DAMARAKLOOF

CONSERVATION AREA

ENVIRONMENTAL MANAGEMENT PLAN

2022 – 2032

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ESTABLISHMENT OF CONTEXT

During early 2021, Mr. Jaco Lourens of Damarakloof contacted CapeNature to enquire on the process involved to join the CapeNature Stewardship programme. Rupert Koopman, who recently moved from CapeNature to the Botanical Society of SA arranged with the local CREW group to visit the property in order to conduct a baseline botanical survey to determine the habitat condition and potential extent of threatened species. This region of the Cape Winelands contains an interesting mix of geological substrates with relatively little information on the extent and condition of most natural remnants.

Since 2017, the City of Cape Town: Biodiversity Management Branch have been working with the local land owners to try and establishing a biodiversity corridor from Hercules Pilaar farm to the Telkom Radio farm, a near-continuous remnant spanning nearly 1 000 ha. Damarakloof is located just south of this and it made sense to try and incorporate Damarakloof into the initiative, even if they are just outside the City's municipal boundary. A combined spring assessment was conducted by CapeNature represented by Andrie Joubert & Steve Gildenhuys with the CCT: Biodiversity Management Branch represented by Jacques van der Merwe during mid-August and again mid-September 2021.

The remnants contained high and medium condition Swartland Shale Renosterveld and Swartland Silcrete Renosterveld (both Critically Endangered) with significant associated wetlands with more 10 threatened species, including Critically *Endangered Podalyria microphylla*, recorded during the initial survey - likely with many more waiting to be discovered. The natural remnant spans across three properties of which Damarakloof is one.

In order to help protect and rehabilitate the important biodiversity on Damarakloof, Mrs. Elizabeth De Vos, representing the E.C.E. De Vos Trust, on 23 November 2021 signed a Biodiversity Agreement with CapeNature establishing the 5.5 ha Conservation Area, **Damarakloof Conservation Area (DCA)** over the following immovable property namely:

- Portion 3 of the Farm Weltevreden No. 719, situated in the Cape Winelands Municipality, Division of Paarl, Western Cape Province;
  In extent: 85,5135 (Eighty-Five comma Five One Three Five) Hectares;
  Held by Deed of Transfer No. T55560/2007

The DCA was identified as an area with high conservation value;

a) Containing Critically Endangered Swartland Shale Renosterveld with associated wetlands which is of local, national and international significance. The potential loss of this habitat would be permanent and irrevocable and likely result in the extinction of some species and inability to attain conservation targets.

b) The Renosterveld remnant on the property is key for maintaining ecological connectivity to the Klipheuwel Corridor.

c) The DCA is in need of long-term protection and management for the maintenance of the biodiversity found thereon.

Vision Statement:

The DCA will by 2032 be an ecologically functional, green open space that protects the indigenous fauna and flora while also creating a safe space for the enjoyment and recreational benefits of the natural environment. This will be achieved by ensuring that all activities and operations within the Conservation Area are environmentally responsible and don't impact on the natural processes within the Protected Area.

Management Objectives:

The following management objectives in relation to the Conservation Area were agreed to:

- No further development will occur within the Conservation Area.
- No further grazing will occur within the Conservation Area.
- To maintain the Conservation Area free of woody invasive alien species.
- To limit the spread of secondary or herbaceous invasive alien species.
- To implement a fire management system that will ecologically favour the natural vegetation patterns and aid in the conservation thereof.
- With the exception of the firebreaks, all non-essential roads within the Conservation Area will be rehabilitated to mitigate erosion and prevent degradation of the surrounding environment.
- Management of all activities in the Conservation Area will be monitored and adhere to schedules, thereby ensuring sound management and conservation of natural resources.
- Compliance with legal and policy provisions pertaining to the Conservation Area will be ensured;
- Monitoring and baseline information to be collected.

STRATEGIC MANAGEMENT FRAMEWORK

The Environmental Management Plan (EMP) for the **Damarakloof Conservation Area (DCA)** provides the guidelines and framework within which the Conservation Area will be managed. The EMP intends to add value and continuity by clearly stating management objectives, scheduling actions and providing guidelines on the management approach.

Where possible, emphasis have been placed on

1) assigning responsibility for management intervention and
2) scheduling said management intervention.

This approach has the specific intention of creating a mechanism whereby management intervention can be monitored and audited on an annual basis. In context, this Management Plan is a dynamic document that should be updated on an annual basis or as soon as new information comes to light that may better inform decisions on responsible land management.

1. Site Description and Locality

Damarakloof historically had a variety of agricultural land uses from being a stud farm for race horses and greyhound dogs to a large piggery. Today, the farm produces its' own brand of boutique wines, producing around 4 000 bottles a year, has a few hectares under small grains and olives as well as a small herd of cattle and has converted much of the disused infrastructure for use as a function venue and accommodation.

Located within the Drakenstein Local Municipality (Cape Winelands district), the farm also borders on the City of Cape Town in the north. Road access is immediately off the Klipheuwel Road (R304) or Hoopenberg Road as the farm lies on the intersection of the two. The N1 highway interchange is also only 450 m south of the farm along the Klipheuwel Road.

The DCA is the consolidation of two disconnected remnants into a single Conservation Area in the across the northern boundary of the farm.

A rocky Swartland Silcrete Renosterveld outcrop lies directly beneath the Eskom transmission lines and spanning roughly 0.4 ha of near-natural condition. There has not been any recent cultivation of the areas immediately around it, now containing a low-diversity grassy shrubland providing an important buffering effect from the elements. The remnant was grazed extensively by cattle historically which has been excluded since December 2021 to allow some recovery. During October of 2021, Eskom conducted fuel load reduction under the transmission lines and cropped the bulk of the remnant to less than 1 m high removing all the biomass. The impact of this activity is still being monitored.

A tributary of the Mosselbank river runs along the northern boundary of the Conservation Area. While the stream is still natural and vegetated, the bordering wetlands have been impacted on historically through cultivation. There are a few segments that are still natural and in a really high condition spanning roughly 0.5 ha. The remainder can be rehabilitated in the long run. – see Figure 1.

Figure 1: The Damarakloof Conservation Area.

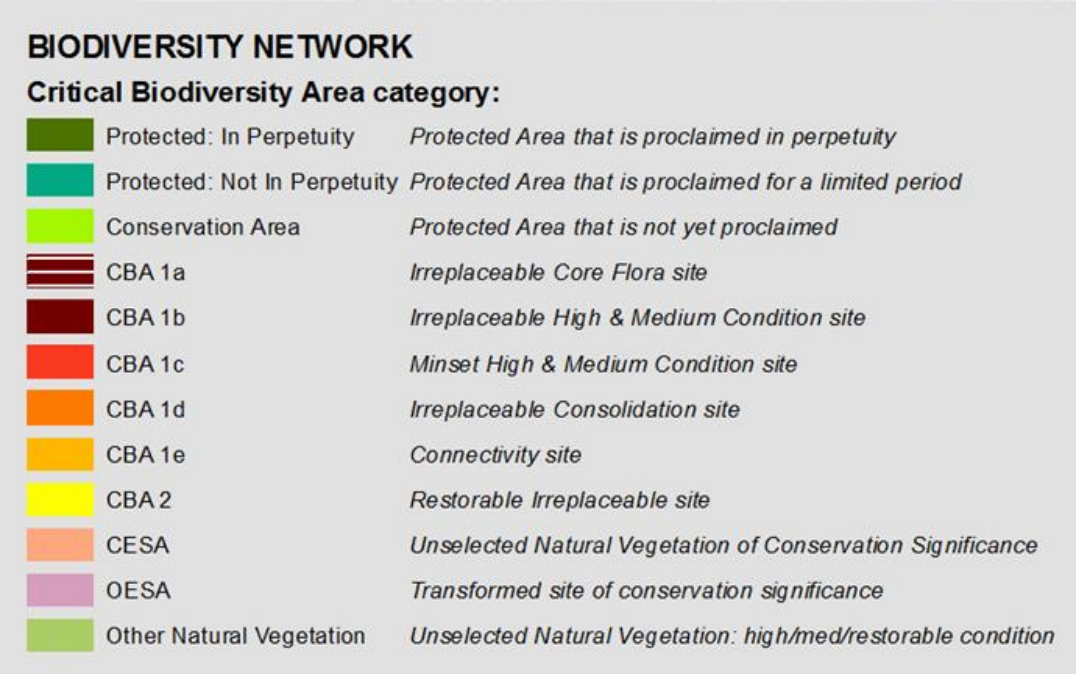
Within a larger context, the DCA is the most southern end of the Klipheuwel Corridor (**Appendix 1**) within the City's Bioregional plan, the Biodiversity Network.

Within the BioNet are a number of priority clusters and corridors of natural vegetation remnants critical for the conservation of numerous threatened species and climate change resilience. The Klipheuwel Corridor is one of these priority clusters containing the last significant remnants of Swartland Alluvium Fynbos, Swartland Shale Renosterveld and Swartland Silcrete Renosterveld remaining in the City.

The long term goal is to expand the DCA through further negotiations with surrounding neighbours to formally protect as much of the indigenous vegetation within the cluster as possible with the aim of establishing functional ecological corridors following the Mosselbank river allowing for biodiversity movement from the N1 in the south to the Telkom Radio Farm in the north.

The DCA is one of the first Formal Conservation Areas in the corridor along with Joostenbergskloof.

In terms of regional planning, DCA falls within the Drakenstein Municipality and is zoned for agriculture (**Appendix 3).**



Critical Biodiversity Areas in Cape Town:

CBA 1a **Irreplaceable Core Flora Site**
Core Flora Sites: Irreplaceable site of historical significance and a very high priority for conservation. National and International significance: Loss of habitat will probably result in extinction of some species and inability to attain conservation targets.

CBA 1b **Irreplaceable High and Medium Site**
A critically endangered habitat site of high and medium condition which is needed for national conservation targets, any loss of which is permanent and irreplaceable.

CBA 1 c High value, Medium Condition Site
A high or medium condition natural habitat site that was selected on the Biodiversity Network for meeting the national targets. Losses could potentially be replaced by obtaining specific unselected natural vegetation sites of the same kind.

CBA 1d **Irreplaceable Consolidation Site**
A critically endangered habitat site of low or restorable condition, but is essential for management consolidation to ensure viability of CBA1a, CBA1b or a proclaimed reserve.

CBA 1e **Connectivity Site**
A natural or near-natural site that was selected on the Biodiversity Network for connectivity to support existing ecological processes.

CBA 2 **Restorable Irreplaceable Site**
A critically endangered habitat type of restorable condition that is needed for national targets but not for conservation management consolidation, connectivity or viability of priority Biodiversity Network sites.

