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BOTANICAL ASSESSMENT AND CONSERVATION MANAGEMENT PLAN FOR MOUNTAIN ROSE FARM (REMAINDER FARM 585), HEMEL N AARDE HERMANUS, WESTERN CAPE.

Client: Mr Hermann Boeddinghaus

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1. EXECUTIVE SUMMARY

Mountain Rose Farm is 169.07 hectares in extent and situated on the eastern slopes of the Hemel en Aarde Valley, just outside of Hermanus . While the property has a long history of agricultural use on the lower slopes, the upper mountainous slopes are home to a rich diversity of indigenous fynbos vegetation. The current owners of the property are committed to the conservation and rehabilitation of both the natural and old-agricultural lands on the property. Significant headway has been made in clearing invasive species, most notably from the natural mountainous areas of the farm, while steady progress has been made in the natural rehabilitation of the old lands.

The natural vegetation of the upper mountainous slopes is critically endangered Overberg sandstone fynbos, while the remaining natural vegetation on the lower slopes is critically endangered Elim ferricrete fynbos. There is also some sensitive riverine and wetland vegetation on the property. While the remaining natural vegetation on the property is of very high regional and national conservation value and is designated Critical Biodiversity Area (CBA), the previously ploughed areas have low conservation value but do contribute to ecological functioning within the intact, natural areas on the property.

The major conservation threat to the property remains alien invasive species, while uncontrolled fires could also potentially impact on the ecology and infrastructure of the farm and surrounding properties. As such this conservation management plan highlights the priority conservation areas on the property, the priority areas for alien vegetation clearing and the most important interventions required for controlling wild fires.

The Mountain Rose farm is home to wonderfully diverse and threatened biodiversity and provides important refuge for biodiversity in the fast-developing Hemel en Aarde valley. Ongoing efforts to conserve and restore the biodiversity of this property should be commended and supported.

Contents

2. INTRODUCTION AND STUDY AREA

Mountain Rose Farm (Remainder of Farm 585) is situated on the eastern slopes of the Hemel en Aarde valley, north of Hermanus in the Western Cape. The farm is 169.07 hectares in extent. The lower slopes of the property have been transformed for agriculture and used for cultivation and stock farming in the past. The upper slopes have never been converted and include pristine Overberg sandstone fynbos with a very high diversity of indigenous plants and associated fauna.

The property is located within the Cape Floristic Region (CFR), which is widely acknowledged as a critical global centre of plant diversity and endemism. The lowland regions of the CFR (ie. the non-montane areas, such as much of this farm) have also been identified by the C.A.P.E. project as one of the key systems in need of conservation, due to the high levels of threat posed by development, agriculture, and alien plant invasions (Anonymous 1998, Cowling et al 1998). Furthermore, the majority of the surrounding habitat within the lower Hemel en Aarde valley has been transformed to intensive agriculture, most notably viticulture. The farm is located within a region of critical global botanical importance.

The property borders onto Fernkloof Nature Reserve to the east. Fernkloof covers an area of 1800 hectares in the Kleinrivier Mountains overlooking the coastal town of Hermanus, ranging from sea level to 842m. Fernkloof is home to more than 1250 species of plants (18% of the flora of the CFR) and provides very important habitat to a wide variety of fauna including Cape leopard.

The current owners of the Mountain Rose property are committed to the conservation and natural rehabilitation of the unique biodiversity of the region and as such have commissioned this conservation management plan in order to guide future activities undertaken on the farm. Every landowner has a 'duty of care' that is stipulated by various acts with which the landowners must comply (Conservation of Agricultural Resources Act 43 of 1983, Environmental Management: Biodiversity Act 10 of 2004, National Environmental Management Act 107 of 1998). The biodiversity of the Mountain Rose property cannot be secured by simply doing nothing. Fire, invasive alien invasive plants, erosion, poaching and injudicious farming activities pose a threat to the property's unique and threatened biodiversity. Careful planning and active management is therefore essential to ensure the integrity of the farms natural ecosystems and the natural processes, which support these ecosystems. This management must focus on four major threats, namely:

1. The maintenance and rehabilitation of natural vegetation and functional ecological corridors;
2. Invasive alien plant species must be controlled and managed;
3. The fire frequency must be managed;
4. Land use practices must be managed within defined, controlled and acceptable parameters.

This management plan update was commissioned in order to ensure that environmental and ecological processes continue to be managed appropriately and are properly integrated into current management and future plans for the property. The main objective of this conservation management plan is to identify conservation and developmental priorities, set realistic targets, schedules and criteria, and define clearly how, when and by whom these targets will be met.

Figure 1. Locality of Mountain Rose Farm, Rem 585 (black polygon), north of Hermanus in the Hemel en Aarde valley, Western Cape.

3. TERMS OF REFERENCE

The owners of the property have commissioned this plan in order to provide:

- An overall assessment of the vegetation characteristics of the property;
- Priority conservation habitat on their property that is most urgently in need of management intervention;
- An alien vegetation eradication plan for the property;
- A plan for managing/rehabilitating the old lands on the property;
- A fire management plan for the property;
- Guidelines/list of appropriate species to use in landscaping and rehabilitation of the property.

4. PURPOSE OF THE MANAGEMENT PLAN

- To protect ecologically viable areas of fynbos and wetlands
- To preserve the ecological integrity and biodiversity of the remaining areas of conservation value on the farm

- To protect species of conservation concern
- To protect areas which are vulnerable or ecologically sensitive
- To manage the interrelationship between fire, nature conservation and infrastructure/agricultural protection
- To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

5. NATURAL VALUE

- `Mountain Rose Farm conserves critically endangered Overberg sandstone fynbos, critically endangered Elim ferricrete Fynbos and wetland vegetation;
- The property includes Critical Biodiversity Areas and Ecological Support Areas;
- The property borders onto the Fernkloof Nature Reserve
- The property contributes towards the conservation of rare, threatened and endemic species.

6. ECOSYSTEM SERVICE VALUE

- Purification and Detoxification: filtration, purification and detoxification of air, water and soils;
- Cycling Processes: nutrient cycling, nitrogen fixation, carbon sequestration, soil formation;
- Regulation and Stabilisation: erosion control, regulation of rainfall and water supply, climate regulation, mitigation of storms and floods;
- Habitat Provision: refuge for animals and plants, storehouse for genetic material;
- An important corridor connecting the mountains and broader Fernkloof conservation area with the Onrust River.

7. THE VEGETATION

There are two major vegetation types on the Remainder Farm 585, namely Overberg sandstone fynbos and Elim ferricrete fynbos (Figure 2). The upper, eastern slopes of the farm are characterized by Overberg sandstone fynbos, while the lower farmed slopes would originally have been Elim ferricrete fynbos (Mucina and Rutherford 2006).

