



**GARDEN ROUTE DISTRICT MUNICIPALITY
INVASIVE SPECIES MONITORING,
CONTROL AND ERADICATION PLAN**

**DRAFT
APRIL 2019**

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Report title: Invasive Species Monitoring, Control and Eradication Plan: Garden Route District Municipality

Date: 08 April 2019

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Purpose: This invasive species monitoring, control and eradication plan is prepared to ensure compliance with the requirements of section 76 of the National Environmental Management: Biodiversity Act for a municipality to prepare a plan for property under its control.

Citation: Infinity Environmental, 2019. Invasive Species Monitoring, Control and Eradication Plan: Garden Route District Municipality

Version History: Issue 1 Draft for client comment 8 April 2019

EXECUTIVE SUMMARY

Invasive alien species are plants and animals that have been introduced and spread outside of their natural distribution range. Biological invasions are a large and growing environmental problem, globally and in South Africa. They often have direct negative impacts on both people and ecosystems. It has been estimated that alien invasive species cost the South African economy about R 6.5 billion per year, and threaten the survival of more than 1 200 indigenous species.² Invasive species are particularly problematic in the Garden Route, an area with exceptionally high natural biodiversity.

The Garden Route District Municipality (GRDM) is a Category C (District) Municipality located in the Western Cape Province. The GRDM, as an organ of state, is obliged in terms of section 76 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, NEMBA) and the Alien and Invasive Species Regulations, 2014 (GNR 598 of 2014, AIS Regulations) to prepare an invasive species monitoring, control and eradication plan for land under its control.

The GRDM appointed Infinity Environmental as a service provider to prepare this plan, the purpose of which is to respond to the GRDM's legal obligations and to coordinate the GRDM's efforts to control and eradicate alien and invasive species in areas it owns and manages. It is based on a set of core principles, including

- a focus on prioritising key assets and priority areas, given the constraints of municipal budgets and staffing;
- minimisation of harm to the natural environment; and
- maximisation of socio-economic benefits.

A total of 53 properties divided into 27 sites, with a combined area of 2 825 hectares, were surveyed in early 2019. At least 72 listed alien invasive species were identified and mapped, and their densities determined. The sites are divided into 87 management units, at an appropriate size and structure to allow for coherent management interventions to be implemented within each unit. At the management unit scale, control methods for each species are provided based on best practice and norms and standards. Workload assessments for both the initial clearing and the longer-term follow up have been carried out, allowing the determination of a budget for each management unit.

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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AIS	Alien and invasive species
Biological control	Using one species for the purpose of controlling another species
CARA	Conservation of Agricultural Resources Act, 43 of 1983
Extirpation	Total eradication from a particular area
GIS	Geographic Information System
GRDM	Garden Route District Municipality
IAP	Invasive Alien Plant
NEMBA AIS Regulations	Alien and Invasive Species Regulations, 2014 in terms of NEMBA
NEMBA	National Environmental Management: Biodiversity Act, 10 of 2004
PPE	Personal Protective Equipment



INTRODUCTION

1 INTRODUCTION

1.1 Background

The Garden Route District Municipality (GRDM) is a Category C (District) Municipality located in the Western Cape Province. It comprises seven local municipalities, namely Kannaland, Hessequa, Mossel Bay, George, Oudtshoorn, Knysna, and Bitou, and was formerly known as Eden District Municipality. The GRDM is bordered to the west by the Overberg and Cape Winelands District Municipalities, to the north by the Central Karoo, and to the east by the Cacadu District Municipality. It is approximately 23 000 square kilometres in extent, and includes the major urban centres of George, Knysna, Mossel Bay and Oudtshoorn.

The GRDM, as an organ of state, is obliged in terms of section 76 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, NEMBA) and the Alien and Invasive Species Regulations, 2014 (GNR 598 of 2014, AIS Regulations) to prepare an invasive species monitoring, control and eradication plan for land under its control. Such a plan must include:

- (a) A detailed list and description of any listed invasive species occurring on the relevant land;
- (b) a description of the parts of that land that are infested with such listed invasive species;
- (c) an assessment of the extent of such infestation;
- (d) a status report on the efficacy of previous control and eradication measures;

- (e) the current measures to monitor, control and eradicate such invasive species; and
- (f) measurable indicators of progress and success, and indications of when the control plan is to be completed.

The Act further provides that the invasive species monitoring, control and eradication plans of municipalities must be part of their integrated development plans. The purpose of this document is to respond to this obligation and to coordinate the GRDM's efforts to control and eradicate alien and invasive species in areas it owns and manages. The structure and content of this plan is based on the Guidelines for Monitoring, Control and Eradication Plans published by the Department of Environmental Affairs in 2015 in terms of Regulation 8 of the AIS Regulations.¹



Map 1. Garden Route District Municipality

¹ Department of Environmental Affairs. 2015. *Guidelines for species listed as invasive in terms of section 70 of National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) (NEMBA) and as required by section 76 of this act.*

The GRDM has under its control 53 properties (excluding road reserves, servitudes and properties in urban areas) which for the purposes of this Invasive Species Monitoring, Control and Eradication Plan have been divided into a total of 27 subject sites. A list of the sites, their cadastral delineations, and locations is included in section 3.

1.2 Importance and context

Biological invasion is the translocation of organisms through human activity (intentionally or accidentally) to areas outside their natural range, and their establishment, reproduction, and proliferation in invaded areas. Biological invasions are a large and growing environmental problem, globally and in South Africa.² They often have direct negative impacts on both people and ecosystems, as well as reducing the ability of natural systems to deliver vital services.

An alien invasive species is defined in South African law as

a species which has established and spread outside of its natural distribution range, and threatens ecosystems, habitats or other species, or results in economic or environmental harm or harm to human health.³

Alien invasive species are typically characterised by an ability to reproduce rapidly in their new environments, often due to a lack of natural enemies or to a resistance to local pathogens. Invasive plant species may have a more competitive growth strategy than indigenous species or may colonise disturbed areas faster and outgrow them. Biological invasions pose a threat to biodiversity, as alien species may outcompete or displace locally indigenous plants and animals. The structure, composition and function of ecosystems can be drastically affected by alien invasive plant or animal species. The productive potential of soils and arable land may be impacted on, and invasions

by alien plants may intensify the damage caused by wildfires, flooding, and erosion. Ecosystem services, which are services humans derive from natural systems, may be threatened by biological invasions. For instance, the proliferation of alien tree species in key water catchments may reduce runoff and threaten water security, while the loss of indigenous plant species may reduce the availability of natural products important to human health or the economy.

It has been estimated that alien invasive species cost the South African economy about R 6.5 billion per year, and threaten the survival of more than 1 200 indigenous species.² Invasive species are particularly problematic in the Garden Route, an area with exceptionally high natural biodiversity. It is part of the Cape Floristic Kingdom, by far the smallest of the six floristic kingdoms in the world and the only one within a single country's borders. The region has exceptional species richness and a high proportion of endemics, species that occur only in the region and nowhere else.

Mountain catchment areas in the fynbos region are disproportionately affected by invasive alien trees such as pine, hakea, and Australian acacias. The same species also contribute to changes in the natural fire regime, leading to more frequent, hotter wildfires that disrupt the natural process of regeneration and reduce indigenous plant diversity, as well as threatening life and property. The productive potential of landscapes, both for grazing of livestock and for the production of crops, is impacted by agricultural weeds and other invasives. In the northern parts of the municipality, cacti and other succulent weeds are particularly problematic in this regard. Tourism and amenity values are also affected by the loss of indigenous biodiversity and by the aesthetic impact invasive plants have on scenic routes and areas of natural beauty.

² SANBI and C·I·B, 2018. *The status of biological invasions and their management in South Africa in 2017*. South African National Biodiversity Institute, Kirstenbosch and DST-NRF Centre of Excellence for Invasion Biology, Stellenbosch.

³ National Environmental Management: Biodiversity Act, 2004 section 1

1.3 Legislative context

Two sets of legislation regulate the declaration and control of invasive alien species in South Africa: the Conservation of Agricultural Resources Act (43 of 1983, **CARA**) and the National Environmental Management: Biodiversity Act (Act 10 of 2004, **NEMBA**). Although NEMBA was intended to replace the invasive species provisions of CARA, CARA's regulations have not been repealed and remain in force. Although many invasive plant species are listed under both CARA and NEMBA, this is not the case for all invasive species. In this document, both categorisations are given where applicable.

1.3.1 Conservation of Agricultural Resources Act

The CARA Regulations define three categories of invasive alien plants:

Category 1 plants are declared 'weeds' and must be controlled. They may not be established, planted, maintained, multiplied or propagated.

Category 2 plants are declared 'invaders', and may be retained and cultivated only in demarcated areas and with permission (typically for commercial purposes). Outside of demarcated and permitted areas, steps must be taken to prevent their spread.

Category 3 plants are also declared 'invaders' and may no longer be planted, although existing plants may be retained outside of watercourses so long as steps are taken to prevent their spread.

1.3.2 National Environmental Management: Biodiversity Act

NEMBA imposes a general duty of care in respect of invasive species. Every owner of land on which a listed invasive species occurs must—

(a) **notify** the Department of Environmental Affairs in writing of the invasive species occurring on that land;

(b) take steps to **control and eradicate** the listed invasive species and prevent it from spreading; **and**

(c) take all required **steps** to prevent or **minimise harm to biodiversity**.⁴

The Act further provides that all organs of state in all spheres of government must prepare an invasive species monitoring, control and eradication plan for land under their control. The invasive species monitoring, control and eradication plans of municipalities must be part of their integrated development plans.

Categories of invasive alien species are defined as follows in the Alien Invasive Species Regulations (GN No 598 of 2014):

Category 1a species must be combatted or eradicated. Any form of trade or planting is strictly prohibited.

Category 1b species must be controlled and wherever possible, removed and destroyed. Any form of trade or planting is strictly prohibited.

Category 2 species are regulated by area, and require permits for importation, possession, growing, breeding, moving, or changing of ownership. A landowner or permit holder must ensure that the species does not spread beyond the land or the area in a permit. If an invasive species management programme has been developed for a particular species, the species must be controlled in accordance with the programme.

Category 3 species are regulated by activity. They may remain in prescribed areas or provinces, but further planting, propagation or trade, is prohibited. These species are considered to be Category 1b species where they occur in riparian areas.⁵

⁴ NEMBA s73

⁵ The greater of 32 metres from the edge of a river, lake, dam, wetland or estuary, or the 1:100 year floodline



PRINCIPLES

2 Principles

This plan is based on a set of core management principles, which should inform the implementation of each site-specific plan:

2.1.1 Integrated control

A coordinated management approach that utilises a combination of control methods most appropriate to the site, the timing, and the available resources. Management of invasive alien species will be most effective if it is integrated within and amongst municipal departments and with external partners. Although within the GRDM invasive alien control is primarily located within the EPWP section, there will be overlap with the mandate of other departments and of external organisations. Where this is the case, coordination of efforts is vital to improve implementation and reduce costs.

2.1.2 Landscape-scale control

Invasive alien species will seldom be limited to a cadastral property or site, meaning that control efforts may be hindered by reinvasion from adjacent properties. A concerted effort to coordinate with and involve adjacent landowners and managers (particularly where adjacent land is owned by other organs of state) should be pursued.

2.1.3 Living document

The control programme is not static and should be reviewed from time to time (at least annually) and adapted to fit changing circumstance and budgets.

2.1.4 Focus on key assets and priority areas

In the inevitable context of a limited budget and limited capacity, control efforts should be focused on areas where invasives pose the greatest risk to property or sensitive biodiversity. Fire risk to structures and infrastructure is a priority, so where invasions pose a fire risk initial efforts should focus on the clearing of defensible firebreaks along property boundaries. Similarly, the areas in and around rivers and wetlands are a priority for clearing given the sensitivity of watercourses.

2.1.5 Minimise harm

Indigenous vegetation and watercourses should be protected from damage during clearing of invasives. Control methods, access routes, and training should be appropriate to the site sensitivities. A site camp area may be required for larger projects, to accommodate vehicles, storage areas, and ablutions. It must be located outside sensitive natural areas and must not restrict access routes or damage private property.

2.1.6 Minimise erosion

On steep slopes or dunes, erosion can result from the sudden removal of alien invasive vegetation that stabilises the soil. To reduce this, work should progress horizontally along contours in bands, leaving uncleared bands between cleared areas. After the cleared areas have revegetated with indigenous vegetation, work can begin on the uncleared bands.

2.1.7 Efficiency

Invasives will re-establish from seed or other regenerative material after initial clearing. Simple ways to minimise the duplication of effort include:

- Starting clearing at the head of a catchment or the top of a valley and working downward.
- On flatter terrain, starting clearing at the outside of a block or management unit and working inward.

2.1.8 Recognise use value of some invasive species

Many listed invasive species were planted or introduced for their use value, and some invasions may still have significant use value. Control methods must be sensitive to the current uses, and provide for replacement by indigenous species where required. For instance, the removal of *Acacia cyclops* (Rooikrans) from dune areas may destabilise sand and cause erosion and nuisance. Rehabilitation with indigenous dune vegetation must take place concurrently with the clearing. Similarly, large invasive trees may provide shade or function as windbreaks or bee forage. A sensitive phased approach should be pursued where removal is required, with indigenous replacements

planted early and aliens removed as late as possible. For highly invasive species, this may not be appropriate.

2.1.9 Plan for the management of biomass

Larger invasive alien plants require careful planning and budgeting for the management of woody biomass after clearing. Disposal methods include:

- burning on site (requires risk management and permits)
- chipping and composting (may lead to seed dispersal)
- offsite disposal
- beneficiation (timber, firewood or charcoal production)

2.1.10 Suit methods to the circumstances

Control methods must be suitable to the site and the target species, as well as to available resources (equipment, personnel, and training).

2.1.11 Adequate and thorough training

Staff and personnel responsible for implementation of the plan should be thoroughly trained for their respective roles. At a minimum, workers and supervisors should receive appropriate training and certification. This may include:

- Identifying invasive alien species
- Health and safety
- Herbicide application and chainsaw use (where required)
- Specialised access methods such as rope access

2.1.12 Communication with affected neighbours

Where invasive management activities have the potential to impact on other landowners or nearby residents (e.g. road closure, access over private land, herbicide spraying), they should be notified well in advance.

2.1.13 Responsible herbicide use

The use of herbicides must comply with relevant law and best practice. This includes:

- Using only herbicides registered for the target species
- Providing for safe storage and handling
- Using specific, rather than general, herbicides where possible to reduce collateral damage
- Certification and training for all herbicide applicators



SITES

3 Sites

The Garden Route District Municipality owns several properties throughout the municipal area. The 27 subject sites are located across all seven of the GRDM's local municipalities. Most are in rural areas outside of the urban edge. They range in size from 1.5 hectares (ha) to 1150 ha, with the mean size being 108 ha and the median 44 ha. The total area of the sites is over 2800 ha. See Table 1 and Map 2 for site descriptions and locations.

Table 1. Sites forming part of this plan

Site name	Size (ha)	Municipality	Property descriptions	Nearest town
De Hoek	215.2	Oudtshoorn	Portions 9,13,22 of Farm 29 Groenefontyn Portions 9, 21, 37, 38 and 39 of Farm 30 Nooitgedacht	Oudtshoorn
Calitzdorp Spa	153.2	Kannaland	Portions 27,85,88,99,118,119,126,127 of Farm 60 Calitzdorp Spa	Calitzdorp
Opzoek	28.8	Kannaland	Portion 26 of Farm 73 Opzoek	Ladismith
Buffelsdrift	1.5	Kannaland	Portions 37, 55, 56 of Farm 103 Buffelsdrift	Ladismith
Roodeberg Outspan	12.0	Kannaland	Farm 194 Roodeberg Outspan	Ladismith
De Fontein	10.5	Hessequa	Portion 9 of Farm 291 De Fontein	Riversdale
Hoogekraal	27.2	Mossel Bay	Portion 2 of Farm 238 Hoogekraal	Glentana
Maalgate River Mouth	90.9	George	Portion 2 of Farm 236 Brakfontein	Herolds Bay
Herolds Bay	12.4	George	Portion 9 of Farm 236 Brakfontein	Herolds Bay
Moerasrivier Geelhoutboom	92.3	George	Portion 64 of Farm 233 Moerasrivier	Geelhoutboom
Gwaing Hansmoeskraal	87.7	George	Portion 12 of Farm 202 Hansmoeskraal	Pacaltsdorp, George
Hansmoeskraal Coastal	33.3	George	Portion 1, 2, 73 of Farm 202 Hansmoeskraal	Pacaltsdorp, George
Kaaimans Mouth - Victoria Bay	63.9	George	Farm 195 Kraaibosch	Wilderness / Victoria Bay
Meul River mouth	17.9	George	Portion 102 of Farm 195 Kraaibosch	Victoria Bay
Kleinkrantz	30.0	George	Erf 1297 Kleinkrantz	Wilderness
Woodville	26.4	George	Portion 4 of Farm 172 Woodville	Hoekwil
Swartvlei	219.5	Knysna	Portion 0, 1, 2 of Farm 185 Swartvlei	Sedgefield
Buffelsbaai	61.7	Knysna	Portion 1, 2, 3 of Farm 215 Walkerspoint	Buffalo Bay
Harkerville	24.5	Bitou	Portion 7 of Farm 428 Harkerville	Harkerville
Keurbooms Lagoon edge	18.4	Bitou	Farm 449 Lagoon Edge	Plettenberg Bay
Roodefontein Krantzhoeck	81.9	Bitou	Portion 45 of Farm 440 Roodefontein	Plettenberg Bay
Dysselsdorp 2	1156.7	Oudtshoorn	Erf 2, Dysselsdorp	Dysselsdorp
Dysselsdorp 975	95.9	Oudtshoorn	Erf 975, Dysselsdorp	Dysselsdorp
Annex Haazenjacht	11.3	Oudtshoorn	Portion 4 of Farm 78 Annex Haasejagt	Dysselsdorp
Doornberg Paardepoort	127.2	George	Farm 32 Doornberg Outspan	Herold
Schooneberg	80.6	George	Portion 3 of Farm 109 Schooneberg	Louvain / Uniondale
Reebok	44.5	Mossel Bay	Erf 264 and Remainder Erf 271 Reebok	Reebok



Map 2. Locations of sites forming part of this plan



CONTROL PLANNING

4 Control Planning

4.1 Field surveys

The development of this invasive species monitoring, control and eradication plan was informed by visits to each site during January 2019. The study areas were surveyed on foot, and all alien plant species were noted and identified. Invasive alien species were identified to the lowest taxonomic level possible.⁶ Photographic and GPS records of site visits were used to aid in mapping the density and extent of invasions. At each site, an effort was made to ensure that all habitat types occurring on the site were visited in order to identify as many as possible alien invasives. All field data was captured in a database and in a geographic information system (GIS) for further processing.

4.2 Management units

A management unit is a section of the property of a size and structure that allows for coherent management interventions to be implemented within that unit. For each property, management units were determined based on several factors:

- topography and access;
- land use;
- vegetation and soils;
- extent and density of major invasions; and
- ease of management (a combination of size and relative workload).

A total of **87 management units** were determined and assigned unique identifiers.

4.3 Species classification

A total of **72 listed invasive species** were identified on the municipal properties. These include

- 1 in NEMBA Category 1a,
- 58 in NEMBA Category 1b,
- 6 in NEMBA Category 2, and
- 7 in NEMBA Category 3.

A different approach has been applied in the case of invasive animal species, due to project time constraints and the challenges of accurately determining numbers of invasive fauna or confirming absence. Instead, invasive animal species which are known to occur or may occur in the habitats found in a management unit are listed as potential invaders.

