Reversibility	Irreplaceable Loss	Probability	Impact Significance
	Site (1)	Long-term (4)	Minor (2)	Completely (0)	Partly (0.5)	Probable (3)	Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.6 Impact 6: Risks on the aquatic environment due to water quality impacts – indirect operational phase

Environmental Impact: This impact is mostly related to the agricultural activities (e.g. pivots) that would generate return flows, especially if areas are over irrigated.	Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term as an operational phase impact.	Proposed Mitigation: <ul style="list-style-type: none"> It is important that no surface water runoff is allowed to be directed into the water course. Any runoff must therefore be contained in swales or stormwater management features, particularly where runoff is concentrated. A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers
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Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.7 Impact 7: Cumulative impacts

Environmental Impact: The cumulative impacts are related to the large agricultural areas that are now already in existence	Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term in the operational phase impact. However, this is mostly related to adjacent terrestrial environments.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, and any such species should be removed on an ongoing basis within areas that won't be utilised. • Water use and quality of any return flows should be monitored as this has a direct impact on the quality of the aquatic environment. • Runoff from any areas should be managed using swales or detention ponds, to prevent any pollution (organic) of downstream areas. • A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers. 				
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

Proposed activities (future clearing)

8.1: Impact 1: Loss of terrestrial vegetation or habitats – Direct Negative Impact

Environmental Impact: The clearing of natural vegetation for proposed cultivation		Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term into the operational phase impact.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers • The remaining succulent shrubland should be conserved as an offset area, and to preserve habitat connectivity • The remaining Doubledrift Karroid Thicket should be grazed at appropriate stocking densities to avoid further degradation by overgrazing and to preserve species diversity 			
Impact Significance							
Without Mitigation:	Extent Local (2)	Duration Permanent (5)	Severity High (8)	Reversibility Partly (0.5)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance High (80)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (4)	Reversibility Completely (0.5)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (30)
Potential to Mitigate: Low or Unmitigatable				Assessment Confidence: Complete			

8.2: Impact 2: Loss of terrestrial plant Species of Conservation Concern and Protected Species – Direct Negative Impact

Environmental Impact: The loss of SCCs and Protected Plant species and their associated habitat for cultivation		Activity/Aspect & Impact Source: The clearance of natural vegetation, even if degraded, could result in the permanent loss of SCCs, and their associated habitat. Sensitive Species are slow growing and natural recolonization is highly unlikely. A number of Protected species have been identified within the proposed footprints		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers. • The remaining succulent shrubland should be conserved as an offset area • Translocate all Protected species to an area of the farm that will be protected from overgrazing and clearing • Populations of SCCs should be mapped during their flowering seasons and avoided 			
Impact Significance							
Without Mitigation:	Extent Local (2)	Duration Long-term (5)	Severity High (8)	Reversibility Irreversible (1)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance High (82.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)

Potential to Mitigate: Moderate potential / easy to mitigate	Assessment Confidence: Complete
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8.3: Impact 3: Loss of aquatic riverine and wetland habitat – Direct Impact

Environmental Impact: The clearing of vegetation for the new areas	Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term into the operational phase impact. However the affected habitat is well outside any of the riparian zones if the proposed buffer is adhered to.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers 				
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.4: Impact 4: Habitat fragmentation (aquatic and terrestrial) – direct construction impact

Environmental Impact: Based on the information contained within the ECBCP, the study area is within Critical Biodiversity Areas. The proposed clearing may result in fragmentation of terrestrial habitats (the sites are still surrounded by large tracts of natural vegetation however the aquatic environment was not adversely impacted with regard riparian habitat continuity and any wetland	Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term into the operational phase impact.		Proposed Mitigation: <ul style="list-style-type: none"> • Alien plant regrowth should also be monitored, in any areas that won't be utilised. • A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers. 				
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habitat has remained.							
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.5 Impact 5: Increase in sedimentation and erosion – direct operational phase

Environmental Impact: Vegetation clearing, results in an increase in runoff, with an increase in erosion and sedimentation impacts downstream. This coupled to the creation of additional roads / access tracks have increased the amount of siltation in the river	Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term in the operational phase impact.	Proposed Mitigation: <ul style="list-style-type: none"> • A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers • Suitable stormwater management must be included in the steep access roads. 					
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.6 Impact 6: Risks on the aquatic environment due to water quality impacts – indirect operational phase

Environmental Impact: This impact is mostly related to activities that would generate return flows, especially if areas are over irrigated.		Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term in the operational phase impact.		Proposed Mitigation: <ul style="list-style-type: none"> It is important that no surface water runoff is allowed to be directed into the water course. Any runoff must therefore be contained in swales or stormwater management features, particularly where runoff is concentrated. A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers 			
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

8.7 Impact 7: Cumulative impacts

Environmental Impact: The cumulative impacts are related to the large agricultural areas that are already in existence coupled to the proposed activities assessed in this report.		Activity/Aspect & Impact Source: Due to the nature of the project this will persist in the long term in the operational phase impact. However, this is mostly related to adjacent terrestrial environments.		Proposed Mitigation: <ul style="list-style-type: none"> Clearing of any additional natural vegetation should be kept to a minimum within the region, and future agricultural requirements should be investigated in relation to maintaining important intact areas, preserving habitat corridors and maintaining hydrological processes. Alien plant regrowth should also be monitored, and any such species should be removed on an ongoing basis within areas that won't be utilised. Water use and quality of any return flows should be monitored as this has a direct impact on the quality of the aquatic environment. Runoff from any areas should be managed using swales or detention ponds, to prevent any pollution (organic) of downstream areas. A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers. 			
Impact Significance							
Without Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Moderate (4)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Definite (5)	Impact Significance Moderate (47.5)
With Mitigation:	Extent Site (1)	Duration Long-term (4)	Severity Minor (2)	Reversibility Completely (0)	Irreplaceable Loss Partly (0.5)	Probability Probable (3)	Impact Significance Low (22.5)
Potential to Mitigate: Moderate potential / easy to mitigate				Assessment Confidence: Complete			

9. Conclusion and Recommendations

The results indicated that several important habitats would have occurred in the past, and the present-day activities would have impacted on terrestrial or aquatic habitats or species. It could not be determined when the initial impacts / clearing had occurred as several of the disturbances had occurred many years ago (e.g. cattle grazing and cricket grounds), however the present clearing had not affected any important riverine or wetlands areas.