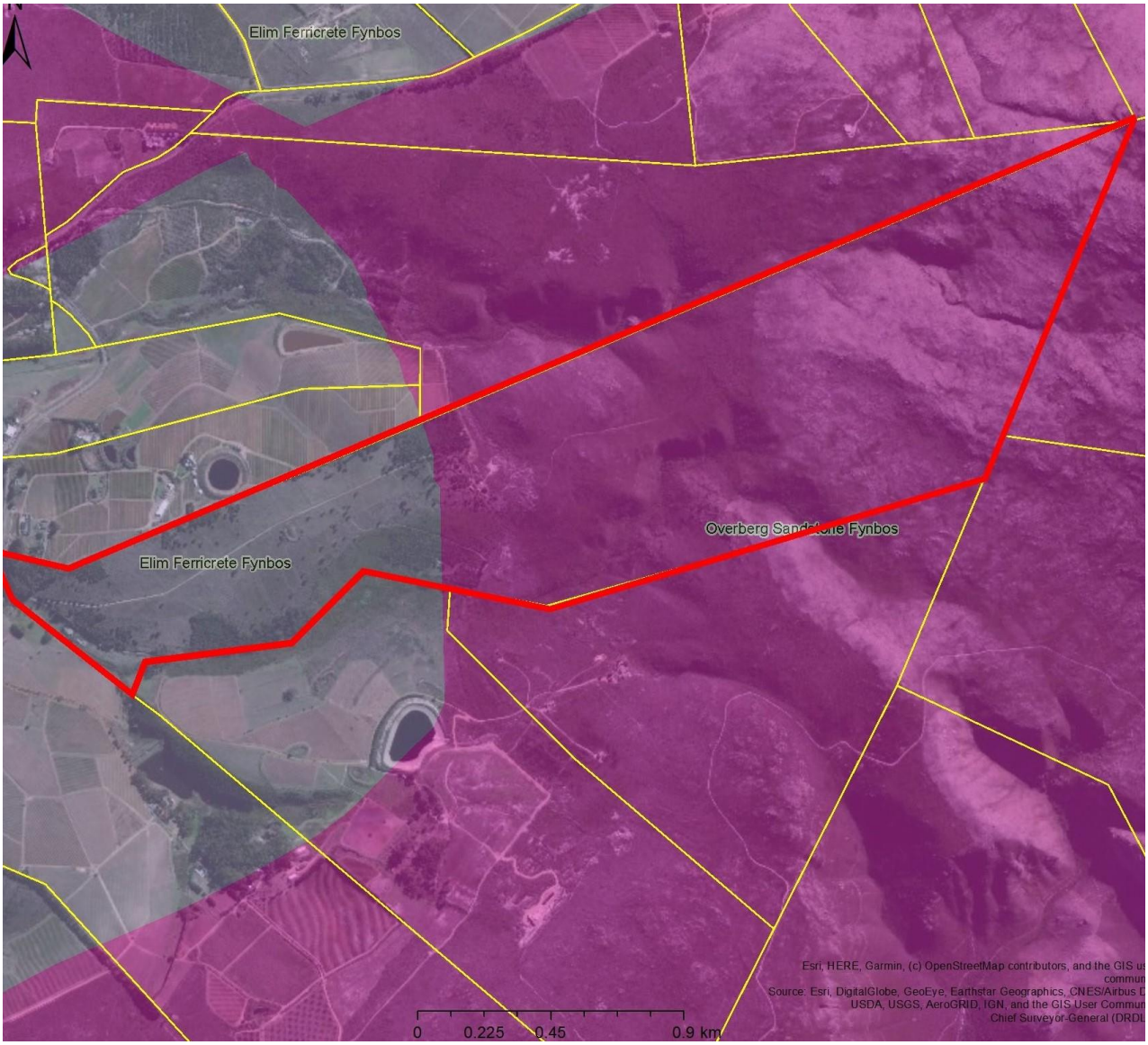

Figure. 2 Approximate distribution of original natural vegetation on Mountain Rose Farm (Remainder of Farm 585) situated in the Hemel n Aarde Valley, north of Hermanus in the Western Cape. Purple is the original extent of Overberg sandstone fynbos and grey is the approximate original extent of Elim ferricrete fynbos (Source layer: National vegetation types from Vegetation map for South Africa, Lesotho and Swaziland (2012) – Sanbi BGIS).

The distribution of natural vegetation shown in Figure 2 is approximate and based on a desktop study that primarily utilized the geological base map of the region. Figure 3 below is a more accurate representation of the actual remaining extent of natural and rehabilitating vegetation on the property. This map has been ground truthed and provides an accurate reflection of the current status and condition of the vegetation on the property.

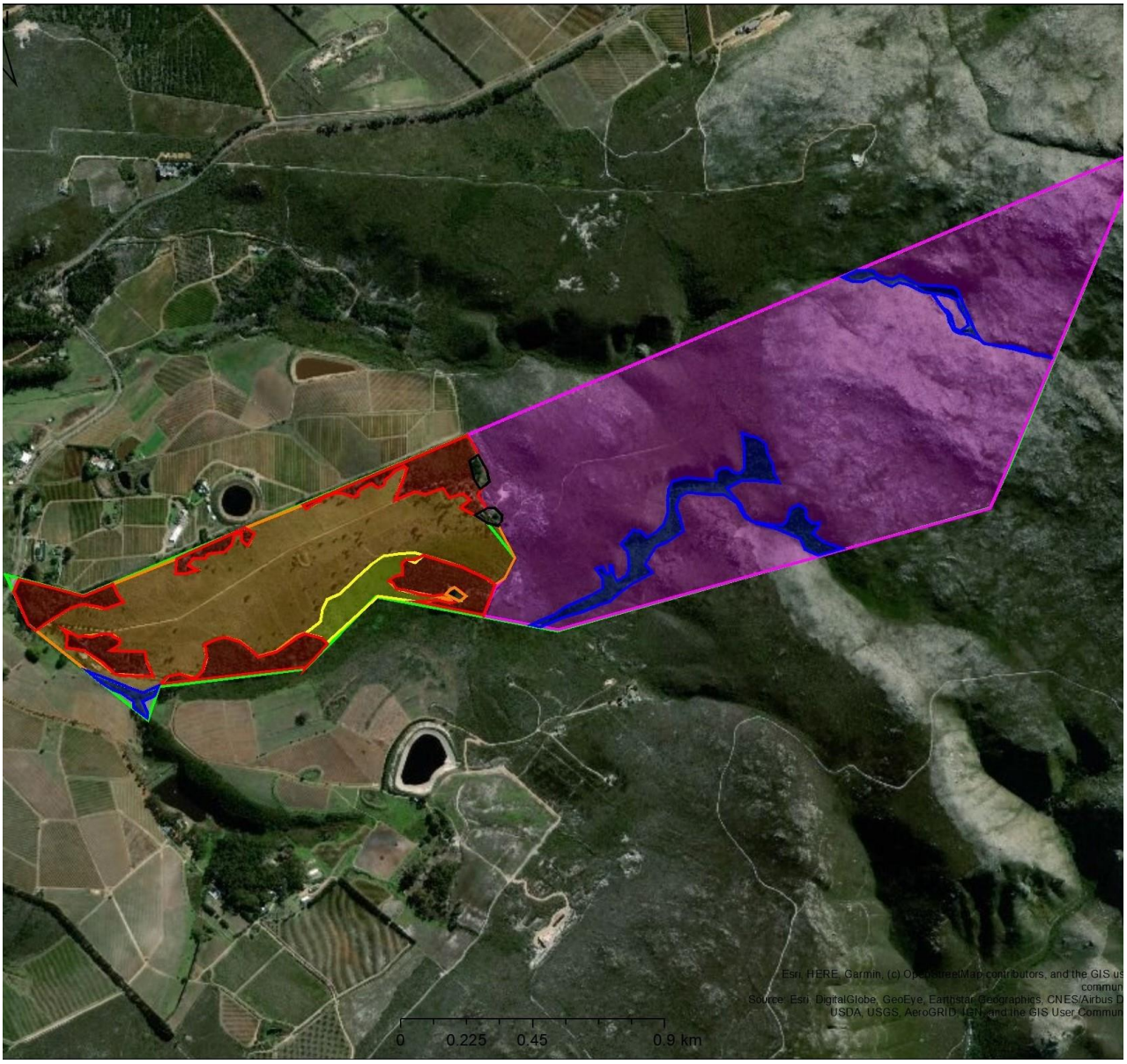

Figure 3. Current status of vegetation on Mountain Rose Farm. Purple is Overberg sandstone fynbos, yellow is Elim ferricrete fynbos, Blue is wetland, orange is old lands that are in a state of rehabilitation, red is dense aliens and black is buildings.

7.1 Overberg sandstone fynbos

Overberg sandstone fynbos is characterized by very high numbers of rare and endemic species and is spread irregularly from Bot River and Hawston in the northwest to the Soetanysberg and Bredasdorp in the southeast including amongst others the Kleinriviersberg range. The vegetation is restricted to low mountains, undulating hills and moderately undulating plains supporting moderately tall, dense restioid, ericoid-leaved and proteoid shrublands. The geology is acidic soils derived from Table Mountain Sandstone (Cape Supergroup). Overberg sandstone fynbos is characterized by a very high diversity and rapid species turnover, over short distances. As a result, there is high endemism and high numbers of rare and endangered species.

Overberg sandstone fynbos has been classified as **critically endangered** on the basis of threatened plant species associations (very high numbers of rare and threatened species).

Dominant species in the Overberg sandstone fynbos community on Mountain Rose farm include *Leucadendron salignum, Leucadendron xanthoconus, Mimetes cucullatus, Protea longifolia, Protea repens, Aulax umbellata, Erica imbricata, Erica muscosa, Pelargonium cucullatum, Pennaea mucronata*, the graminoids *Elegia filacea, Hypodiscus albo-aristatus, Thamnochortus lucens, Cymbopogon marginatus*, and the geophytes *Bobartia gladiata, Aristea glauca* and *Lanaria lanata*.

Overberg sandstone fynbos is characterized by high local and geographical diversity. This is demonstrated on Mountain Rose farm where there are significant changes in floral composition as one move from low to higher altitude as well as from north to south facing slopes on the property. This is the highest diversity area on the farm and a very important conservation area bordering onto the Fernkloof Nature Reserve. The Overberg sandstone fynbos covers approximately 118 hectares of the property.

Thanks to significant investment already made by the current owners into alien invasive vegetation clearing, the Overberg sandstone fynbos on the property is in good condition and has **very high** conservation value.

7.2 Elim ferricrete fynbos

Elim ferricrete fynbos has a natural distribution from the Botriver valley, through the Hemel en Aarde Valley, the area around Stanford, Salmonsdam and Baardskeerdersbos, with the most extensive parts around Elim and the Agulhas Plain. It grows on undulating hills and plains covered with open to closed dwarf shrubland with occasional scattered tall shrubs. It is found on Glenrosa and Mispah soils derived from Bokkeveld shales.

Elim ferricrete fynbos has been classifies as critically endangered on the basis of irreversible loss of natural habitat. More than 42% has been converted to agriculture and only 5.5% is formally conserved. As such the vegetation vulnerability has been rated as high and protection level as poorly protected.

Dominant species in the Elim ferricrete fynbos on Mountain Rose farm include *Leucadendron gandogeri, Leucadendron xanthoconus, Montinia caryophyllacea, Phylica distichya,* the graminoids *Cymbopogon* marginatus (rooigras), *Festuca scabra* and *Mastersiella digitata* and the thicket species *Searsia tomentosa*, *Cassine peragua* and *Olea capensis ssp capensis*.

Unfortunately, the majority of Elim ferricerete fynbos that would originally have grown on the property has been removed in the past for agriculture. All the agricultural lands from the entrance gate up to the houses would have originally been Elim ferricrete fynbos. The soils characteristic of Elim fynbos have high nutrient and agricultural value, are not rocky or on steep slopes and as a result are easy to plough and convert to agriculture. Once ploughed the vegetation will never return to its pristine state. Over time, if left to natural recovery processes, a semi-natural state will return dominated by weedy pioneer species such as *Athanasia trifurcata, Seriphium plumosum, Helichrysum crispum, Anthospermum aethiopicum* and *Metalasia densa*. Unfortunately, the rare and threatened species that would have typified these landscapes, will not return unless actively reintroduced.