Each alien invasive plant invasion was further classified into one of the following size classes:

Seedling	Young	Adult	All
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The extent or density of invasion was then determined for each plant species in each management unit, based on the following simplified matrix:

Few	Ten or fewer individuals
Occasional	Less than 2% cover
Scattered	2-5% cover
Moderate	5-25% cover
High	25-75% cover
Closed	> 75% cover

⁶ Using, amongst others, Bromilow, C. 2018. *Problem Plants and Alien Weeds of South Africa*, Briza Publications, Pretoria. and online resources from www.invasives.org.za (accessed Jan 2019).

4.3.1 Limitations

The mapping and listing of invasive alien species on each site reflect the state of the sites in January 2019. The extent of invasions will change over time, and certain species may have been missed if they occur only in very localised populations. Available time for the preparation of this plan, as well as access limitations, did not allow for every part of every site to be visited. Instead, an effort was made to survey

Therefore, invasive species that are not currently known to be invading in a management unit, but which have the potential to invade in the area, are also listed.

4.4 Prioritisation

Because budget and capacity constraints are an inevitable reality in the municipal context, a realistic approach to control planning that considers the budgetary and staffing requirements over time must be implemented. A proposed prioritisation methodology is described below, in which each management unit (a section of property of a size and structure that allows for coherent management interventions) is assigned ratings on the following factors:

- Fire risk (based on the potential for invasive alien species to increase fire risk or damage)
- Biodiversity protection (based on the status of natural vegetation on the site and the risk posed by invasive species)
- Tourism and amenity (based on the location or use of the site for tourism or other economic purposes)
- Water resource protection (based on whether invasion on the site affect water resources important for human use or ecosystems)
- Productive potential (based on the potential for invasive alien species to reduce agricultural production on the site)
- Flooding and erosion risk

Any prioritisation will be necessarily subjective, and all the ratings assigned in this prioritisation are opinion-based. However, the prioritisations are intended to be transparent and can be altered in the database which makes up the supplementary information to this plan.

See Table 2 for the factors and section 8 of this report for their application.

Table 2. Prioritisation matrix for management units

Factor	Rating			
	0	1	2	3
Fire risk	Not significantly affected by IAS	IAS unlikely to significantly increase fire risk or damage	IAS may increase fire risk or damage	IAS likely to significantly increase fire risk or damage
Biodiversity protection	Not significantly affected by IAS	Minor threat to biodiversity (local significance)	Moderate threat to biodiversity (regional significance)	Major threat to biodiversity (national significance)
Tourism and amenity	IAS have no impact or a positive impact on tourism and amenity value	IAS have a minor negative impact on tourism or amenity value	IAS have a moderate negative impact on tourism or amenity value	IAS have a major negative impact on tourism or amenity value
Water resource protection	Site is not significant for water resource protection	Site is of minor importance for water resource protection, and/or IAS on the site have a minor impact on water resources	Site of moderate importance for water resource protection, and/or IAS have a moderate impact on water resources	Site is of minor importance for water resource protection, and/or IAS on the site have a minor impact on water resources
Productive potential	IAS have no impact on productive potential of the site	IAS have a minor impact on productive potential of the site	IAS have a moderate impact on productive potential of the site	IAS completely remove the productive potential of the site
Flooding and erosion risk	IAS pose no risk of increased flooding or erosion	IAS pose a minor risk of increased flooding or erosion	IAS pose a moderate risk of increased flooding or erosion	IAS pose a major risk of increased flooding or erosion

4.5 Selection of control methods

As outlined below, there are a variety of possibilities when it comes to control of invasive alien species. The selection of a control method is based on the long-term goals for the site.

Control Methods have been detailed at the species level in section 5, and each site-specific control plan recommends the most appropriate control method per species.

The most common control method proposed is cut stump and spray, which includes Felling (where chainsaws are used on larger trees) and Lopping (where loppers will be used on smaller trees). This method presents a biomass management challenge initially, but if the biomass is managed appropriately, it will result in a much more straightforward follow-up operation.

Control methods recommended in this plan include the following:

4.5.1 Mechanical control

Physical destruction or total removal of plants. Appropriate for sparser infestations and species that do not coppice.

Hand pull

Removal of plants by hand, ensuring that the root system is also removed. Only recommended where soil is soft or sandy, and plants are small enough to be successfully pulled out with the roots intact.

Cut-stump

Cut stem / trunk as low to the ground as possible with a saw, lopper or chainsaw (can also be referred to as Felling), not above ankle height. Apply herbicide to the cut surface immediately after cutting (if required – indicated by “cut-stump and spray”).

Ring bark

For large trees, use an axe to remove the tree's bark and cambium in a horizontal band at least 30 cm wide, all the way around the stem and as low to the ground as possible. Apply herbicide to the cut area immediately after ring-barking (if applicable – this is also known as 'Felling'). Not all species require herbicide application.

Bark strip

Using an axe, strip bark of large trees from waist-height down to the ground all the way around the stem. Apply herbicide to the stripped area at the base of the tree immediately after ring-barking (if applicable).

Dig out and burn

Using a spade, dig out all roots and plant matter, ensuring that no material remains in the soil. Collect the material for safe burning. Permits must be obtained and appropriate precautions observed when burning plant material.

Felling

Using a chainsaw, fell larger trees and cut branches and logs into shorter lengths. Training for chainsaw operators is essential, as they must understand the techniques of felling and be able to apply safety precautions. No other persons should work in close proximity to a tree being felled.

4.5.2 Chemical control

Chemical control involves the use of herbicides (chemicals toxic to particular plants) to kill targeted plants. Herbicide must only be used on plant species for which it is registered, and may only be applied by properly trained and certified personnel. Herbicides may be applied using various techniques:

Foliar spray

Using a knapsack sprayer or a handheld sprayer loaded with appropriate herbicide, spray all leaves on plants being controlled to the point at which the herbicide starts to run off the leaves. Training and certification is required for herbicide application using this method.

Soil application

Apply appropriate herbicide directly to the soil surrounding an alien invasive plant.

Cut stump and spray

After cut-stumping, ring-barking, or lopping, apply herbicide directly to the cut surface. Use a handheld sprayer with a nozzle set to the correct spray width. Ensure that herbicide is applied as soon as possible after cutting. When applying herbicide to larger diameter stumps, only the cambium and bark area need to have herbicide applied (outer 50mm).

Stem inject

Using a syringe, inject herbicide directly into the stem or fleshy leaves of a plant. In some species it may be necessary to create a hole before injecting by using a spike or stick.

Basal stem with diesel

Mix herbicide with diesel rather than water, and apply to the base of the plant, preferably after frilling or ring-barking. Minimise runoff as diesel is harmful to the environment.



Cut stump and spray: the Eucalyptus above has been effectively prevented from resprouting by the application of herbicide. Compare with the image below where herbicide was not used



4.5.3 Biological control

Invasive alien plants are successful partly because of a lack of natural enemies that they would have faced in their place of origin. Biological control is based on the introduction of natural enemies that remove this competitive advantage of invasive aliens. Most biocontrol agents are insects, mites or micro-organisms such as fungi or bacteria. Biocontrol agents may attack the reproductive organs (i.e. flowers or fruit) of a plant, or the leaves. They may compromise the plant's reproductive capacity, or may cause stress that either kills a plant or prevents it from spreading. Biocontrol is often slow, and will never entirely eradicate an invasive species since the biocontrol agent's own survival is usually dependent on the host plant.

The only biocontrol recommended in this plan is the application of the cochineal biocontrol agent to certain cactus species.

The biocontrol agents (cochineal) should be harvested by breaking segments with cochineal off cactus plants in the field in an area where the biocontrol agents are already established. Use tongs to grip one segment with live biocontrol agents on an infested cactus plant, and twist it off the plant without damaging the segment unnecessarily. If the stem segments are damaged, they dry out or start rotting easily, and will not survive long enough to allow the female cochineal insects, which cannot move to another plant, to complete their life cycle until they can produce eggs to infest the fresh plant. Make sure you do not remove all the cochineal from one plant, so that the plant will remain under biological control, and the agents can continue to breed.

Attach one infested segment to the plant you want to inoculate by pushing it into a sheltered spot, protected from wind and rain, attached by its spines.

Re-visit the release the site after 2-3 months to check on the progress.

It should be possible to harvest material after four or six months if the initial inoculation was large enough.

There are already biocontrol agents on a number of the species in this control plan. Biocontrol has had a noticeable effect on some of the cactus species. However, we have recommended chemical control to hasten the control process for these species.



Cylindropuntia imbricata on the Dysselsdorp site affected by cochineal, tiny sap-sucking insects that feed only on cactus species. The cactus is damaged and eventually killed by the insect (below).



4.6 Workload assessments and budgeting

Determining the amount of effort required for implementation of control methods on a particular site involves innumerable variables. The assessment of workload and thus time and cost is based on the amount of time that would typically be required for certain tasks. For example, the amount of effort and time needed to cut down a large tree with a chainsaw is vastly different to the time needed to handpull a seedling. These differences must form the basis for workload assessments and budgeting.

The Working for Water programme has developed a set of norms, based on observations and records of the factors affecting productivity, in particular:

- Species,
- Density,
- Age class, and
- Control Method.

If this data is available for a site, a person-day calculation can be developed using the Norms. In most cases, the person-day calculations require significant adjustment for walk time, drive time, access, slope, and other factors. The complexity is increased when more species are involved. In these cases, the person-day figures must be adjusted based on industry experience.

The person-days allocated to each species on each site are loosely based on the Working for Water Programme species norms, but have been adjusted in certain cases due to site conditions, control methods, and previous project experience. It must be noted that the person-days allocated to each site do not include the person-days needed for biomass management.

All workload estimates and associated budgets are based on a set of assumptions regarding the effectiveness of the implementation of the control methods, which is itself a function of the effectiveness of management of the staff and contractors responsible for implementation. The workload, budget and timeframe assessments are to some extent a 'best-case' estimate, based on industry norms and on the authors' experience of implementation under the Natural Resource Management programme.

Should the quality of work not be effectively managed, or should the scheduled implementation, follow-up and monitoring not be adhered to, the workload and budget estimations may be significantly underestimated. Other factors outside the scope of this plan include changes to the site conditions as a result of fire, farming practices, or land use. The plan is based on site conditions during January 2019, and will require amendment and updating as conditions change.

Invasive species control is not a one-off intervention, since invasive alien species will typically rapidly recolonise or regrow in areas disturbed by initial clearing efforts or where other drivers such as wildfires have changed the conditions on the site. As there will always be some measure of regeneration after initial clearing, regular and effective follow-up and maintenance is vital. Should maintenance be neglected, all progress made during initial clearing may be lost within a few years. If implemented effectively, however, the costs of management will decline rapidly over time as the extent and density of invasion decreases. The reestablishment of indigenous vegetation should also be supported, to reduce the risk of erosion and to reduce reinvasion by alien invasive species.

On most sites, follow up has been recommended every year after the initial clearing for up to 5 years. Thereafter, follow up is less frequent. The first few years require frequent follow-up due to the seed bank that will produce more seedlings after the initial clearing. After 5 years of good quality, consistent clearing, if there is no significant disturbance (e.g. fire or erosion) then the infestation will be largely under control and will just need to be kept clear by removing individual alien invasives every few years. The timing of follow ups is also dependent on which species are being controlled. Acacias, for instance will need rapid follow up as they recolonise areas quickly, while pines can be revisited on a slower rotation.

4.7 Biomass management

Biomass management is critical to the success of control operations. Wherever there are dense infestations, it is recommended that the material be chipped or removed (as much as is possible). This will allow for better access to follow up control, facilitate rehabilitation and

growth of indigenous vegetation, and in some cases can provide usable wood for firewood or timber. By removing the biomass, the fire hazard is also much reduced and the risk of wildfires is managed. On sites that are used as resorts or for farming, it is necessary to remove cut material to enable everyday operations.

The methods used for determining the biomass management strategy were based on:

- **Density of the infestation and type of material.** Typically high density woody material should be chipped or at least debranched and material removed to a dump site.
- **The threat posed by cut material.** E.g. if wind or steep slopes increase the risk of material falling onto a road or into a river.
- **Accessibility and practicality** of moving cut material (in very steep areas it is completely impractical to remove cut material).



SPECIES

5 Species

The tables below describe each listed alien invasive species identified on the GRDM properties, as well as various invasive alien animal species which are known or considered likely to occur on the sites.

5.1 Plants

Table 3. Listed invasive alien plant species

NEMBA = Category in terms of 2016 NEMBA Regulations (simplified). **CARA** = Category in terms of 1984 CARA Regulations. **“nl”** = not listed.

Species name	Common names	NEMBA	CARA	Description	Impact	Control method	Ref
<i>Acacia cyclops</i>	Rooikrans Red eye	1b	2	Tree or shrub, evergreen and thornless with a dense, untidy appearance. On the coast it grows as a low shrub up to 1.5 m, while inland it averages 3 m and may reach up to 8 m. Young branches are smooth. Leaves 3 to 9 cm long and up to 1.5 cm wide, and grow in a hanging position. Bright yellow flowers 7 to 8 mm in diameter, in inflorescences produced throughout the year but mainly Oct to Feb. Pods up to 15 cm long, often twisted. When mature, dark-brown or black seeds are exposed, surrounded by a bright red seed stalk. Does not coppice readily.	Originally introduced to stabilise drifting sands, rooikrans forms dense, impenetrable thickets with intertwined crowns that exclude natural vegetation.	Cut Stump and Spray with Lumberjack 3% and 0.5% wetter Foliar spray with Garlon at 0.5% mix and 0.5% wetter	1,3
<i>Acacia meansii</i>	Black wattle	2	2	Tall, evergreen and thornless tree with deep green, bipinnate leaves that have golden tips when young. Sprays of creamy-yellow, globular flowerheads borne in spring followed by green seed pods that turn brown	Invades indigenous vegetation and forms dense, single-species thickets. Significantly reduce runoff in streams and rivers.	Cut Stump and Spray with Lumberjack 3% and 0.5% wetter Frill with Lumberjack 3% and 0.5% wetter Foliar Spray with Garlon at 0.25% and 0.5% wetter	1,4,5

				<p>as they ripen. Coppices easily and produces large amounts of seed that can remain dormant for many years until stimulated by fire.</p> <p>Do not confuse with indigenous keurboom <i>Virgilia oroboides</i> and <i>V. divaricata</i>.</p>			
<i>Acacia melanoxylon</i>	Blackwood	2	2	<p>Erect, evergreen, thornless tree from 10 to 35 m in height, with a clean bole and dense crown. Bark rough, fibrous and usually light grey-brown. Leaves slightly curved or sickle-shaped, 6 to 12 cm long and dark green. A few feathery compound leaves are often present at the end of each 'leaf'. Flowers creamy or dull yellow, in rounded inflorescences. Flowering usually from August to September. Seeds small, black and surrounded by a dull reddish (not bright red or orange) seed-stalk. Readily regenerates from roots when cut.</p>	<p>Forms large single-species stands, swamping indigenous vegetation and transforming the landscape. Used as a source of firewood and for sand stabilisation.</p>	<p>Cut Stump and Spray with Timbrel 6% and 0.5% wetter Frill with Timbrel 6% and 0.5% wetter Foliar Spray with Garlon at 0.75% and 0.5% wetter</p>	1
<i>Acacia saligna</i>	Port Jackson willow	1b	2	<p>Evergreen willowy shrub or tree up to ten metres high. Long, blue-green turning bright green leaves up to 20 cm long and 1-5 cm wide. Bright yellow, globe-shaped flowers bloom from August to November. Brown pods 5 to 10 cm long and 5 to 6 mm</p>	<p>Grows very rapidly and produces copious amounts of long lived seed. Resistant to fire and felling – coppices and regrows rapidly afterwards – and germination of the seeds is stimulated by fire.</p>	<p>Cut Stump and Spray with Lumberjack 3% and 0.5% wetter Foliar Spray with Garlon at 0.5% and 0.5% wetter</p>	1,6

				wide, flat, with hardened, whitish margins.	Dense thickets of Port Jackson which exclude almost all other plants, drastically reducing biodiversity in the area. Increases biomass and decreases moisture content, resulting in changes in fire regime.		
<i>Agave americana</i>	Spreading century-plant, Agave	3	nl	Evergreen perennial subshrub with very large succulent sword-shaped leaves up to 2 m in height. Leaves are grey-green, sometimes with a pale central stripe or yellow margins. Margins have teeth of up to 10 mm long. Produces a single, tall inflorescence up to 9 m tall, with funnel-shaped greenish yellow flowers. Found around old habitations, along watercourses and roadsides.	Forms dense impenetrable stands. Renders areas inaccessible to humans, game and livestock.	Foliar Spray with Turbododor at 100%	7
<i>Agave sisalana</i>	Sisal hemp, Sisal	2	2	Evergreen perennial succulent shrub with no stem, with thick sword-shaped leaves up to 1 m long. Leaves are bright green with smooth margins. Single much-branched flower cluster as tall as 12 m.	Forms impenetrable barrier as leaves are tipped with a spine. Renders areas inaccessible to humans, game and livestock.	Foliar Spray with Turbododor at 100%	2
<i>Anredera cordifolia</i>	Madeira vine, Bridal wreath	1b	1	Perennial, succulent creeper that can reach 7 m in length, crawling along the ground and over trees, hedges and fences. Spreads mainly by underground and aerial edible tubers, which drop to the ground and take root.	Smothers and destroys all other vegetation, including trees. Grows rapidly from small vegetative parts and aerial tubers and can survive from underground tubers even when all	Cut Stump and spray with Garlon at 1% with 0.1% wetter. Mix with Diesel. Cut material <u>must</u> be collected and carefully bagged, Keep in double black bags under a secure tarpaulin (to keep all	1

					foliage has been destroyed.	light out) for 6 months, after which the material is no longer viable and may be used as compost.	
<i>Arundo donax</i>	Spanish reed, Giant reed	1b	1	Tall, perennial cane- or reed-like grass 2-10 m tall. Stems are partitioned like bamboo, 1-4 cm in diameter. Pale blue-green leaves up to 70 cm in length. Flowers large, whitish, plume-like, 30-65 cm between March and September.	Aggressive, reproduces quickly and outcompetes indigenous species. Particularly invasive in riparian areas, where it lowers the groundwater table. Highly flammable and can change fire regimes.	Cut Stump and spray with Kilo at 3% with 0.1% wetter	8
<i>Atriplex inflata</i>	Sponge-fruit Saltbush	1b	3	Low soft woody shrublet 20 to 40 cm in height, with creamy – white branches and grey to bluish-green leaves. Flowers cream to yellow, small. Fruits grey-green to pink or straw-coloured, spongy and inflated, up to 10 mm in size.	Forms dense stands, particularly on overgrazed land. Competes with and replaces indigenous vegetation.	Handpull or cut stump. No registered herbicide	2
<i>Atriplex nummularia</i>	Old man saltbush	2	2	Large multi-stemmed shrub up to 3 m tall and 4 m wide, deciduous with silvery-grey leaves 1-5 cm in length. Fruits fan-shaped, up to 6 mm in diameter. Thrives in harsh saline environments.	Competes with and has the potential to replace and reduce indigenous species.	Handpull or cut stump. No registered herbicide	2
<i>Austrocylindropuntia cylindrica</i>	Cane cactus	1a	Nl	Tall, branched cactus with small, red flowers. Spines white, groups of 2 to 5, 1-3 cm long.	Dense infestations reduce the grazing potential and hence the carrying capacity of the land. Thickets restrict access of livestock and game. Causes injuries to livestock and damage to sheep's wool.	Physical removal as no herbicide is registered. Care is required to remove all stem sections. Foliar spray with Turbodor at 100% may be effective.	1
<i>Callistemon viminalis</i>	Weeping bottlebrush	3	nl	Shrub or small tree up to 8 m in height. Pendant branches with leaves 3 to 7 cm long	Competes with and replaces indigenous species.	Cut stump and spray with Format at 2% mix with 0.1% wetter.	2

				and 3 to 7 mm wide. Distinctive bright red flower spikes are 4 to 10 cm long and 3 to 6 cm wide, borne in spring and summer. Do not confuse with indigenous bottlebrush species.			
<i>Canna indica</i>	Canna, Indian shot	1b	1	Perennial leafy shrub 0.5 to 2.5 m in height with large, tapering green or purple leaves sheathing the stem. Red, orange or yellow flowers and green spiny fruits.	Forms dense spreading clumps that compete with and replace indigenous species.	Dig out. No registered herbicide	2
<i>Casuarina cunninghamiana</i>	Beefwood	1b or 2	2	Evergreen tree with fine needle-like leaves and arching, slender branches. 10 to 35 m in height, with dense rough bark. Cones small, nearly round and 10 mm in diameter. Strongly resembles pine trees but unrelated.	Can invade even nutrient-poor soils as its roots can fix nitrogen. Alters the soil and local ecology, inhibiting natural vegetation growth by creating a thick layer of leaf litter and through allelopathic chemicals.	Cut Stump and spray with Garlon at 3%, 0.1% wetter	1,2
<i>Cestrum laevigatum</i>	Inkberry	1b	1	Glossy evergreen shrub up to 2 m in height, or tree up to 5 m in coastal regions. Bark thin and brownish-grey, bruises easily. Lance-shaped leaves and greenish-yellow, tubular flowers. Leaves release an unpleasant odour when crushed. Berries green, turning black when ripe.	Competes with and replaces indigenous species, particularly in coastal bush. Fruit, leaves and bark are poisonous to animals and humans.	Cut Stump and spray with Hatchet 2%, wetter and dye already included.	1,2,10
<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Spiny, herbaceous biennial plant with a large basal rosette of leaves and a flowering stem up to 1.5 m high. Leaves dark green, deeply lobed with stiff hairs.	Common in pastures and indicative of poor veld management. Reduces carrying capacity of pasture or natural veld.	Hand pull and remove material to be burned. Low infestations.	1,2,11