Similarly the proposed cultivation areas, occur within areas that have been grazed in the past, that has resulted in some changes in the vegetation composition. This would result in some natural vegetation loss, but with the recommendation below the impacts would be minimised.

However, it is suggested that the following mitigations be considered:

- A plant survey of *Mestoklema* sp. and *Trichodiadema decorum* (DDD) should take place during their flowering season. This should be arranged with the Albany Herbarium and the Custodians of Rare and Endangered Wildflowers (CREW), based in Grahamstown
- Clearing of any additional natural vegetation should be kept to a minimum within the region, and future agricultural requirements should be investigated in relation to maintaining important intact areas, preserving habitat corridors and maintaining hydrological processes.
- Remaining areas of succulent shrubland/Albany Broken Veld should be set aside and not cultivated, as most of the Protected species and SCCs occur in this habitat
- The remaining vegetation on the farm should be managed sustainably, to prevent further degradation and loss of biodiversity
- All Alien Invasive Plants should be removed, and regrowth should be monitored, and any such species should be removed on an ongoing basis from areas that won't be utilised.
- Water use and quality of any return flows should be monitored as this has a direct impact on the quality of the aquatic environment.
- Runoff from any areas should be managed using swales or detention ponds, to prevent any pollution (organic) of downstream areas.
- A 120m buffer must be allowed (indigenous grasses) to developed between the proposed cleared areas and rivers
- A 50m buffer must be allowed (indigenous grasses) to developed between the cleared areas and rivers. i.e. current farming activities that border the various watercourses

With this in place the overall significance of the impacts could be reduced to LOW for both the current day and proposed activities.

10. References

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11. Appendix 1: Species Checklists

Source SANBI ADU <http://vmus.adu.org.za/index.php?database> Accessed 25 May 2020

AMPHIBIANS					
Brevicipitidae	<i>Breviceps adpersus</i>	Bushveld Rain Frog	Least Concern		
Bufoidea	<i>Sclerophrys capensis</i>	Raucous Toad	Least Concern		
Heleophrynidae	<i>Heleophryne hewitti</i>	Hewitt's Ghost Frog	Critically Endangered		
Hyperoliidae	<i>Hyperolius marmoratus</i>	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)		
Pipidae	<i>Xenopus laevis</i>	Cape Clawed Toad	Least Concern		
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	Least Concern (2017)		
Pyxicephalidae	<i>Amietia fuscigula</i>	Cape River Frog	Least Concern (2017)		
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern (2013)		
Pyxicephalidae	<i>Cacosternum nanum</i>	Bronze Caco	Least Concern (2013)		
Pyxicephalidae	<i>Strongylopus fasciatus</i>	Striped Stream Frog	Least Concern		
Pyxicephalidae	<i>Strongylopus grayii</i>	Clicking Stream Frog	Least Concern		
REPTILES					
Agamidae	<i>Agama aculeata aculeata</i>	Common Ground Agama	Least Concern	(SARCA 2014)	
Agamidae	<i>Agama atra</i>	Southern Rock Agama	Least Concern	(SARCA 2014)	
Chamaeleonidae	<i>Bradypodion sp. (Groendal)</i>	Groendal Chameleon	Dwarf		
Chamaeleonidae	<i>Bradypodion taeniabronchum</i>	Elandsberg Chameleon	Dwarf	Endangered (SARCA 2014)	
Colubridae	<i>Dispholidus typus typus</i>	Boomslang	Least Concern	(SARCA 2014)	
Cordylidae	<i>Pseudocordylus microlepidotus microlepidotus</i>	Cape Crag Lizard	Least Concern	(SARCA 2014)	
Elapidae	<i>Naja nivea</i>	Cape Cobra	Least Concern	(SARCA 2014)	
Gekkonidae	<i>Afroedura nov sp. 1 (Kouga)</i>	Flat Gecko sp. 1 (Kouga)			
Lacertidae	<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	Least Concern	(SARCA 2014)	
Lacertidae	<i>Tropidosaura gularis</i>	Cape Mountain Lizard	Least Concern	(SARCA 2014)	

Lamprophiidae	<i>Lycodonomorphus rufulus</i>	Brown Water Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Psammophylax rhombeatus</i>	Spotted Grass Snake	Least Concern (SARCA 2014)
Scincidae	<i>Acontias orientalis</i>	Eastern Legless Skink	Least Concern (SARCA 2014)
Testudinidae	<i>Chersina angulata</i>	Angulate Tortoise	Least Concern (SARCA 2014)
Viperidae	<i>Bitis arietans arietans</i>	Puff Adder	Least Concern (SARCA 2014)

LEPIDOPTERA

HESPERIIDAE	<i>Spialia satespes</i>	Boland sandman	Least Concern (SABCA 2013)
HESPERIIDAE	<i>Tsitana uitenhaga</i>	Uitenhage sylph	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Aloeides aranda</i>	Aranda copper	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Aloeides damarensis</i>	Damara copper	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Aloeides depicta</i>	Depicta copper	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Aloeides juana</i>	Juana copper	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Aloeides pallida liversidgei</i>	Giant copper	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Cacyreus marshalli</i>	Common geranium bronze	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Capys alpheus alpheus</i>	Orange banded protea	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Chrysoritis beulah</i>	Beulah's opal	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Chrysoritis chrysaor</i>	Burnished opal	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Chrysoritis zeuxo cottrelli</i>	Cottrell's daisy copper	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Lachnocnema durbani</i>	D'Urban's woolly legs	Least Concern (SABCA 2013)
LYCAENIDAE	<i>Lampides boeticus</i>	Pea blue	Least Concern (SABCA 2013)