CESA **Critical Ecological Support Area (Natural Vegetation Site)**
Unselected areas of natural habitats that are essential for providing ecological support for CBA 1, CBA 2 or proclaimed reserves.

OESA **Other Ecological Support Area (Transformed Land)**
Open space transformed by agriculture or other activities, but is essential for providing ecological support for protected sites.

Other Natural Vegetation
Other natural habitats not required for national conservation targets.

2. Zoning of the Property

In terms of the Western Cape Nature Conservation Board Act, Act 15 of 1998 ("the Act"); the management of the property should distinguish between a Conservation Area and a Private/Commercial Use Area.

2.1 Private/Commercial Use Area

This area is utilised for business and intensive agricultural purposes and is excluded from the conservation agreement. No management actions are required, except efforts to limit impacts on the conservation area (such as planned best practice).

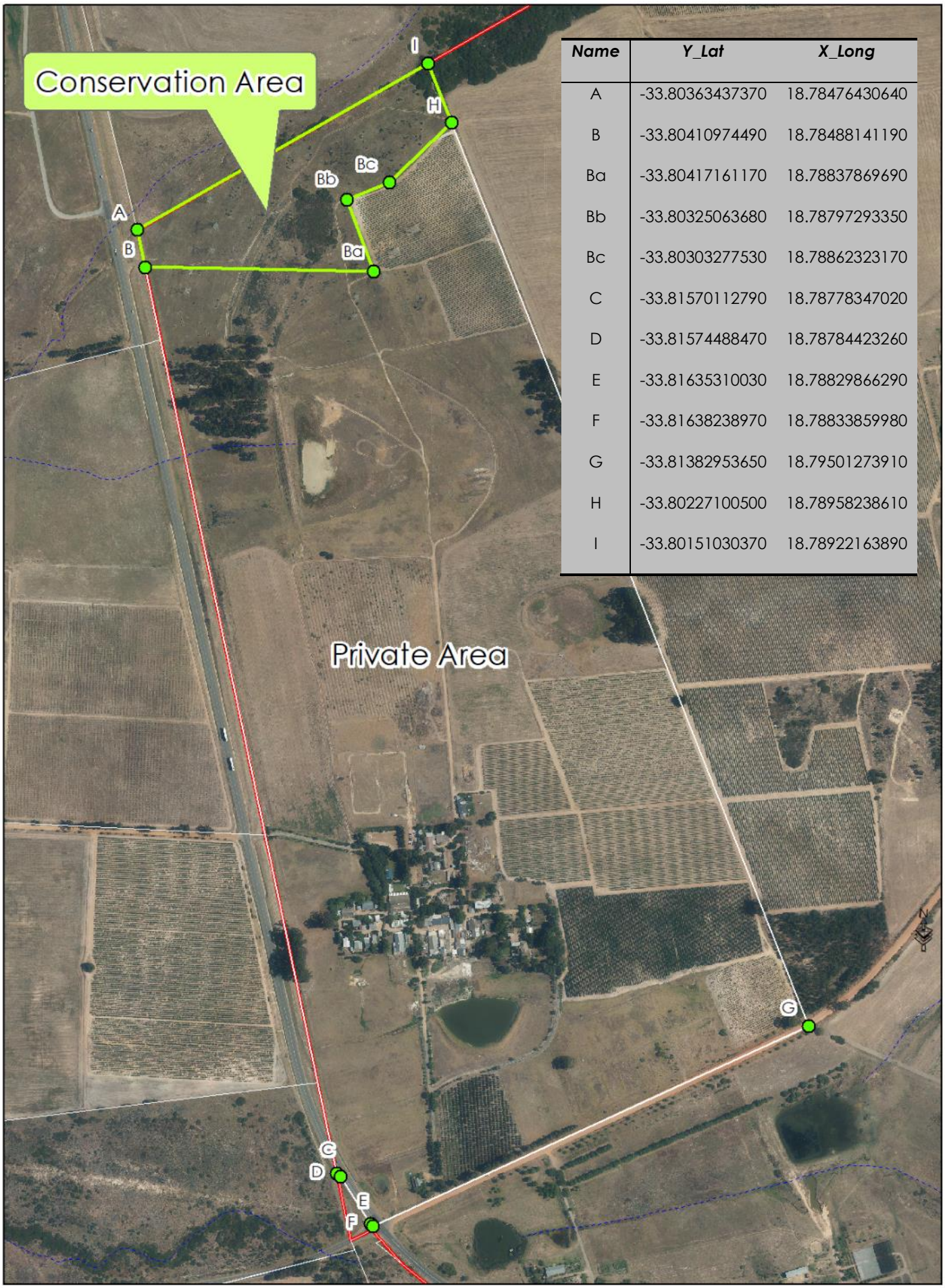
2.2 Conservation Area

This part of the property is subject to the provisions of the conservation agreement (see **Table 1**). This area should be managed according to the prescriptions of the management plan as contained in the preamble to the title deed.

Table 1: Breakdown of the Zoning of the Natural Zone/ Protected Area

Zoning	Description	Management inputs	Permissible activities	Impermissible activities
Natural zone	• In this zone there is no or minimal development or consumptive utilisation and little or no evidence of human intervention other than conservation management activities. • The minimum management inputs are required and natural processes can take place undisturbed.	• Remove all alien fauna and flora species. • Fire Management: Protect against unseasonal fires and fires within short succession of each other. • Restoration of species and ecosystem processes. • Patrol area to identify negative impacts. • Proactively limit potentially negative impacts. • Preserve the aesthetic, spatial and spiritual value.	• Visitor groups pre-arranged with management. • Research to improve on management effectiveness.	• Further development. • Consumptive utilisation. • Mining. • Dumping. • Hunting of wildlife. • **Grazing of livestock.** • Subdivision of the remnant into smaller parcels. • Introduction of extralimital fauna and flora. • No new trails, other than those included in the EMP can be developed. • Vehicle access, in particular quad bike and 4x4, is only allowed along designated tracks defined in the EMP for management purposes.

Zonation Map:



Name	Y_Lat	X_Long
A	-33.80363437370	18.78476430640
B	-33.80410974490	18.78488141190
Ba	-33.80417161170	18.78837869690
Bb	-33.80325063680	18.78797293350
Bc	-33.80303277530	18.78862323170
C	-33.81570112790	18.78778347020
D	-33.81574488470	18.78784423260
E	-33.81635310030	18.78829866290
F	-33.81638238970	18.78833859980
G	-33.81382953650	18.79501273910
H	-33.80227100500	18.78958238610
I	-33.80151030370	18.78922163890

Figure 2: Map distinguishing between the Private Area and Conservation Area.

3. Flora & Fauna

Historically, the indigenous vegetation in the area consisted of a mosaic of Swartland Shale Renosterveld, Swartland Granite Resnosterveld, Swartland Silcrete Renosterveld and Cape Flats Sand Fynbos. Pockets of Swartland Silcrete Renosterveld occur where the silica's in the sandy soils are cemented into the shale under these wet lowland conditions while the natural water channels that formed through these lowland vegetation types created seasonal vernal pools and wetlands with their own unique species.

These species-rich mosaics of lowlands vegetations have however been significantly transformed over the past 200 years, mostly through urban and agricultural expansion and infestations of invasive alien species that also alter the natural processes such as the fire, nutrient cycling and hydrology required to maintain these Fynbos ecosystems. The loss of the vegetation meant the loss of the topsoil and seedbanks while damming and ploughing of natural water courses and extraction of groundwater changed the hydrology and PH of the systems creating highly saline pans and massive erosion gullies. The degraded ecosystems are quickly engulfed with invasive species that colonise the disturbed areas and expand from there until eventually continuously spanning hundreds of hectares.

3.1 National Vegetation map

Historically area contained a mix of Swartland Shale Renosterveld, Swartland Granite Renosterveld, Swartland Silcrete Renosterveld and Cape Flats Sand Fynbos. Of these, only Swartland Shale Renosterveld is mapped for the Conservation Area, but physically on the ground it is more accurately a mix of Shale and Silcrete Renosterveld types. Both of these vegetation types ranks among the most threatened ecosystem in the country having lost more than 90 % of their original extent. For this reason, both Swartland Shale Renosterveld and Swartland Silcrete Renosterveld are classified as a Critically Endangered ecosystems (See **Appendix 4**).

Renosterveld, unlike true Fynbos vegetation typically has no Protea, Erica or Restio components and are associated with clay soils that are more nutrient rich. As a result, most of the vegetation type has been transformed for agriculture and only tiny, isolated islands remain usually on top of hills or rocky outcrops. Dominated by members of the daisy family (Asteraceae), including renosterbos (*Dicerothamnus rhinocerotus*), the west coast renosterveld veld types has a rich diversity of geophytes many of which are locally endemic. Also embedded into the vegetation type are various unique habitats including vernal pools, ferricrete gravels, quartz patches and seasonal wetlands all ranking amongst the most threatened habitats in the Cape containing many endemic species. **Distribution:** Limited to the Western Cape Province, Swartland Shale Renosterveld

used to span a large (4 945.766 km^2), generally continuous area across the Swartland and Boland on the West Coast lowlands. Stretching from Het Kruis in the north, southwards between the Piketberg and Olifantsrivierberge, widening appreciably in the region around Mooreesburg between Gouda and Hopefield and encompassing Riebeek-Kasteel, Klipheuwel, Philadelphia, Durbanville, Stellenbosch to the South and Sir Lowry's Pass village near Gordon's Bay. Altitude of the rolling hills landscape ranged from 50 to 350 m.a.s.

3.2 Threatened species

During spring of 2021 the DCA was visited in order to conduct a basic botanical scan and ground truthing of the natural remnants on the property. Most of the natural areas on the property was assessed. During the botanical scan 30 species of flowering plants were recorded (MANY more likely to occur), six of which are considered as taxa of conservation concern. The list is still very preliminary and it is expected that at least 100 species are likely to still occur.

The most significant find was a small population of *Podalyria microphylla*, which is a lowlands West Coast Renosterveld endemic ranging in extent from Malmesbury to Paarl to Durbanville. Currently the species is known from only a handful of sites after having lost 90 % of its remaining populations. It is therefore listed as Critically Endangered.

Three other very rare lowlands Renosterveld species recorded includes *Phylica strigulosa* (Endangered), *Babiana odorata* (Endangered) and *Eriospermum capense stonoliferum* (Vulnerable).

There are however very likely a large number of additional threatened species not yet recorded, particularly geophytes and annuals that are dormant only occurring in the soil-stored seed banks at present because the veld is extremely old and senescent.