				Flowers purple to pink, thistle-like with spines around the base. Seeds silky, plumed.			
<i>Cortaderia selloana</i>	Pampas grass	1b	1	Tussock grass up to 3.5 m in diameter with flowering stalks up to 4 m high. Long slender greyish or bluish-green leaves with rough margins. Silvery-white to pink feathery inflorescences.	Forms large clumps displacing indigenous vegetation.	Foliar spray with Springbok at 10%, 0.1% wetter	2
<i>Cotoneaster pannosus</i>	Silver leaf cotoneaster	1b	3	Shrub up to 3 m in height, with arching branches and berry-like fruits. Dull green leaves, white and felty on undersides. White flowers borne in dense clusters from August to January. Berries green, ripening to deep red.	Competes with and replaces indigenous species, forming dense stands.	Cut Stump and spray with Springbok at 5%, 0.1% wetter	2
<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	1b	1	Spiny, much-branched succulent cactus up to 2 m high with an erect main stem. Old branches hang downwards. Stems dull grey-green with raised edges and a woven or rope-like appearance. Spines up to 3 cm long. Purple-red flowers and yellow, succulent fruit.	Competes with and replaces indigenous species. Dense infestations reduce the grazing potential and hence the carrying capacity of the land. Thickets restrict access of livestock and game. Causes injuries to livestock and damage to sheep's wool.	Foliar spray with Turbododor 100%	2
<i>Datura stramonium</i>	Large thorn apple	1b	1	Annual, branching shrub forming a bush 60 to 150 cm in height. Stem smooth, pale yellow-green to red, with multiple forks. Each fork forms a leaf and a single flower. Leaves 8 to 20 cm long, smooth, toothed, and dark green. White trumpet-shaped flowers borne in summer. Egg-shaped, spiny	Seeds and parts of the plant are toxic to livestock and humans. May contaminate commercial or food crops.	Handpull and remove seed heads from site and burn. Low infestations	1,2

				seed capsule borne at stem forks.			
<i>Echinopsis schickendantzii</i>	Torch cactus	1b	1	Spiny, multistemmed cactus up to 1.5 m in height. Spines in tufts of 8-10, with each central spine longer than the others.	Competes with indigenous species. Dense infestations reduce the grazing potential and hence the carrying capacity of the land. Thickets restrict access of livestock and game. Causes injuries to livestock and grazing animals.	Foliar spray with Turbodor 100%	1,2
<i>Echium plantagineum</i>	Patterson's curse	1b	1	Annual or biannual herb, with hairy dark green oval leaves. Stems grow to 120 cm in height. Purple or blue, tubular flowers in clusters, 2-3 cm long.	Competes with pasture crops for space and moisture. May outcompete indigenous vegetation, particularly in disturbed areas. Toxic to livestock.	Hand pull. Very low infestations	1,2
<i>Eichhornia crassipes</i>	Water hyacinth	1b	1	Perennial aquatic plant, free-floating or anchored in shallow water. 10-20 high, but may form dense mats up to a metre thick. Dark, shiny green leaves in rosettes with swollen, bladder-like stalk. Pale violet or blue flowers from November to April. Invades dams and slow-flowing rivers.	Dense mats completely cover the water surface, altering chemistry and composition.	Physically remove from the river and stack out of the flood zone. Low infestations.	1,2
<i>Eucalyptus camaldulensis</i>	River red gum	Always 1b in riparian areas, protected areas, or listed ecosystems. 2 in the Succulent Karoo biome. 1b in the fynbos biome, but -	2	Tall tree up to 40 m with a large spreading crown. Bark white or grey, sometimes red, smooth and sheds in strips or flakes. Rough bark may occupy the lower 1-2 m of the trunk. Leaves pale, dull green. Inflorescence axillary, 7-11-flowered. White flowers. Capsules hemispherical or	Competes with and replaces indigenous species. Reduces stream flow when occurring along watercourses. Suppresses ground vegetation and increases soil erosion. Increases fire hazard.	Cut Stump and spray with Plenum at 4.5% mix, with 0.5% wetter	12

		<p>2 in plantations, windrows, bee forage areas or lining avenues.</p> <p>nl in cultivated land at least 50 m from untransformed land, or within 50 m of a farmhouse, or in urban areas for trees >400 mm in diameter.</p>		<p>egg-shaped, 5-7 mm long and wide, with exerted valves.</p> <p>Important in the bee industry, but must be controlled in riparian areas.</p>			
<i>Eucalyptus cladocalyx</i>	Sugar gum	<p>Always 1b in riparian areas, protected areas, or listed ecosystems.</p> <p>2 in the Succulent Karoo biome.</p> <p>1b in the fynbos biome, but -</p> <p>2 in plantations, windrows, bee forage areas or lining avenues.</p> <p>nl in cultivated land at least 50 m from untransformed land, or within 50 m of a farmhouse, or in urban areas for trees >400 mm in diameter.</p>	2	<p>Tall, slender tree with smooth, flaky, tan-coloured bark. Leaves dark green and glossy above.</p> <p>Inflorescence axillary, 7-11-flowered. White flowers. Capsules barrel or urn-shaped, with included valves.</p> <p>Important in the bee industry, but must be controlled in riparian areas.</p>	<p>Competes with and replaces indigenous species. Reduces stream flow when occurring along watercourses. Suppresses ground vegetation and increases soil erosion. Increases fire hazard.</p>	Cut Stump and spray with Plenum at 4.5% mix, with 0.5% wetter	13

<i>Eucalyptus conferruminata</i>	Spider gum	<p>Always 1b in riparian areas, protected areas, or listed ecosystems.</p> <p>2 in the Succulent Karoo biome.</p> <p>1b in the fynbos biome, but -</p> <p>2 in plantations, windrows, bee forage areas or lining avenues.</p> <p>nl in cultivated land at least 50 m from untransformed land, or within 50 m of a farmhouse, or in urban areas for trees >400 mm in diameter.</p>	1	<p>Small tree with smooth, whitish-grey bark. Usually multi-trunked with light green foliage.</p> <p>Inflorescence axillary, 15-21 flowers. Capsules long, woody, 'spider-like', hence the common name.</p>	<p>Competes with and replaces indigenous species. Reduces stream flow when occurring along watercourses. Suppresses ground vegetation and increases soil erosion. Increases fire hazard.</p>	<p>Cut Stump and spray with Lumberjack at 4%, with 0.1% wetter</p>	2,13,14
<i>Eucalyptus grandis</i>	Saligna gum	<p>Always 1b in riparian areas, protected areas, or listed ecosystems.</p> <p>2 in the Succulent Karoo biome.</p> <p>1b in the fynbos biome, but -</p> <p>2 in plantations, windrows, bee forage areas or lining avenues.</p>	2	<p>Tall, evergreen tree with a shaft-like trunk 25-55m high. Smooth bark except for the lowest 4 m, where bark is rough. Bark peels to expose a powdery, white or grey-white surface.</p> <p>Leaves dark green, glossy above and paler below. Cream flowers appear from April to August. Inflorescence axillary, 157-11 flowers. Brown capsules pear- or cone-shaped with a bluish-grey powdery surface. Valves exerted.</p>	<p>Competes with and replaces indigenous species. Reduces stream flow when occurring along watercourses. Suppresses ground vegetation and increases soil erosion. Increases fire hazard.</p>	<p>Cut Stump and spray with Hatchet at 5%. Wetter and dye already included</p>	2,13

		nl in cultivated land at least 50 m from untransformed land, or within 50 m of a farmhouse, or in urban areas for trees >400 mm in diameter.					
<i>Gleditsia triacanthos</i>	Honey locust	1b	2	Deciduous, spreading tree 15-20m tall. Trunk and branches have sword-like thorns. Bi-pinnate bright green leaves up to 20 cm long. Small, yellowish-green bundled flowers, followed by sickle-shaped, reddish-brown and often twisted pods.	Competes with and replaces indigenous species. Dense stands along watercourses can reduce stream flow.	Cut Stump and apply Kaput gel to the cambium (100%)	2,15
<i>Grevillea robusta</i>	Australian silky oak	3	3	Tall evergreen tree 18-30 m in height. Bark dark grey and furrowed. Leaves fern-like, 10 to 30 cm long, dark green above and greyish-white below. Flowers bright orange, bottle-brush like sprays. Seeds winged, up to 2 cm long.	Competes with and replaces indigenous species. Inhibits growth of indigenous species through allelopathic chemicals.	Cut Stump. No registered herbicide	2,16
<i>Hakea salicifolia</i>	Willow hakea, Hedge hakea	1b	nl	Shrub or small tree with pale or greyish-green leathery, flat, linear to lance-shaped leaves 5 to 10 cm long. Fruits are grey woody capsules 2 cm in diameter.	Invades fynbos and outcompetes indigenous species.	Cut Stump. No registered herbicide	1,2
<i>Hakea sericea</i>	Silky Hakea	1b	1	Small tree up to 5 m high. Leaves needle-like, sharp-pointed and up to 40 mm long. Hard woody fruit, which remain on the trees and release the winged	Invades indigenous fynbos, creating dense stands and rapidly invading mountainous areas. Dense stands in mountain catchments	Cut Stump. No herbicide necessary	17

				seeds only when the plant dies (usually by fire).	restrict access, reduce runoff, and are a fire hazard.		
<i>Ipomoea purpurea</i>	Morning glory	1b	3	Herbaceous twining annual with bright green, heart-shaped leaves and purplish-blue, magenta or white funnel-shaped flowers.	Scrambles over and competes with other species.	Foliar spray with Springbok at 2%. No Wetter.	2
<i>Lantana camara</i>	Lantana, Tickberry	1b	1	Spreading shrub or scrambler up to 2m in height. Dark green, rough, hairy leaves that smell strongly when crushed. Pink, red, orange, yellow or white flowers in compact, flat-topped heads. Glossy green fruits turning purple-black.	Forms dense, impenetrable thickets. Competes with and replaces indigenous species. Suppresses indigenous species with allelochemicals that inhibit germination and growth of other plants.	Hand pull. Very low infestation and very small size.	1,2
<i>Leptospermum laevigatum</i>	Australian myrtle	1b	1	Large and compact many-branched shrub or small tree up to 6 m in height. Mature stems twisted, with a ribbony thin brown bark. Leaves leathery, egg-shaped, 15 to 30 mm long and up to 8 mm wide. Single white flowers up to 2 cm across.	Invasive in sandy areas and lowland fynbos. Forms dense and impenetrable stands that outcompete and replace indigenous species.	Cut Stump. No herbicide registered for this. Foliar Spray with Confront at 2%, with 0.5% wetter. Foliar spray if any of the cut stumps coppice.	18
<i>Ligustrum japonicum</i>	Japanese wax-leaved privet	1b	3	Evergreen shrub or small tree 3 to 6 m in height. Dark green, thick, leathery flossy leaves. Heavily scented white flowers in large clusters. Produces masses of small black berries which are spread by birds.	Competes with indigenous species. Berries are poisonous in large quantities.	Cut Stump and spray with Hatchet at 5%. No need for wetter or dye, it is included.	1,2
<i>Melia azedarach</i>	Syringa, Seringa	1b or 3 in urban areas	3	Large spreading tree up to 20 m in height with reddish brown, smooth bark. Serrated dark green glossy leaves. Clusters of purple to lilac flowers. Produces abundant marble-sized, pale yellow berries which	Invades streams and riparian areas, establishing and growing rapidly in disturbed areas and replacing indigenous vegetation. Berries are poisonous.	Cut Stump and spray with Hatchet at 3%. No need for wetter or dye, it is included	1,2

				often remain on the tree for a year or more.			
<i>Myoporum tenuifolium</i>	Manatoka	3	3	Large, densely branched shrub up to 10 m in height. Leaves thin, elliptic, 5 to 7 cm long and 1 cm wide.	Replaces indigenous vegetation in coastal fynbos, dunes and riverbanks. Poisonous to humans and animals.	Cut Stump. No registered herbicide	1
<i>Nephrolepis cordifolia</i>	Erect sword fern, Ladder sword fern	1b	nl	Bright green fern, rigid, up to a metre long and 6 cm wide.	Forms dense single-species stands, eliminating indigenous plant species.	Foliar spray with Springbok at 3% with 0.1% wetter.	1,19
<i>Nerium oleander</i>	Oleander	1b	1	Evergreen shrub or small tree up to 6 m in height with dark, dull green leaves. Pink, red or white flowers with a single row of petals.	Competes with and replaces indigenous species. Plant is highly toxic to humans and animals and the sap is a skin irritant.	Cut Stump and spray with Hatchet at 10%. No need for wetter or dye, it is included	1,2
<i>Nicotiana glauca</i>	Wild tobacco	1b	1	An evergreen shrub or small tree growing up to 6m high with blue- or grey-green, leathery leaves. Yellow, tubular flowers appear in terminal, drooping clusters all year.	Competes with indigenous species. Forms dense and extensive stands along watercourses, which may reduce water flow.	Cut Stump. No herbicide registered for cut stump. Foliar spray with Springbok at 3% with 0.1% wetter	2,20
<i>Opuntia aurantiaca</i>	Jointed cactus	1b	1	Low-growing cactus seldom above 50 cm with elongated, cylindrical segments. Large numbers of sharp barbed spines, which cause segments to become attached to passing animals or humans. These joints will regenerate into new plants when dislodged. Bright yellow flowers like miniature of those of <i>O. ficus-indica</i> .	Competes with indigenous species. Dense infestations reduce grazing potential for both livestock and wild animals.	Foliar spray with Turbodor (100%)	2,21
<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	1b	1	Branched cactus up to 1.5 m in height. Leaf-like pads grey-green and egg-shaped, reaching 15-30 cm long and 12-20 cm wide. flowers are yellow,	Lowers grazing potential in pastures. Displaces indigenous species and reduces access.	Stem inject with Springbok at 48% mix, no wetter	2

				occasionally reddish, funnel-shaped and 5-8cm in diameter. Purple, fleshy fruits.			
<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Branched cactus up to 5 m in height. Flattened, grey to green cladodes branch from a central trunk. Spines up to 10 cm long in groups of 3 to 6. Bright yellow or orange flowers followed by edible fruit.	Can aggressively invade and render infested land inaccessible.	Stem inject with Springbok at 33%, 0.1% wetter	22
<i>Opuntia microdasys</i>	Yellow bunny-ears	1b	1	Dense cactus shrub, forming thickets. Flattened green, velvety leaf-like pads with densely clustered barbed hairs or bristles.	Competes with indigenous species. Has the potential to form extensive, dense stands that prevent access and reduce grazing availability.	Stem inject with Springbok at 48%mix , no wetter	2
<i>Opuntia monacantha</i>	Drooping prickly pear	1b	1	Branched cactus shrub or small tree up to 4 m in height. Leaf-like pads are glossy green, 10 to 35 cm long and 7 to 12 cm wide with clusters of small spines. Flowers yellow-orange, 7 cm diameter. Fruits reddish purple, fleshy.	Establishes large, dense infestations, competing with and replacing indigenous species.	Foliar spray with Turbodor (100%)	1,23
<i>Opuntia stricta</i>	Pest pear of Australia, Australian prickly-pear	1b	1	Trunkless prickly-pear with green to bluish-green pads and purplish fruits. Flowers yellow. Leaf-like pads (cladodes) are longer than they are broad.	Competes with indigenous species. Has the potential to form extensive, dense stands that prevent access and reduce grazing availability.	Foliar spray with Turbodor (100%)	1
<i>Paraserianthes lophantha</i>	Stinkbean, Australian albizzia	1b	1	Evergreen shrub or small tree up to 7 m. Leaves bipinnate. Inflorescences 30 to 80 mm long, resembling cream or yellowish bottle-brushes. Dark brown seed pods are	Forms monospecific stands that outcompete indigenous vegetation.	Cut Stump and spray with Lumberjack at 3% mix with 0.5% wetter	1,24