LYCAENIDAE	<i>Lepidochrysops sp.</i>					
LYCAENIDAE	<i>Lepidochrysops ketsi ketsi</i>	Ketsi blue		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Lepidochrysops patricia</i>	Patricia blue		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Lepidochrysops poseidon</i>	Baviaanskloof blue		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Lepidochrysops robertsoni</i>	Robertson's blue		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Lepidochrysops variabilis</i>	Variable blue		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Leptomyrina lara</i>	Cape black-eye		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Tarucus thespis</i>	Vivid dotted blue		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Thestor murrayi</i>	Murray's skolly		Least 2013)	Concern	(SABCA
LYCAENIDAE	<i>Trimenia argyroplaga argyroplaga</i>	Large silver-spotted copper		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Acraea neobule neobule</i>	Wandering acraea	donkey	Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Aeroptes tulbaghia</i>	Table mountain beauty		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Charaxes pelias</i>	Protea charaxes		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Danaus chrysippus orientis</i>	African monarch, tiger	Plain	Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Hypolimnas misippus</i>	Common diadem		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Junonia hierta cebrene</i>	Yellow pansy		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Pardopsis punctatissima</i>	Polka dot		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Precis archesia archesia</i>	Garden commodore		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Precis octavia sesamus</i>	Gaudy Commodore		Least 2013)	Concern	(SABCA
NYMPHALIDAE	<i>Pseudonympha magus</i>	Silver-bottom brown		Least 2013)	Concern	(SABCA

NYMPHALIDAE	<i>Pseudonympha ruthae</i>	<i>trimenii</i>	Trimen's brown	Least Concern (SABCA 2013)
NYMPHALIDAE	<i>Stygionympha vigilans</i>		Western hillside brown	Least Concern (SABCA 2013)
NYMPHALIDAE	<i>Stygionympha williami</i>	<i>wichgrafi</i>	Wichgraf's hillside brown	Least Concern (SABCA 2013)
NYMPHALIDAE	<i>Vanessa cardui</i>		Painted lady	Least Concern (SABCA 2013)
PAPILIONIDAE	<i>Papilio demodocus</i>	<i>demodocus</i>	Citrus swallowtail	Least Concern (SABCA 2013)
PIERIDAE	<i>Belenois aurota</i>		Brown-veined white	Least Concern (SABCA 2013)
PIERIDAE	<i>Pontia helice helice</i>		Common meadow white	Least Concern (SABCA 2013)
PIERIDAE	<i>Teracolus eris eris</i>		Banded gold tip	Least Concern (SABCA 2013)

AVES (BIRDS)

Common_group	Common_species	Genus	Species
Apalis	Bar-throated	<i>Apalis</i>	<i>thoracica</i>
Apalis	Yellow-breasted	<i>Apalis</i>	<i>flavida</i>
Barbet	Acacia Pied	<i>Tricholaema</i>	<i>leucomelas</i>
Barbet	Black-collared	<i>Lybius</i>	<i>torquatus</i>
Batis	Cape	<i>Batis</i>	<i>capensis</i>
Bishop	Southern Red	<i>Euplectes</i>	<i>orix</i>
Bokmakierie	Bokmakierie	<i>Telophorus</i>	<i>zeylonus</i>
Boubou	Southern	<i>Laniarius</i>	<i>ferrugineus</i>
Brownbul	Terrestrial	<i>Phyllastrephus</i>	<i>terrestris</i>
Bulbul	Cape	<i>Pycnonotus</i>	<i>capensis</i>
Bunting	Cinnamon-breasted	<i>Emberiza</i>	<i>tahapisi</i>
Bunting	Golden-breasted	<i>Emberiza</i>	<i>flaviventris</i>
Bush-shrike	Olive	<i>Telophorus</i>	<i>olivaceus</i>
Buzzard	Jackal	<i>Buteo</i>	<i>rufofuscus</i>
Buzzard	Steppe	<i>Buteo</i>	<i>vulpinus</i>
Cameroptera	Green-backed	<i>Cameroptera</i>	<i>brachyura</i>
Canary	Brimstone	<i>Crithagra</i>	<i>sulphuratus</i>

Canary	Cape	<i>Serinus</i>	<i>canicollis</i>
Canary	Forest	<i>Crithagra</i>	<i>scotops</i>
Canary	Yellow-fronted	<i>Crithagra</i>	<i>mozambicus</i>
Chat	Anteating	<i>Myrmecocichla</i>	<i>formicivora</i>
Chat	Familiar	<i>Cercomela</i>	<i>familiaris</i>
Cisticola	Grey-backed	<i>Cisticola</i>	<i>subruficapilla</i>
Cisticola	Lazy	<i>Cisticola</i>	<i>aberrans</i>
Cisticola	Levaillant's	<i>Cisticola</i>	<i>tinniens</i>
Cisticola	Zitting	<i>Cisticola</i>	<i>juncidis</i>
Coot	Red-knobbed	<i>Fulica</i>	<i>cristata</i>
Cormorant	Reed	<i>Phalacrocorax</i>	<i>africanus</i>
Cormorant	White-breasted	<i>Phalacrocorax</i>	<i>carbo</i>
Coucal	Burchell's	<i>Centropus</i>	<i>burchellii</i>
Crane	Blue	<i>Anthropoides</i>	<i>paradiseus</i>
Crested-flycatcher	Blue-mantled	<i>Trochocercus</i>	<i>cyanomelas</i>
Crow	Cape	<i>Corvus</i>	<i>capensis</i>
Crow	Pied	<i>Corvus</i>	<i>albus</i>
Cuckoo	Black	<i>Cuculus</i>	<i>clamosus</i>
Cuckoo	Klaas's	<i>Chrysococcyx</i>	<i>klaas</i>
Cuckoo	Red-chested	<i>Cuculus</i>	<i>solitarius</i>
Cuckoo-shrike	Black	<i>Campephaga</i>	<i>flava</i>
Cuckoo-shrike	Grey	<i>Coracina</i>	<i>caesia</i>
Dove	Laughing	<i>Streptopelia</i>	<i>senegalensis</i>
Dove	Lemon	<i>Aplopelia</i>	<i>larvata</i>
Dove	Red-eyed	<i>Streptopelia</i>	<i>semitorquata</i>
Dove	Tambourine	<i>Turtur</i>	<i>tympanistria</i>
Drongo	Fork-tailed	<i>Dicrurus</i>	<i>adsimilis</i>
Duck	African Black	<i>Anas</i>	<i>sparsa</i>
Duck	Yellow-billed	<i>Anas</i>	<i>undulata</i>
Eagle	African Crowned	<i>Stephanoaetus</i>	<i>coronatus</i>
Eagle	Martial	<i>Polemaetus</i>	<i>bellicosus</i>
Eagle	Verreaux's	<i>Aquila</i>	<i>verreauxii</i>
Eagle-owl	Spotted	<i>Bubo</i>	<i>africanus</i>