The one remaining Elim ferricrete fynbos area remaining on the property is the lower southern slope shown in Figure 3. This area of natural vegetation has never been ploughed and is approximately 3.5 hectares in extent. It is mature fynbos on a damp south facing slope and is characterized by a high proportion of wetland species. It has **very high** conservation value.

In total approximately 125 ha of the farm is intact natural vegetation, of which the vast majority is Overberg sandstone fynbos.

7.3 Wetland vegetation

The wetland vegetation on Mountain Rose Farm is restricted to two stream systems originating in the western mountainous areas of the property, within the Overberg sandstone complex. The southern of these two stream systems runs along the southern boundary of the property and is an important natural corridor linking the mountainous vegetation to the Onrust River. Wetland vegetation on the property is characterized by *Berzelia lanuginosa, Psoralea arborea, Cliffortia strobilifera, Osmitiposis asteriscoides, Diospyros glabera, Drosera trinervia, Grubbia tomentosa, Pennisetum macrourum, and Cannomois virgata.* The wetland vegetation has **high** conservation value.

7.4 Species on site

A total of 163 indigenous plant species have been recorded on the property (see appendix 1). This is a preliminary survey and more species will be recorded if a full survey is undertaken including all seasons and post-fire stages. Of the 163 species recorded, 10 are of conservation concern and are described, each with a photo at the end of this report. More species of conservation concern will be found on the property should a more detailed botanical survey be undertaken.

7.5 Species on old agricultural lands

Dominant species in the old lands include *Athanasia trifurcata, Carissa bispinnosa, Chrysomcoma ciliata, Helichrysum petiolare, Seriphium plumosum, Anthospermum aethiopicum, Cliffortia ruscifolia, Cymbopogon marginatus, Cynodon dactylon, Koeleria capensis* and *Tribolium hispidum*. No species of conservation concern were noted in the old agricultural lands on the property. The old agricultural lands have **low** conservation value., but do provide functional and ecological value to the property.

8. CRITICAL BIODIVERSITY AREAS

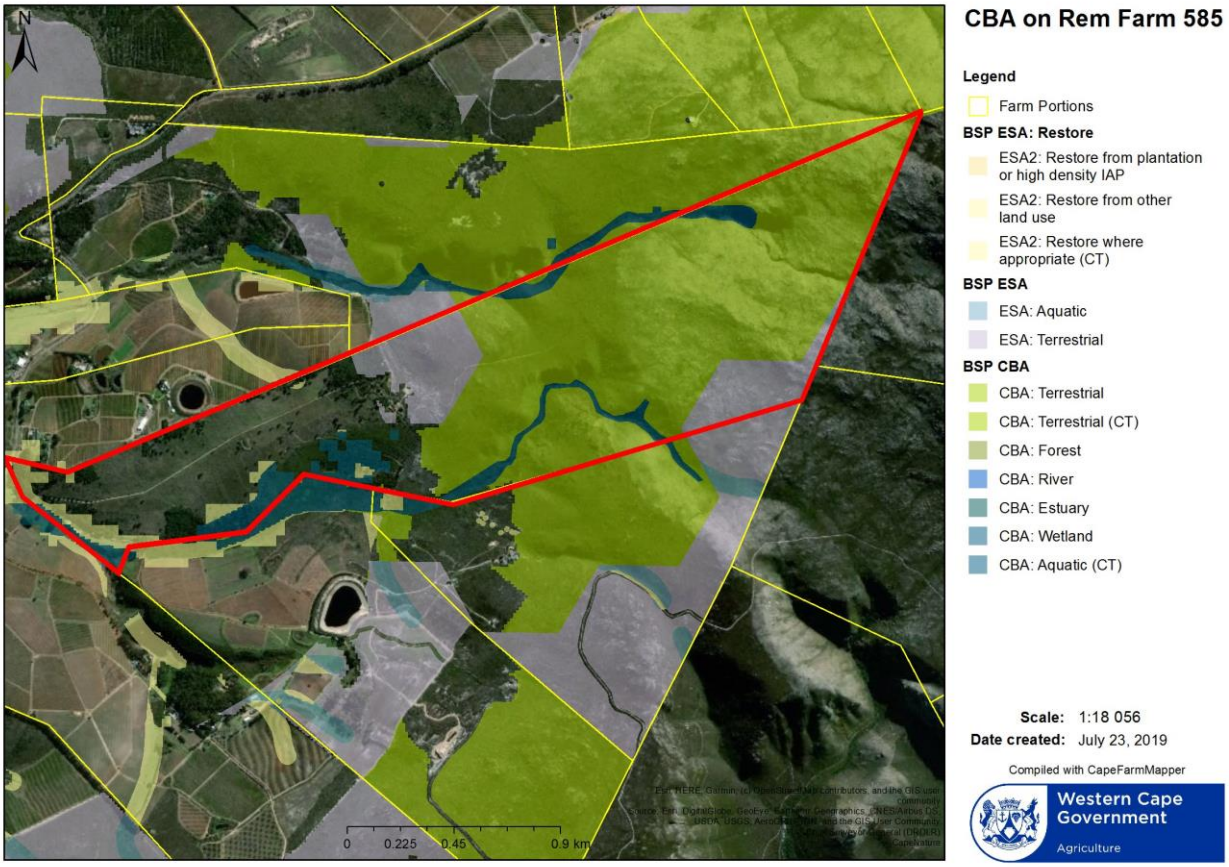

Figure 4. Critical biodiversity areas on Mountain Rose Farm (Rem Farm 585). Lime green is the Critical Biodiversity Area (CBA 1), blue is Critical Biodiversity Area wetland, grey is Ecological Support Area and light yellow is proposed Ecological Support Areas to be restored. (Source: Cape Farm Mapper.)

The Western Cape Biodiversity Spatial Plan (WCBSP) is the product of a systematic biodiversity planning assessment that delineates Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and freshwater realms. These spatial priorities are used to inform sustainable development in the Western Cape Province. Critical Biodiversity Areas (CBA's) indicates areas of land as well as aquatic features which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. CBAs incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species.

Figure 4 shows that the remaining natural areas on Mountain Rose Farm are all important components of the Western Cape Biodiversity Spatial Plan. Furthermore, the river/wetland system that runs down the southern border of the property is seen as an important natural corridor linking the mountains to the Onrust River wetland corridor. As such the map shows the need for restoring the Ecological Support Area along this lower southern boundary in order to provide a viable natural corridor for ecological and evolutionary processes (Western Cape Biodiversity Spatial Plan 2017).

9. ALIEN VEGETATION MANAGEMENT

INVASIVE VEGETATION MANAGEMENT	
Implement control of invasive vegetation	Map the distribution and density of invasive vegetation on site
	Eradicate and control spread of invasive vegetation where applicable as per National Environmental Biodiversity Act (NEMBA) regulations
	Release biocontrol agents in areas with high invasive vegetation densities in conjunction with the Department of Environmental Affairs (DEA) if applicable.
	Map and control spread of invasive vegetation utilised for agricultural or heritage purposes as per NEMBA Regulations.
	Integrate use of fire in alien clearing strategy where applicable
	Provide employment opportunities to local communities through alien clearing project
Woodlot management	Effective control of invasive woodlot
Management of dense stands of invasive vegetation	If opportunity arises, look into alternative clearing mechanisms such as biochar, chipping and firewood.

Alien vegetation is currently the greatest threat to the unique biodiversity of Mountain Rose Farm. Despite significant investment in clearing invasive species from the farm, there remains large areas requiring treatment. The following section prioritises future clearing interventions. The speed and effectiveness of these interventions will be determined by available resources.

9.1 Implement control of invasive vegetation

9.1.1 Map the Distribution and density of invasive vegetation onsite

The occurrence of invasive species has been mapped according to species and density assessed in field. The information has been captured and will inform the invasive vegetation management strategy in compliance with applicable legislation. A map of alien vegetation on Mountain Rose farm is provided in Figure 5 below.