				50 to 110 mm long, flattened with raised edges. Superficially resembles black wattle <i>Acacia mearnsii</i> but leaves are much finer and branches less rigid. When seeds are broken, they release a strong odour.			
<i>Pennisetum clandestinum</i>	Kikuyu	1b in protected areas and wetlands in which it does not already occur. nl elsewhere.		Rhizomatous grass with matted roots and a creeping habit. May grow up to half a metre high when ungrazed, but forms a dense turf when mowed or grazed.	Forms a thick mat that crowds out other species, particularly in wetlands.	Dig out and remove manually from wetland areas. Can be foliar sprayed with Springbok at 1.5% mix	2,25
<i>Pennisetum setaceum</i>	Fountain grass	1b	1	Tussock-forming perennial grass with feathery, spike-like inflorescences 10 to 25 cm long and purple or pink-tinged.	Replaces indigenous vegetation.	Foliar spray with Springbok 1.5% mix with 1.5% wetter.	1
<i>Phytolacca octandra</i>	Forest inkberry	1b	nl	Large erect herbaceous plant up to 2 m tall with pink stems. Leaves lance-like. Inconspicuous white or greenish-white flowers. Berries 8-lobed, reddish-purple, changing to purple-black.	Rapidly invades disturbed areas, outcompeting indigenous species. Toxic to mammals.	Handpull. Low infestations are easily pulled out. Remove material from site wherever possible.	2
<i>Pinus halepensis</i>	Aleppo pine	3	2	Slender single-stemmed pine tree up to 20 m in height. Bark greyish and smooth at first, in older specimens reddish-brown or orange. Needles pale green or yellow-green 4-8 cm long. Cones conical, 5-12 cm long, turned downward.	Competes with and replaces indigenous species. Reduces water runoff and can pose a fire hazard.	Cut Stump. No herbicide necessary. Ringbark where needed.	26
<i>Pinus pinaster</i>	Cluster pine	2 for plantations and windrows 1b elsewhere	2	Tall coniferous tree 8 to 15 m in height, conical when young becoming cylindrical. Bark reddish-brown, deeply	Competes with and replaces indigenous species. Reduces water	Cut Stump. No herbicide necessary.	2,27

				cracked into plates. Needles stiff, occurring in pairs with a vivid green colour. Cones egg-shaped to conical, light brown with scales. Overall appearance is a brighter green than <i>P. radiata</i> , but darker than <i>P. halepensis</i> .	runoff and stream flow, and poses a fire hazard.	Frill where needed, use Kilo at 10.8% mix, no wetter necessary	
<i>Pinus radiata</i>	Radiata pine, Monterey pine	2 for plantations and windrows 1b elsewhere	2	Tall coniferous tree 8 to 15 m in height, conical when young becoming cylindrical. Bark reddish-brown, deeply cracked into plates. Needles dark green, usually in threes, very dense. Cones large, yellowish-brown, egg-shaped with large thick scales ending in a fine thorn.	Competes with and replaces indigenous species. Reduces water runoff and stream flow, and poses a fire hazard.	Cut Stump. No herbicide necessary Ringbark where needed	2
<i>Populus x canescens</i>	Grey poplar, Matchwood poplar	2	2	Tall tree with silver-green, round to ovoid notched leaves. White or grey bark in young trees turns black in mature specimens. Being a hybrid, the grey poplar does not produce seed.	Forms dense stands on riverbanks and in wetlands, outcompeting indigenous plants and lowering the water table.	Cut Stump and Spray with Hatchet at 5% mix. No wetter or dye needed, already included.	
<i>Prosopis glandulosa</i>	Honey mesquite	1b	2	Multi-stemmed, acacia-like shrub or small tree up to 10 m in height. Thick, straight spines on each twig. Leaves bipinnate, dark green. Flower spikes yellow, between June and November.	May lower water table and affect runoff and stream flow. Dense stands compete with and replace indigenous species.	Cut Stump and spray with Confront at 4% mix. add 0.5% wetter. Foliar spray with Confront at 1.5% mix, add 0.5% wetter	2,28
<i>Psidium cattleianum</i>	Cherry guava, Strawberry guava	1b	3	Evergreen shrub or slender tree up to 8m high with smooth, cylindrical branchlets. Dark green, smooth, shiny, thick and leathery leaves. White flowers from October to December. Purplish-red fruit.	Competes with and has the potential to replace indigenous species.	Handpull. Only one small plant found.	2

<i>Psidium guajava</i>	Guava	nl in Western Cape	2	Shrub or small tree up to 10 m in height, branching from the base. Bark smooth, green to red-brown, peeling. Leaf light green, hairy below with conspicuous veins.	Competes with and replaces indigenous species. Dense stands along watercourses and on the edges of wetlands are likely to consume large quantities of water. It is a host of fruit flies and invasive plants could act as a source of infestation of the flies to fruit orchards.	Cut Stump and spray with Hatchet at 12.5% mix. No need for wetter or dye, already included.	2,29
<i>Pyracantha angustifolia</i>	Yellow firethorn	1b	3	Evergreen shrub 2-4m high with stiff, spiny branches. Dull, dark green leaves with grey-downy undersides. White flowers October to December. Fruit conspicuous orange berries.	Competes with and replaces indigenous species. Dense stands are virtually impenetrable and restrict access to grazing by domestic and wild animals.	Cut Stump. No registered herbicide	2
<i>Ricinus communis</i>	Castor-oil plant	2	2	Annual shrub or small tree with distinctive green or red, spreading star-shaped leaves.	Competes with indigenous pioneering species especially in watercourses. Seeds very poisonous.	Cut Stump and spray with Hatchet at 3%. No need for wetter or dye, already included.	2
<i>Rubus cuneifolius</i>	American bramble	1b	1	Sprawling, thorny bush up to 1.5 m high. Leaves have finely serrated margins, sometimes densely grey-downy below. Flowers white, berries red turning black.	Competes with and replaces indigenous woody and grassland species. Dense stands are impenetrable and restrict access.	Foliar spray with Garlon at 0.5%, add 0.5% wetter. Cut Stump or slash if very large infestation, follow up with foliar spray	2
<i>Salix babylonica</i>	Weeping willow	nl	2	Deciduous tree up to 20 m tall. Hanging branches with long, lance-shaped grey-green leaves. Prefers moist environments and usually grows near rivers. Do not confuse with <i>S. mucronata</i>, the indigenous Cape willow.	Competes with and replaces indigenous woody and grassland species. Dense stands are impenetrable and restrict access.	Cut Stump and spray with Lumberjack at 3%, with 0.1% wetter.	1

<i>Salsola kali</i>	Tumbleweed	1b	nl	Annual weed with a spherical form, up to 50 cm in height. Stems branched from base. Leaves narrow, linear, fleshy. Mature plants break off at the ground and roll during windy conditions, scattering seeds.	Rapidly colonises disturbed and overgrazed soil. Unpalatable to grazing animals, leading to exacerbated overgrazing.	Hand pull young plants or hoe just below ground level. Cut large plants at ground level.	2
<i>Sambucus nigra</i>	Elder	1b	nl	Deciduous shrub or small tree reaching 6 m tall. Tiny, white, scented flowers appear in a flat-topped cluster in late spring to summer. Dark purple berries are edible.	Can replace indigenous vegetation, rapidly establishing in disturbed areas.	Cut Stump. No registered herbicide	1,2
<i>Schinus terebinthifolius</i>	Brazilian pepper tree	3	3	Evergreen tree or shrub reaching more than 6 m in height, with spreading branches. Leaves dark green. Bright red berries borne in late summer.	Aggressively invades disturbed sites and replaces indigenous vegetation. Particularly problematic in wetland or riparian areas.	Cut Stump and spray with Lumberjack at 3% mix with 0.1% wetter	1,2
<i>Sesbania punicea</i>	Red Sesbania	1b	1	Small deciduous tree with compound pinnate leaves and bunches of bright red to orange flowers. Brown, winged pods 6 to 8 cm long.	Invades wetland and riverine areas, as well as disturbed sites. Forms dense monospecific stands that can transform the landscape and replace indigenous vegetation.	Cut Stump and spray with Hatchet at 2%. No need for wetter or dye, already included. Handpull where the plants are small enough	30
<i>Solanum mauritianum</i>	Bugweed	1b	1	Branched shrub or small tree from 2 to 10 m in height. Plant is covered in soft white hairs. Leaves dull green, 25 cm long and 10 cm wide. Small purple flowers and clusters of green or yellowberries.	Invades disturbed areas, forming dense stands that block out light and displace indigenous species. Fruit is transported by birds.	Cut Stump and spray with Lumberjack at 3% mix, with 0.5% wetter Handpull where the plants are small enough	31
<i>Solanum pseudocapsicum</i>	Jerusalem cherry	1b	nl	Bushy, evergreen shrub with glossy dark green leaves. Bears white flowers similar to tomato or pepper flowers, followed by spherical red,	Invades and transforms areas by displacing existing indigenous plants and leaving the area open to soil erosion. It	Handpull	2

				yellow or orange fruit 10-15 mm in diameter.	can also form dense stands in open areas and disturbed sites. Poisonous to animals and humans.		
<i>Tamarix ramossissima</i>	Tamarisk	1b	1	Shrub or small tree 1 to 5 m high with reddish brown bark. Twiggy, woody branches covered with small, scale like leaves. Minute pink flowers are borne in long feathery terminal spikes. Do not confuse with indigenous <i>T. usneoides</i> , which has white (not pink) flowers.	Replace indigenous vegetation and increase salt levels in the soil. Invade watercourses, sandy river banks and drainage lines, removing soil moisture particularly in arid environments.	Cut Stump and spray with Lumberjack at 3% mix with 0.5% wetter	1,32
<i>Tecoma stans</i>	Yellow bells	1b	1	Evergreen shrub or tree up to 10 m in height. Pinnate leaves, bright green with serrated margins. Bunches of bright yellow, trumpet-shaped flowers, followed by long green flattened seed pods turning brown before splitting to release winged seeds.	Forms dense stands, replaces indigenous vegetation and alters ecosystem structure.	Cut Stump. No registered herbicide	1,33
<i>Tipuana tipu</i>	Tipu tree	3	3	Large, massively branched, wide-spreading deciduous tree up to 23 m high. Bright green pinnate compound leaves up to 25 cm long. Sprays of bright yellow flowers in spring and summer. Yellowish-brown, seeded winged pods 5-6 cm long.	Competes with and replaces indigenous species, particularly in disturbed areas.	Cut stump	1,2
<i>Verbena bonariensis</i>	Purple top, Wild verbena	1b	nl	Flowering herb up to 2m tall. Leaves thick textured, strongly veined and deeply toothed. Flowers purple in	Seeds readily and invades roadsides and fallow lands.	Handpull.	1,2

				terminal spikes, during summer.			
<i>Vinca major</i>	Greater periwinkle	1b	nl	Perennial herb or groundcover with glossy green leaves 25 to 60 mm wide. Flowers blue or violet, 30 to 50 mm wide on erect stems.	Invade moist shaded places and form extensive mats that smother and replace all other vegetation. Inhibits growth and germination of other plant species.	Handpull. No registered herbicide	1,2
<i>Xanthium spinosum</i>	Spiny cocklebur	1b	1	Branched annual growing to 1.2 m in height. Yellow, brown or grey downy stems. Leaves woolly white below and green above. Each leaf has a yellow, three pronged spine up to 2 cm long. Produces spiny oval burs about 10 mm long, with red hooked spines.	Competes with crop plants and indigenous species along riverbanks. Burs adhere to the coats of livestock causing discomfort. Seedlings toxic to domestic livestock. Readily invades overgrazed pastures and competes with indigenous species.	Handpull. Small infestation. Remove the material from the site.	2

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5.2 Animals

Table 4. Listed invasive alien animal species

NEMBA = Category in terms of 2016 NEMBA Regulations (simplified).

Group	Species name	Common name	NEMBA	Description	Impact	Control method	Ref
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	<p>Small, medium to dark brown ants, reaching 2 to 3mm in length. They are less tolerant to high temperatures and dry conditions, compared to native ants.</p> <p>Habitat: Occurs in agricultural areas, coastland, natural forests, planted forests, range/grasslands, riparian zones, disturbed areas, and urban areas. Constructs shallow, 1- to 2-inch deep mounds in open, often disturbed habitats, either moist or dry.</p>	Reduces indigenous ant diversity, and reduces seed germination in fynbos.	It is not known whether control methods have been successfully applied in SA. Insecticide baits have been used with varying success in small populations in Australia and New Zealand. ^{7,8} Unlikely to be practicably controllable on municipal property.	1
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	A small to medium-sized mosquito with distinctive black and white body and a 5.5 mm wingspan. Narrow white bands are prominent on the legs.	Transmits various diseases that affect humans.	It is not known whether control methods have been successfully applied in SA. International control programmes	1

7 http://issg.org/database/species/management_info.asp?si=127&fr=1&sts=&lang=EN

8 <https://www.cabi.org/isc/datasheet/30839>

					Habitat: Found around dams, streams, marshes and wetlands where suitable breeding habitat occurs. Females lay eggs in still and running water where the larva develop.		have had limited success. ⁹ Breeding containers (such as old tyres containing water) should be manually removed. Unlikely to be practicably controllable on municipal property.	
Fresh-water Invertebrates	<i>Aplexa marmorata</i>	Marbled snail tadpole	1b		A small aquatic snail with a narrow, pointed shell measuring up to 15mm. The shell is coiled to the left. The shell is brownish with a marbled pattern of lighter blotches. In South Africa, the species has been found only in standing water including reservoirs, swamps, pans, artificial ponds and pools. ¹⁰	May negatively impact indigenous snails, although its impact on aquatic biodiversity is not yet known	It is not known whether control methods have been successfully applied in SA. Unlikely to be practicably controllable on municipal property.	1
Terrestrial Invertebrates	<i>Harmonia axyridis</i>	Asian ladybeetle	1b		A medium-sized shiny orange to red beetle of 5-8mm. The pattern of black spots is very variable and. A black 'M' or 'W' pattern on the pronotum ('neck') distinguishes it from	Negatively impacts natural vegetation and agricultural crops, as it is a voracious generalist. It can occur in large densities and	It is not known whether control methods have been successfully applied in SA. Control in agricultural areas is possible	1

9 <https://www.cabi.org/ISC/datasheet/94897>

10 http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0038-23532007000600012

				indigenous ladybeetles. Habitat: Grassland, fynbos, gardens and agricultural crops.	compete against other indigenous insects.	using insecticides such as pyrethroids, but may adversely affect other indigenous and beneficial species. ¹¹ Unlikely to be practicably controllable on municipal property.	
Marine Invertebrates	<i>Mytilus galloprovincialis</i>	Mediterranean mussel	2	Smooth-shelled, large dark blue to black mussels. Typically 50mm in length but can reach 120mm. Habitat: Marine, rocky shores and intertidal areas.	Forms dense beds on intertidal rocks, displacing indigenous mussels and other smaller species which inhabit the rocks.	Unlikely to be practicably controllable on municipal property.	1
Freshwater fish	<i>Cyprinus carpio</i>	Common carp	3 where it occurs, 1b in protected areas, 2 for release where it does not occur	Large, omnivorous, toothless fish reaching over 1m in length and 24kg in weight. Colour is variable, in most cases olive above and with a lighter colour below. Habitat: Large, shallow, vegetated freshwater habitats.	Compete with indigenous fish for food. Alter freshwater habitats by changing nutrient balance and disturbing plant growth.	None required in catchments where it already occurs. Introduction into new catchments is prohibited.	1,2
Freshwater fish	<i>Gambusia affinis</i>	Mosquito-fish	3 where it occurs, 1b in protected areas	Small, live-bearing fish, dull grey or brown, with no bars or bands on the sides and a rounded tail. Body is short and the head flattened,	Aggressively compete with and attack other fish species.	None required in catchments where it already occurs. Introduction into	1,2

11 <https://www.cabi.org/ISC/datasheet/26515#3A9E762F-132E-42C5-B0AA-0C59D4D1BE9A>

				<p>with the mouth pointed upward for surface feeding. May have a large dusky to black teardrop marking beneath its eye, but this marking is sometimes reduced. Females have a rounded, small anal fin and grow to about 6-7cm. Males grow to about 4cm.</p> <p>Habitat: A variety of freshwater and protected brackish environments. It preferentially occupies vegetated ponds and lakes, backwaters and quiet pools of streams. It is most often encountered in standing or slow-flowing waters</p>		new catchments is prohibited.	
Freshwater fish	<i>Micropterus dolomieu</i>	Smallmouth bass	<p>3 in rivers, wetlands, lakes and estuaries where it occurs 1b in protected areas Not listed for dams in catchment areas where it occurs</p>	<p>Predatory fish with a large head and mouth, reaching up to 5kg in weight and 60cm in length. Olive to coppery-yellow colour above, with darker olive vertical bars, dusky white underneath and red eyes.</p> <p>Habitat: Freshwater, preferring rocky pools and dams.</p>	Outcompete indigenous fish species.	None required in catchments where it already occurs. Introduction into new catchments is prohibited.	1,2

Freshwater fish	<i>Micropterus salmoides</i>	Largemouth bass	3 in rivers, wetlands, lakes and estuaries where it occurs 1b in protected areas Not listed for dams in catchment areas where it occurs	Olive green with dark blotches forming a jagged horizontal stripe along each flank. Females are larger than males. It can grow up to 75cm in length and weigh up to 11.4kg. The upper jaw reaches far beyond the rear margin of the eye socket. Habitat: Lakes, ponds, streams and wetlands	Outcompete indigenous fish species.	None required in catchments where it already occurs. Introduction into new catchments is prohibited.	1,2
Freshwater fish	<i>Micropterus punctulatis</i>	Spotted bass	3 in rivers, wetlands, lakes and estuaries where it occurs 1b in protected areas Not listed for dams in catchment areas where it occurs	Moderately compressed, elongated body, with similar colouration and markings to the largemouth bass. Habitat: Warm, slow-moving streams and stream-like areas or riverine arms of reservoirs.	Outcompete indigenous fish species.	None required in catchments where it already occurs. Introduction into new catchments is prohibited.	1,2
Birds	<i>Sturnus vulgaris</i>	Common starling	3	Robust medium-sized passerine with white-flecked glossy black plumage. Bright yellow bill. 21 cm in length. Habitat: Mainly cities, agricultural land.	Competes with indigenous species.	None	1,3
Birds	<i>Anas platyrhynchos</i>	Mallard	2	Duck about 58cm in length. Breeding male has bottle green head with purplish brown chest. Female streaked	Competes with indigenous species, hybridises with	Walk-in/Swim-in duck traps followed by euthanasia of all captured birds.	1,3

				brown with greyish bill. Non-breeding male similar to female, with yellow bill Habitat: Vegetated wetlands, including estuaries and lagoons.	indigenous ducks.	CapeNature to provide traps and expertise. Removal to be in accordance with humane standards.	
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References for descriptions, photographs, and other information. All photographs from 1 unless otherwise referenced.

#	Source
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An aerial photograph of a rural landscape. In the foreground, a dense forest of green trees and shrubs covers a hillside. A small river or stream flows through the forest on the left side. In the middle ground, a large field of tall, green crops, possibly corn, stretches across the landscape. To the right, a dirt road or path runs through the field. In the background, a farm complex with several large, white, rectangular buildings is visible. The surrounding area consists of rolling green hills and fields under a clear sky.

**SITE-SPECIFIC MONITORING AND
CONTROL PLANS**

6.1 De Hoek Site: Management Unit DH01



Map 3. Management unit DH01, De Hoek site

6.1.1 Description

Locality

The De Hoek site is located approximately 60 km north of Oudtshoorn and about 28 km south-east of Prince Albert. Management unit DH01 stretches east from the resort approximately 1.8 km, to a point north of De Fontein farm. It is accessed from the resort or from the rough access road to De Fontein. The MU is 65.5 ha in extent.

Topography

De Hoek is located at the base of the southern slopes of the Swartberg mountain range. The management unit is an area of mountainous terrain lying east of the resort. It lies between 700 and 960 m altitude.

Sensitivities

The MU supports the Kango Limestone Renosterveld vegetation type (an ecosystem listed as Vulnerable). Natural vegetation in fairly good condition is present throughout the MU.

Land uses

Immediately to the north of the MU is the Groot Swartberg Nature Reserve, a provincial nature reserve and World Heritage Site. The De Hoek municipal resort is located west of the MU.