Egret	Cattle	<i>Bubulcus</i>	<i>ibis</i>
Firefinch	African	<i>Lagonosticta</i>	<i>rubricata</i>
Fiscal	Common (Southern)	<i>Lanius</i>	<i>collaris</i>
Fish-eagle	African	<i>Haliaeetus</i>	<i>vocifer</i>
Flycatcher	African Dusky	<i>Muscicapa</i>	<i>adusta</i>
Flycatcher	Fiscal	<i>Sigelus</i>	<i>silens</i>
Flycatcher	Spotted	<i>Muscicapa</i>	<i>striata</i>
Goose	Egyptian	<i>Alopochen</i>	<i>aegyptiacus</i>
Goose	Spur-winged	<i>Plectropterus</i>	<i>gambensis</i>
Goshawk	African	<i>Accipiter</i>	<i>tachiro</i>
Goshawk	Southern Pale Chanting	<i>Melierax</i>	<i>canorus</i>
Grassbird	Cape	<i>Sphenoeacus</i>	<i>afer</i>
Grebe	Little	<i>Tachybaptus</i>	<i>ruficollis</i>
Greenbul	Sombre	<i>Andropadus</i>	<i>importunus</i>
Guineafowl	Helmeted	<i>Numida</i>	<i>meleagris</i>
Gull	Kelp	<i>Larus</i>	<i>dominicanus</i>
Harrier	Black	<i>Circus</i>	<i>maurus</i>
Harrier-Hawk	African	<i>Polyboroides</i>	<i>typus</i>
Heron	Black-headed	<i>Ardea</i>	<i>melanocephala</i>
Heron	Grey	<i>Ardea</i>	<i>cinerea</i>
Honeyguide	Greater	<i>Indicator</i>	<i>indicator</i>
Honeyguide	Lesser	<i>Indicator</i>	<i>minor</i>
Honeyguide	Scaly-throated	<i>Indicator</i>	<i>variegatus</i>
Hoopoe	African	<i>Upupa</i>	<i>africana</i>
Hornbill	Crowned	<i>Tockus</i>	<i>alboterminatus</i>
Ibis	African Sacred	<i>Threskiornis</i>	<i>aethiopicus</i>
Ibis	Hadedda	<i>Bostrychia</i>	<i>hagedash</i>
Indigobird	Dusky	<i>Vidua</i>	<i>funerea</i>
Kestrel	Rock	<i>Falco</i>	<i>rupicolus</i>
Kingfisher	Brown-hooded	<i>Halcyon</i>	<i>albiventris</i>
Kingfisher	Half-collared	<i>Alcedo</i>	<i>semitorquata</i>
Kingfisher	Malachite	<i>Alcedo</i>	<i>cristata</i>
Kingfisher	Pied	<i>Ceryle</i>	<i>rudis</i>

Kite	Black-shouldered	<i>Elanus</i>	<i>caeruleus</i>
Kite	Yellow-billed	<i>Milvus</i>	<i>aegyptius</i>
Lapwing	Blacksmith	<i>Vanellus</i>	<i>armatus</i>
Lapwing	Crowned	<i>Vanellus</i>	<i>coronatus</i>
Lark	Red-capped	<i>Calandrella</i>	<i>cinerea</i>
Longclaw	Cape	<i>Macronyx</i>	<i>capensis</i>
Marsh-harrier	African	<i>Circus</i>	<i>ranivorus</i>
Martin	Brown-throated	<i>Riparia</i>	<i>paludicola</i>
Martin	Rock	<i>Hirundo</i>	<i>fuligula</i>
Masked-weaver	Southern	<i>Ploceus</i>	<i>velatus</i>
Moorhen	Common	<i>Gallinula</i>	<i>chloropus</i>
Mousebird	Red-faced	<i>Urocolius</i>	<i>indicus</i>
Mousebird	Speckled	<i>Colius</i>	<i>striatus</i>
Neddicky	Neddicky	<i>Cisticola</i>	<i>fulvicapilla</i>
Olive-pigeon	African	<i>Columba</i>	<i>arquatrix</i>
Oriole	Black-headed	<i>Oriolus</i>	<i>larvatus</i>
Palm-swift	African	<i>Cypsiurus</i>	<i>parvus</i>
Paradise-flycatcher	African	<i>Terpsiphone</i>	<i>viridis</i>
Pigeon	Speckled	<i>Columba</i>	<i>guinea</i>
Plover	Three-banded	<i>Charadrius</i>	<i>tricoloris</i>
Prinia	Karoo	<i>Prinia</i>	<i>maculosa</i>
Puffback	Black-backed	<i>Dryoscopus</i>	<i>cubla</i>
Quelea	Red-billed	<i>Quelea</i>	<i>quelea</i>
Raven	White-necked	<i>Corvus</i>	<i>albicollis</i>
Robin-chat	Cape	<i>Cossypha</i>	<i>caffra</i>
Rock-thrush	Cape	<i>Monticola</i>	<i>rupestris</i>
Rush-warbler	Little	<i>Bradypterus</i>	<i>baboecala</i>
Saw-wing	Black (Southern race)	<i>Psalidoprocne</i>	<i>holomelaena</i>
Scrub-robin	Brown	<i>Cercotrichas</i>	<i>signata</i>
Scrub-robin	White-browed	<i>Cercotrichas</i>	<i>leucophrys</i>
Seed-eater	Streaky-headed	<i>Crithagra</i>	<i>gularis</i>
Sparrow	Cape	<i>Passer</i>	<i>melanurus</i>
Sparrow	House	<i>Passer</i>	<i>domesticus</i>