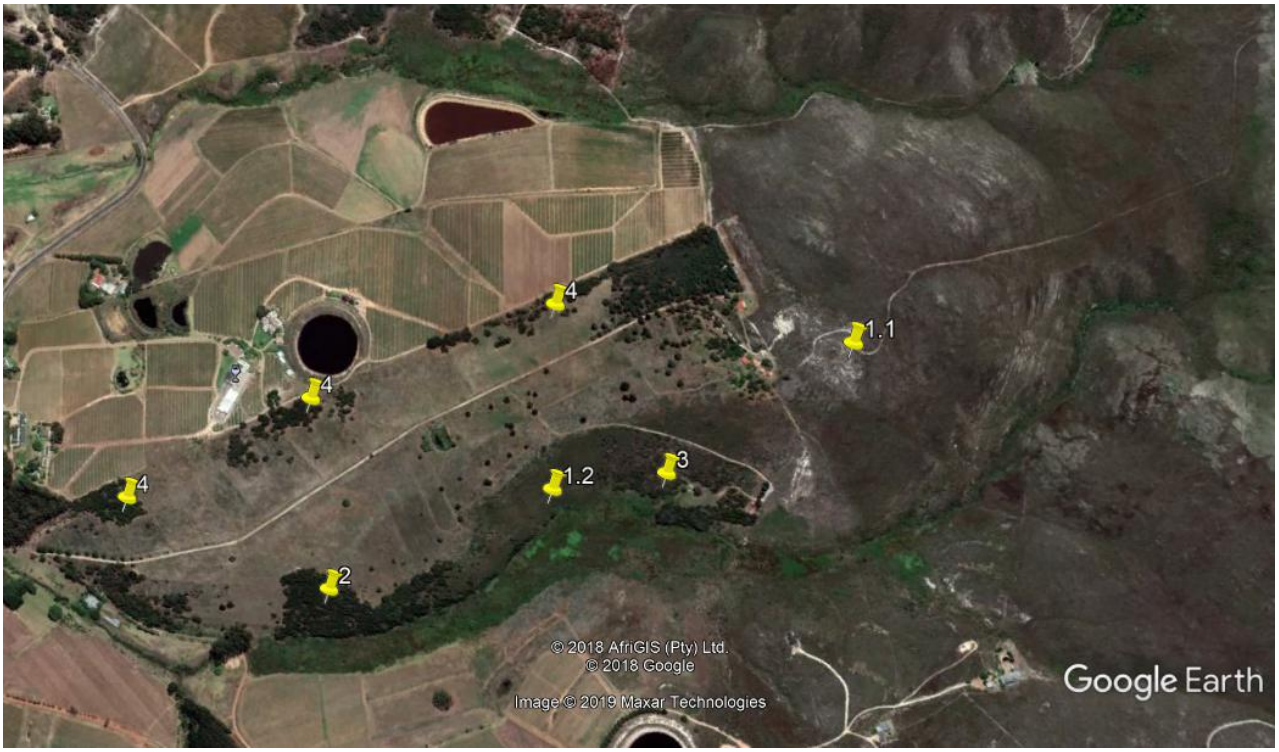

Figure 5. Alien vegetation clearing priorities on Mountain Rose Farm (see section below for priorities description).

9.1.2 Eradicate and control spread of invasive vegetation where applicable as per National Environmental Biodiversity Act (NEMBA) regulations

The National Environmental Management: Biodiversity Act (NEMBA), Act No 10 of 2004 determines the method that aliens should be identified and controlled according to the category that the species falls within. Most of the species on Mountain Rose Farm fall within Category 1b: Invasive species which must be controlled and wherever possible, removed and destroyed. Any form of trade or planting is strictly prohibited. Species in this category that occur on Mountain Rose include: *Acacia saligna* (Port Jackson), *Acacia cyclops* (Rooikrans), *Acacia longifolia* (Long-leaf wattle), *Leptospermum laevigatum* (Australian myrtle), *Eucalyptus spp.* (blue gum), and *Hakea spp*. These species must be controlled wherever they occur within any area of natural vegetation or within a watercourse.

Priority 1. Maintenance of existing cleared areas.

1.1 Existing cleared Overberg sandstone fynbos (118 hectares).
This area has been cleared by the current owners of the farm and is now in a maintenance phase. It is important that an annual follow-up clearing operation be carried out across this entire area to remove young plants prior to them seeding. Furthermore, should there be a fire there will be regrowth of alien species following the fire (in the first 18 months post-fire) that will require follow up clearing. Alien species in this vegetation include *Pinus sp., Hakea sp. Acacia saligna* (Port Jackson) and *Acacia longifolia* (long-leaf wattle).

1.2 Existing cleared Elim ferricrete fynbos (3.5 hectares)
This is a maintenance priority as it has recently been cleared and is the only area of high conservation value Elim ferricrete fynbos remaining on the property. The area is planned for a management burn during 2020 and resources will need to be set aside to deal with expected alien germination and regrowth

after the fire.

Priority 2. Initial clearing of Elim Ferricrete fynbos

Dense stand of Black wattle (*Acacia mearnsii*) adjacent to Elim ferricrete fynbos patch
The clearing of this stand of mature Black wattle has already been initiated using local wood cutters. It is proposed that this clearing be continued and the piles remaining after the wood is removed be stacked and burnt at the same time as the Elim ferricrete block (1. above).

Priority 3. Initial clearing of invaded wetland/Elim ferricrete fynbos

Dense stand of aliens around cottage on middle south slope
This area is characterised by dense stands of mature invasive species. It is a moderate priority for clearing on the basis of potential Elim ferricrete and wetland restoration as well as to reduce the potential fire threat on infrastructure on the property. It is proposed that wood cutting be used to clear the majority of mature trees and that fire and follow up clearing be used for secondary clearing.

Priority 4. Initial clearing of Black wattle woodlots

These clusters of Black wattle located within the agricultural lands of the property pose minimal threat to biodiversity and do not contribute significantly to overall fire threat. They should be cleared over time as resources are available. Clearing should be undertaken by wood cutters who can fund the clearing through the sale of the wood.

Methods to be implemented for alien clearing

Four control options exist:

- Mechanical: used for non-sprouting species, mature plants are cut down and seedlings hand pulled.
- Chemical: for sprouting species the use of herbicides is required to complement mechanical control**.** Herbicides can be applied as a foliar or cut stump application.
- Fire: commercially valuable wood is removed and remaining sapling and brush burnt to stimulate germination. Follow up clearing implemented to clear seedlings.
- Biological: use of natural enemies to reduce the vigour or reproductive potential of an alien, the most commonly used agents are insects, mites and pathogens (disease causing organisms e.g. fungi). This is usually used in combination with other control methods.

Control methods for the most common species on Mountain Rose

Port Jackson (*Acacia saligna*):
Large trees: These can be felled and the stumps treated with herbicide. Frilling, also applying herbicide, can be used as an alternative.
Saplings and young trees: A foliar spray may be applied or alternatively hand pulling and tree popping could be implemented.
Seedlings: A foliar spray may be applied, or hand pulling employed. (But be aware that foliar spraying can harm emerging fynbos)

Pine *(Pinus pinaster)* and (*Pinus radiata):*
Mature trees: Felling is the most common means of eradication, ring barking is also effective, removing a 12 – 15 cm ring of bark near the base of the stem.
Seedlings: Hand pulling or cutting at the base of the stem, it is important to apply these control measures before seeds have been formed.

Silky Hakea *(Hakea sericea):*
Mature trees and thickets: Trees can be felled and left to dry for eight to ten months. The stacks can then be burnt to destroy the dead material and new seedlings. Alternatively, the seedlings can be hand pulled.
Biological control: Three species of insects are available with the main impact on seed production; thus, it is a long-term control and mechanical treatment is still needed.

Black Wattle (*Acacia mearnsii*):
Mature medium to dense stands: Felling and burning, bulldozing/using a "Mulch Master", herbicide stump treatment, stump treatment with fungus, frilling, bark stripping or ring barking, or using biological control "Melanterius acaciae" can be used to treat this category.
Scattered mature trees: All the methods of eradication described above are applicable with the exception of bulldozing and the release of Melanterius acaciae. Barkstripping and frilling are good options for this category.
Medium and dense stands of saplings: Trees can be felled and the stumps treated with herbicide or fungus, the slash can be burnt (if fungus is not being applied). A stem treatment of herbicide may be applied or bulldozer or "mulchmaster" used.
Scattered and single young trees: The cheapest and most efficient way is to apply herbicide to the stems, however stump treatment is also applicable.
Seedlings: Foliar spray, hand pulling or burning is effective for this category.

9.1.3 Using fire as a clearing cycle in alien clearing

Invasive species all maintain seed bank in the ground that are stimulated by fire. Using fire as a clearing cycle will stimulate the growth of dormant seeds and one will get a better flush of the invasive species. Alien vegetation clearing should be undertaken within six months post fire, while clearing is still relatively cost efficient and fynbos species height is still below those of the invasive species.

9.2 Effective control of invasive woodlot

Should any of the current woodlots (priority 4 in Figure 5) be maintained then the landowner is responsible for ensuring that a woodlot is managed appropriately. The following are some guidelines for effective woodlot management:

- To reduce fuel for fire, all waste from harvesting should be removed from site
- Ensure the invasive species does not spread by removing saplings from the surrounding areas
- Ensure that the woodlot does not spread into agriculture and conservation areas of the farm
- Often Eucalyptus stands are used to provide a source of food for apiary sites; ensure that sustainable beekeeping is practised that is not detrimental to the biodiversity surrounding the area

10. FIRE MANAGEMENT

MANAGEMENT OBJECTIVES	
FIRE MANAGEMENT	
Fire breaks	Ensure fire breaks are in place and maintained
Create Partnerships to Improve Fire Management	Ensure membership of Greater Overberg Fire Protection Association
	Attend municipal and fire protection association meetings
	Initiate cross-border landowner agreements where applicable
Controlled burn strategy	Develop and implement controlled burn strategy
	Burns must meet ecological requirements and follow relevant permitting approval (FPA, DAFF, OM)
Fire as a management tool	Alien clearing to be done within six months post fire
	Use of fire as a tool for alien clearing
Response to unplanned fire	Cost effectiveness related to responding to an unplanned fire

10.1 Fire breaks

The existing houses and valuable infrastructure are all situated towards the middle of the farm at the base of the mountainous vegetation, at the interface between the fynbos and the old agricultural lands. The potential fire threat posed by the mature Overberg sandstone fynbos is high. This is as a result of the connectivity with the large expanse of highly flammable mountain fynbos on the neighbour's properties in the Hemel en Aarde valley as well as the greater Fernkloof Nature Reserve to the east. Prevailing winds in summer are from the south east and therefore a high likelihood of fires spreading from surrounding mountainous areas to the east and threatening the infrastructure on Mountain Rose Farm. A proposed prescribed burn is planned to reduce this fire threat (see paragraph on prescribed burn below). Furthermore, to reduce the general fire threat on infrastructure as well as to comply with the requirements of the National Veld and Forest Fire Act, a system of firebreaks protecting the properties infrastructure is proposed as shown in Figure 6 below.