6.1.2 Invasive species and densities

Only one invasive species was identified in the MU. It occurs primarily in the eastern part of the MU, although there are also offsite specimens to the north that may spread onto the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Pinus halepensis</i>	Aleppo pine	3	2	Occasional	Adult

6.1.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.1.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.1.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Pinus halepensis</i>	Aleppo pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.1.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Pinus halepensis</i>	Aleppo pine	Cut Stump	None

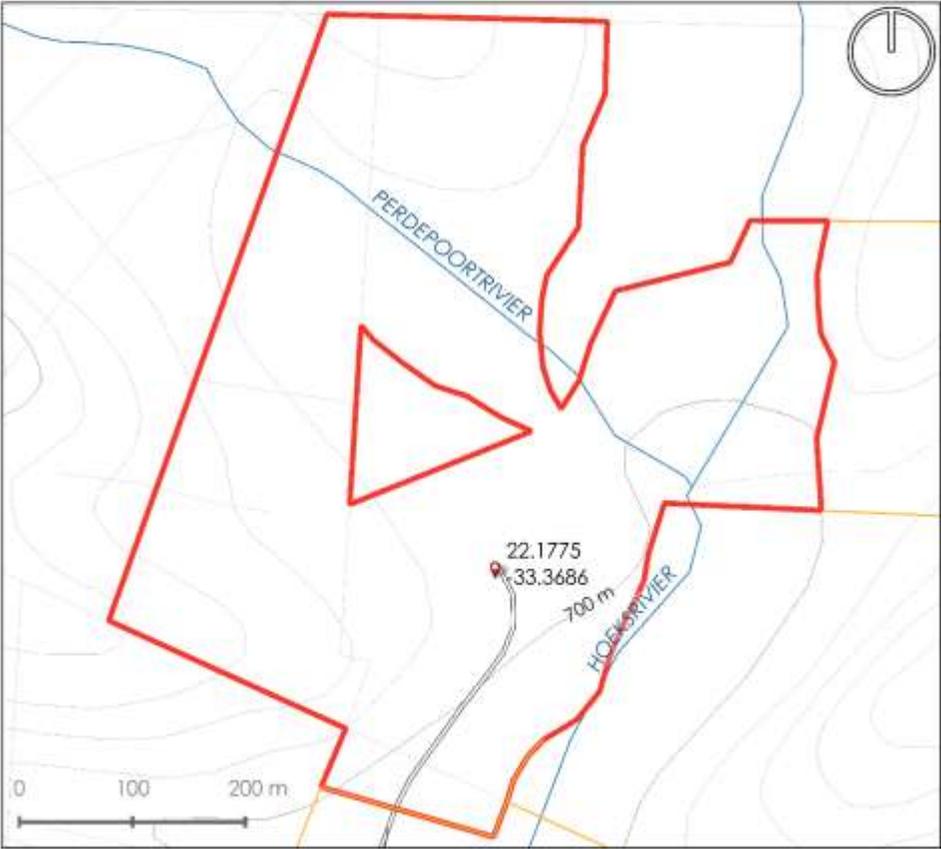
6.1.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.1.8 Economic opportunities

Very limited economic opportunity associated with the sale of firewood or timber from the pine species found in the MU. The costs of exploiting this opportunity are likely to outweigh any potential benefit, however.

6.2 De Hoek Site: Management Unit DH02



Map 4. Management unit DH02, De Hoek site

6.2.1 Description

Locality

The De Hoek site is located approximately 60 km north of Oudtshoorn and about 28 km south-east of Prince Albert. Management unit DH02 contains the municipal resort and its immediate surroundings. It is accessed from the De Hoek access road (DR01719). The MU is 30.0 ha in extent.

Topography

De Hoek is located at the base of the southern slopes of the Swartberg mountain range. The management unit is in a valley surrounding the Hoeks River, and is relatively flat. It lies between 700 and 760 m in altitude.

Sensitivities

The MU supports the Kango Limestone Renosterveld vegetation type (an ecosystem listed as Vulnerable). Natural vegetation in fairly good condition is present on the mountain slopes in the northern and southwestern parts of the site. The Hoeks River and three of its tributaries flow across the MU.

Land uses

- Immediately to the north of the MU is the Groot Swartberg Nature Reserve, a provincial nature reserve and World Heritage Site.
- The De Hoek municipal resort is located within the MU.

6.2.2 Invasive species and densities

Several invasive woody tree species occur in the MU, many of them as planted shade trees within the resort. Nearly all are limited to fewer than ten individuals. The weeping willow *Salix babylonica* occurs along the river.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Callistemon viminalis</i>	Weeping bottlebrush	3	nl	Few	Adult
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	1b here	2	Few	Adult
Plants	<i>Cotoneaster pannosus</i>	Silver leaf cotoneaster	1b	3	Few	Adult
Plants	<i>Datura stramonium</i>	Common thorn apple	1b	1	Few	Adult
Plants	<i>Gleditsia triacanthos</i>	Honey locust	1b	2	Few	Adult
Plants	<i>Grevillea robusta</i>	Australian silky oak	3	3	Few	Adult
Plants	<i>Hakea salicifolia</i>	Hedge hakea	1b	nl	Few	Adult
Plants	<i>Ligustrum japonicum</i>	Japanese wax-leaved privet	1b	3	Few	Adult
Plants	<i>Melia azedarach</i>	Syringa	1b	3	Few	Adult

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Nerium oleander</i>	Oleander	1b	1	Few	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b	2	Few	Adult
Plants	<i>Pyracantha angustifolia</i>	Yellow firethorn	1b	3	Few	Adult
Plants	<i>Salix babylonica</i>	Weeping willow	nl	2	Occasional	Adult
Plants	<i>Tipuana tipu</i>	Tipu tree	3	3	Few	Adult

6.2.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Low

6.2.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.2.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Callistemon viminalis</i>	Weeping bottlebrush	Prevent spread and prohibit new planting	n/a	Resort staff
<i>Casuarina cunninghamiana</i>	Beefwood	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Cotoneaster pannosus</i>	Silver leaf cotoneaster	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Datura stramonium</i>	Common thorn apple	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Gleditsia triacanthos</i>	Honey locust	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Grevillea robusta</i>	Australian silky oak	Prevent spread and prohibit new planting	n/a	Resort staff

<i>Hakea salicifolia</i>	Hedge hakea	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Ligustrum japonicum</i>	Japanese wax-leaved privet	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Melia azedarach</i>	Syringa	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Nerium oleander</i>	Oleander	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Pyracantha angustifolia</i>	Yellow firethorn	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Salix babylonica</i>	Weeping willow	Prevent spread and prohibit new planting	n/a	Resort staff
<i>Tipuana tipu</i>	Tipu tree	Prevent spread and prohibit new planting	n/a	Resort staff
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Anas platyrhynchos</i>	Mallard	Mallard	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.2.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Callistemon viminalis</i>	Weeping bottlebrush	Leave	
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	Cut Stump and spray	Remove smaller branches to a licensed landfill site. The main trunk can be used for firewood.
Plants	<i>Cotoneaster pannosus</i>	Silver leaf cotoneaster	Cut Stump and spray	Remove to a licensed landfill site
Plants	<i>Datura stramonium</i>	Common thorn apple	Handpull	Remove to a licensed landfill site
Plants	<i>Gleditsia triacanthos</i>	Honey locust	Cut Stump and apply	Remove to a licensed landfill site
Plants	<i>Grevillea robusta</i>	Australian silky oak	Leave	
Plants	<i>Hakea salicifolia</i>	Hedge hakea	Cut Stump	Remove to a licensed landfill site

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Ligustrum japonicum</i>	Japanese wax-leaved privet	Cut Stump and spray	Remove to a licensed landfill site
Plants	<i>Melia azedarach</i>	Syringa	Cut Stump and spray	Remove to a licensed landfill site
Plants	<i>Nerium oleander</i>	Oleander	Cut Stump and spray	Remove to a licensed landfill site
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Remove smaller branches to a licensed landfill site. Trunk can be used for firewood or any other wood needs
Plants	<i>Pyracantha angustifolia</i>	Yellow firethorn	Cut Stump	Remove to a licensed landfill site
Plants	<i>Salix babylonica</i>	Weeping willow	Leave	
Plants	<i>Tipuana tipu</i>	Tipu tree	Leave	

6.2.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species, ensuring that category 3 species have not reproduced or spread.
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.2.8 Economic opportunities

Very limited economic opportunity associated with the production of firewood or timber from the various trees found in the MU. Firewood may be saleable within the resort.

6.3 De Hoek Site: Management Unit DH03



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- Access points
- River
- Cadastral



Map 5. Management unit DH03, De Hoek site

6.3.1 Description

Locality

The De Hoek site is located approximately 60 km north of Oudtshoorn and about 28 km south-east of Prince Albert. Management unit DH03 is located along the Hoeks River. It is accessed from the De Hoek access road (DR01719). The MU is 87.8 ha in extent.

Topography

De Hoek is located at the base of the southern slopes of the Swartberg mountain range. The management unit lies along the Hoeks River valley, and incorporates the mountain slopes along the eastern side of the valley. The valley is at 660 m in altitude, while the slopes rise to 760 m.

Sensitivities

The MU supports the Kango Limestone Renosterveld vegetation type (an ecosystem listed as Vulnerable). Natural vegetation in fairly good condition is present on the mountain slopes along the eastern part of the MU. The Hoeks River flows from north to south across the site.

Land uses

- The De Hoek municipal resort is located north of the MU.
- Fields along the Hoeks River are farmed, and there is farm workers' accommodation on the central eastern part of the MU.

6.3.2 Invasive species and densities

The majority of invasive species in this MU are cacti and herbaceous species, the latter associated with the agricultural lands. Moderately dense stands of Grey poplar *Populus x canescens* line the Hoeks River.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Occasional	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Few	Adult
Plants	<i>Datura stramonium</i>	Common thorn apple	1b	1	Few	Adult
Plants	<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	1b	1	Scattered	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Occasional	Adult
Plants	<i>Opuntia microdasys</i>	Yellow bunny-ears	1b	nl	Few	Adult
Plants	<i>Populus canescens</i>	Grey Poplar	2	2	Moderate	Adult
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Few	Adult

6.3.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	High

6.3.4 Previous control efforts

The biocontrol agent cochineal was observed on *Opuntia ficus-indica* specimens within this MU.

6.3.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Datura stramonium</i>	Common thorn apple	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia microdasys</i>	Yellow bunny-ears	Local extirpation	Within five years	GRDM EPWP
<i>Populus canescens</i>	Grey Poplar	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.3.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	None
Plants	<i>Datura stramonium</i>	Common thorn apple	Handpull	None
Plants	<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	Stem inject	None
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Opuntia microdasys</i>	Yellow bunny-ears	Stem inject	None
Plants	<i>Populus canescens</i>	Grey Poplar	Cut Stump and spray	Remove smaller material to licensed landfill site, larger trunks can be used by resort or community for wood.
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

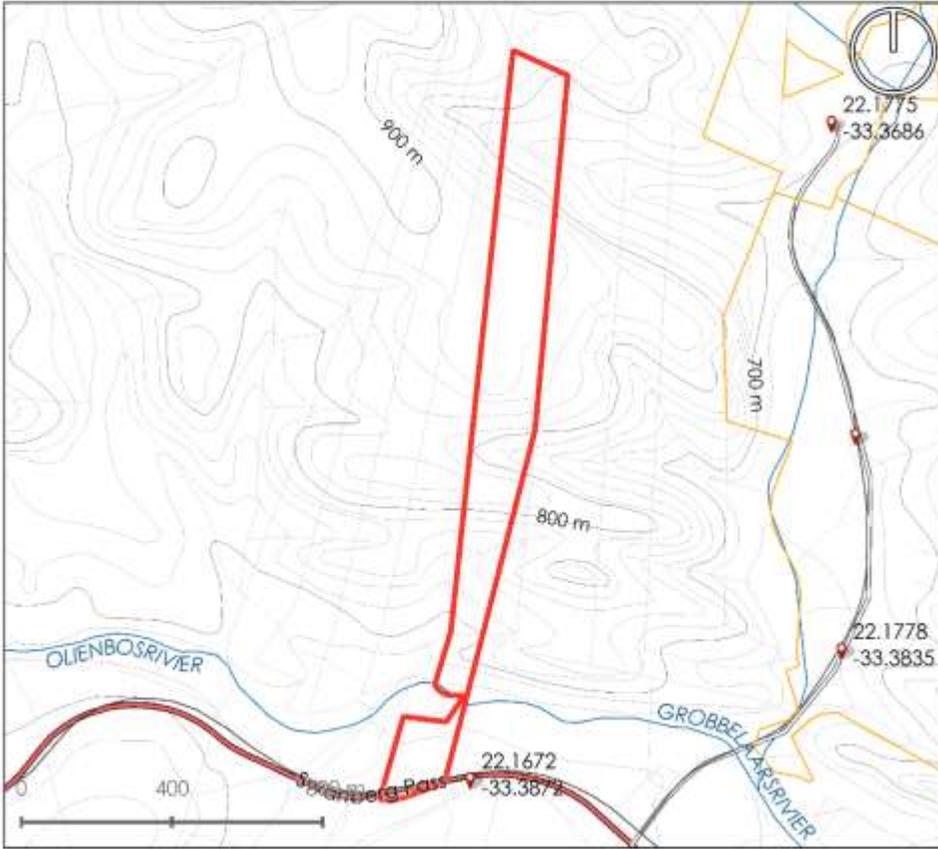
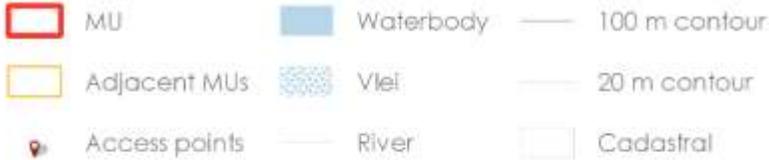
6.3.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.3.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.4 De Hoek Site: Management Unit DH04



Map 6. Management unit DH04, De Hoek site

6.4.1 Description

Locality

The De Hoek site is located approximately 60 km north of Oudtshoorn and about 28 km south-east of Prince Albert. Management unit DH04 extends north from the Grobelaars River valley in a narrow strip approximately 2km long and 200m wide. It is accessed from the R326 (MR00369). The MU is 31.9 ha in extent.

Topography

De Hoek is located at the base of the southern slopes of the Swartberg mountain range. The management unit extends north from the Grobelaars River valley into the mountains behind, and lies between 660 and 880 m altitude.

Sensitivities

The MU supports the Kango Limestone Renosterveld vegetation type (an ecosystem listed as Vulnerable). Natural vegetation in fairly good condition is present on most of the site. The Grobelaars River flows across the southern part of the site.

Land uses

- The southernmost part of the site is an agricultural field.

6.4.2 Invasive species and densities

Invasive species in this MU are associated largely with the agricultural lands at the southern extent.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Few	Adult
Plants	<i>Datura stramonium</i>	Common thorn apple	1b	1	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Few	Adult
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Few	Adult
Plants	<i>Xanthium spinosum</i>	Spiny cocklebur	1b	1	Few	Adult

6.4.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	High

6.4.4 Previous control efforts

The biocontrol agent cochineal was observed on *Opuntia ficus-indica* specimens within this MU.

6.4.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Datura stramonium</i>	Common thorn apple	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Xanthium spinosum</i>	Spiny cocklebur	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.4.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	None
Plants	<i>Datura stramonium</i>	Common thorn apple	Handpull	None

Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None
Plants	<i>Xanthium spinosum</i>	Spiny cocklebur	Handpull	None

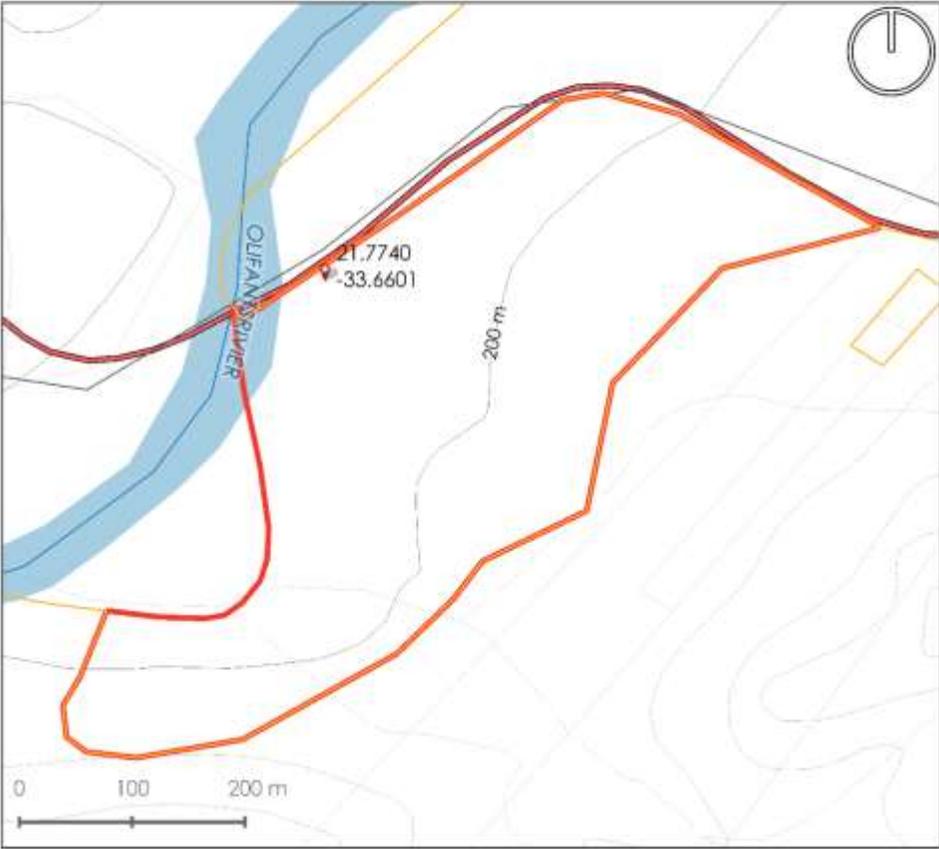
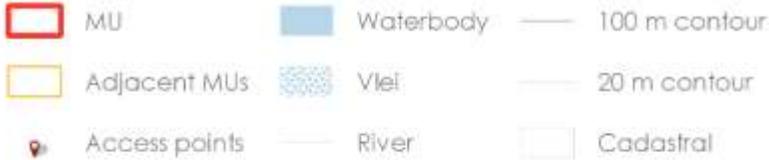
6.4.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.4.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.5 Calitzdorp Spa Site: Management Unit CA01



Map 7. Management unit CA01, Calitzdorp Spa site

6.5.1 Description

Locality

The Calitzdorp site is located approximately 40 km north of Herbertsdale and about 28 km west of Volmoed. It is in the Kannaland Local Municipality, on the Olifants River. CA01 contains the municipal resort and its immediate surroundings. The MU is 31.9 ha in extent, and is accessed from the DR1688, off the R62.

Topography

The MU is located in the Olifants River valley, and has a nearly flat topography at 200 m altitude.

Sensitivities

The MU is within the Muscadel Riveire and Eastern Little Karoo ecosystems, which are listed as Vulnerable and Critically Endangered, respectively. The Olifants River flows along the western boundary of the MU.

Land uses

- The MU is a municipal resort centred around a natural hot spring.