Sparrow	Southern Grey-headed	<i>Passer</i>	<i>diffusus</i>
Sparrowhawk	Black	<i>Accipiter</i>	<i>melanoleucus</i>
Sparrowhawk	Little	<i>Accipiter</i>	<i>minullus</i>
Spoonbill	African	<i>Platalea</i>	<i>alba</i>
Spurfowl	Red-necked	<i>Pternistis</i>	<i>afer</i>
Starling	Black-bellied	<i>Lamprotornis</i>	<i>corruscus</i>
Starling	Cape Glossy	<i>Lamprotornis</i>	<i>nitens</i>
Starling	Common	<i>Sturnus</i>	<i>vulgaris</i>
Starling	Pied	<i>Spreo</i>	<i>bicolor</i>
Starling	Red-winged	<i>Onychognathus</i>	<i>morio</i>
Stilt	Black-winged	<i>Himantopus</i>	<i>himantopus</i>
Stonechat	African	<i>Saxicola</i>	<i>torquatus</i>
Stork	White	<i>Ciconia</i>	<i>ciconia</i>
Sugarbird	Cape	<i>Promerops</i>	<i>cafer</i>
Sunbird	Amethyst	<i>Chalcomitra</i>	<i>amethystina</i>
Sunbird	Collared	<i>Hedydipna</i>	<i>collaris</i>
Sunbird	Greater Double-collared	<i>Cinnyris</i>	<i>afer</i>
Sunbird	Grey	<i>Cyanomitra</i>	<i>veroxii</i>
Sunbird	Malachite	<i>Nectarinia</i>	<i>famosa</i>
Sunbird	Orange-breasted	<i>Anthobaphes</i>	<i>violacea</i>
Sunbird	Southern Double-collared	<i>Cinnyris</i>	<i>chalybeus</i>
Swallow	Barn	<i>Hirundo</i>	<i>rustica</i>
Swallow	Greater Striped	<i>Hirundo</i>	<i>cucullata</i>
Swallow	Lesser Striped	<i>Hirundo</i>	<i>abyssinica</i>
Swallow	White-throated	<i>Hirundo</i>	<i>albigularis</i>
Swamp-warbler	Lesser	<i>Acrocephalus</i>	<i>gracilirostris</i>
Swift	Alpine	<i>Tachymarptis</i>	<i>melba</i>
Swift	Horus	<i>Apus</i>	<i>horus</i>
Swift	Little	<i>Apus</i>	<i>affinis</i>
Swift	White-rumped	<i>Apus</i>	<i>caffer</i>
Tchagra	Southern	<i>Tchagra</i>	<i>tchagra</i>
Teal	Cape	<i>Anas</i>	<i>capensis</i>
Thrush	Olive	<i>Turdus</i>	<i>olivaceus</i>

Tinkerbird	Red-fronted	<i>Pogoniulus</i>	<i>pusillus</i>
Tit-babbler	Chestnut-vented	<i>Parisoma</i>	<i>subcaeruleum</i>
Trogon	Narina	<i>Apaloderma</i>	<i>narina</i>
Turaco	Knysna	<i>Tauraco</i>	<i>corythaix</i>
Turtle-dove	Cape	<i>Streptopelia</i>	<i>capicola</i>
Wagtail	Cape	<i>Motacilla</i>	<i>capensis</i>
Warbler	Knysna	<i>Bradypterus</i>	<i>sylvaticus</i>
Warbler	Victorin's	<i>Cryptillas</i>	<i>victorini</i>
Waxbill	Common	<i>Estrilda</i>	<i>astrild</i>
Waxbill	Swee	<i>Coccygia</i>	<i>melanotis</i>
Weaver	Cape	<i>Ploceus</i>	<i>capensis</i>
Weaver	Dark-backed	<i>Ploceus</i>	<i>bicolor</i>
Weaver	Spectacled	<i>Ploceus</i>	<i>ocularis</i>
Weaver	Thick-billed	<i>Amblyospiza</i>	<i>albifrons</i>
Weaver	Village	<i>Ploceus</i>	<i>cucullatus</i>
White-eye	Cape	<i>Zosterops</i>	<i>virens</i>
Whydah	Pin-tailed	<i>Vidua</i>	<i>macroura</i>
Wood-dove	Emerald-spotted	<i>Turtur</i>	<i>chalcospilos</i>
Wood-hoopoe	Green	<i>Phoeniculus</i>	<i>purpureus</i>
Woodland-warbler	Yellow-throated	<i>Phylloscopus</i>	<i>ruficapilla</i>
Woodpecker	Cardinal	<i>Dendropicos</i>	<i>fuscescens</i>
Woodpecker	Knysna	<i>Campethera</i>	<i>notata</i>
Woodpecker	Olive	<i>Dendropicos</i>	<i>griseocephalus</i>

Appendix 1.2 Annotated List of Plant Species Recorded on Site (CV: Cultivated Fields, RW: Riparian Woodland, KDS24G: Karoo Dwarf Shrubland near to existing fields, KDSNew: Karoo Dwarf Shrubland in area of proposed fields, SS: Succulent Shrubland, DKT: Doubledrift Karroid Thicket (Carlisle Bridge School site). Protected species in Green, Alien species in Red.