Figure 3: Renoster sweetpea (*Podalyria microphylla*) – Critically Endangered.

Figure 4 & 5: *Phylica strigulosa* (Endangered) & *Babiana odorata* (Endangered)

Table 2: List of threatened species recorded at DCA:

Species	Common name	Status
Podalyria microphylla	Renoster Sweatpea	Critically Endangered
Babiana odorata	'Old spice' Bobbejaantjie	Endangered
Phylica strigulosa	Swartland Hardleaf	Endangered
Eriospermum capense stonoliferum	Cape Woolseed	Vulnerable
Pelargonium ternifolium	Nerine Storksbill	Near Threatened
Gladiolus watsonius	Red 'Afrikaner'	Near Threatened

3.3 Alien vegetation management

Invasive alien plants are a significant national problem affecting almost 10 million hectares (8.28 %) of the country, and spreading rapidly. About 750 tree and 8 000 other species have been introduced to South Africa from Australia, South and Central America, North America, Europe and Asia. Their reasons for introduction are varied, and include their commercial value (crop species, timber and firewood), ornamental, stabilising sand dunes and as barrier and hedge plants. Others have been introduced accidentally by the containers of ships and aircraft.

Invasive alien species have a significant negative impact on the environment. Next to direct habitat destruction, invading alien organisms are regarded as the biggest threat to biodiversity, and Southern Africa could lose almost a quarter of its plant species from the fynbos region alone, due to invading alien plants.

Other impacts include:

- reducing stream flow (particularly when replacing fynbos with tree species that use more water)

- reducing the ability of water supply schemes to deliver water to meet demands, especially in the dry periods
- invading aquatic species such as water hyacinth, *Azolla* and *Salvinia spp*, have a marked impact on freshwater ecosystems including the alteration of flow patterns, decrease in oxygenation, reduction in light intensity, the accumulation of large amounts of detritus resulting in river blockages and increased breeding sites for disease carrying organisms
- increasing the fuel load that can burn leading to higher intensity and more regular fires. This in turn leads to physical damage of the soil and erosion after fire,
- reduction in the viability of indigenous seeds thereby favouring recruitment of more invasive alien plants
- densely invaded areas are impenetrable, restricting access and making fires even more difficult to control

Landowners are under a legal obligation to control invading alien plants occurring on their properties. This obligation exists as a result of the various laws.

a. The common law relating to neighbours and nuisance;
b. Section 97(1) of the National Environmental Management: Biodiversity Act, 10 of 2004;
c. Section 151(1) of the National Water Act 36 of 1998
d. Section 31A of the Environment Conservation Act, 73 of 1989;
e. Municipal by-laws and the National Veld and Forest Fire Act 101 of 1989
f. Regulations in terms of the Conservation of Agricultural Resources Act, 43 of 1983.

Alien control programs are long term management projects and require careful and well considered planning and execution. The objective is to eradicate all invasive alien plants from the Conservation Area. The DCA is remarkably free of invasive species with only a single pocket of roughly ten Blue gums (*Eucalyptus cladocalyx*) trees behind the little dam inside the Conservation Area. These ten trees contain nests for Jackal Buzzards and Yellow-billed kites and are therefore not a priority to clear at this stage. The watercourse contained one young Rooikrans tree (*Acacia cyclops*) that suggests there might be more, but were not evident during the initial quick survey.

The first step is to prioritise areas to be controlled:

- Areas requiring follow up treatment take precedence over areas which still require initial clearing. Follow up treatment is essential to curb the further growth and spread of the alien vegetation which has already had time and money spend on it.
- Start with young less dense trees to arrest the invasion and prevent the build-up of seed banks. Starting with less dense areas also requires fewer resources and these areas will also be easier to carry out follow up treatment in.
- Dense mature stands should ideally be left for last, as they most probably won't increase in density or pose a greater threat than they are at the moment. Starting to clear dense areas also means that you have to be dedicated to expensive follow up treatments thereafter.

- Collective management and planning with neighbours allows for more cost effective clearing and maintenance.
- One should always consider the natural gradient of the area being cleared, all operations should follow the gradient of the e.g. the slope or drainage lines.
- It also helps using existing roads or visible land marks for demarcating the boundaries of management units.

Following these principles, the DCA can be divided into two conservation management blocks as depicted in **Appendix 4**. All invasive alien woody plants should be cleared per block according to the alien clearing schedule **(Table 3).**

Table 3: Alien clearing management blocks and clearing schedule.

Management Block	Size (ha)	Species	Average Density (%)	Maintenance Follow-up	Annual Inspection
DCA_01	3.0	*A. cyclops*	5 %	March 2023	**Oct**
DCA_02	3.0	*A. cyclops*	<1 %	March 2023	**Oct**

Follow-up of resprouting plants and seedlings are required between 3 months and 6 months after the initial clearing. A second follow-up must be done at about 3 to 6 months following the second follow-up, thereafter an annual follow-up will be required to ensure that any seedlings are eradicated. Different invasive species may require different approaches to clearing based on their physiology and ecological stimuli. Invasive species have different registered herbicides with specific applications development to ensure that the application is effective.

Port Jackson willow (*Acacia saligna*):

Age	Mechanical	Chemical	Biological
Seedlings	Hand pulled or hoed depending on site sensitivity. In sandy soils, seedlings can be cut 2 -3 cm below ground level with a lopper to also remove resprouting buds.	Foliar spray in very dense infestations depending on site sensitivity. Herbicide: Confront (triclopyr) **0.7 % or 70 ml/10 litres** Wetter and dye: 0.5 % or 50 ml/10 litres of each	The Acacia gall fungus (*Uromycladium tepperianum*) has spread into most stands of Port Jackson and causes substantial mortality. The seed feeding weevil (*Melanterius compactus*) has been introduced with limited impact.
Saplings & Young trees	Using a lopper or a hand saw, cut the stump at ground level, apply herbicide in less than 10 minutes.	Cut-stump with herbicide: Herbicide: Confront (triclopyr) **2.5 % or 250 ml/10 litres** Wetter and dye: 0.5 % or 50 ml/10 litres of each	
Large trees	Must be felled as low as possible (< 10 cm ideally) with a stump treatment within 10 minutes.	Cut-stump or frill with herbicide: Herbicide: same as above	

Rooikrans (Acacia cyclops):

Age	Mechanical	Chemical	Biological
Seedlings	Hand pulled or hoed depending on site sensitivity. In sandy soils, seedlings can be cut 2 -3 cm below ground level with a lopper to also remove resprouting buds.	Foliar spray in very dense infestations depending on site sensitivity. <u>Herbicide:</u> Confront (triclopyr) **0.5 % or 50 ml/10 litres** <u>Wetter and dye:</u> 0.5 % or 50 ml/10 litres of each	A seed feeding weevil (*Melanterius servulus*) has been released which can cause 95 % destruction of seed. A galling midge (*Dasineura dielsi*) has also been released causing extensive damage to seed.
Saplings & Young trees	Using a lopper or a hand saw, cut the stump at ground level, apply herbicide in less than 10 minutes.	Cut-stump with herbicide: <u>Herbicide:</u> Confront (triclopyr) **3 % or 300 ml/10 litres** <u>Wetter and dye:</u> 0.5 % or 50 ml/10 litres of each	
Large trees	Must be felled as low as possible (< 10 cm ideally) with a stump treatment within 10 minutes.	Cut-stump or frill with herbicide: <u>Herbicide:</u> Same as above	

Prickly pear (*Opuntia ficus-indica*):

All sizes	Direct stem injection in cuts or punctures into cladodes (from the top down) OR Biocontrol agent	Roundup Max/Roundup Turbo (glyphosate) **18 % or 1.8 litres /10 litres** Wetter and dye: 0.5 % or 50 ml/10 litres of each	Cochineal bug (*Dactylopius opuntiae*) is an extremely damaging biocontrol agent and will kill all infected plants within 2 years.

Stacking of cut material

Trees should be separated into heavy woods (tree trunks and large branches with a diameter of more than 75 mm) and brush (remaining light branches and leaves) and stacked separately.
The heavy woods should ideally be removed from site as these heavy fuels burn for long periods that result in soil damage and hard to control fires.

The light brush should be stacked in large heaps to facilitate the easy access for follow up. It also assists in containing the resulting fuel load and therefore the risk of uncontrolled fire. Keep stacks well apart to prevent fires from crossing easily, not less than five meters apart, this is naturally dependant on the size of the stack and the resulting fire intensity when they burn.

Do not make stacks under trees, power and telephone lines, within 30 meters of a fire belt or near watercourses, houses and other infrastructure.

3.4 Fauna

Mammals: The Fynbos biome is not only unique for its flora, but has evolved with the animals that inhabit it creating co-dependant relationships between animals (insects, birds and mammals) and the plants that make up their habitat often resulting in animals that are as unique as their floral counterparts. These intricate relationships drive processes such as pollination and seed dispersal that are crucial in maintaining healthy ecosystems.

To date, no dedicated baseline fauna collection has been conducted for the area. Many of the indigenous mammal species are inconspicuous, secretive and nocturnal. As such, they are not easily observed. Their presence is often most easily recognised by observing signs left behind in the form of middens, scat and spoor.

Traces of some mammals that have been identified, not only in the reserve but on neighbouring properties, include Porcupine (*Hystrix africaeaustralis*), Cape hare (*Lepus capensis*), Yellow Mongoose (*Cynictis penicillata*), Cape Grey Mongoose (*Galerella pulverulenta*), Karoo bushrat (*Otomys unisulcatus*), Four-stripe mouse (*Rhabdomys pumilio*), Cape Gerbil (*Tatera afra*) and the common house mouse (*Mus musculus*). Other larger species also likely to occur in the direct area could include Grey rheebok (*Pelea capriolus*) – now Near Threatened, Steenbok (*Raphicerus campestris*), Duiker (*Sylvicapra grimmia*), Caracal (*Caracal caracal*), African wild cat (Felis silvestrus cafra), Cape fox (*Vulpes chama*) and bat-eared fox (*Otocyon megalotis*).

Grey rheebok (Near Threatened)

Bat-eared Fox

Historically, the area would have been home to a large variety of game migrating through the region on a seasonal basis including elephant (north from Melkbos), hippo, black rhino (infrequent visitor), Burchell's zebra, eland, red hartebeest.

Species introduced to the Cape Town area in recent years that historically never occurred here includes buffalo, wildebeest (black or blue), springbok, bontebok, giraffe, gemsbok or kudu (Skead 1980).