6.5.2 Invasive species and densities

Invasive species in this MU are largely shade trees planted within the resort, but also include agricultural weeds along the roadway and adjacent farmlands.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Arundo donax</i>	Spanish reed	1b	1	Occasional	Adult
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	2 here	2	Few	Adult
Plants	<i>Gleditsia triacanthos</i>	Honey locust	1b	2	Few	Adult
Plants	<i>Melia azedarach</i>	Syringa	1b here	3	Few	Adult
Plants	<i>Prosopis glandulosa</i>	Honey mesquite	1b	2	Few	Adult
Plants	<i>Salsola kali</i>	Tumbleweed	1b	nl	Few	All
Plants	<i>Tipuana tipu</i>	Tipu tree	3	3	Few	Adult

6.5.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Low
Freshwater fish	<i>Micropterus dolomieu</i>	Smallmouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus salmoides</i>	Largemouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus punctulatis</i>	Spotted bass	3 here	n/a	Unknown

6.5.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.5.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Arundo donax</i>	Spanish reed	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Casuarina cunninghamiana</i>	Beefwood	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Gleditsia triacanthos</i>	Honey locust	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Melia azedarach</i>	Syringa	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Prosopis glandulosa</i>	Honey mesquite	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Salsola kali</i>	Tumbleweed	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Tipuana tipu</i>	Tipu tree	Prevent spread and prohibit new planting	n/a	Resort staff

6.5.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Arundo donax</i>	Spanish reed	Cut Stump and spray	Can be used by resort or else stacked and burned
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	Cut Stump and spray	Smaller branches taken to a licensed landfill site, trunks can be used
Plants	<i>Gleditsia triacanthos</i>	Honey locust	Cut Stump and spray	Remove to licensed landfill site
Plants	<i>Melia azedarach</i>	Syringa	Cut Stump and spray	Remove to licensed landfill site
Plants	<i>Prosopis glandulosa</i>	Honey mesquite	Cut Stump and spray	Remove to licensed landfill site
Plants	<i>Salsola kali</i>	Tumbleweed	Handpull	Remove to licensed landfill site
Plants	<i>Tipuana tipu</i>	Tipu tree	Leave	

6.5.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species, ensuring that category 3 species have not reproduced or spread.
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

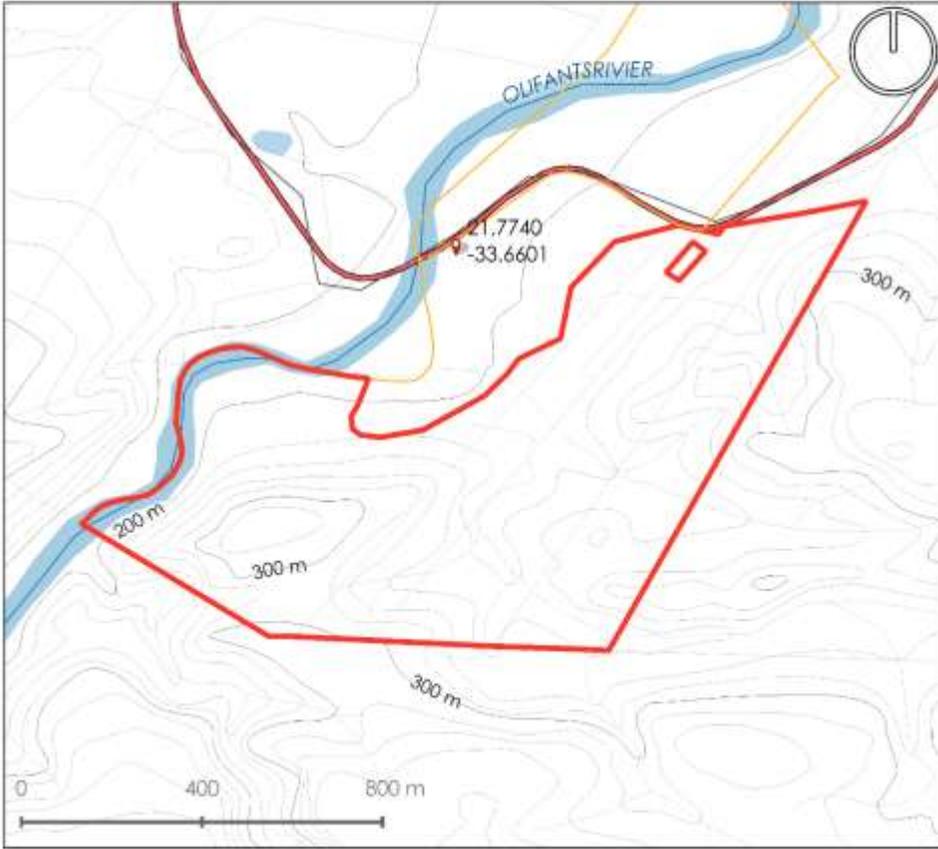
6.5.8 Economic opportunities

Very limited economic opportunity associated with the production of firewood or timber from the various trees found in the MU. Firewood may be saleable within the resort.

6.6 Calitzdorp Spa Site: Management Unit CA02



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- 📍 Access points
- River
- Cadastral



Map 8. Management unit CA02, Calitzdorp Spa site

6.6.1 Description

Locality

The Calitzdorp site is located approximately 40 km north of Herbertsdale and about 28 km west of Volmoed. It is in the Kannaland Local Municipality, on the Olifants River. CA02 is south and east of the resort, incorporating mountainous terrain and three valleys. The MU is 99.8 ha in extent, and is accessed from the DR1688. A network of gravel roads provides internal access.

Topography

The MU is located between 200 and 320 m in altitude and includes the koppie on which the resort's reservoirs are located, and adjoining mountainous terrain.

Sensitivities

The MU is within the Gamka Thicket ecosystem, and supports natural vegetation in good condition. The Olifants River flows along the western boundary of the MU.

Land uses

Various hiking trails cross the MU, giving access from the resort to the higher terrain.

6.6.2 Invasive species and densities

Invasive species in this MU are associated with the disturbed areas around the resort.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Melia azedarach</i>	Syringa	1b here	3	Few	Adult
Plants	<i>Ricinus communis</i>	Castor-oil plant	2	2	Occasional	All
Plants	<i>Salsola kali</i>	Tumbleweed	1b	nl	Few	All

6.6.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.6.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.6.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Melia azedarach</i>	Syringa	Local extirpation	Within five years	GRDM EPWP
<i>Ricinus communis</i>	Castor-oil plant	Local extirpation	Within five years	GRDM EPWP
<i>Salsola kali</i>	Tumbleweed	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.6.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Melia azedarach</i>	Syringa	Cut Stump and spray	None
Plants	<i>Ricinus communis</i>	Castor-oil plant	Cut Stump and spray	None
Plants	<i>Salsola kali</i>	Tumbleweed	Handpull	None

6.6.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

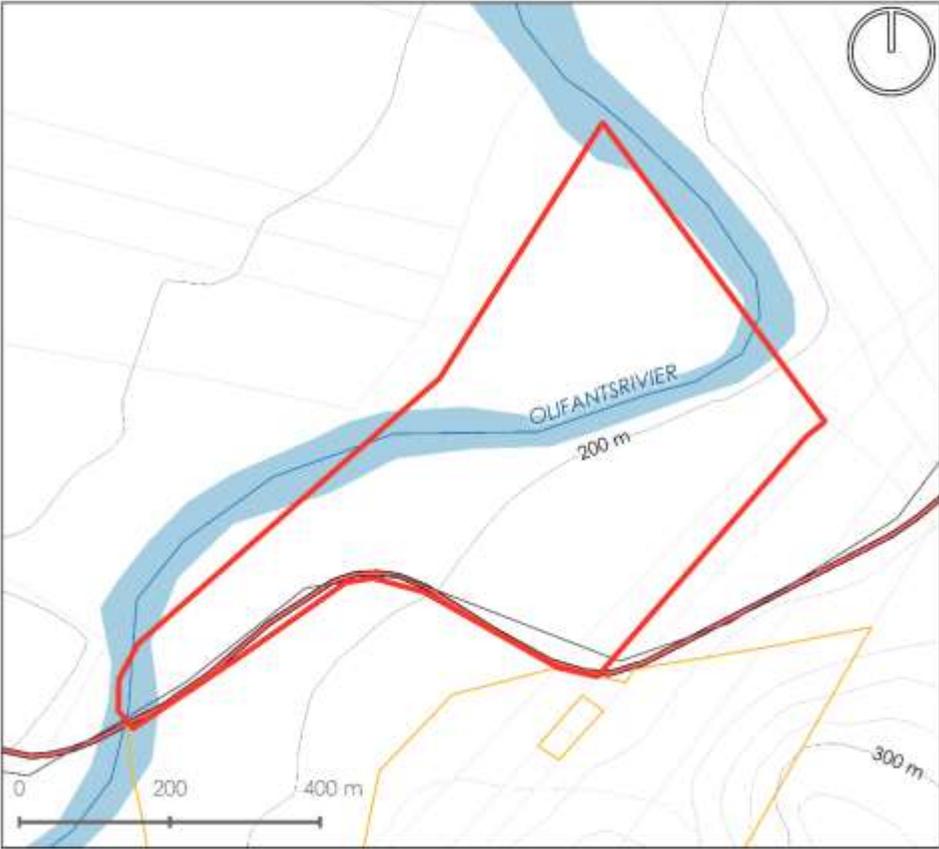
6.6.8 Economic opportunities

Continued and improved use of the resort and surrounding areas for holiday accommodation, ecotourism and related activities.

6.7 Calitzdorp Spa Site: Management Unit CA03



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 9. Management unit CA03, Calitzdorp Spa site

6.7.1 Description

Locality

The Calitzdorp site is located approximately 40 km north of Herbertsdale and about 28 km west of Volmoed. It is in the Kannaland Local Municipality, on the Olifants River. CA03 is north of the access road, and incorporates the Olifants River, agricultural lands, and municipal housing. The MU is 34.0 ha in extent, and is accessed from the DR1688, off the R62.

Topography

The MU is located in the Olifants River valley, and has a nearly flat topography at 200 m altitude.

Sensitivities

The MU is within the Muscadel Riveire and Eastern Little Karoo ecosystems, which are listed as Vulnerable and Critically Endangered, respectively. The Olifants River flows along the western boundary of the MU.

Land uses

- Agricultural fields are present along the eastern river bank.
- Several municipally-owned houses are located in the MU near the eastern boundary.

6.7.2 Invasive species and densities

Invasive species in this MU are associated largely with the agricultural land.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Atriplex nummularia</i>	Old man saltbush	2	2	Occasional	Adult
Plants	<i>Callistemon viminalis</i>	Weeping bottlebrush	3	nl	Few	Adult
Plants	<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	1b	1	Few	Adult
Plants	<i>Prosopis glandulosa</i>	Honey mesquite	1b	2	Few	Adult
Plants	<i>Tamarix ramossissima</i> *	Tamarisk	1b	1	Scattered	Adult

* A stand of *Tamarix* sp. on the western side of the river was not in flower and could not be conclusively identified. To avoid possible confusion with the indigenous *T. usneioides* control efforts should only take place after positive identification. The pink (not white) flowers of *T. ramossissima* are diagnostic.

6.7.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium
Freshwater fish	<i>Micropterus dolomieu</i>	Smallmouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus salmoides</i>	Largemouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus punctulatis</i>	Spotted bass	3 here	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.7.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.7.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Atriplex nummularia</i>	Old man saltbush	Local extirpation	Within five years	GRDM EPWP
<i>Callistemon viminalis</i>	Weeping bottlebrush	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Prosopis glandulosa</i>	Honey mesquite	Local extirpation	Within five years	GRDM EPWP
<i>Tamarix ramossissima</i>	Tamarisk	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Micropterus dolomieu</i>	Smallmouth bass	No new introductions	n/a	n/a
<i>Micropterus salmoides</i>	Largemouth bass	No new introductions	n/a	n/a
<i>Micropterus punctulatis</i>	Spotted bass	No new introductions	n/a	n/a

6.7.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Atriplex nummularia</i>	Old man saltbush	Cut Stump	Remove from flood zone
Plants	<i>Callistemon viminalis</i>	Weeping bottlebrush	Cut Stump and spray	Remove from flood zone
Plants	<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	Stem inject	Remove from flood zone
Plants	<i>Prosopis glandulosa</i>	Honey mesquite	Cut Stump and spray	Remove from flood zone
Plants	<i>Tamarix ramosissima</i>	Tamarisk	Cut Stump and spray	Remove from flood zone

6.7.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

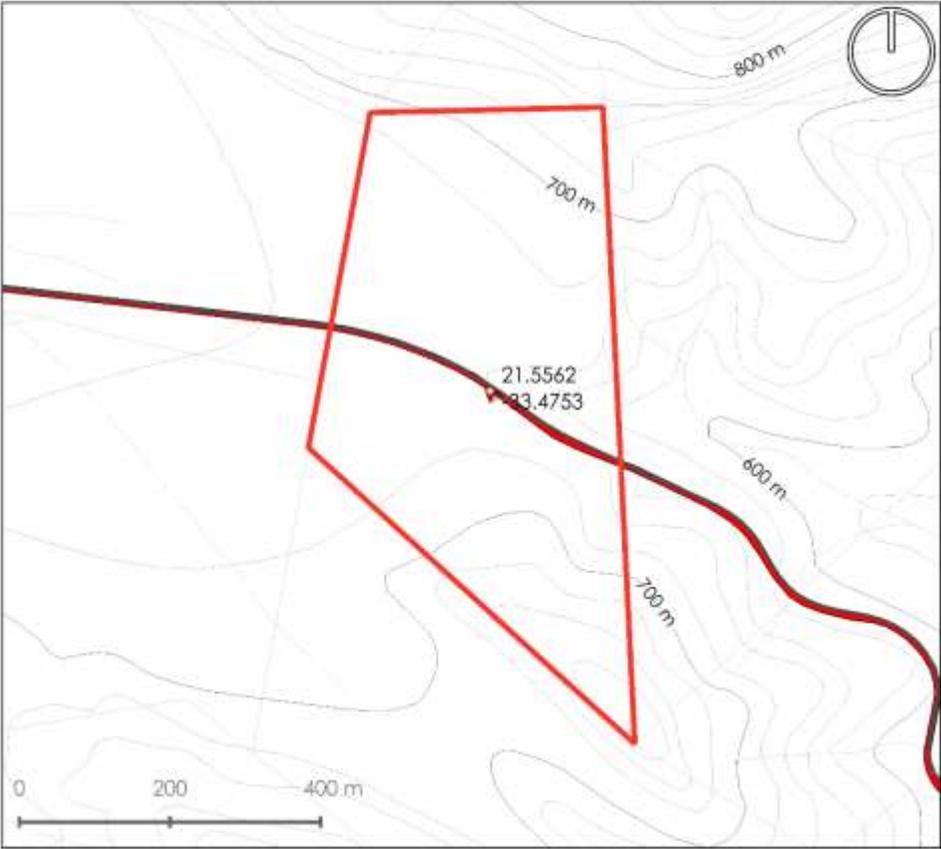
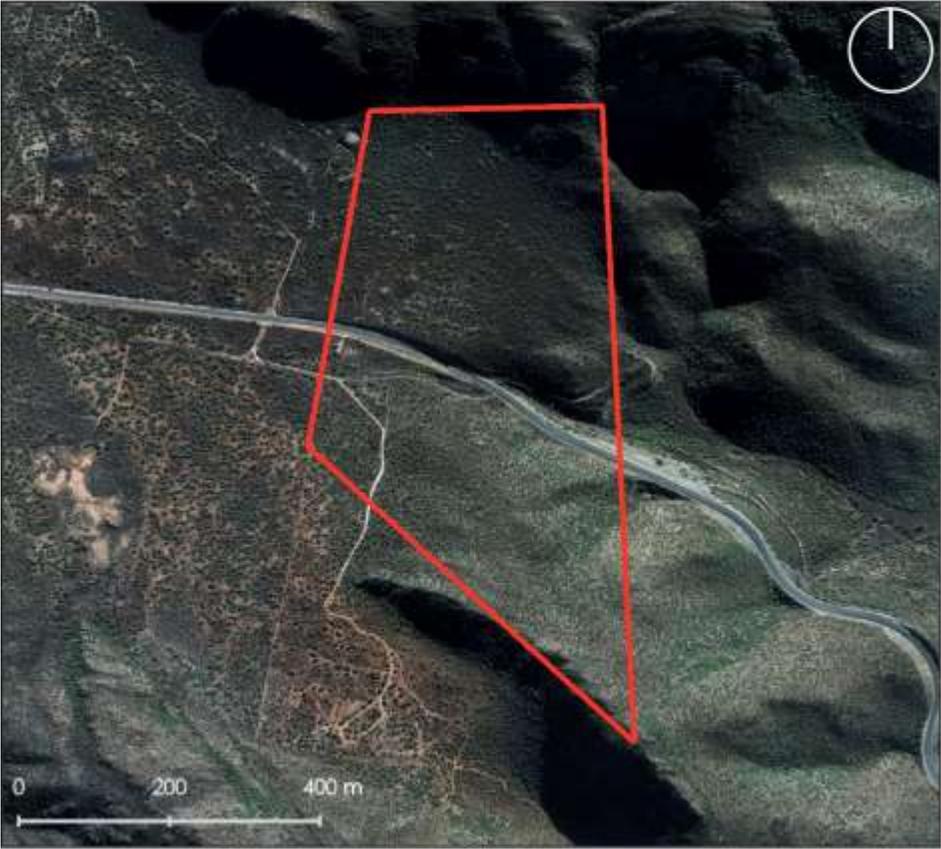
6.7.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.8 Opzoek Outspan: Management Unit OP01



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- 📍 Access points
- River
- Cadastral



Map 10. Management unit OP01, Opzoek site

6.8.1 Description

Locality

The Opzoek site is approximately 28 km east of Ladismith in the Huisrivier Pass. The site is in the Kannaland local municipality. The R62 bisects the site from west to east. The site has only a single management unit, 28.8 ha in extent.

Topography

The site rises steeply from the road (640 m altitude) to north and south, reaching 750 m at its highest points.

Sensitivities

The site supports natural Gamka Thicket vegetation. The northern boundary falls within an area mapped as Montague Shale Renosterveld, a Vulnerable ecosystem.

Land uses

An access road to an adjacent private property crosses the southern part of the site.

6.8.2 Invasive species and densities

Only a single invasive species was identified in this MU, scattered sparsely across the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Occasional	Adult

6.8.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.8.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.8.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.8.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

6.8.7 Monitoring and evaluation

4. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
1. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
2. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.8.8 Economic opportunities

None identified.

6.9 Buffelsdrif: Management Unit BU01



- | | | |
|---------------|-----------|---------------|
| MU | Waterbody | 100 m contour |
| Adjacent MUs | Vlei | 20 m contour |
| Access points | River | Cadastral |



Map 11. Management unit BU01, Buffelsdrif site

6.9.1 Description

Locality

The Buffelsdrif site is approximately 12 km south-east of Ladismith in the Kannaland municipal area, on a minor road (DR01702) off the R323. The site is a single management unit, and is located on the Swartberg River. The MU is 1.5 ha in extent.

Topography

The site is on the Swartberg River and is essentially flat, located at 400 m altitude.

Sensitivities

The site would historically have been within the Western Little Karoo ecosystem. The (seasonal) Swartberg River flows through the site from north to south.

Land uses

None.

6.9.2 Invasive species and densities

The MU is heavily invaded by both woody tree species and the invasive alien reed *Arundo donax*.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Scattered	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Scattered	Adult
Plants	<i>Arundo donax</i>	Spanish reed	1b	1	Moderate	Adult
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	1b here	2	Moderate	Adult

6.9.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.9.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.9.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Arundo donax</i>	Spanish reed	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus camaldulensis</i>	River red gum	Local extirpation	Within five years	GRDM EPWP

6.9.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Remove from the flood zone
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut Stump and spray	Remove from the flood zone
Plants	<i>Arundo donax</i>	Spanish reed	Cut Stump and spray	Remove from the flood zone
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	Cut Stump and spray	Remove from the flood zone

6.9.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

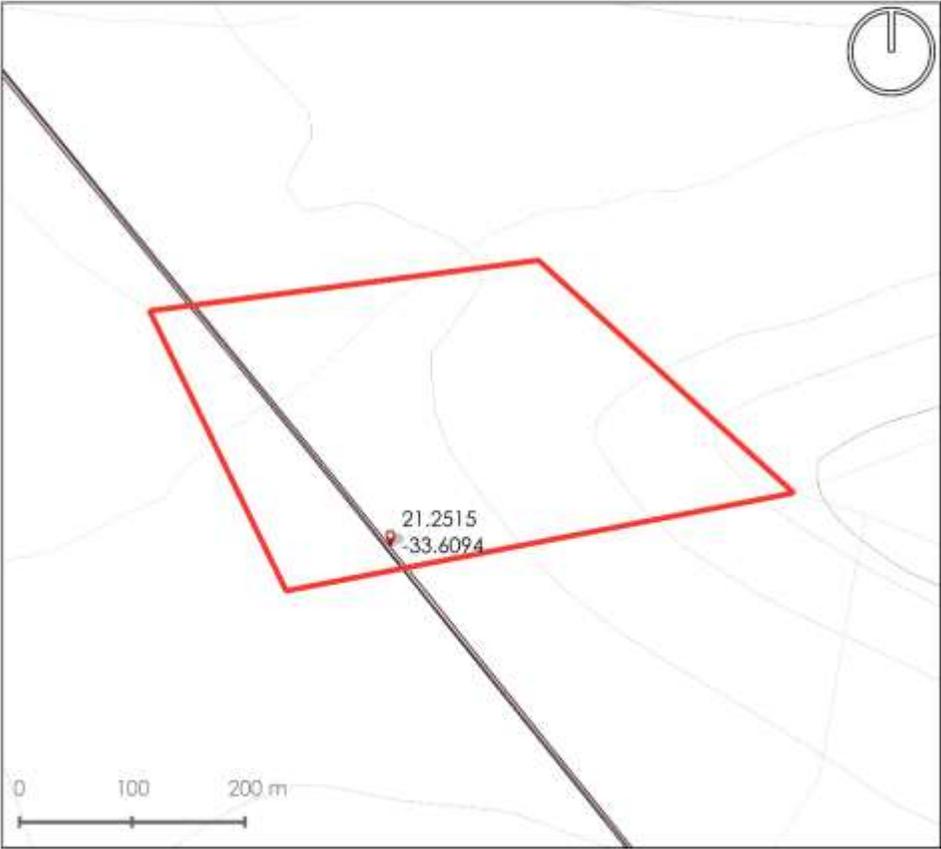
6.9.8 Economic opportunities

None identified.