FAMILY	SPECIES	CF	RW	KDS24G	KDSNew	SS	DKT	Threat status*	NFA	NCO**	TOPs#	ECECB****	ALPst	Endemic
AGAVACEAE	<i>Agave sisalana</i> Perrine						x	NE					2	
AIZOACEAE	<i>Aizoon glinoides</i> L.f.	x	x	x				LC						
HYACINTHACEAE	<i>Albuca bracteata</i> (Thunb.) J.C.Manning & Goldblatt		x					LC						
ASPHODELACEAE	<i>Aloe africana</i> Mill.						x	LC		Sch 4		Sch 5		
ASPHODELACEAE	<i>Aloe ferox</i> Mill.						x	LC						
ASPHODELACEAE	<i>Aloe micracantha</i> Haw.							LC		Sch 4		Sch 5		
ASPHODELACEAE	<i>Aloe microstigma</i> Salm-Dyck			x	x			LC		Sch 4		Sch 5		
ASPHODELACEAE	<i>Aloe speciosa</i> Baker						x	LC		Sch 4		Sch 5		
ASPHODELACEAE	<i>Aloiampelos tenuior</i> (Haw.) Klopper & Gideon F.Sm.			x	x			LC		Sch 4		Sch 5		
ANACAMPSEROTACEAE	<i>Anacampseros arachnoides</i> (Haw.) Sims					x		LC						
RUBIACEAE	<i>Anthospermum spathulatum</i> Spreng. subsp. <i>uitenhagense</i> Puff			x	x		x	LC						
PAPAVERACEAE	<i>Argemone ochroleuca</i> Sweet	x						NE					1b	
POACEAE	<i>Aristida congesta</i> Roem. & Schull. subsp. <i>congesta</i>	x	x	x	x		x	LC						
POACEAE	<i>Arundo donax</i> L.		x					NE					1b	
ASPARAGACEAE	<i>Asparagus aethiopicus</i> L.						x	LC						
ASPARAGACEAE	<i>Asparagus burchellii</i> Baker						x	LC						
ASPARAGACEAE	<i>Asparagus multiflorus</i> Baker						x	LC						
ASPARAGACEAE	<i>Asparagus racemosus</i> Willd.						x	LC						
ASPARAGACEAE	<i>Asparagus striatus</i> (L.f.) Thunb.						x	LC						
ASPARAGACEAE	<i>Asparagus suaveolens</i> Burch.						x	LC						
POACEAE	<i>Avena sativa</i> L.	x	x					NE					*	
SALVADORACEAE	<i>Azima tetraacantha</i> Lam.		x	x	x		x	LC						
ACANTHACEAE	<i>Blepharis capensis</i> (L.f.) Pers.			x	x		x	LC						

FAMILY	SPECIES	CF	RW	KDS24G	KDSNew	SS	DKT	Threat status*	NFA	NCO**	Tops#	ECECB***	ALPst	Endemic
AMARYLLIDACEAE	<i>Boophone disticha</i> (L.f.) Herb.			x			x	LC		Sch 4		Sch 5		
BRASSICACEAE	<i>Boscia oleoides</i> (Burch. ex DC.) Toelken		x					LC						
ASTERACEAE	<i>Brachylaena ilicifolia</i> (Lam.) E.Philips & Schweik						x	LC						
SCHROPHULARIACEAE	<i>Buddleja saligna</i> Willd.		x					LC				Sch 5		
ASPHODELACEAE	<i>Bulbine asphodeloides</i> (L.) Spreng.		x	x	x		x	LC						
ASPHODELACEAE	<i>Bulbine narcissifolia</i> Salm-Dyck			x				LC						
APOCYNACEAE	<i>Carissa bispinosa</i> (L.) Desf. Ex Brenana							LC		Sch 4		Sch 5		
AMARANTHACEAE	<i>Chenopodium</i> sp.	x	x		x								*	
POACEAE	<i>Chloris virgata</i> Sw.	x						LC						
ASTERACEAE	<i>Chrysocoma ciliata</i> L.			x	x			LC						
COMBRETACEAE	<i>Combretum caffrum</i> (Eckl. & Zeyh.) Kuntze		x					LC				Sch 5		
CRASSULACEAE	<i>Cotyledon campanulata</i> Marloth						x	LC						
CRASSULACEAE	<i>Cotyledon orbiculata</i> L. var. <i>oblonga</i> (Haw.) DC.						x	LC						
CRASSULACEAE	<i>Crassula capitella</i> Thunb. subsp. <i>thyrsoflora</i> (Thunb.) Tolken						x	LC						
CRASSULACEAE	<i>Crassula mesembryanthoides</i> (Haw.) D.Dietr.						x	LC						
ARALIACEAE	<i>Cussonia spicata</i> Thunb.						x	LC						
APOCYNACEAE	<i>Cynanchum ellipticum</i> (Harv.) R.A.Dyer						x	LC		Sch 4		Sch 5		
APOCYNACEAE	<i>Cynanchum viminale</i> (L.) Bassi subsp. <i>viminale</i>						x	LC		Sch 4		Sch 5		
POACEAE	<i>Cynodon dactylon</i> (L.) Pers.	x	x					LC						
CYPERACEAE	<i>Cyperus textilis</i> Thunb.		x					LC						
VITACEAE	<i>Cyphostemma quinatum</i> (Dryand.) Desc. ex Wild & R.B.Drumm.						x	LC						
SOLANACEAE	<i>Datura ferox</i> L.	x	x					NE					1b	
AIZOACEAE	<i>Delosperma multiflorum</i> L.Bolus			x	x	x		LC		Sch 4		Sch 5		
ACANTHACEAE	<i>Dicliptera cernua</i> (Hook.f. ex Nees) J.C.Manning & Goldblatt		x				x	LC						
POACEAE	<i>Digitaria eriantha</i> Steud.				x		x	LC						
HYACINTHACEAE	<i>Drimia altissima</i> (L.f.) Ker Gawl.		x	x	x			LC						
HYACINTHACEAE	<i>Drimia anomala</i> (Baker) Baker		x	x	x		x	LC						