Birds: A comprehensive bird list has not been compiled for the conservation area as yet however, the common bush bird's characteristic of Fynbos and Renosterveld vegetation have been confirmed from the site. These include: Grey-backed Cisticola (*Cisticola subruficapillus*), Karoo Prinia (*Prinia maculosa*), Southern Double-collared Sunbird (*Cinnyris chalybea*), Long-billed Crombec (*Sylvietta rufescens*), Malachite Sunbird (*Nectarinia famosa*) and Cape Robin-Chat (*Cossypha caffra*).

Raptors are very common in the fynbos with several species recorded in the immediate vicinity including Black-shouldered kite *(Elanus caeruleus)*, Jackal buzzard (*Buteo rufofuscus*), Black sparrowhawk (*Accipiter melanoleucus*) and Yellow-billed kite are all regular visitors. Scarcer raptors which have been identified on site are Verreaux's Eagle (*Aquila verreauxii*), Lanner Falcon (*Falco biarmicus*), Brown snake eagle (*Circaetus cinereus*) and Eurasian Hobby (*Falco subbuteo*) and even a white-backed vulture (*Gyps africanus*). Nocturnal birds in the nature reserve include the Spotted-Eagle Owl (*Bubo africanus*) and the Common Barn Owl (*Tyto alba*) and Fiery-necked nightjar (*Caprimulgus pectoralis)*.

In the dense thicket areas dominated by wild olive and wild peach, common birds include Cape Batis (*Batis capensis*), Bar-throated Apalis (*Apalis thoracica*), Cape White-eye (*Zosterops pallidus*), Fiscal Flycatcher (*Sigelus silens*), and Acacia Pied Barbet (*Tricholaema leucomelas*).

Southern Black Korhaan

Blue crane

Additional common birds include Cape Sparrow (*Passer melanurus*), Common Fiscal (*Lanius collaris*), Cape Bulbul (*Pycnonotus capensis*), Cape Wagtail (*Motacilla capensis*), White-throated Canary (*Serinus albogularis*) and Bokmakierie (*Telophorus zeylonus*). Annually, the bird diversity is augmented with the arrival of the summer migrants. These include Eurasian Bee-eater (*Merops apiaster*), Pearl-breasted Swallow (*Hirundo dimidiata*), Yellow-billed Kite (Milvus parasitus), Barn Swallow (*Hirundo rustica*), and White-rumped Swift (*Apus caffer*).

Herpetofauna: No comprehensive herpetofauna list has been compiled for the Conservation Area as yet, but a few of the reptiles that have been identified in the reserve include Parrot-beaked tortoise (*Homopus aeriolatus*), Angulate tortoise (*Chersina angulata*), Mole Snake (*Pseudaspis cana*), Cape cobra (*Naja nivea*) and Karoo sand snake (*Psammophis notostictus*) and Spotted harlequin snake (*Homoroselaps lacteus*).

Common Padloper

Spotted Harlequin

4. Fire Management

Fire and alien management are the biggest management issues which private land owners have to undertake. Alien invasion is directly linked to fire as numerous species are adapted to fire. Alien vegetation also increases the fuel load which leads to more intense and dangerous fires. Fire is a critical tool that is the essential driving force in Fynbos, rejuvenating both the Flora and Fauna. Sand Fynbos types are adapted to burn on cycles between 10 and 15 years while Renosterveld should ideally burn at intervals between 8 and 12 years. The prevention of fire on the site is therefore not the objective but rather the management of fire. Fire is also an important tool when managing the brush from alien clearing operations.

The National Veld and Forest Fire Act No 101 of 1998 places a lot of responsibility on the land owner:

- In terms of section 12 and 14 every landowner must prepare and maintain a firebreak as determined in section 13. Failure to do so is an offence in terms of section 25(3), unless he has been exempted by the Minister in terms of section 15.
- While section 12 states that a firebreak must be maintained along the boundary of the property, the aim is to reach an agreement with the neighbouring properties to limit the number of firebreaks and thus reduce the fragmenting of the natural veld.
- There is also a further duty on landowners to have equipment, protective clothing and trained personnel available in the eventuality that there may be fire on their property (section 17). Failure to meet this requirement is an offence in terms of section 25(4).

It is recommended that the property be registered with the Cape Peninsula Fire Protection Association (CPFPA) to assist with the above criteria. An application form is available online at www.cpfpa.org.za.

4.1 Firebreaks

The current system of roads around the property should suffice as fire breaks for most of the property. The only potential issue that might need resolving is the requirement for having a fire breaks along southern boundary of conservation area between the farming operations and the Conservation Area.

As grazing is being excluded, for the first couple of years, the alien grasses are going to become tall and senescent and a potential fire hazard. Having a decent break between the farming operations and the conservation area will be critical to managing this potential risk. Numerous fires have been started by arsonists from the R304 in recent years and its best to be prepared.

The water course and wetlands run along the northern boundary of the property and it doesn't make sense to try and cut a fire break through the stream. Although the National Veld and Forest Fire Act No 101 of 1998 states that a firebreak should be maintained along all the boundaries of the property, it also allows for exemption in cases where it is not logical to make fire breaks up steep

slopes on top of mountains. The aim therefore should be to reach an agreement with the neighbouring properties to limit the number of firebreaks and thus reduce the fragmenting of the natural veld. Only where no such agreement can be reached will a firebreak be created along the boundary. The local Fire Protection Association should be able to help facilitate this. See **Appendix 4** and Table 5.

4.2 Ecological burning

The management of fire is a key component of conservation management. Fire management includes the prevention of too frequent and unseasonal fires. The interval between fires should largely be determined by the growth rate of natural, existing plants. No fire should be permitted in fynbos until at least 50 % of the population of the slowest-maturing species in an area have flowered for at least three successive seasons (or at least 90% of the individuals of the slowest maturing species in the area have flowered and produced seed).

The vegetation on the silcrete outcrop is very senescent and will benefit from an ecological burn. The problem lies in proximity to the Eskom Transmission lines. A fire under the transmission lines could easily cause the electricity to arc through the smoke which is a life-threatening situation for anyone attending to the burn and will likely also cause extensive damage to the local substation of Eskom should the power arc. It might be interesting to try and simulate the effects of a fire without burning i.e. physically removing select species and sowing in seed of pre-treated mix to stimulate recovery.

The current size and shape of the conservation area lends it towards two management blocks for conservation management **(Appendix 4)**, split down the middle creating a southern unit containing the rocky outcrops and a northern unit mostly making up the wetlands and low-lying areas. As additional neighbouring properties eventually join into a conservancy are at a later stage, it will likely require an adjustment again.

Sound principles of ecological burning include:

1) Avoid rigid burning regimes.
2) Any fires in vegetation younger than 8 years should be extinguished as soon as possible.
3) **Ecological burns must only occur in summer or late summer. Ideal dates are in the months of February and March**.
4) Special allowance needs to be made for post-fire alien clearing to ensure the control of seeds stimulated to germinate by the fire are eradicated.

All prescribed/ecological burns must be conducted in partnership with the City of Cape Town: Biodiversity Management Branch and the Cape Peninsula Fire Protection Association.

4.3 Brush Pile Burning

Removing brush from site is the first prise. However, when this is not possible, fire is also an effective tool for removing brush following alien clearing. All thick wood (with more than a 50 mm diameter) should be removed and used as fire wood. The remaining brush is then stacked in piles in the most disturbed local site. Ideal sites are on nearby roads or recently bulldozed areas. If no such area exists in the immediate vicinity the most degraded areas locally should be used to stack the brush. These brush piles can be left to rot away and will be burnt during an ecological burn sometime in the future, or they can be burnt during the winter months when the soil is wet. This will help to reduce the heat scaring of the soil in the vicinity of the brush piles.

4.4 Fire age mapping

Accurate mapping of the fire history of a Protected Area, particularly in Fynbos, has many benefits. The resulting maps provide data on important spatial characteristics of fires, such as their size and configuration. They can also be used to determine fire frequency, to link fire to environmental variables and to determine the susceptibility of vegetation types to fire and thus identify fire-prone areas. Such knowledge can then guide fuel management and the planning of appropriate burning regimes. Accurate fire maps can also be used to evaluate the success of fire suppression and fuel management activities, and their impact on the overall fire regime of an area.

Table 5: Summarised maintenance schedule

Action	Responsible	How often	When
Firebreak maintenance around the lower slopes of the hill.	Farm manager	Annually	Oct.-Nov.
5 m wide brush-cut; tracer belts vegetation < 250 mm tall.	CCT: BMB / FPA	Only for Ecological Burns	January
Fire control	Farm manager; Fire & Rescue	As needed	Ongoing
Brush Pile burning	Farm manager, FPA	Annually	May – Aug.
Ecological burning	Farm manager; CCT: BMB; FPA	Every 8 -12 years	t.b.d
Fire age mapping	CCT: BMB	After each burn	Within two weeks of each burn.

5 Wetlands and hydrology

Wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, temporary or permanent, with water that is static or flowing, fresh, brackish or salt, including areas of marine water to the depth of which at low tide does not exceed six meters. Other examples are swamps, rivers and salt pans.

Various sets of legislation and policy have been put in place specifically towards the conservation and preservation of wetlands and water courses in South Africa. Section 24 of the Constitution of South Africa states that, 'everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development'.

The 1984 Conservation of Agricultural Resources Act (CARA) became the first substantial legal instrument for protecting wetlands and remains in force to this day.

Principles such as the '**duty of care**', enshrined in section 28 of the National Environmental Management Act (NEMA), require that landowners must take reasonable measures to prevent, minimise and rectify environmental degradation on their properties. Working for Wetlands offers technical expertise to landowners and collaborates with local partners to set rehabilitation objectives with the intention of improving the integrity and functioning of ecosystems. Rehabilitation measures address both the causes and effects of degradation.

The National Environmental Management Act 107 of 1998 (NEMA) the National Water Act 36 of 1998 (NWA) and the environmental provisions of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) ensure that urban and commercial developments do not affect or alter the natural state of wetlands and water courses.

Wetlands and water courses are our **natural assets** and natural infrastructure able to provide a range of products, functions and services, free of charge. Despite being high-value ecosystems they make up only a small fraction of the country. Once considered valueless wastelands that needed to be converted to other uses in order to improve their usefulness to people, many governments around the world, including South Africa, were still providing farmers with incentives to convert their wetlands for agriculture as recently as the 1970s.

These activities severely affected and dramatically altered South Africa's landscapes over the past few centuries. Studies in several areas have suggested that between 35% and 60% of South Africa's wetlands have already been lost or severely degraded.