6.10 Roodeberg Outspan: Management Unit RO01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 12. Management unit RO01, Roodeberg Outspan site

6.10.1 Description

Locality

The Roodeberg site is approximately 14 km south of Ladismith, in the Kannaland Local Municipality, on the R327. The site is a single management unit, 12.0 ha in extent.

Topography

The site rises slightly to the east, occurring between 440 and 480 m in altitude.

Sensitivities

The site supports the Western Gwarrieveld vegetation type. The eastern boundary is mapped as falling within the North Rooiberg Sandstone Fynbos ecosystem.

Land uses

A municipal borrowpit is located on the site adjacent to the road. A farmhouse is located offsite but immediately adjacent, to the southeast.

6.10.2 Invasive species and densities

Very few invasive aliens were identified on the site. The sweet prickly pear *Opuntia ficus-indica* is associated largely with the roadside, while an unconfirmed *Tamarix* species occurs at the northern boundary.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Few	Adult
Plants	<i>Tamarix sp.</i> *	Unconfirmed tamarisk species*	1b or nl *	nl	Occasional	Adult

* As the plants were not in flower, they could not be conclusively identified. To avoid possible confusion with the indigenous *T. usneoides* control efforts should only take place after positive identification. The pink (not white) flowers of *T. ramosissima* are diagnostic.

6.10.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.10.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.10.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Tamarix sp.</i>	Unconfirmed tamarisk species	Local extirpation if confirmed to be invasive.	Within five years	GRDM EPWP

6.10.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Tamarix sp.</i>	Unconfirmed tamarisk species	Confirm species before control	

6.10.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

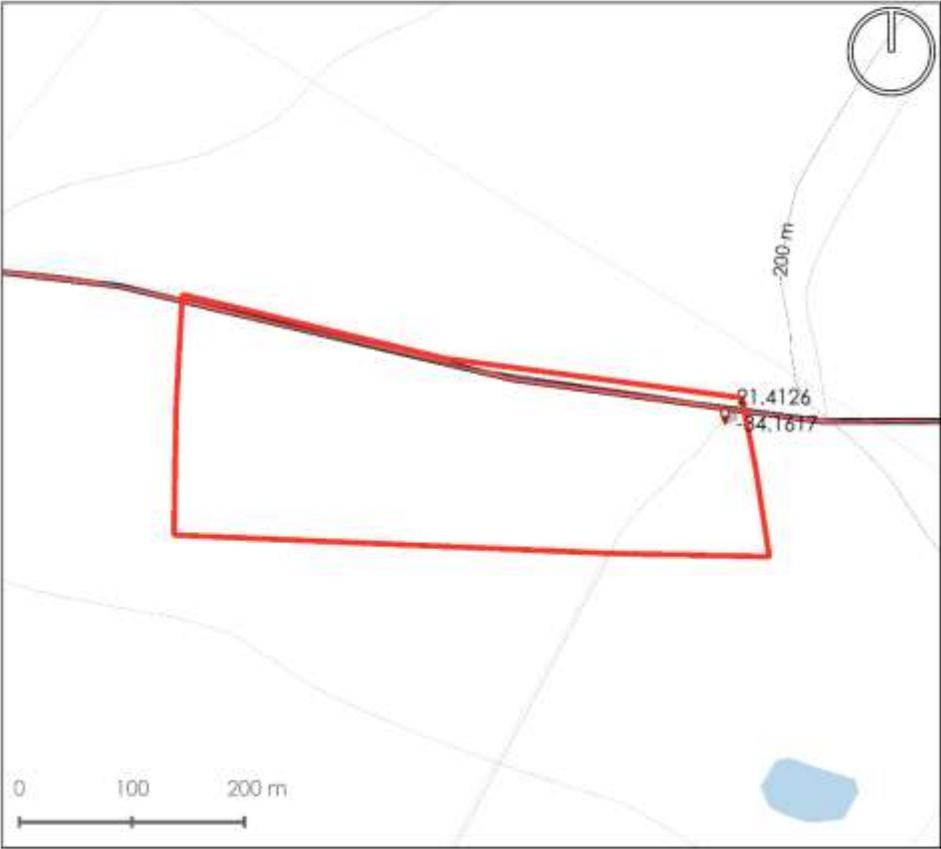
6.10.8 Economic opportunities

Continued use of the existing borrowpit in the MU.

6.11 De Fontein: Management Unit DF01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 13. Management unit DF01, De Fontein site

6.11.1 Description

Locality

The De Fontein site is located nearly equidistant from Riversdal and Albertinia, in the Resiesbaan area. Access is obtained from the DR01551, off the N2. The site is a single management unit, 10.5 ha in extent.

Topography

The site is flat, at 290 m above sea level.

Sensitivities

The fallow central part of the site supports natural vegetation mapped as Eastern Ruens Shale Renosterveld, a Critically Endangered vegetation type.

Land uses

- The site is actively farmed for wheat (western portion) and livestock (eastern portion).
- A major overhead power line crosses the site.

6.11.2 Invasive species and densities

Woody alien invasive species are located along the roads, while the other two species identified in this MU occur both in the road reserve and in the agricultural land on the eastern part of the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Occasional	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Few	Adult

6.11.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.11.4 Previous control efforts

Clearing of *Acacia cyclops* along the fenceline has been undertaken at some point in the past, but not all specimens were removed.

6.11.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP

6.11.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Stack away from any roads
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	Remove from site if flowering heads are mature
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

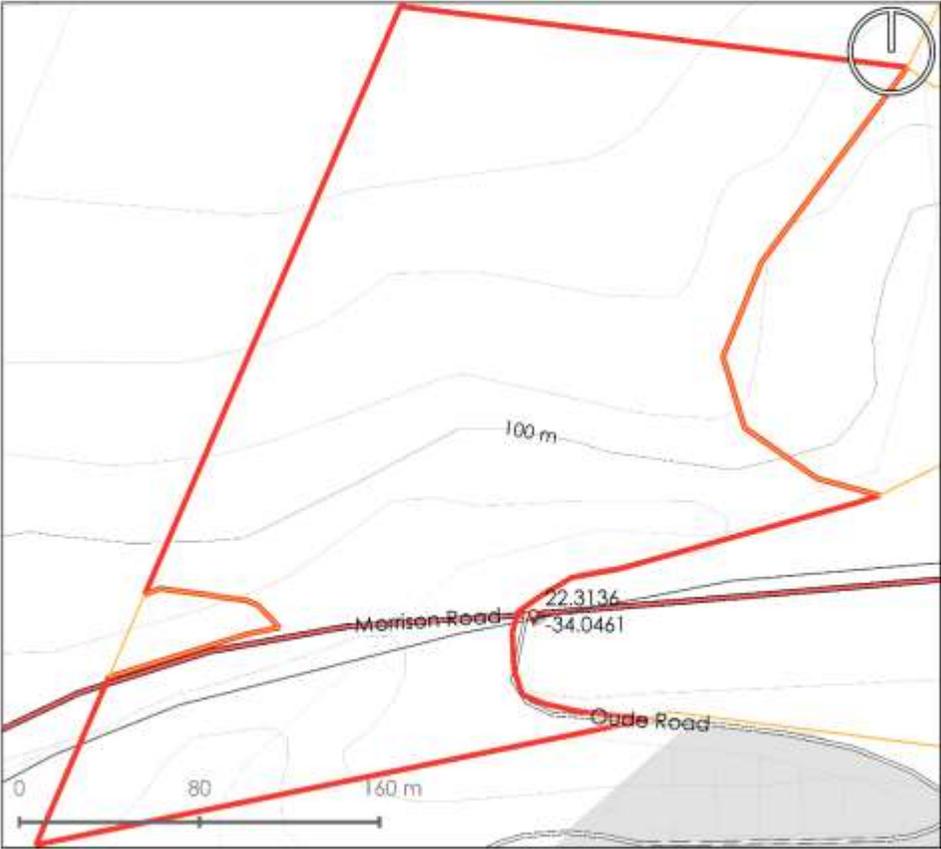
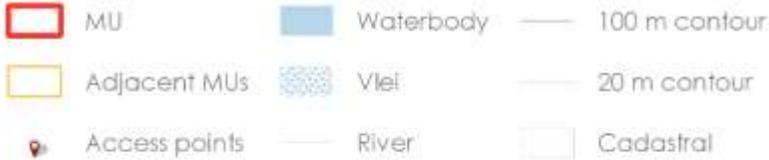
6.11.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.11.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.12 Hoogekraal: Management Unit HO01



Map 14. Management unit HO01, Hoogekraal site

6.12.1 Description

Locality

The Hoogekraal site is located in Glentana, east of Great Brak. Morrison Road (MR00348) traverses the site. HO01 is the western part of the Hoogekraal site, extending from below Morrison Road north to the site's boundary. It has an extent of 8.6 ha and can be accessed from both Morrison Road and the private property to the north.

Topography

The MU slopes down toward the coast, which lies some 500 m to the south. Slopes on HO01 are gentle enough to be accessible.

Sensitivities

The MU is mapped as including two Endangered vegetation types: Garden Route Granite Fynbos and Groot Brak Dune Strandveld. The latter is mapped south of the road.

Land uses

- Residential communities are located immediately south of the MU.
- Morrison Road is an important access route that crosses the MU.

6.12.2 Invasive species and densities

Woody alien invasive species are fairly evenly distributed on the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	High	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Moderate	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Adult

6.12.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.12.4 Previous control efforts

Clearing of invasive species has been undertaken in a small area adjacent to the northern boundary of the site.

6.12.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.12.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood or left on site to decompose
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood or left on site to decompose
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use

6.12.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

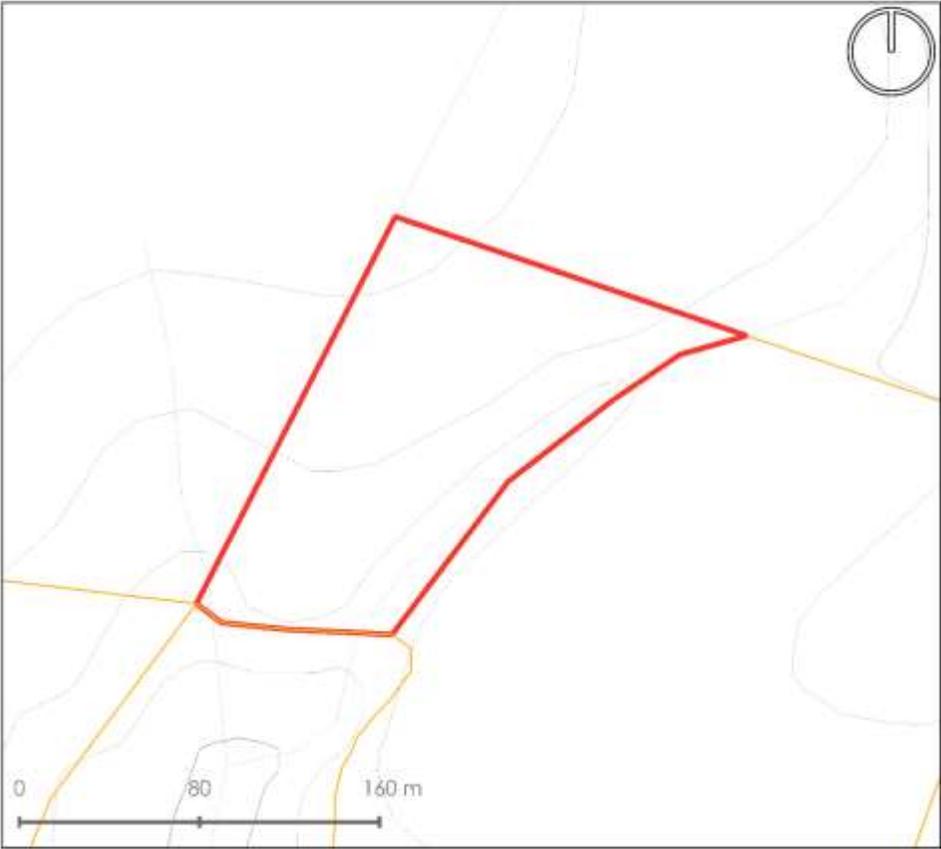
6.12.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.13 Hoogekraal: Management Unit HO02



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 15. Management unit HO02, Hoogekraal site

6.13.1 Description

Locality

The Hoogekraal site is located in Glentana, east of Great Brak. Morrison Road (MR00348) traverses the site. HO02 is the northern part of the Hoogekraal site, with an extent of 2.4 ha. It can be accessed from both Morrison Road and the private property to the north.

Topography

The MU slopes gently down in an easterly direction.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem, and includes two small seasonal watercourses.

Land uses

- Residential properties are located immediately north of the MU.

6.13.2 Invasive species and densities

Woody alien invasive species are fairly evenly distributed on the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Moderate	Adult
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Occasional	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	High	Adult

6.13.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.13.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.13.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.13.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood or left on site to decompose
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood or left on site to decompose
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood or left on site to decompose
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood or left on site to decompose
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use

6.13.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

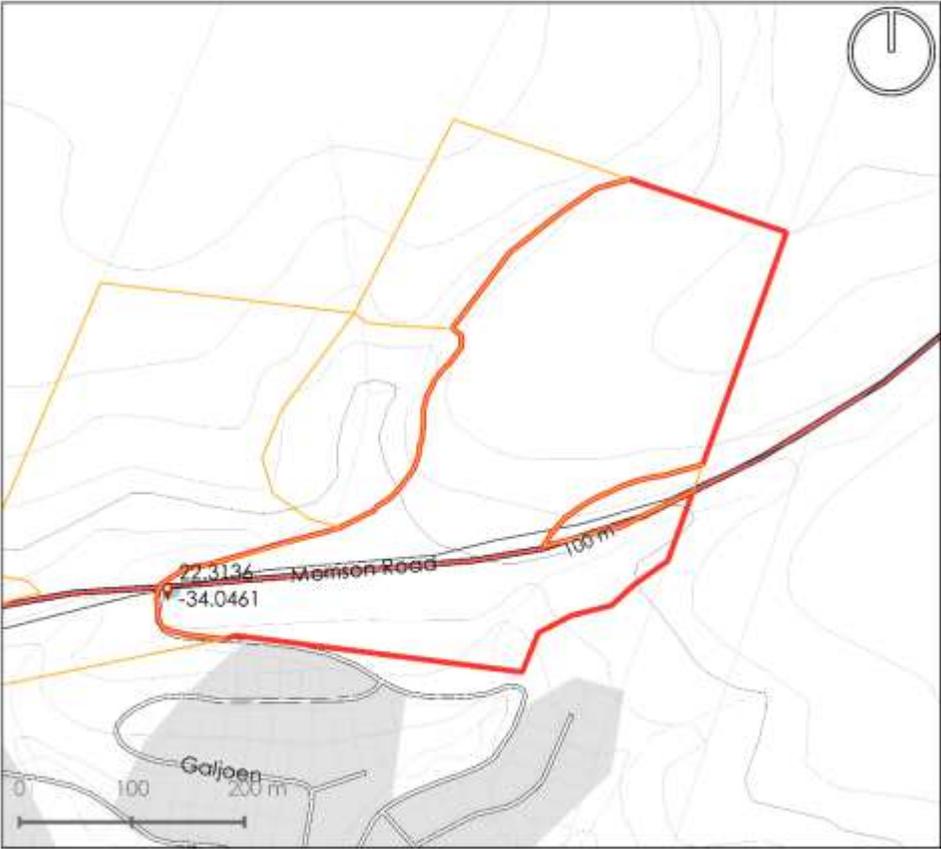
6.13.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.14 Hoogekraal: Management Unit HO03



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral
- River



Map 16. Management unit HO03, Hoogekraal site

6.14.1 Description

Locality

The Hoogekraal site is located in Glentana, east of Great Brak. Morrison Road (MR00348) traverses the site. HO03 is the eastern part of the Hoogekraal site, with an extent of 13.2 ha. It can be accessed from both Morrison Road and the private property to the north.

Topography

The MU slopes gently down in a southerly direction.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

- A single dwelling on the eastern part of the site is informally occupied.

6.14.2 Invasive species and densities

Woody alien invasive species are fairly evenly distributed on the site. Other species are found around the old building located near the eastern boundary.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	High	Adult
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Occasional	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Few	Adult
Plants	<i>Canna indica</i>	Canna	1b	1	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	High	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	High	Adult
Plants	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	3	3	Few	Adult

6.14.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.14.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.14.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Anredera cordifolia</i>	Madeira vine	Local extirpation	Within five years	GRDM EPWP
<i>Canna indica</i>	Canna	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Schinus terebinthifolius</i>	Brazilian pepper tree	Local extirpation	Within five years	GRDM EPWP
<i>Stumus vulgaris</i>	Common starling	None	n/a	n/a

6.14.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and Spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood.
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and Spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood.
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and Spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood.
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut Stump and Spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for firewood.
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut Stump and Spray	Place <u>all</u> plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred, the material may be used as compost.