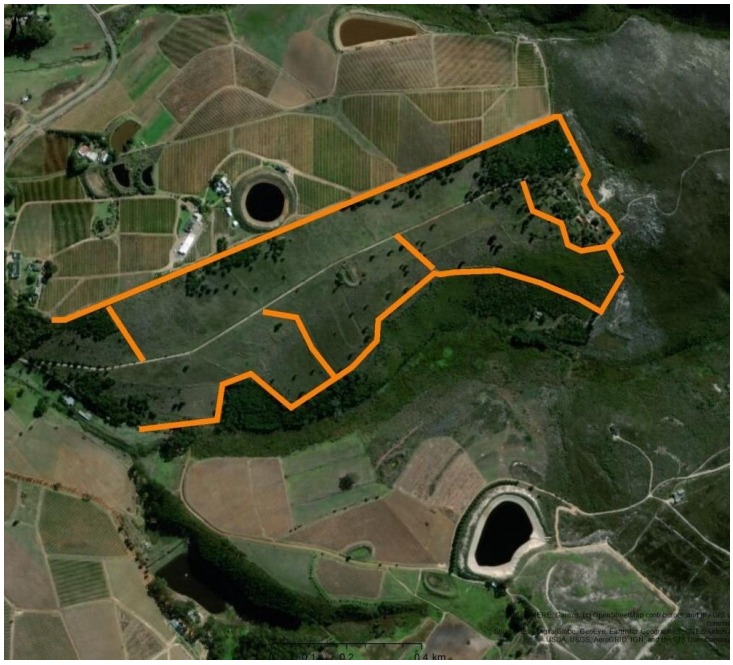

Figure 6. Proposed fire infrastructure protection and perimeter fire breaks on Mountain Rose Farm.

These firebreaks are designed to protect the infrastructure and should be 20 m wide and brushcut twice a year in September and January. While there will be an initial cost in establishing these fire breaks, once established the maintenance costs should be reasonable and included in the annual operating cost budget for the farm. The cutting and maintaining of these fire breaks could either be outsourced, or a tractor mower attachment could be purchased for the property.

10.2 Create partnerships to improve fire management

Mountain Rose Farm is a member of the Greater Overberg FPA (GOFPA). Membership must be maintained and meetings attended as required.

- Relevant legislation (National Veld and Forest Fire Act [No 1 of 1998]) must be adhered to.
- Fire readiness must be maintained during fire season as per the requirements of the FPA.
- Cross border agreements should be implemented under the direction of the FPA, especially where natural veld extends across neighbouring property boundaries.

Currently the manager of Mountain Rose farm attends FPA meeting and is collaborating with neighbouring landowners regarding controlled burns on the eastern mountainous portion of the property.

According to the National Veld and Forest Fire Act, there rests a duty on all owners to acquire equipment and have available personnel to fight fires. Mountain Rose should look into purchasing a mobile fire fighting trailer unit or a bakkie fire fighting unit with all necessary fittings, fire beaters and the necessary protective clothing. This equipment needs to be maintained in a fire ready condition at all times. In most circumstances a rapid response can result in fires being extinguished before they get out of hand. It is important to ensure fire fighting equipment is maintained and in good working order before the start of each fire season. Furthermore, a close relationship with surrounding landowners will be useful for pooling equipment and providing rapid, co-ordinated fire response.

10.3 Controlled burning strategy

Fire management in fynbos is crucial for maintaining fuel loads as well as for ensuring proper ecological functioning of ecosystems. Fynbos naturally burns at a frequency of approximately every fifteen years. Fires at short (<7 years) or long (>20 years) intervals can have a detrimental effect on fynbos communities. Short fire frequencies will impact on slow maturing species such as Protea's and conebush that require three to four years to start flowering and then need time to build up their canopy-stored seedbank before fire. Likewise, long fire frequencies are detrimental as most fynbos species have a relatively short lifespan (20-25 years). With long fire interval, species may die and their seedbank becomes depleted resulting in low recovery rates after fire.

Future fire management at Mountain Rose Farm requires establishment and maintenance of fire breaks (see section above) in order to reduce the potential impact on infrastructure of uncontrolled wild fires and secondly prescribed (ecological) burns to reduce fuel loads and support ecological functioning.

These ecological burns should be undertaken in March and early April. Ecological burns take extensive planning and resources, but if properly implemented will support the ecological integrity of the natural landscape and reduce the risks of uncontrolled fires during the summer.

Fynbos is home to many bulb species that ideally should be burnt in summer fires. Once they start shooting leaves (normally after the first rains in April), fire can be very detrimental for them. It is therefore important to get the timing of ecological burns right. With summers in the Overberg lasting longer and conditions still being dry in early April, it should be possible to still burn during the first two weeks of April. But ideally no later than this. The only exception could be for critical fuel reduction burns that may have to take place outside this period.

It is essential to obtain a permit for burning before starting any fires (including burning piles). Permits are issued for different lengths of time depending on the time of year and the type of burn. For Mountain Rose Farm, the Overstrand Municipality will issue the required fire permit. Their fire department will do an inspection before issuing the permit. Some important rules regarding burning include:

- You may not burn on a Friday, Saturday, Sunday or public holiday.
- You may only burn on a Friday or day before a public holiday with special permission from the Fire Brigade.
- You may not burn on an Orange or Red day. (Fire Danger Index, obtainable on the GOFPA website -https://overbergfpa.co.za/burn-permits/)
- You are bound by the personnel and equipment numbers as on the application.
- You must inform your neighbours and/or other authorities 2 weeks prior to the burn and again daily before burning starts.
- You must inform the control centre or local fire station daily before burning starts.
- All fires have to be extinguished before 16:30 daily.
- As landowner you are responsible for patrolling the area until the burnt area is cold.
- You are responsible for the burn and its consequences even if contracting someone else to do the burn.

10.3.1 Current veld age

With the exception of the upper mountainous slopes of the property that burnt in 2016, all other natural areas on Mountain Rose are older than 20 years post-fire and comfortably in the window for prescribed burns (Figure 7).

Figure 7 Veld ages on Mountain Rose Farm. White polygon burnt in 2018, green burnt in 2016. All other natural areas on the property are older than 15 years since the last fire.

10.3.2 Proposed controlled burn plan for Mountain Rose Farm

Two areas are proposed for controlled burns at Mountain Rose; 1. the mountainous area to the east (in conjunction with neighbouring landowners) and 2. The Elim ferricrete fynbos hill on the lower southern boundary of the property.

Mountain burn

Figure 8. High priority fire threat area in vicinity of Mountain Rose Farm (source: Rob Erasmus Enviro Wildfire (Pty) Ltd)

The red zone (high fire threat corridor area shown in Figure 8 as red polygon) has been highlighted by the Greater Overberg Fire Protection Association as a priority area for controlled burning. This area has been prioritized based on the veld age and infrastructure in the area. The burning of the block will significantly reduce the fire threat posed to Mountain Rose from wildfires originating in Fernkloof or on surrounding private mountainous land. Given the high conservation value of the Overberg sandstone fynbos on Mountain Rose, a March/early April fire is proposed for this block.

The methodology to be employed to break up this area for block burns is beyond the scope of this project as it includes working with a number of adjacent landowners. Guidance from the FPA will be important in this regard. Management is currently in discussion with the FPA and neighbours in order to plan for this burn during 2020 and 2021.

Elim ferricrete fynbos burn

It is proposed to burn the mature Elim ferricrete fynbos slope on the southern side of the property in a prescribed burn. The vegetation on this slope is moribund (old) and will benefit ecologically from a burn. Furthermore, the burning of this slope will reduce fire threat from neighbouring properties. It is proposed to break the block up into three small blocks to make burning easier and safer (Figure 9). In order to do this, temporary fire breaks will need to be cut (dotted lines in Figure 8). The central block (block 1) which has already been cleared of alien vegetation can be burnt in March/April 2020 and the two side blocks (blocks 2 & 3) should be burnt after clearing of invasive species in March/April 2021.

Figure 8. Proposed controlled burn (dashed lines) on Mountain Rose Farm.

10.4 Fire as a management tool

Fire can be used as part of the properties alien vegetation clearing plan. Rather than completely clearing all dense aliens, commercially valuable wood could be removed by wood cutters, the remaining brush left on site with younger trees and then burnt. In this way the densely infested areas (block 2 & 3 in Figure 8 above) could be part cleared/felled and then burnt, reducing overall clearing costs. The burning not only cleans up the felled material but will also stimulate germination of the invasive species, which will then need to be dealt with in follow up clearing of seedlings/saplings.

10.5 Response to unplanned fires

As owners of a farm in the fynbos you are encouraged to implement the following precautionary measures for wild fires:

- Speak to your insurance brokers to explore cover for additional aerial firefighting costs should they be required and for spread of fire insurance.
- Clear fuels around your home and thin out fuels in surrounding areas.
- Keep grass around the home cut.
- Ensure leaves and dead vegetation are removed.
- Clear beneath decks and balconies and avoid build-up of fuels against walls.
- Keep gutters clear of leaf litter.
- Check your roof and seal any gaps such as air vents that could let embers in.
- Store flammable material like wood piles away from your home.
- Make sure gas bottles are stored safely and not exposed to possible heat sources.
- You must have available water sources at your house.
- Install defence measures, like sprinklers or drencher systems around your home, assets and infrastructure.