Wetlands are beneficial for;

- Flood reduction and stream flow regulation
- Ground water recharge and discharge
- Erosion control by wetland vegetation
- Habitat for biodiversity
- Chemical cycling
- A valuable source of water
- Economically efficient waste water treatment
- Aesthetics (beauty) and nature appreciation

See **Appendix 5** for the hydrological map of DCA.

The DCA conserves one of the VERY few natural tributaries of the **Mosselbank river** and is a critical ecological corridor for birds and mammals that migrate through the region as well as critical recharge areas for local ground water sources. Maintaining high quality water flow from the catchment is therefore very important for the lower lying receptor areas. The degradation of catchment areas ultimately degrades the entire system including groundwater sources.

One of the primary concerns in this region of the City lies with erosion. The fine clay particles of the shale-derived soils are easily dissolved and carried off by fast-flowing water which creates massive erosion dongas. The collected sediments that settle downstream blocks up drainage channels that can cause flooding lower down the slope and also quickly **silts up dams** and watercourse significantly reducing their capacity.

6 Rehabilitation

The primary purpose of the DCA is the conservation of the unique biodiversity and associated ecosystem features and functions associated with the property. In order to reinstate the natural vegetation structure and function to a mostly near-natural state, whereby the long-term ecological integrity of the Swartland Shale Renosterveld vegetation type is preserved, the effective implementation of the management plan is essential.

For the duration of the management plan, the restoration should focus on passive restoration i.e.

- Identifying problem areas for potential secondary invasive species (herbaceous weeds) within the conservation area and control the spread.
- Identifying areas of erosion, taking the appropriate steps in reducing the impact and establishing a monitoring system to evaluate the effectiveness of management actions.
- Monitoring the impact of the MTB trails on the indigenous vegetation.
- Prevent any physical disturbance on natural vegetation within the conservation area.
- Perhaps look at an ecological burn within the next five years.

Any active ecological restoration should ideally be covered in a subsidiary **Ecological Restoration Plan** drafted in consultation with the Biophysical specialist within the Biodiversity Management Plan.

7 Monitoring and Evaluation

Ecological monitoring plays an important role in the management of a protected area. Monitoring of the ecosystem needs to take place before management decisions can be put in place, so that an improved understanding can be obtained on which management can be based. Management decisions should be based on data collected in a scientifically defensible, repeatable manner. Studies should be aimed at investigating longer term trends, so that decisions can be based on facts gathered rather than an individual's "gut feel". The natural environment is constantly changing due to human influences and natural process, and the only way to understand and notice these changes is to have effective ecological monitoring programmes. A question must be answered when developing a worthwhile monitoring programme: what, how, where, when to measure, how to store and analyse data and how to present the results.

A wide variety of methods is available for conducting monitoring and evaluation (M&E) and can be overwhelming. Each method has its advantages, limitations, skills requirements, time frames and implementation costs. These methods fall into two broad categories: qualitative and quantitative methods.

Quantitative methods are measurements of cold, hard facts and rigid numbers with their validity, truth and objectivity taken as unshakeable facts. They are also seen as "objective and verifiable". For example, the number of individuals of a species within a defined area i.e. the quantity and frequency of a species within sample plot 2.

Qualitative methods are seen as subjective, sometimes unreliable and difficult to accurately verify. They are more difficult to ascertain because they probe the contexts of people's decisions, actions and perceptions. Qualitative methods are however valuable to the evaluation process because projects and initiatives are involved with studying changes in people's perception of change. They seek to measure the impact and evaluate the long-term effects and benefits of a project or an initiative.

Quantitative methods	**Qualitative methods**
Advantages • **Provide robust, quantified findings** • **Information is easier to analyse**	**Advantages** • Useful to gain insight on what is happening • Easy to organise and cost-effective (small samples)
Limitations • **Costly to organise (large samples)** • **Do not provide contextual information** • **Offer limited insights on what is happening**	**Limitations** • Information collected cannot be generalised • Information is harder to analyse

7.1 Flora Monitoring

7.1.1 Presence-absence monitoring

Effective detection of population trends is crucial for managing threatened species. Little theory exists to assist managers in choosing the most cost-effective monitoring techniques for diagnosing these trends. The most basic method is presence-absence monitoring where species lists are maintained and updated at least annually during the peak flowering season. Monitoring of Threatened Species should take place during the peak flowering season for each of the species.

The key is maintaining notes on changes observed while also checking for the presence for as many species as possible per survey. Table 6 provides an example for a species list template that will also track very basic trends is species populations. Volunteer groups such as CREW are always happy to assist.

Table 6: Example of species list for monitoring trends in populations.

FAMILY	SPECIES	STATUS	NOTES (latest notes)	GPS (Lat. & Long.)	Oct. 2016	Mar. 2017	Sept. 2017	Jan. 2018
Proteaceae	*Protea odorata*	CR	4 plants observed, 2 flowering (Mar. '17).	-33.123456 18.123456	X	X		
IRIDACEAE	*Moraea tricolor*	EN	Post Fire (Apr '17) survey	-33.12345 18.123456			X	X

7.1.2 **Fixed point photography**

Fixed Point Photography is an essential tool in short to medium term monitoring of vegetation communities because it provides:

1. Cheap and permanent record that is easy to access and review broad trends.
2. A rapid means of assessing short to medium term trends in vegetation structure.
3. An achievable means of evaluating and interpreting the impact of external influences like fire and game on vegetation.

Setting up a fixed point photo monitoring network.

1. At ground level, select points throughout the reserve that give adequate coverage of the vegetation communities present – record the GPS position for each point. Plant a permanent marker (sleeve pipe with cap) to easily relocate the point and positioning of the camera. Number each point and photo-reference for easy repeatability.
2. To standardize photos use a fixed lens instead of a zoom lens.
3. Photos can be taken at fixed compass directions – a 35mm lens covers a 62° arc thus four or eight photos can be taken 0°, 45°, 90°, 135° etc. this ensure good overlap between photo's. Aim to achieve a 10-30% overlap between photos. Alternatively, digital cameras with a panorama function may be used.
4. As far as practically possible – take photos at the same time and date during each survey.
5. Proper labelling, storage and archiving of the photographic record are essential.

There are various designs for fixed-point systems, but they all follow the same basic design:

- also see Figure 3 & 4 for a more complex designed system (Coetzee 2005)

- Have a permanent sleeve pipe that is concreted in at each of the Fixed-point sites.
- The sleeve pipe should extrude above ground about 10 - 15 cm and should have a little cap to prevent water from coming in.
- The camera support pipe should have a little platform for a camera (at least 10 cm x 10 cm) welded on top that is flat)
- The platform on the camera support pipe should be about 1.5 m above ground.
- There should be a guide with previous photos that you can take along to make sure you take same pics every time.

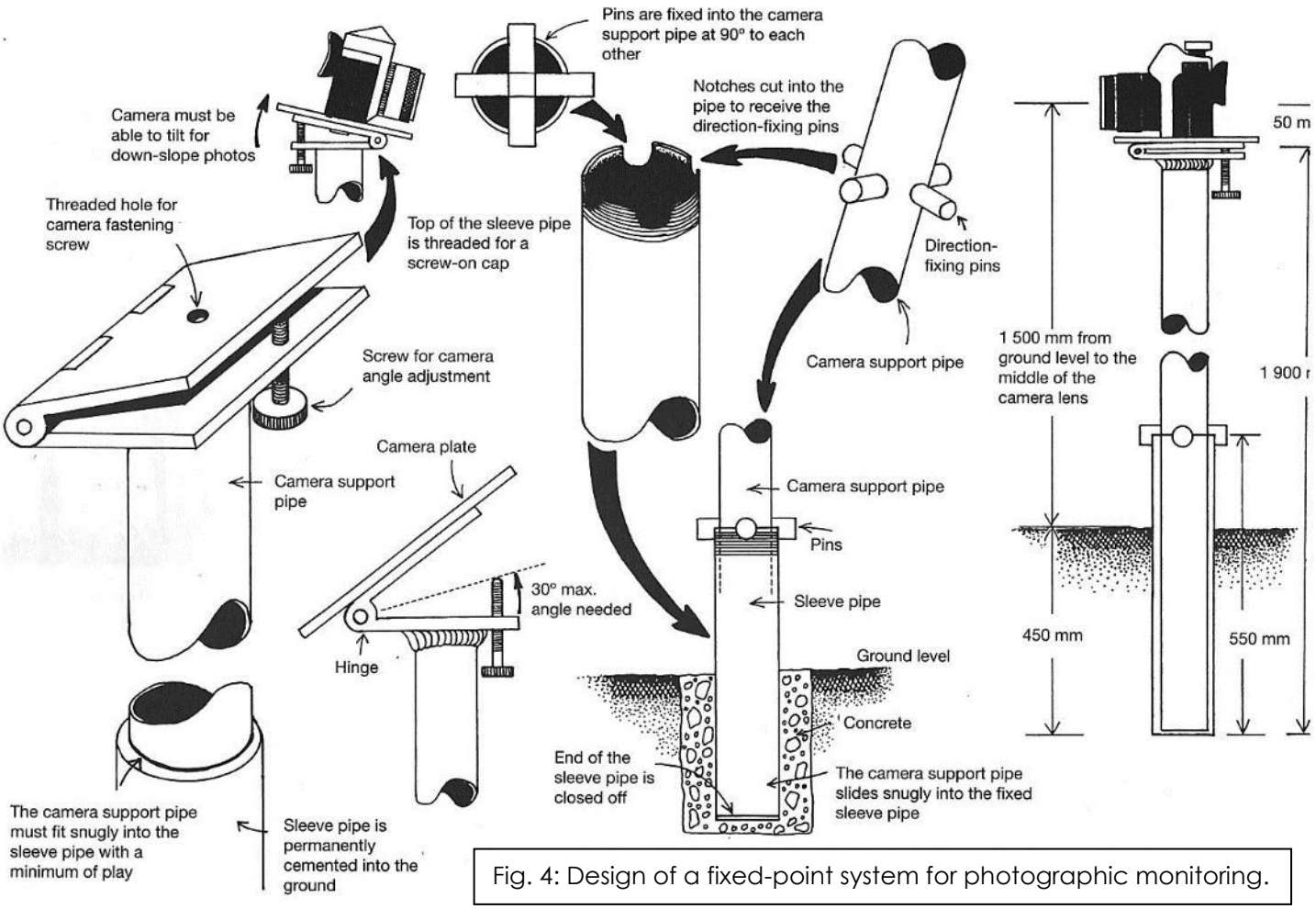


Fig. 4: Design of a fixed-point system for photographic monitoring.