FAMILY	SPECIES	CF	RW	KDS24G	KDSNew	SS	DKT	Threat status*	NFA	NCO**	Tops#	ECECB***	ALPst	Endemic
AIZOACEAE	<i>Drosanthemum hispidum</i> (L.) Schwantes	x	x	x	x		x	LC		Sch 4		Sch 5		
BORAGINACEAE	<i>Ehretia rigida</i> (Thunb.) Druce subsp. <i>rigida</i>		x		x		x	LC						
POACEAE	<i>Eleusine coracana</i> (L.) Gaertn. subsp. <i>africana</i> (Kenn.-O'Byrne) Hilu & de Wet	x						LC						
POACEAE	<i>Enneapogon scoparius</i> Stapf				x		x	LC						
POACEAE	<i>Eragrostis curvula</i> (Schrud.) Nees				x		x	LC						
POACEAE	<i>Eragrostis lehmanniana</i> Nees var. <i>lehmanniana</i>	x	x	x			x	LC						
POACEAE	<i>Eragrostis obtusa</i> Munro ex Ficalho & Hiern						x	LC						
ASTERACEAE	<i>Erigeron</i> sp.	x	x					NE					*	
ASTERACEAE	<i>Eriocephalus africanus</i> L. var. <i>africanus</i>						x	LC						
RUSCACEAE	<i>Eriospermum brevipes</i> Baker			x	x		x	LC						
EBENACEAE	<i>Euclea undulata</i> Thunb.			x	x		x	LC						
EUPHORBIACEAE	<i>Euphorbia mauritanica</i> L.			x			x	LC						
EUPHORBIACEAE	<i>Euphorbia pentagona</i> Haw.						x	LC						
EUPHORBIACEAE	<i>Euphorbia prostrata</i> Aiton	x	x					NE					*	
EUPHORBIACEAE	<i>Euphorbia rhombifolia</i> Boiss.		x	x			x	LC						
EUPHORBIACEAE	<i>Euphorbia triangularis</i> Desf.						x	LC						
ASTERACEAE	<i>Felicia filifolia</i> (Vent.) Burt Davy			x	x			LC						
ASTERACEAE	<i>Felicia hyssopifolia</i> (P.J.Bergius) Nees subsp. <i>polyphylla</i> (Harv.) Grau			x	x			LC						
ASTERACEAE	<i>Felicia muricata</i> Thunb. Nees. subsp. <i>muricata</i>	x	x	x	x		x	LC						
ASPHODELACEAE	<i>Gasteria bicolor</i> Haw. var. <i>bicolor</i>						x	LC				Sch 5		
AIZOACEAE	<i>Glottiphyllum grandiflorum</i> (Haw.) N.E.Br.					x		LC		Sch 4		Sch 5		EC
MALVACEAE	<i>Grewia robusta</i> Burch.			x	x		x	LC						
CELASTRACEAE	<i>Gymnosporia heterophylla</i> (Eckl. & Zeyh.) Loes.		x	x				LC						
CELASTRACEAE	<i>Gymnosporia linearis</i> (L.f.) Loes. subsp. <i>linearis</i>						x	LC						
CELASTRACEAE	<i>Gymnosporia polyacantha</i> (Sond.) Szyszyl. subsp. <i>polyacantha</i>						x	LC						
AMARYLLIDACEAE	<i>Haemanthus albiflos</i> Jacq.						x	LC		Sch 4		Sch 5		
MALVACEAE	<i>Hermannia coccocarpa</i> (Eckl. & Zeyh.) Kuntze			x	x		x	LC						

FAMILY	SPECIES	CF	RW	KDS24G	KDSNew	SS	DKT	Threat status*	NFA	NCO**	Top#	ECEC***	Alps†	Endemic
MALVACEAE	<i>Hermannia cuneifolia</i> Jacq. var. <i>cuneifolia</i>			x	x		x	LC						
MALVACEAE	<i>Hibiscus pusillus</i> Thunb.		x	x	x		x	LC						
CONVOLVULACEAE	<i>Ipomoea oenotheroides</i> (L.f.) Raf. ex Hallier f.			x				LC						
CRASSULACEAE	<i>Kalanchoe rotundifolia</i> (Haw.) Haw.						x	LC						
AIZOACEAE	<i>Lampranthus</i> sp.						x			Sch 4		Sch 5		
VERBENACEAE	<i>Lantana rugosa</i> Thunb.						x	LC						
THYMELAEACEAE	<i>Lasiosiphon meisnerianus</i> Endl.		x	x	x		x	LC						
LAMIACEAE	<i>Leonotis pentadentata</i> J.C. Manning & Goldblatt			x	x		x	LC						
BRASSICACEAE	<i>Lepidium africanum</i> (Burm.f.) DC.	x	x	x				LC						
FABACEAE	<i>Lotus subbiflorus</i> Lag.			x				NE					*	
SOLANACEAE	<i>Lycium cinereum</i> Thunb.		x	x	x		x	LC						
SOLANACEAE	<i>Lycium oxycarpum</i> Dunal		x				x	LC						
SOLANACEAE	<i>Lycium ferocissimum</i> Miers		x		x			LC						
AIZOACEAE	<i>Malephora lutea</i> (Haw.) Schwantes		x	x	x		x	LC		Sch 4		Sch 5		
MALVACEAE	<i>Malva parviflora</i> L. var. <i>parviflora</i>	x	x	x				NE					*	
FABACEAE	<i>Medicago sativa</i> L.		x					NE					*	
AIZOACEAE	<i>Mesembryanthemum</i> sp. (<i>Psilocaulon</i> group)		x	x	x		x			Sch 4		Sch 5		
AIZOACEAE	<i>Mestoklema</i> sp.			x	x	x				Sch 4		Sch 5		
IRIDACEAE	<i>Moraea polystachya</i> (Thunb.) Ker Gawl.			x	x			LC		Sch4		Sch 5		
SOLANACEAE	<i>Nicotiana glauca</i> Graham	x	x					NE					1b	
ASTERACEAE	<i>Nidorella ivifolia</i> (L.) J.C.Manning & Goldblatt	x	x					LC						
LAMIACEAE	<i>Ocimum burchellianum</i> Benth.			x			x	LC						
OLEACEAE	<i>Olea europaea</i> L. subsp. <i>africana</i> (Mill.) P.S.Green		x					LC				Sch 5		
CACTACEAE	<i>Opuntia aurantiaca</i> Lindl.	x	x	x	x	x	x	NE					1b	
CACTACEAE	<i>Opuntia ficus-indica</i> (L.) Mill.						x	NE					1b	
CACTACEAE	<i>Opuntia microdasys</i> (Lehm.) Pfeiff.						x	NE					1b	
CACTACEAE	<i>Opuntia robusta</i> J.C.Wendl. ex Pfeiff.[]			x				NE					1a	