For more information on the GOFPA contact Louise Wessels: manager@overbergfpa.co.za

11. LANDSCAPING AND REHABILITATION

Future landscaping on Mountain Rose Farm should make use of local indigenous species. Appendix 4 provides a list of indigenous plants proposed for landscaping on the farm. The majority of these species are available locally at Fernkloof, Green Futures and Fynbos Ecoscapes nurseries. Not only will these plants be locally adapted to the conditions of Mountain Rose, but will contribute to the ecological functioning of the natural ecosystem. It is proposed that the existing scattered pines on the property gradually be removed and replaced by indigenous tree species where appropriate.

The old lands are gradually rehabilitating at a slow, natural rate. Unfortunately, as mentioned above, these lands are now dominated by a small suite of weedy, pioneer indigenous shrubs. In order to enhance the condition of these lands additional seed can be collected from natural areas on the property and be sown into the lands. The process will involve collecting seeds in summer, smoke treatment of the seed, clearing and scarifying nodes (5m diameter) in the old land and sowing the seed after the first rains in autumn.

12. CONCLUSIONS

Mountain Rose Farm (Remainder Farm 585) includes a large area of intact natural vegetation with high conservation value as well as significant areas of old, naturally rehabilitating agricultural lands. The mountainous areas are characterised by critically endangered Overberg sandstone fynbos with some wetland areas. This vegetation is in very good condition, as it has been cleared of alien vegetation and has a high diversity. This mountainous area of the property has very high conservation value and is an important natural buffer to the greater Fernkloof conservation area to the east. It is important that ongoing alien vegetation maintenance clearing is undertaken in this area and it is proposed that the majority of this area be burnt in a prescribed burn, together with adjoining landowners.

The other significant area on the property from a conservation perspective is the intact Elim ferricrete fynbos on the lower, southern slope of the property. This Elim ferricrete fynbos is also critically endangered and provides an important natural corridor between the Fernkloof mountainous area and the Onrust River. It is important that existing alien vegetation clearing efforts in this area be maintained and that a combination of wood cutting and prescribed burn and follow up clearing be used to clear the invasive species from this corridor.

Overall the property is home to conservation worthy fynbos and wetland habitat and has local and regional conservation value. The owners should be commended and supported in their efforts at conserving the natural habitats on this property.

S D J Privett
1 November 2019

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Appendix 1. Species of conservation concern

	Merciera leptoloba (Near threatened – Kogelberg to Bredasdorp, known from 10-15 locations. Declining as a result of urban expansion, alien plant invasion and crop cultivation.
	Aulax umbellata (Near threatened - Houwhoek, Bredasdorp, Potberg and Mossel Bay. A population reduction of 27% is estimated based on a reduction in range size in the past 40 years. Land transformation and climate change models predict a >50% population reduction by 2025. Model predictions are considered extreme, but a further population reduction in the next 20 years is likely. Other threats to the species include alien plant invasion, afforestation, expanding protea and vineyard cultivation and urban expansion)
	Leucospermum gracile (Near threatened - Kleinrivier Mountains to Bredasdorp. A population reduction of nearly 30% is estimated based on a 30% habitat loss, but only 20% reduction in area of occupancy due to alien plant invasion and urban expansion in the past 60 years (generation length 20 years).

	Leucospermum truncatulum (Near threatened - Nuweberg to Soetanysberg. A population reduction of nearly 30% is estimated based on 27% habitat loss and a loss of 36% of known subpopulations, mainly to agriculture, in the past 60 years (generation length 20 years). Although most remaining subpopulations occur in sites safe from cultivation it continues to be threatened by alien acacia, hakea and pine invasion, wild flower harvesting and protea cultivation.)
	Protea longifolia (Vulnerable - Hottentots Holland Mountains to Agulhas. A population reduction of at least 30% is estimated based on a decline in range (EOO) and habitat loss to commercial protea cultivation in the past 10-20 years. Habitat loss models predict at least a further 30% reduction in population size by 2025 (Bomhard et al. 2005), generation length 20 years.)
	Serruria elongata (Near threatened - Du Toit's Kloof to Agulhas. A population reduction of nearly 30% is estimated based on a 30% reduction in range size due to habitat loss to agriculture and urban expansion, afforestation and alien plant invasion in the past 60 years (generation length 20 years). Land transformation models predict a population reduction of up to 50% by 2025 (Bomhard et al. 2005), but this is an extreme scenario and a population reduction of 20-30% is considered more realistic. Also threatened by alien invasive ants.

	Serruria heterophylla (Endangered - Kleinmond and Kleinrivier Mountains. three known locations continue to decline due to urban development, vineyard expansion, alien plant invasion and development of golf courses.
	Spatalla curvifolia (Near threatened - Kogelberg to Agulhas coast. estimated population reduction (33-36%) based on general transformation of the vegetation type in which it occurs and transformation of sites known from historical records is likely to be an overestimate. Declines were due to urban development, alien plant invasion and agriculture in the past 60 years (generation length 20 years). Harvested for the cut flower industry.
	Leucospermum conocarpodendron (Near threatened - Cape Peninsula, Cape Flats (Kanonberg), Hottentots Holland to Franschhoek Mountains, Kogelberg, Kleinmond, Babilonstoring and Kleinrivier Mountains to Stanford. A population reduction of 24% is estimated based on habitat loss to agricultural and urban expansion, afforestation and alien plant invasion in the past 60 years

	Spatalla racemosa (Near threatened - Viljoen's Pass to Kleinrivier Mountains. A population reduction of nearly 30% is estimated based on 24% reduction in range (EOO) and 34% habitat loss due to urban expansion, alien plant invasion, invasive alien ants, agriculture and afforestation in the past 60 years

Appendix 2. Mountain Rose Farm - Conservation management targets & actions to be implemented 2020 – 2025.

1	**Natural Flora Conservation**	Target	Actions Taken
1.1	Develop a flora species checklist in conjunction with interest groups to be regularly updated that will highlight and monitor areas that have red data species	Last updated 01/11/2019 By Sean Privett	To be updated annually
1.2	Allow for natural rehabilitation of old agricultural lands and explore options for re-introducing indigenous species.	Old lands are no longer being ploughed or grazed. Natural rehabiliation is taking place. Seeds of missing serotinous species could be reintroduced from surrounding natural veld.	Ongoing
1.3	To plant indigenous trees and shrubs at appropriate areas on the property.	Gradual removal of scattered pines and replacing, where appropriate with indigenous trees	A list of appropriate species has been developed and advice provided by Sean Privett
1.4	Collect and harvest seed for the propagation of indigenous species for replanting on site.	Have requested advice from S. Privett	Ongoing seasonal, seed collecting summer, sowing in April
2	**Fauna Conservation**		
2.1	To develop a fauna inventory list for the site (including fish, insect, reptile, amphibian and mammal species) in conjunction with information available on what species should occur in this area.	Ongoing observation and records kept	Needs more attention – Sean Privett and interest groups
2.2	To develop and monitor a bird species inventory list in conjunction with local birding clubs		Needs more attention – interest groups
2.3	Develop a suitable management plan for the control of exotic bird and duck species (e.g. crows, Mallard ducks) by hunting or catching them in cages and re-locating them to suitable locations.	No mallard ducks resident on the farm but ongoing monitoring	
2.4	To notify the Cape Nature Wildlife Management Programme when new alien fauna species are sighted on the farm (e.g. feral pigs)	Ongoing	Hermann

2.5	To notify Cape Nature if any injured or dead Blue Cranes are found on the property	Ongoing	Hermann
3	**Alien Vegetation Management**		
3.1	To implement an alien clearing plan as per attached map – Figure 5		
3.1.1	Area 1.1- Overberg sandstone fynbos mountainous area (±118) Priority 1	Annual maintenance sweep for follow up (focus on regrowth following proposed prescribed burn in 2020)	Ongoing maintenance – Gary
3.1.2	Area 1.2 -Elim ferricrete fynbos (±3.5ha) Priority 1	Focus on follow up cleearing in 2021 following prescribed burn in 2020	Gary
3.1.3	Area 2 – Elim ferricrete fynbos heaviliy invaded Priority 2	Clearing stand of mature Black wattle already initiated using local wood cutters. Proposed clearing to be continued and piles to be stacked and burnt at the same time as the Elim ferricrete block in 2021	Hermann/Gary
3.1.4	Area 3 – Elim ferricrete fynbos & wetland heaviliy invaded – Priority 3	It is proposed that wood cutting be used to clear the majority of mature trees and that fire (2021) and follow up clearing be used for secondary clearing	Hermann/Gary
3.1.5	Area - Clusters of Black wattle in the agricultural lands of the property – Priority 4	It is proposed that would cutting be used as mechanism to clear these over time (after clearing of higher priority sites)	Hermann/Gary
3.4	Initiate and monitor a locally indigenous tree planting programme	Tree planting and indigenous gardening ongoing on the property	Annually – Hermann & Sean Privett
3.5	To monitor and document all clearing actions and to keep track of which areas are due for follow-up clearing.	Ongoing	Gary
3.6	To continue with follow up actions for rehabilitation of the cleared area.	Ongoing	Gary