7.2 Fauna Monitoring

No dedicated fauna monitoring programmes are proposed at present apart from basic presence/absence monitoring. This can be done by logging observations on the iNaturalist platform that will automatically collate the data for analysis. Follow the link below for more information. https://www.inaturalist.org/places/fair-cape-dorstberg-conservation-area

Table 7: Summarised maintenance schedule.

Action	Responsible Party	How often	When
Fixed-point photography	CCT: BMB with Farm Manager	Biannually	Mar. & Sept.
CREW monitoring	CREW	Annually	Aug./Sept.
Fauna & Flora monitoring	Farm manager; CCT: BMB	Ongoing	Ongoing
Evaluation	Farm manager; CCT: BMB	Annually	Spring

8 Infrastructure

At present, the DCA contains no hard infrastructure apart from a single jeep track. There are also no plans to construct any permanent structures within the Conservation Area. Structures include viewing decks, water pipelines, tele-communication masts and roads infrastructure.

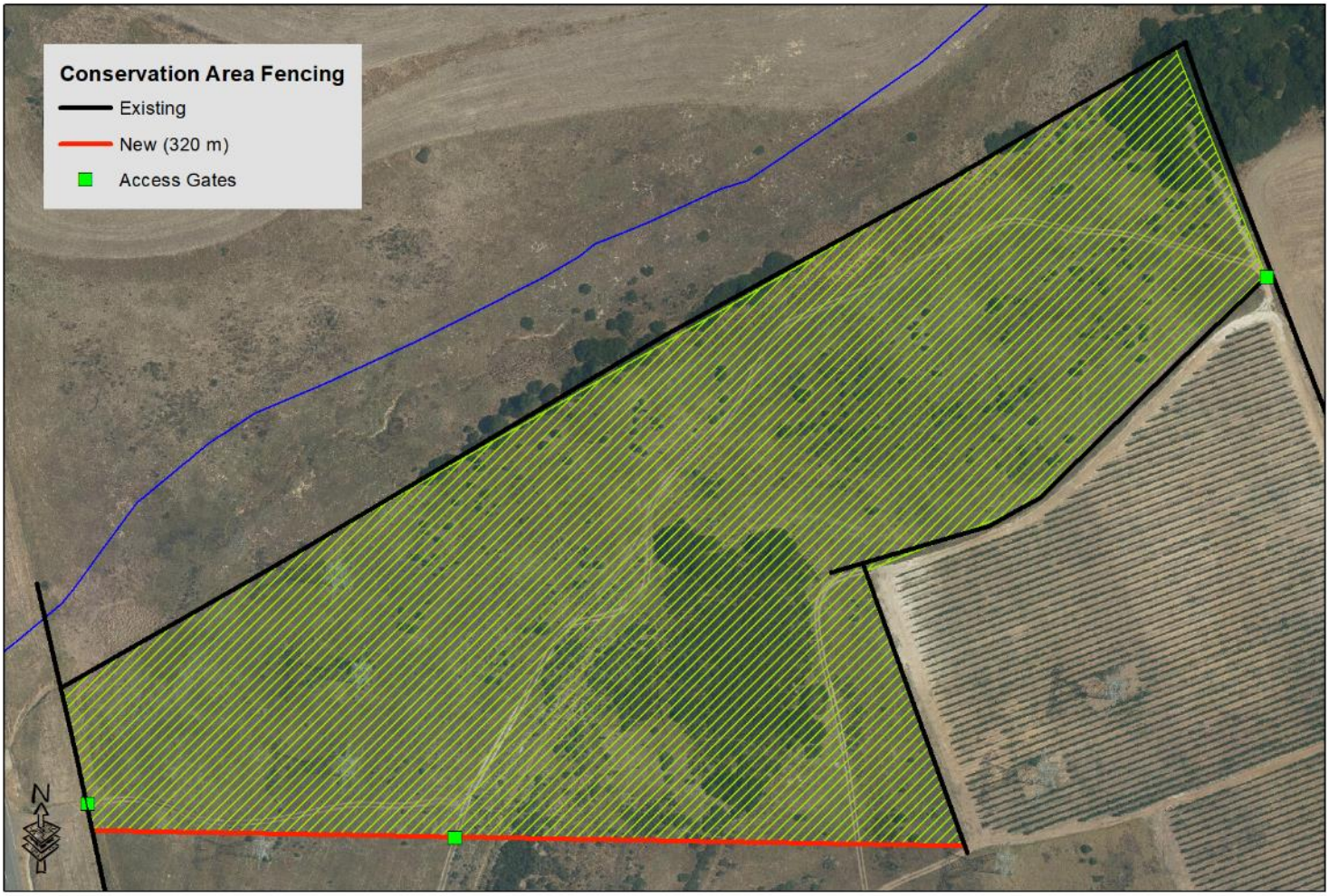
Fencing: This section should be read in combination with the CapeNature Policy on Fencing and Enclosure of Game, Predators and Dangerous Animals in the Western Cape Province.

Small conservation areas, such as DCA, are vulnerable to overgrazing and often have high numbers of small game that have are forced into these confined natural spaces in a sea of intensive agriculture. By allowing livestock such as sheep, cattle or goats to graze these isolated, natural remnants extirpates the small remaining populations of wildlife to the point of local extinction. Overgrazing the indigenous plant species heavily affects their ability to recover as the bulk of the seeds and flowers are eaten before they can mature.

Livestock furthermore introduce seed of invasive weeds that compete with the indigenous pioneer species slowing the natural recovery or even further degrading the remnants by outcompeting the indigenous species. Active restoration of the conservation areas is therefore also impossible when combined with grazing animals as all the introduced plants and seeds are eaten almost immediately with no recruitment.

It is therefore highly recommended that both sections of the conservation area be fenced off from grazing animals. Minimum specifications are as follows:

- Minimum height of 1.2 m
- At least 6 strands of fully galvanised barbed wire. Allow for a slightly wider gap at ground level (i.e. 300 mm, then 180 mm apart to the top) to allow for smaller wildlife movement.
- Fencing posts must be SABS approved, CCA treated, minimum of 100 mm diameter.
- Fencing posts must be concreted into the ground, spaced at a minimum of 10 m intervals with boxes every 100 m and on every corner.
- Wooden droppers should be spaced 2 m apart in between posts resting flush on the ground, not hanging from the wires.
- At least one entrance gate, no narrowed than 3m wide, should be installed into the conservation area perimeter fence to allow vehicle access for management purposes.



Damarakloof Conservation Area: Fencing

When constructing a fence, consider the following features:

- The fence should be permeable to allow for movement of small, naturally-occurring wild animals, while having regard to the behaviour of wild animals in respect of which such fence is constructed.
- It should be in a perfectly straight line between straining posts with all the posts in between standing in perfect alignment.
- The straining, corner and gateposts should be sturdy and be set vertically into the ground.
- All other fence posts and droppers should stand erect and maintain the same height above ground level. In this way the undulations of the ground are followed.
- Straining posts should not be too far apart. The closer they and the fence posts are together, the sturdier the fence.
- Irrespective of the number and type of wires used each should be at a specific height above ground level be parallel to the other and be well secured to each fence post and dropper in such a manner that it cannot be shifted vertically. The more wire stands in a fence of a particular height the more difficult it is for man or animal to climb through them.
- Droppers must be spaced so that the distance between the fence posts is divided equally.
- They must stand erect and the wire stands must be securely tied to them at the same spacing as on the fence post.

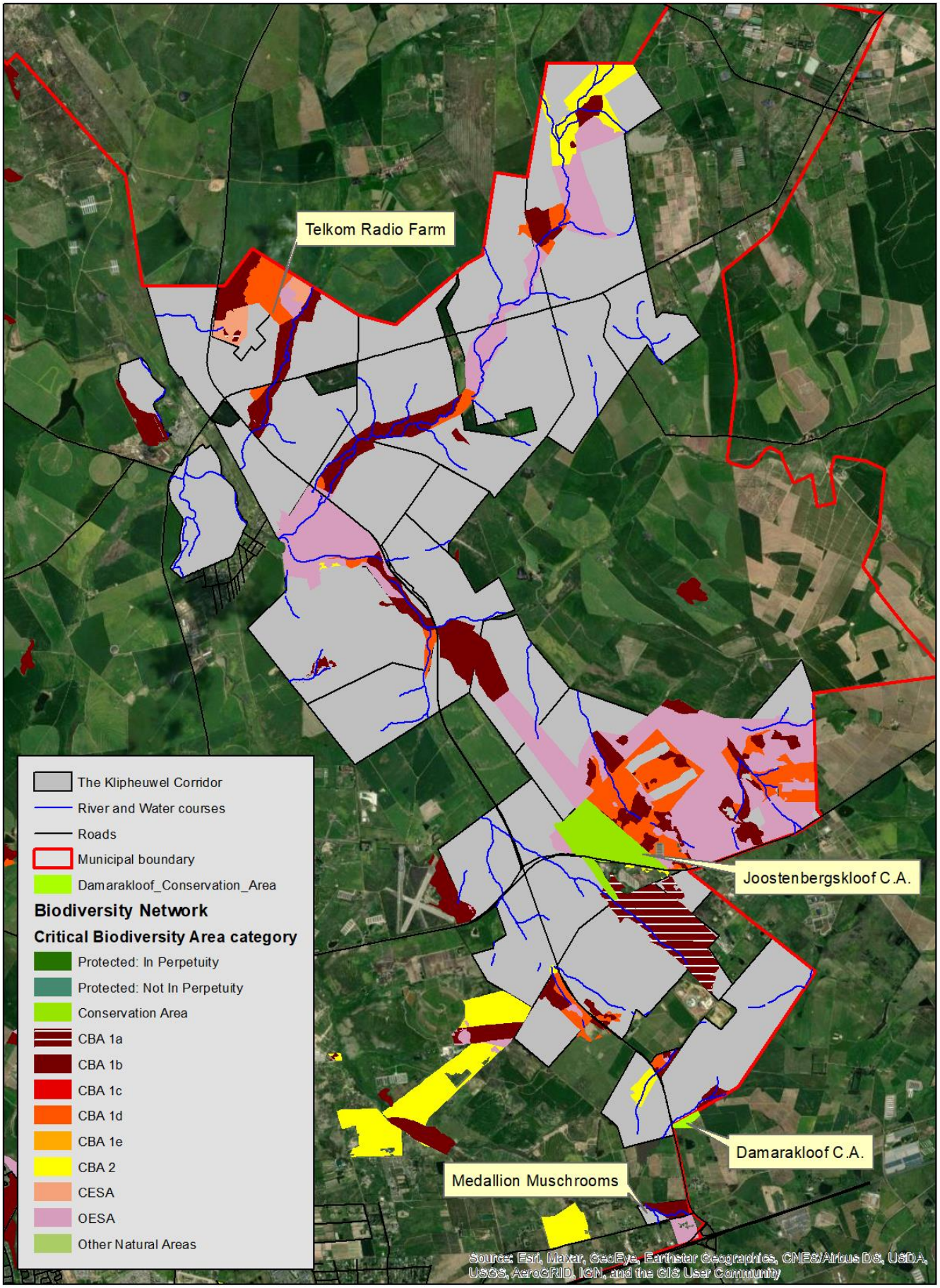
- The fence must be visible to game animals to prevent unnecessary collisions with the fence.
- A good fence can never be erected with inferior material.
- A good fence must be correctly maintained and regularly patrolled to ensure that the fence or enclosure remains complete.
- A landowner must make provision for damage to the fence or enclosure as a result of fires, floods or other emergencies or disasters.