FAMILY	SPECIES	CF	RW	KDS24G	KDSNew	SS	DKT	Threat status*	NFA	NCO**	Tops#	ECECB***	ALPst	Endemic
ASTERACEAE	<i>Osteospermum scariosum</i> DC.		x	x	x			LC						
APOCYNACEAE	<i>Pachypodium succulentum</i> (Jacq.) Sweet			x	x		x	LC		Sch 4		Sch 5		
POACEAE	<i>Panicum maximum</i> Jacq.				x		x	LC						
SAPINDACEAE	<i>Pappea capensis</i> Eckl. & Zeyr							LC				Sch 5		
GERANIACEAE	<i>Pelargonium cf. schizopetalum</i> Sweet			x	x		x	LC				Sch 5		
ASTERACEAE	<i>Pentzia incana</i> (Thunb.) Kuntze	x	x	x	x		x	LC						
POACEAE	<i>Phragmites australis</i> (Cav.) Steud.		x					LC						
PLUMBAGINACEAE	<i>Plumbago auriculata</i> Lam.				x			LC						
PORTULACACEAE	<i>Portulacaria afra</i> Jacq.				x		x	LC						
BIGNONIACEAE	<i>Rhigozum obovatum</i> Burch.			x	x			LC						
VITACEAE	<i>Rhoicissus tridentata</i> (L.f.) Wild & R.B.Drumm.						x	LC						
POLYGONACEAE	<i>Rumex crispus</i> L.		x					NE					*	
AMARANTHACEAE	<i>Salsola kali</i> L.	x	x					NE					1b	
RUSCACEAE	<i>Sansevieria hyacinthoides</i> (L.) Druce						x	LC						
ANACARDIACEAE	<i>Searsia lancea</i> (L.f.) F.A.Barkley		x					LC						
ANACARDIACEAE	<i>Searsia longispina</i> (Eckl. & Zeyh.) Moffett		x	x	x		x	LC						
ASTERACEAE	<i>Senecio linifolius</i> L.						x	LC						
POACEAE	<i>Sporobolus africanus</i> (Poir.) Robyns & Tournay			x				LC						
POACEAE	<i>Sporobolus fimbriatus</i> (Trin.) Nees				x		x	LC						
ASTERACEAE	<i>Tithonia diversifolia</i> (Hemsl.) A. Gray	x						NE					1b	
POACEAE	<i>Tragus berteronianus</i> Schult.	x		x				LC						
POACEAE	<i>Tragus koelerioides</i> Asch.			x	x			LC						
AIZOACEAE	<i>Trichodiadema decorum</i> (N.E.Br.) Stearn ex H.Jacobsen					x		DDD		Sch 4	Sch 5			?
AIZOACEAE	<i>Trichodiadema pomeridianum</i> L.Bolus			x	x	x	x	LC		Sch 4	Sch 5			
TYPHACEAE	<i>Typha capensis</i> (Rohrb.) N.E.Br.		x					LC						
FABACEAE	<i>Vachellia karroo</i> (Hayne) Banfi & Gallaso	x	x	x	x		x	LC						
VISCACEAE	<i>Viscum rotundifolium</i> L.f.		x				x	LC						

FAMILY	SPECIES	CF	RW	KDS24G	KDSNew	SS	DKT	Threat status*	NFA	NCO**	Top#	ECECR***	Alps†	Endemic
RHAMNACEAE	<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>		x					LC						

*Species of Conservation Concern IUCN and Red List Categories

SANBI. 2017. Statistics: Red List of South African Plants version 2017.1.

LC = Least Concern

NT = Near Threatened

V = Vulnerable

EN = Endangered

CR = Critically Endangered

NE = Not Evaluated

** Nature and Environmental Conservation Ordinance of 1974

E = Schedule 3 Endangered Flora

P = Schedule 4 Protected Flora

*** Eastern Cape Environment Conservation Bill 9 of 2003

E = Schedule 3 Endangered Flora

P = Schedule 4 Protected Flora

National Forests Act No. 84 of 1998 – List of Protected Trees (published 8 September 2017)

P = Protected Tree Species

† National Environmental Management: Biodiversity Act No. 10 of 2004 – Alien and Invasive Species Lists (published 29 July 2016)

Category 1a Invasive species requiring compulsory control and which are identified as Category 1a listed

invasive species

Category 1b

Category 2

Category 3

* Alien species, but not a listed Invader