3.7	To institute a collective management plan with neighbours that allows for more cost effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or watercourses.	Discuss with neighbours	Hermann
3.8	To ensure there is financial resources in event of wild fire for follow up clearing of emergent alien seedlings post-fire	Ongoing	Hermann
4	**Fire Management**		
4.1	Elect a fire chief and assistant	To be done	Hermann
4.2	Ensure that staff are trained and capable of fighting fires and that contact is made with neighbours regarding fire fighting resources and personel		Hermann/Gary
4.3	Prepare and maintain fire breaks prior to the fire season as per attached plan (see figure 8).	Fire belts to be prepared 2019, ongoing maintenance	Hermann/Gary
4.4	Identify suitable water points (dams, rivers, hydrants, etc)	To do	Hermann
4.5	Establish clear emergency procedures nd protocol for wild fire reaction (neighbours, municipality and GOFPA)	underway	Hermann
4.6	Liaise with the Greater Overberg Fire Protection Association (FPA) to jointly prevent, predict, manage and extinguish veld fires. Work with neighbours more effectively to manage wild fires, controlled burns and firebreaks, as a collective, not just one property.	Done	Hermann
4.7	Burn block 1		2020
4.8	Burn block 2 & 3		2021
4.9	Burn mountain block with neighbours		2020
5	**Wetland and Riparian Zone Management**		
5.1	Identify and demarcate the ecologically important wetland areas and effectively manage these areas accordingly.	Assessment completed, upper wetlands well managed, lower wetland bordering on Hamilton Russel needs alien clearing	Hermann
5.2	Maintain a buffer of indigenous vegetation along the existing watercourses and around the existing dams, and wetlands by removing all alien vegetation between 25-75m	Ongoing clearing around dams	5 year programme
5.3	To keep riparian zones intact and rehabilitate these areas where possible as this vegetation stabilises the riverbank, filters pollutants, helps maintain a natural water temperature, contribute organic matter in support of aquatic life and acts as a buffer to adjacent land uses.	Ongoing	5 year programme
6	**Erosion Control**		
6.1	Monitor roads and other areas for erosion damage after heavy rains and rehabilitate where	Ongoing	Gary

	necessary		
6.2	Maintain existing swales and gulleys along the roads thus preventing any more erosion to the roads	Annually in April	Gary
7	Set up fixed point photography points in core conservation areas	To be done	Gary - Seasonally
8	Re-evaluate management targets	To be done	Bi-annually

Appendix 3. Plant species list

Mountain Rose, Hemel en Aarde Valley						
Family	**Genus**	**species**	**common name**	**veg type**	**growth form**	**conservation status**
Aizoaceae	Erepsia	anceps		sandstone fynbos	shrub	
Aizoaceae	Erepsia	bracteata		Sandstone fynbos	Shrub	
Anacardiaceae	Searsia	angustifolia	wilgerkorentebos	ferricrete/sandstone	tree	
Anacardiaceae	Searsia	laevigata	dune taaibos	ferricrete/sandstone	tree	
Anacardiaceae	Searsia	lucida	Taaibos	ferricrete/sandstone	tree	
Anacardiaceae	Searsia	tomentosa	Korentebos	elim ferricrete fynbos	tree	
Anacradiaceae	Searsia	scytophylla		Sandstone fynbos	Tree	
Apiaceae	Centella	difformis		sandstone fynbos	Herb	
Aquifoliaceae	Ilex	mitis	African holly	wetland	tree	
Aracaceae	Zantedeschia	aethiopica	arum lily	wetland	geophyte	
Asparagaceae	Asparagus	rubicundus	haak dooring	elim ferricrete fynbos	shrub	
Asphodelaceae	Bulbine	sp yellow, 1 leaf		sandstone fynbos	geophyte	
Asteraceae	Anaxeton	asperum		sandstone fynbos	shrub	
Asteraceae	Athanasia	trifurcata	klaaslouwbos	elim ferricrete fynbos	shrub	
Asteraceae	Brachylaena	neriifolia		sandstone fynbos	tree	
Asteraceae	Cliffortia	strobilifera		wetland	shrub	

Asteraceae	Corymbium	africanum	plampers	sandstone fynbos	geophyte	
Asteraceae	Disparago	ericoides		sandstone fynbos	shrub	
Asteraceae	Edmondia	sesamoides	sewejaartjie	sandstone fynbos	shrub	
Asteraceae	Gazania	sp		sandstone fynbos	ground cover	
Asteraceae	Haplocarpha	lanata		sandstone fynbos	shrub	
Asteraceae	Helichrysum	crispum	kooigoed	elim ferricrete fynbos	ground cover	
Asteraceae	Hippia	pillosa		Sandstone fynbos	Shrub	
Asteraceae	Metalasia	densa	blombos	elim ferricrete fynbos	shrub	
Asteraceae	Metalasia	erubescens		sandstone fynbos	shrub	
Asteraceae	Metalasia	muricata	blombos	ferricrete/sandstone	shrub	
Asteraceae	Oedera	capensis		sandstone fynbos	shrub	
Asteraceae	Osmitopsis	asteriscoides		wetland	shrub	
Asteraceae	Othonna	quinquedentata		sandstone fynbos	shrub	
Asteraceae	Phaenocoma	prolifera	pink everlasting	sandstone fynbos	shrub	
Asteraceae	Senecio	mitophyllus		sandstone fynbos	herb	
Asteraceae	Senecio	triqueter		sandstone fynbos	herb	
Asteraceae	Seriphium	cinereum		sandstone fynbos	shrub	
Asteraceae	Seriphium	plumosum	slangbos	ferricrete/sandstone	shrub	
Asteraceae	Stoebe	capitata		ferricrete/sandstone	shrub	
Asteraceae	Stoebe	incana		sandstone fynbos	shrub	
Asteraceae	Syncarpha	vestita	cape snow	sandstone fynbos	shrub	
Asteraceae	Ursinia	paleacea	mountain marigold	sandstone fynbos	herb	
Brassicaceae	Heliophila	sp		ferricrete/sandstone	herb	
Bruniaceae	Berzelia	lanuginosa	kol kol	wetland	shrub	
Bruniaceae	Brunia	paleacea		sandstone fynbos	shrub	
Campanulaceae	Merciera	leptoloba		sandstone fynbos	herb	near threatened
Campanulaceae	Roella	incurva		sandstone fynbos	shrub	
Campanulaceae	Wahlenbergia	tenella		sandstone fynbos	shrub	
Celastraceae	Cassine	shinoides		sandstone fynbos	tree	

Celastraceae	Cassine	peragua	bastard saffronwood	ferricrete/sandstone	tree	
Celastraceae	Maytenus	acuminata		sandstone fynbos	tree	
Crassulaceae	Crassula	fascicularis	fragrant crassula	sandstone fynbos	shrub	
Cunoniaceae	Cunonia	capensis	rooiels	wetland	tree	
Cyperaceae	Carpha	glomerata		wetland	graminoid	
Cyperaceae	Ficinia	radiata	stergras	wetland	graminoid	
Cyperaceae	Tetraria	thermalis		sandstone fynbos	graminoid	
Dennstaedtiaceae	Pteridium	aquilinum	bracken fern	wetland	fern	
Droseraceae	Drosera	trinervia		wetland	herb	
Ebenaceae	Diospyros	glabra		wetland	tree	
Ebenaceae	Euclea	sp		wetland	tree	
Ebenaceae	Euclea	racemosa	sea guarrie	ferricrete/sandstone	tree	
Ebenaceae	Euclea	polyandra		Sandstone fynbos	tree	
Ericaceae	Erica	cerinthoides		sandstone fynbos	shrub	
Ericaceae	Erica	corifolia		sandstone fynbos	shrub	
Ericaceae	Erica	equisetifolia		sandstone fynbos	shrub	
Ericaceae	Erica	ericoides		sandstone fynbos	shrub	
Ericaceae	Erica	hispidula		sandstone fynbos	shrub	
Ericaceae	Erica	imbricata		ferricrete/sandstone	shrub	
Ericaceae	Erica	longiaristata		sandstone fynbos	shrub	
Ericaceae	Erica	muscosa		ferricrete/sandstone	shrub	
Ericaceae	Erica	quadrangularis		sandstone fynbos	shrub	
Ericaceae	Erica	tenella		sandstone fynbos	shrub	
Fabaceae	Aspalathus	aspalathoides		sandstone fynbos	shrub	
Fabaceae	Podalyria	calyptrata		wetland	tree	
Fabaceae	Psoralea	arborea	fountain bush	wetland	tree	
Fabaceae	Psoralea	pinnata	fountain bush	wetland	tree	
Geraniaceae	Pelargonium	cucullatum		ferricrete/sandstone	shrub	
Grubbiaceae	Grubbia	tomentosa		wetland	shrub	
Haemodoraceae	Dilatris	viscosa		sandstone fynbos	geophyte	