Table 8: Summarised maintenance schedule.

Action	Responsible Party	By when
Initial construction	Farm Manager in consultation with BMB	Winter 2022
Annual maintenance	Farm manager	Winter

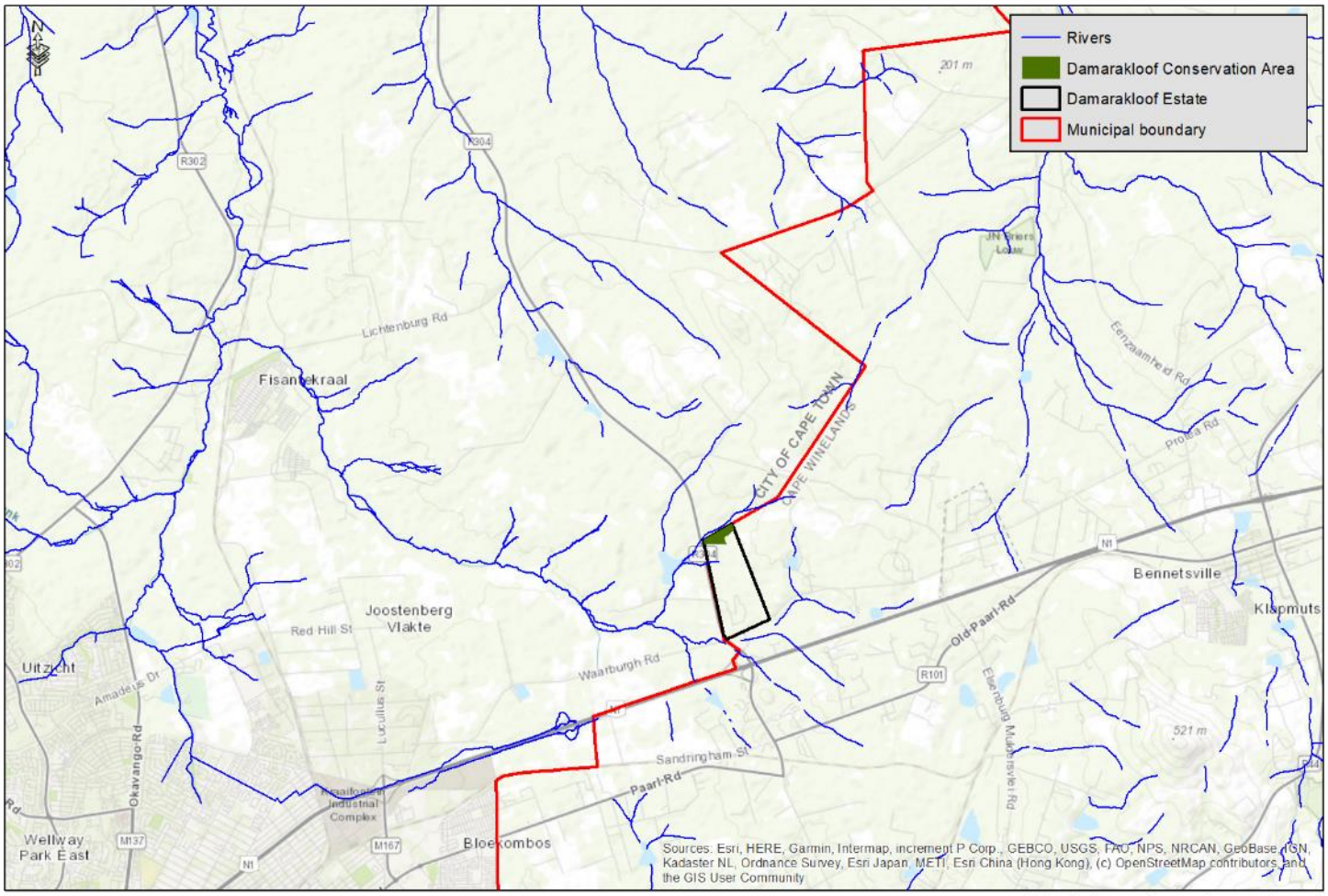
Appendices

<u>Appendix 1:</u> Cape Town Biodiversity Network: The Klipheuwel Corridor.



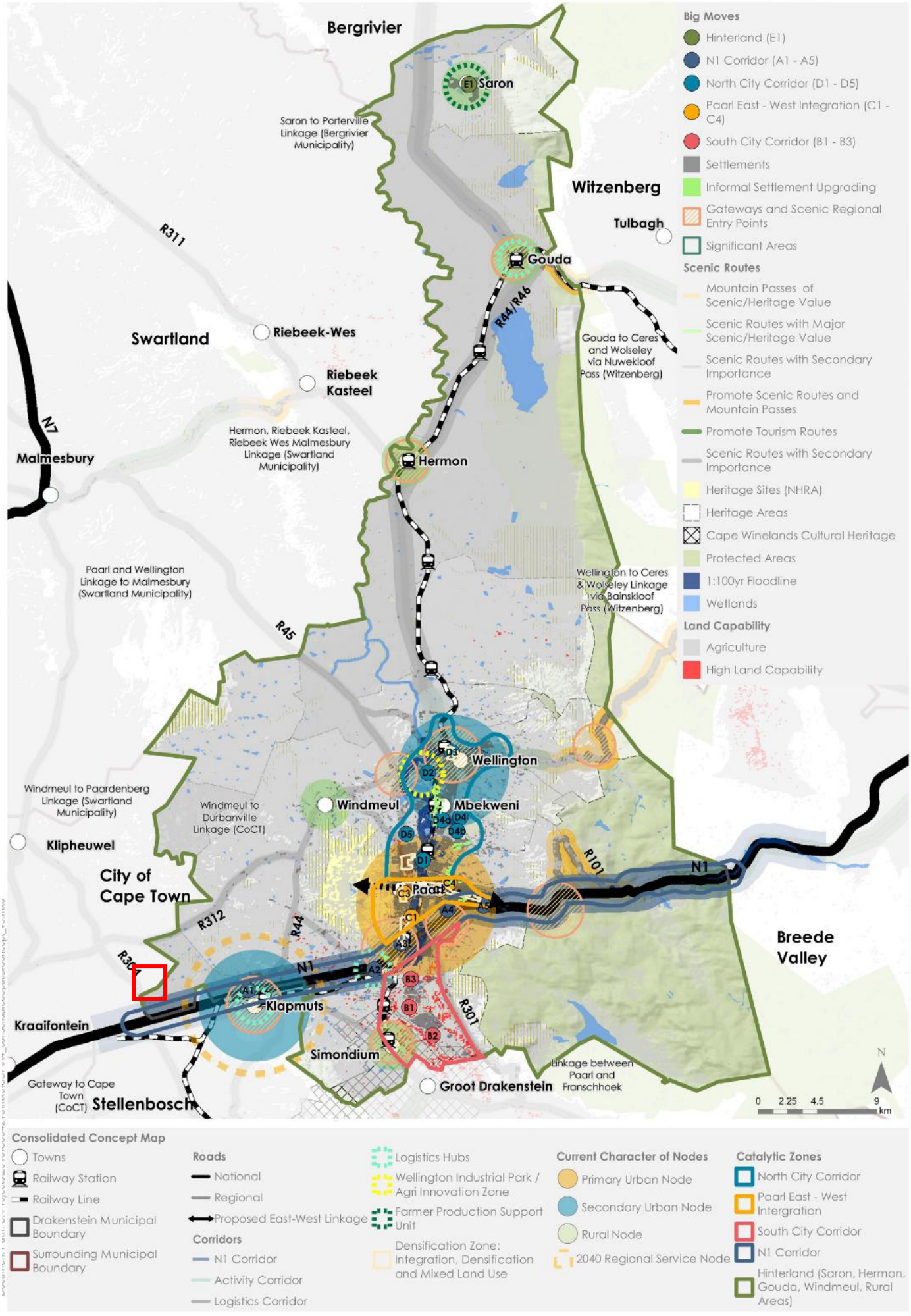
<u>The Klipheuwel Corridor</u>

Appendix 2: **Locality Map.**

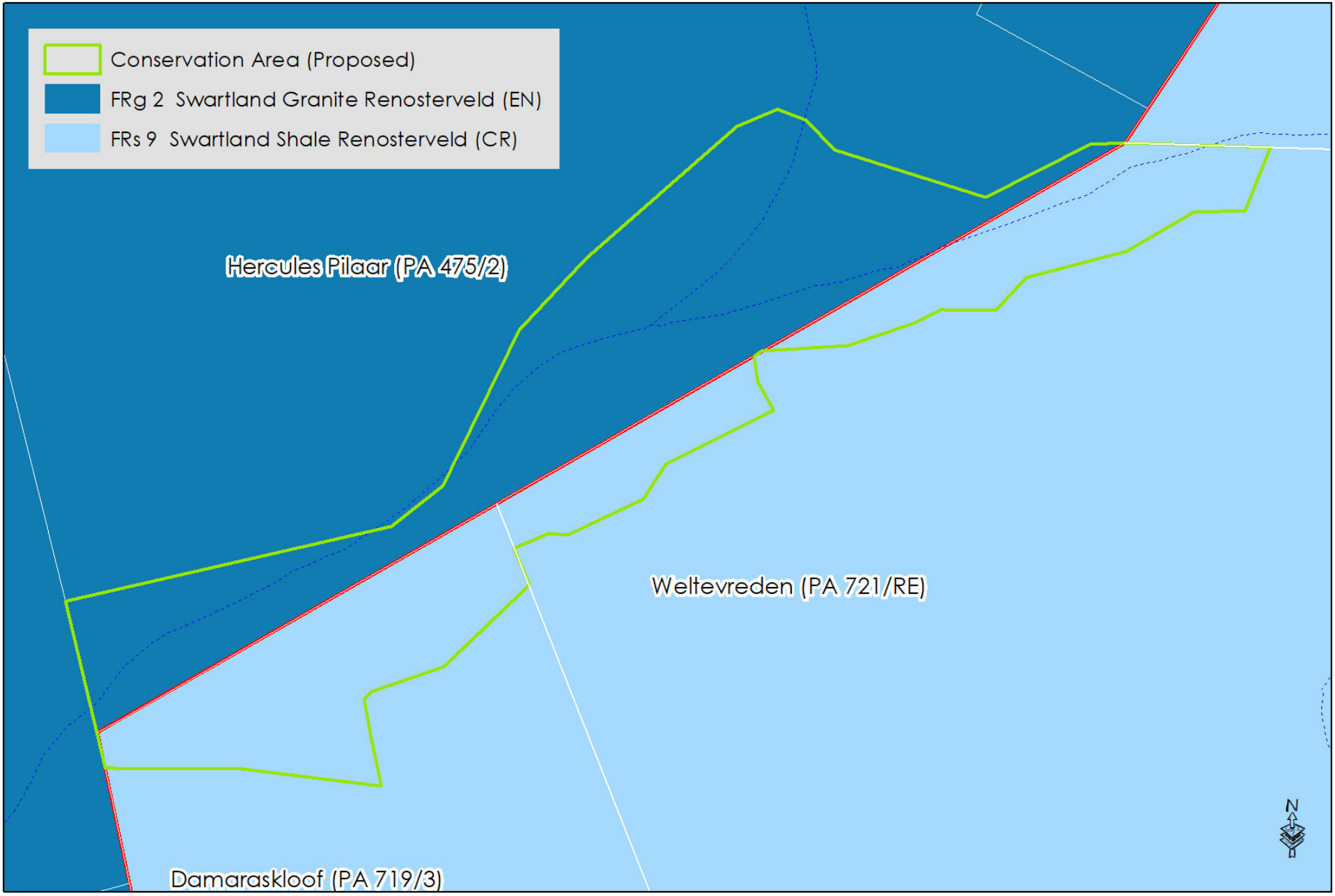


Damarakloof Locality Map

Appendix 3: **Spatial Development Framework and regional context map.**

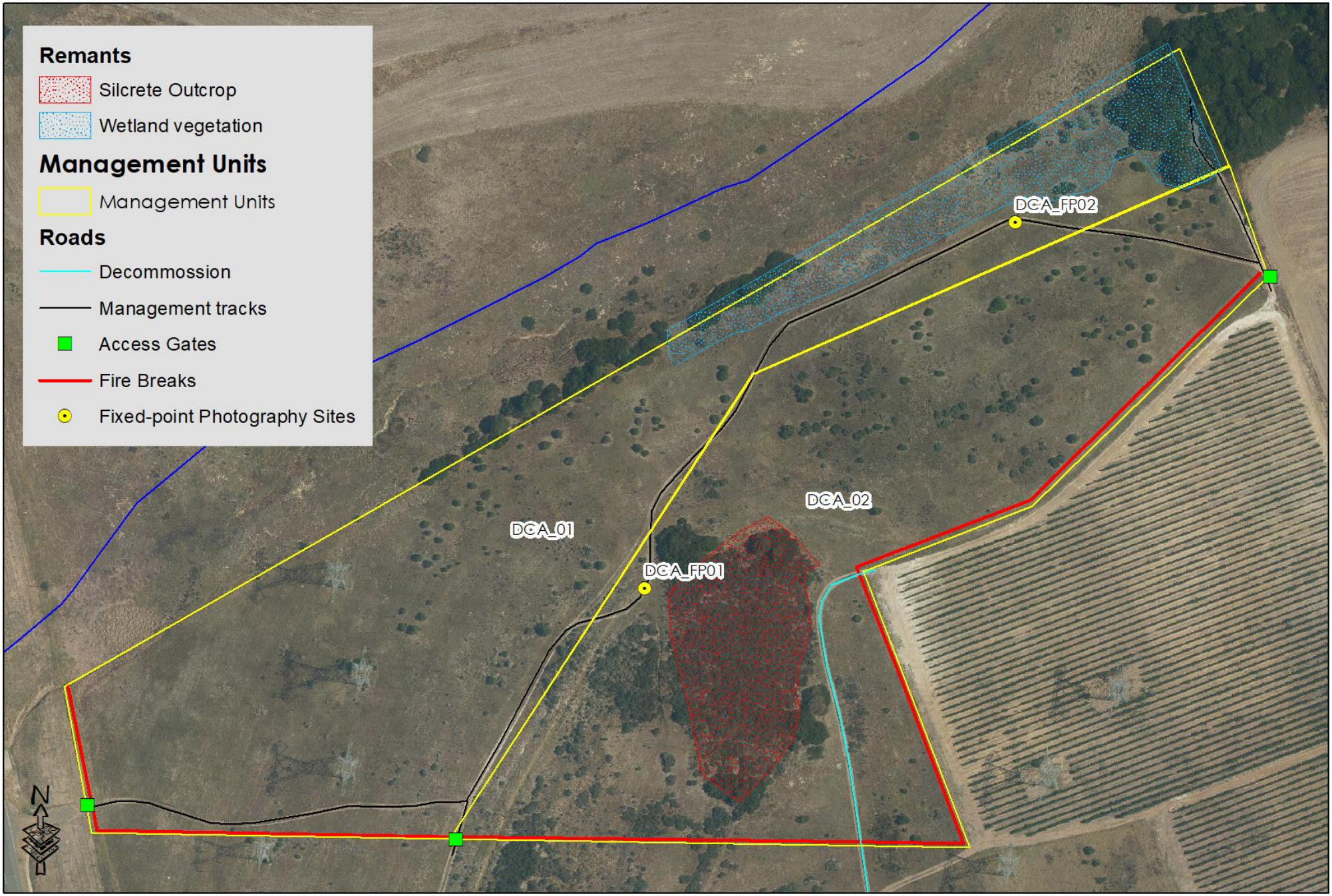


Appendix 4: **Type and extent of indigenous vegetation units.**



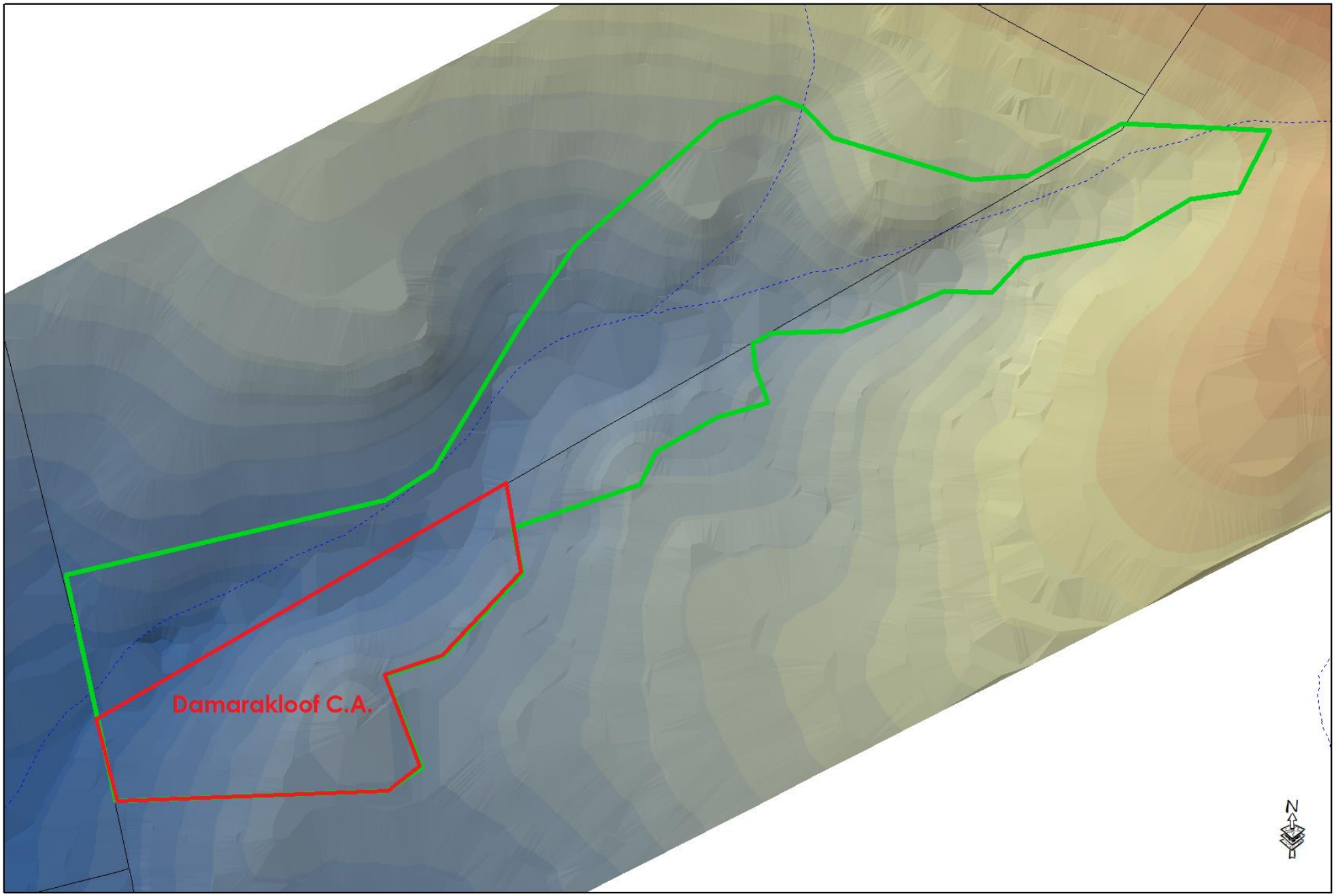
National Vegetation types (historic extent)

Appendix 5: **Conservation Management.**



Damarakloof Conservation Area: Conservation Management Units

Appendix 6: Hydrological map.



<u>Appendix 7:</u> Fixed point photography monitoring log sheet example.

PROPERTY NAME: Damarakloof Conservation Area

POINT NUMBER: DCA_FPP01

Photo Number	Property number/photo point/direction/date (113/5 Paarl) / A / W /03052005 e.g. 113-5PAW0305		
Date	03/05/2021	**Photographer**	R. Jantjies
Time	12h00	**Direction**	N
Weather Conditions	Cloudy &Windy		
GPS Reading	-33° 16.211" S 18° 39.994" E		
Additional Notes	Severe erosion caused by flooding on 25/04/2005		