Haemodoraceae	Wachendorfia	pniculata		Sandstone fynbos	geophyte	
Haemodoraceae	Wachendorfia	thyrsiflora	rooikanol, Butterfly lily	wetland	geophyte	
Iridaceae	Aristea	glauca		sandstone fynbos	geophyte	
Iridaceae	Aristea	oligocephala		sandstone fynbos	geophyte	
Iridaceae	Aristea	spiralis		Sandstone/wetland	geophyte	
Iridaceae	Bobartia	gladiata		sandstone fynbos	geophyte	
Iridaceae	Pillansia	templemanii		sandstone fynbos	geophyte	
Iridaceae	Gladiolus	hirsutus		Sandstone fynbos	geophyte	
Iridaceae	Hesperantha	falcata	bontrokkie	Sandstone fynbos	geophyte	
Iridaceae	Romulea	rosea		Elim ferricrete fynbos	Geophyte	
Iridaceae	Tritoniopsis	lata lata		sandstone fynbos	geophyte	
Iridaceae	Tritoniopsis	triticea		sandstone fynbos	geophyte	
Lanariaceae	Lanaria	lanata		sandstone fynbos	geophyte	
Lobeliaceae	Cyphia	volubilis		ferricrete/sandstone	climber	
Lobeliaceae	Lobelia	chamaepitys		sandstone fynbos	herb	
Lobeliaceae	Lobelia	coronopifolia		sandstone fynbos	herb	
Lobeliaceae	Lobelia	pinifolia		sandstone fynbos	herb	
Lobeliaceae	Lobelia	setacea		sandstone fynbos	herb	
Mesembryanthemaceae	Carpobrotus	acinaciformis		ferricrete/sandstone	ground cover	
Montiniaceae	Montinia	caryophyllacea		ferricrete/sandstone	shrub	
Myricaceae	Morella	serrata		wetland	tree	
Myrsinaceae	Myrsine	africana	Cape myrtle	ferricrete/sandstone	tree	
Myrsinaceae	Rapanea	melanophloeos	Cape beech	wetland	tree	
Oleaceae	Olea	capensis macrocarpa	ironwood	wetland	tree	
Oleaceae	Olea	capensis capensis		ferricrete/sandstone	tree	
Oliniaceae	Olinia	ventosa		wetland	tree	
Orchidaceae	Disa	bracteata		elim ferricrete fynbos	geophyte	
Oxalidaceae	Oxalis	?long leaf stem		sandstone fynbos	herb	
Oxalidaceae	Oxalis	truncatula		sandstone fynbos	herb	

Penaeaceae	Penaea	mucronata		sandstone fynbos	shrub	
Penaeaceae	Saltera	sarcocolla		sandstone fynbos	shrub	
Poaceae	Cymbopogon	marginatus		ferricrete/sandstone	graminoid	
Poaceae	Festuca	scabra		elim ferricrete fynbos	graminoid	
Poaceae	Pennisetum	macrourum	riverbed grass	wetland	graminoid	
Polygalaceae	Muraltia	?stokoei		sandstone fynbos	shrub	
Polygalaceae	Polygala	small?		sandstone fynbos	shrub	
Proteaceae	Aulax	umbellata		sandstone fynbos	shrub	near threatened
Proteaceae	Leucadendron	gandogeri		elim ferricrete fynbos	shrub	
Proteaceae	Leucadendron	salignum		sandstone fynbos	shrub	
Proteaceae	Leucadendron	salicifolium		wetland	shrub	
Proteaceae	Leucadendron	xanthoconus		ferricrete/sandstone	shrub	
Proteaceae	Leucospermum	gracile		sandstone fynbos	shrub	near threatened
Proteaceae	Leucospermum	truncatulum		sandstone fynbos	shrub	near threatened
Proteaceae	Leucospermum	conocarpodendron	Green tree pincushion	sandstone fynbos	tree	near threatened
Proteaceae	Mimetes	cucullatus		sandstone fynbos	shrub	
Proteaceae	Protea	cynaroides		sandstone fynbos	shrub	
Proteaceae	Protea	longifolia		sandstone fynbos	shrub	vulnerable
Proteaceae	Protea	repens	sugarbush	ferricrete/sandstone	shrub	
Proteaceae	Serruria	elongata		sandstone fynbos	shrub	near threatened
Proteaceae	Serruria	heterophylla		sandstone fynbos	shrub	
Proteaceae	Serruria	rubricaulis		sandstone fynbos	shrub	endangered
Proteaceae	Spatalla	curvifolia		sandstone fynbos	shrub	near threatened
Proteaceae	Spatalla	racemosa		sandstone fynbos	shrub	near threatened
Restionaceae	Cannomois	virgata	bell reed	wetland	graminoid	
Restionaceae	Elegia	deusta		sandstone fynbos	graminoid	
Restionaceae	Elegia	filacea		sandstone fynbos	graminoid	
Restionaceae	Elegia	persistens		sandstone fynbos	graminoid	
Restionaceae	Elegia	vaginulata		sandstone fynbos	graminoid	
Restionaceae	Hypodiscus	albo-aristatus		ferricrete/sandstone	graminoid	

Restionaceae	Hypodiscus	argenteus		sandstone fynbos	graminoid	
Restionaceae	Hypodiscus	aristatus		ferricrete/sandstone	graminoid	
Restionaceae	Mastersiella	digitata		ferricrete/sandstone	graminoid	
Restionaceae	Restio	egregius		sandstone fynbos	graminoid	
Restionaceae	Restio	hyalinus		sandstone fynbos	graminoid	
Restionaceae	Restio	perplexus		sandstone fynbos	graminoid	
Restionaceae	Staberoha	cernua		sandstone fynbos	graminoid	
Restionaceae	Thamnochortus	lucens		sandstone fynbos	graminoid	
Restionaceae	Willdenowia	teres		ferricrete/sandstone	graminoid	
Rhamnaceae	Phylica	disticha		elim ferricrete fynbos	shrub	
Rhamnaceae	Phylica	humilis		sandstone fynbos	shrub	
Rhamnaceae	Phylica	lasiocarpa		sandstone fynbos	shrub	
Rhamnaceae	Phylica	buxifolia		elim ferricrete fynbos	tree	
Rosaceae	Cliffortia	atrata		elim ferricrete fynbos	shrub	
Rosaceae	Cliffortia	graminea	Vleirooigras	wetland	shrub	
Rosaceae	Cliffortia	ruscifolia	climbers friend	ferricrete/sandstone	shrub	
Rosaceae	Cliffortia	strobilifera		wetland	shrub	
Rubiaceae	Anthospermum	aethiopicum	new look	ferricrete/sandstone	shrub	
Rutaceae	Adenandra	viscida		Sandstone fynbos	shrub	
Rutaceae	Diosma	oppositifolia		sandstone fynbos	shrub	
Santalaceae	Thesium	capitatum		ferricrete/sandstone	shrub	
Santalaceae	Thesium	ericaefolium		sandstone fynbos	shrub	
Santalaeae	Colpoon	compressum		ferricrete/sandstone	tree	
Scrophulariaceae	Halleria	lucida	tree fuschia	wetland	tree	
Thymelaeaceae	Gnidia	juniperifolia		sandstone fynbos	shrub	
Thymeleaceae	Gnidia	tenuifolia		Sandstone fynbos	shrub	
Thymelaeaceae	Passerina	corymbosa		ferricrete/sandstone	shrub	
Thymeleaceae	Struthiola	ciliata		Ferricrete/sandstone	shrub	
Thymelaeaceae	Struthiola	confusa		sandstone fynbos	shrub	
Thymelaeaceae	Struthiola	striata		sandstone fynbos	shrub	

Thymelaeaceae	Struthiola	myrsinites		sandstone fynbos	tree	

Appendix 4. Local indigenous species for landscaping

Botanical Name	**Common Name**
Feature Trees	
Brachylaena discolor – Pioneer Species	*Coast silver oak*
Tarconanthus camphorates – Pioneer species	*Camphor bush*
Brabejum stellatifolium	*Wild almond*
Ficus natalensis	*Natal fig*
Ekebergia capensis	*Cape ash*
Bauhinia galpinii	*Pride of the Cape*
Trees for windbreaks and mass groupings:	
Brachylaena discolor – Pioneer Species	*Coast silver oak*
Tarconanthus camphorates – Pioneer species	*Camphor bush*
Brabejum stellatifolium	*Wild almond*
Olea exasperata	*Dune olive*
Halleria lucida	*Tree fuschia*
Ficus nataliensis	*Natal fig*
Kiggelaria africana	*Wild peach*
Rapanea melanophloeos	*Cape beech*
Buddleja saligna	*False olive*
Sideroxylon inerme	*Milkwood*
Ekebergia capensis	*Cape ash*
Erythrina lysistemon	Coastal c*oral tree*
Tree clusters:	
Dais cotinifolia	*Pompom tree*
Olea africana	*Olive tree*
Rhus crenata	*Dune crow-berry*
Rhus glauca	*Blue kunie-bush*
Cassine pergua	*Cape saffron*

Brachylaena discolour	*Coast silver oak*
Halleria lucida	*Tree fuchsia*
Pterocelastrus tricuspidatus	*Candlewood*

Large Shrubs

Rhus angustifolia	*Willow karee*
Rhus glauca	*Blue kunie-bush*
Rhus lucida	*Waxy currant*
Rhus pallens	
Osteospermum monilifera	*Bietou*
Diospyros glabra	*Blueberry bush*
Podalyria cuneifolia	*Keurtjie*
Olea capensis	*Wild Cape Olive*
Olea exasperata	*Dune olive*
Psoralea arborea	*Fountain bush*

Shrubs

Athanasia trifurcata	*Klaas Louwbos*
Helichrysum patulum	
Metalasia densa	*Blombos*
Stoebe plumosa	
Gymnosporia buxifolia	*Spike thorn*
Aspalathus ciliaris	
Salvia africana-caerulea	*Wild sage*
Stachys aethiopica	
Anisodontea scabrosa	*Pink mallow*
Melianthus major	*Giant honey flower*
Leucadendron salignum	*geelbos*
Leucadendron xanthoconus	
Lycium afrum	

Sedges & Bulbs

Scripoideus nodosus	
Amaryllis belladonna	*Belladonna lilly*
Haemanthus sanguineus/coccineus	*Paint brush flower*

Brunsvigia orientalis	*Candelabra flower*
Lachenalia bulbifera	
Ornithogalum thyrsoides	
Chasmanthe aethiopica	
Restios	
Thamnochortus erectus	
Restio tetragonus	
Thamnochortus insignis	
Thamnochortus cinereus	