Plants	<i>Canna indica</i>	Canna	Dig out	Chip and remove chipped material from site
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use.
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use.
Plants	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	Cut Stump and Spray	Chip any cut material smaller than 10cm diameter, larger trunks can be left on site to decompose

6.14.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

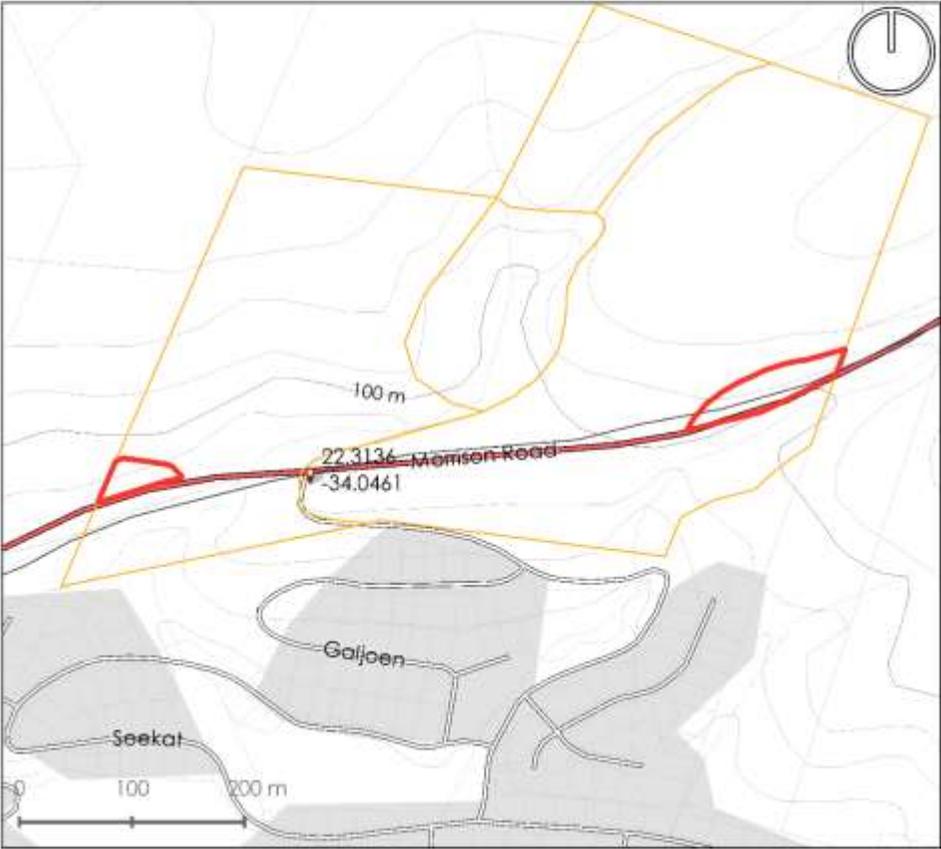
6.14.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.15 Hoogekraal: Management Unit HO04



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 17. Management unit HO04, Hoogekraal site

6.15.1 Description

Locality

The Hoogekraal site is located in Glentana, east of Great Brak. Morrison Road (MR00348) traverses the site. HO04 has two parts, with a total extent of 0.6 ha. HO04 includes the two steeply sloped areas above Morrison Road at the western and eastern boundaries of the Hoogekraal site. It can be accessed from Morrison Road, with special equipment.

Topography

The MU has very steep terrain, with cliffs in places. Special equipment will be required for access.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.15.2 Invasive species and densities

Woody alien invasive species are found above and on the cliffs that make up the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Scattered	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Moderate	Adult

6.15.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.15.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.15.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.15.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and Spray	Remove from site
	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Remove from site
	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Remove from site

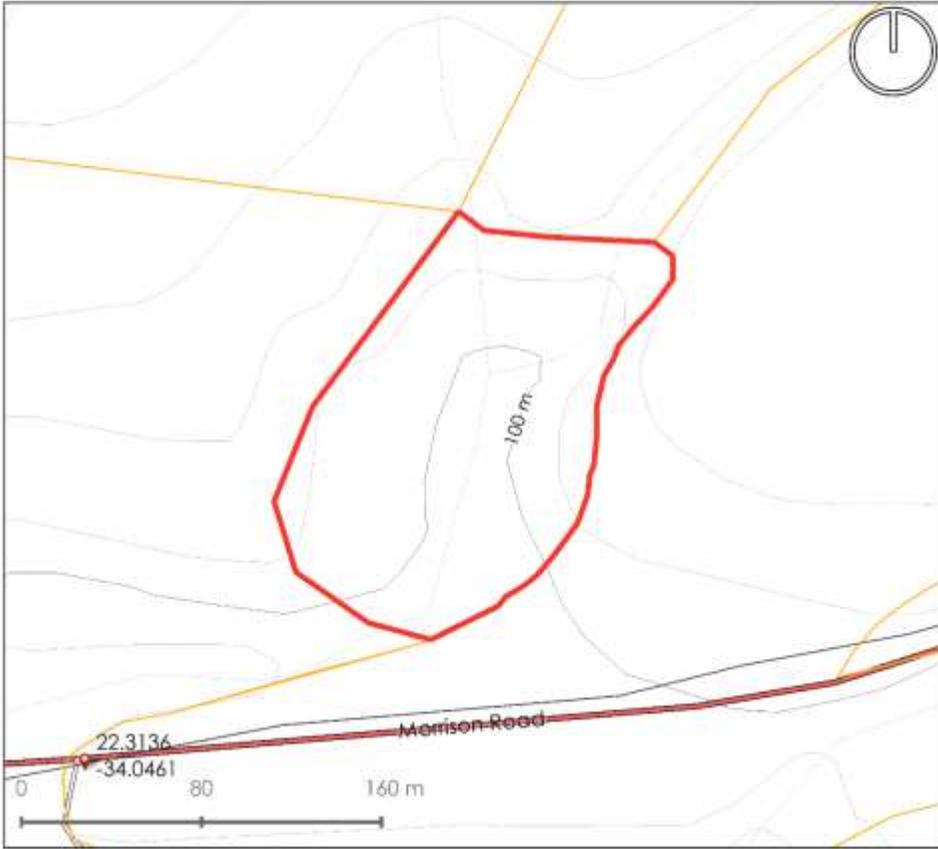
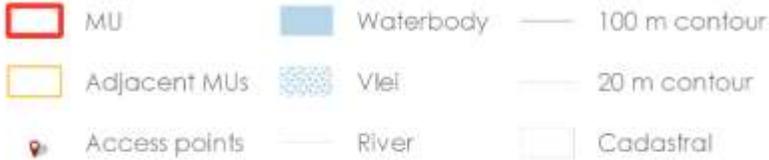
6.15.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.15.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.16 Hoogekraal: Management Unit HO05



Map 18. Management unit HO05, Hoogekraal site

6.16.1 Description

Locality

The Hoogekraal site is located in Glentana, east of Great Brak. Morrison Road (MR00348) traverses the site. HO05 is the steep central river valley above Morrison Road. It can be accessed from Morrison Road or the private properties to the north, and may require special equipment. It is 2.4 ha in extent.

Topography

The MU has very steep terrain, with cliffs in places. Special equipment will be required for access.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem. A small watercourse flows through the MU in a southerly direction.

Land uses

None

6.16.2 Invasive species and densities

Woody alien invasive species are evenly distributed in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Few	Young
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Few	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Few	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Few	Young

6.16.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.16.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.16.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.16.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	None
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	None
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	None

6.16.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.16.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.17 Maalgate: Management Unit MA01



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 19. Management unit MA01, Maalgate site

6.17.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA01 is 2.9 ha in extent and located in the northeastern corner of the site.

Topography

The MU is flat, at approximately 160 m in altitude.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.17.2 Invasive species and densities

MA01 is dominated by black wattle *Acacia mearnsii*, with other woody invasives occurring in much lower numbers.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Closed	All
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young

6.17.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.17.4 Previous control efforts

The eastern and northern edges of the MU have been cleared to establish a firebreak.

6.17.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.17.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and Spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for firewood and removed from site
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and Spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use

6.17.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.17.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.18 Maalgate: Management Unit MA02



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 20. Management unit MA02, Maalgate site

6.18.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA02 is 2.7 ha in extent and located near the northeastern corner of the site.

Topography

The MU slopes gently to the south, at approximately 160 m in altitude.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.18.2 Invasive species and densities

MA02 is dominated by black wattle *Acacia mearnsii*, with other woody invasives occurring in much lower numbers.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Closed	All
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young

6.18.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.18.4 Previous control efforts

The eastern edge of the MU has been cleared to establish a firebreak.

6.18.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.18.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for firewood and removed from site
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use

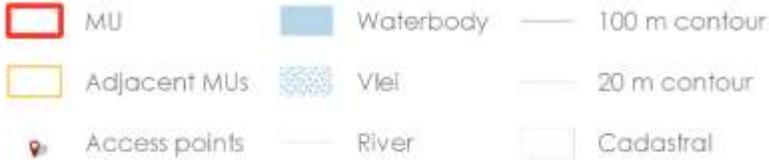
6.18.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.18.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.19 Maalgate: Management Unit MA03



Map 21. Management unit MA03, Maalgate site

6.19.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA03 is 4.6 ha in extent and located near the northeastern corner of the site.

Topography

The MU slopes downward in a southerly direction, from 160 to 140 m altitude.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.19.2 Invasive species and densities

MA03 has relatively lower invasive species densities than adjacent MUs, with *Acacia mearnsii* and *Pinus pinaster* predominating.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Scattered	All
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Scattered	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Few	Adult

6.19.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.19.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.19.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.19.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and Spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for firewood and removed from site
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and Spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material less than 10cm diameter, larger trunks should be cut up for use

6.19.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

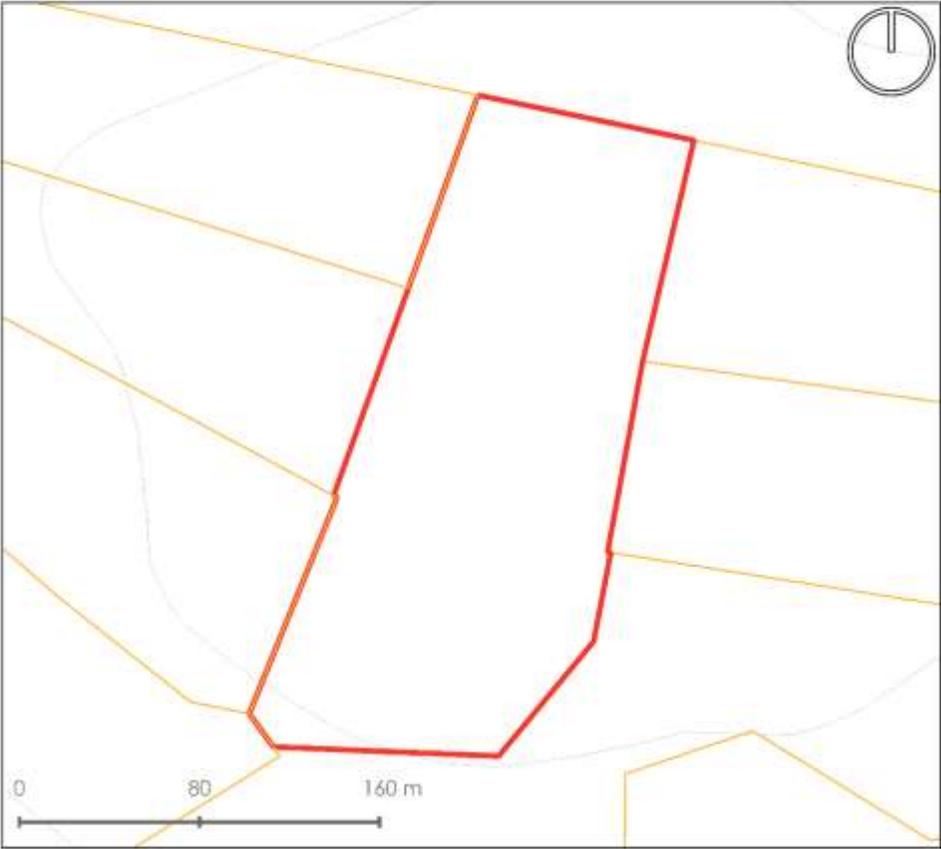
6.19.8 Economic opportunities

Mature wattles and pines may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.20 Maalgate: Management Unit MA04



- MU
- Adjacent MUs
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral
- Access points
- River



Map 22. Management unit MA04, Maalgate site

6.20.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA04 is 4.0 ha in extent and located in the northern central section of the site.

Topography

The MU is flat, at approximately 160 m altitude.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.20.2 Invasive species and densities

MA04 is dominated by a monoculture of black wattle *Acacia mearnsii*.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Closed	All

6.20.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.20.4 Previous control efforts

The northern edge of the MU has been cleared to establish a firebreak.

6.20.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.20.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for firewood and removed from site

6.20.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.20.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.21 Maalgate: Management Unit MA05



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 23. Management unit MA05, Maalgate site

6.21.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA05 is 2.5 ha in extent and located in the northern central section of the site.

Topography

The MU is flat, at approximately 160 m altitude.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.21.2 Invasive species and densities

MA05 is dominated by a monoculture of black wattle *Acacia mearnsii*.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Closed	All

6.21.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.21.4 Previous control efforts

The northern edge of the MU has been cleared to establish a firebreak.

6.21.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.21.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for firewood and removed from site

6.21.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

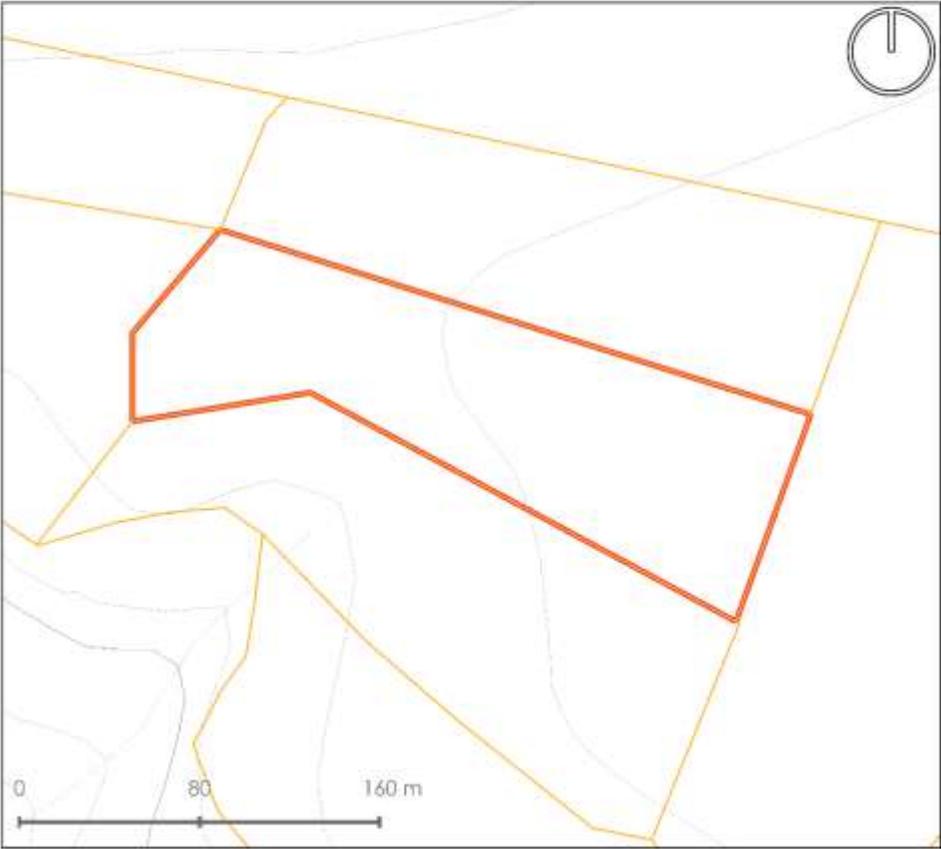
6.21.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.22 Maalgate: Management Unit MA06



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 24. Management unit MA06, Maalgate site

6.22.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA06 is 2.6 ha in extent and located in the northern central section of the site.

Topography

The MU slopes gently downward to the west.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.22.2 Invasive species and densities

MA06 is dominated by a monoculture of black wattle *Acacia mearnsii*.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Closed	All

6.22.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.22.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.22.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.22.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material less than 10cm diameter, larger trunks should be cut up for firewood and removed from site

6.22.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.22.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.23 Maalgate: Management Unit MA07



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 25. Management unit MA07, Maalgate site

6.23.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA07 is 2.6 ha in extent and located in the northern central section of the site.

Topography

The MU slopes gently downward to the southwest.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.23.2 Invasive species and densities

MA07 has a high density of radiata pine, uniformly distributed.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Pinus radiata</i>	Radiata pine	1b / 2	2	High	Adult

6.23.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.23.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.23.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.23.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use

6.23.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

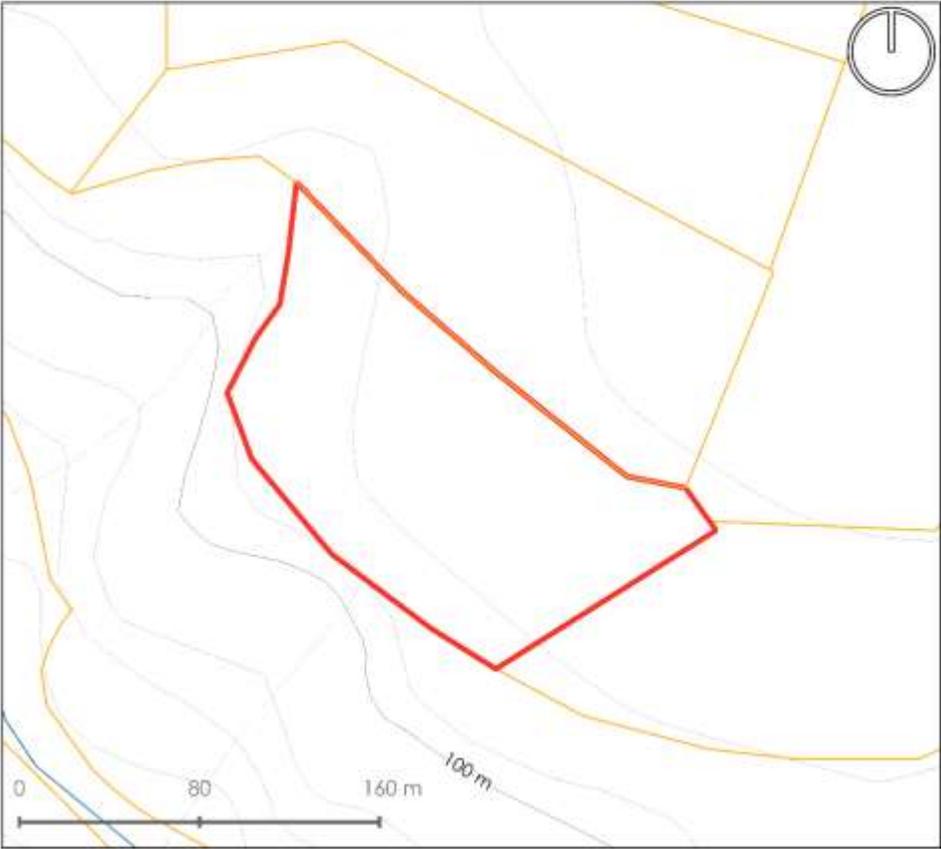
6.23.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.24 Maalgate: Management Unit MA08



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 26. Management unit MA08, Maalgate site

6.24.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA08 is 2.5 ha in extent and located in the northern central section of the site.

Topography

The MU slopes gently downward to the southwest.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.24.2 Invasive species and densities

MA08 has a high density of radiata pine, uniformly distributed.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	High	Adult

6.24.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.24.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.24.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.24.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use

6.24.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.24.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.25 Maalgate: Management Unit MA09



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 27. Management unit MA09, Maalgate site

6.25.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA09 is 2.4 ha in extent and located in the northwestern part of the site.

Topography

The MU slopes gently downward to the west.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.25.2 Invasive species and densities

MA09 has a high density of radiata pine, uniformly distributed. Other woody invasive species occur amongst the pines.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	High	Adult

6.25.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.25.4 Previous control efforts

Past efforts to control invasive species in the MU include the clearing of a firebreak along the northern boundary in 2018 (pers comm. GRDM EPWP manager).

6.25.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.25.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use

6.25.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.25.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.26 Maalgate: Management Unit MA10



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 28. Management unit MA10, Maalgate site

6.26.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA10 is 3.2 ha in extent and located in the northwestern part of the site.

Topography

The MU slopes gently downward to the west.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem.

Land uses

None

6.26.2 Invasive species and densities

MA10 has a high density of radiata pine, uniformly distributed. Other woody invasive species occur amongst the pines.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	High	Adult

6.26.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.26.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.26.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.26.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip any cut material smaller than 10cm, larger trunks can be removed from site for use

6.26.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

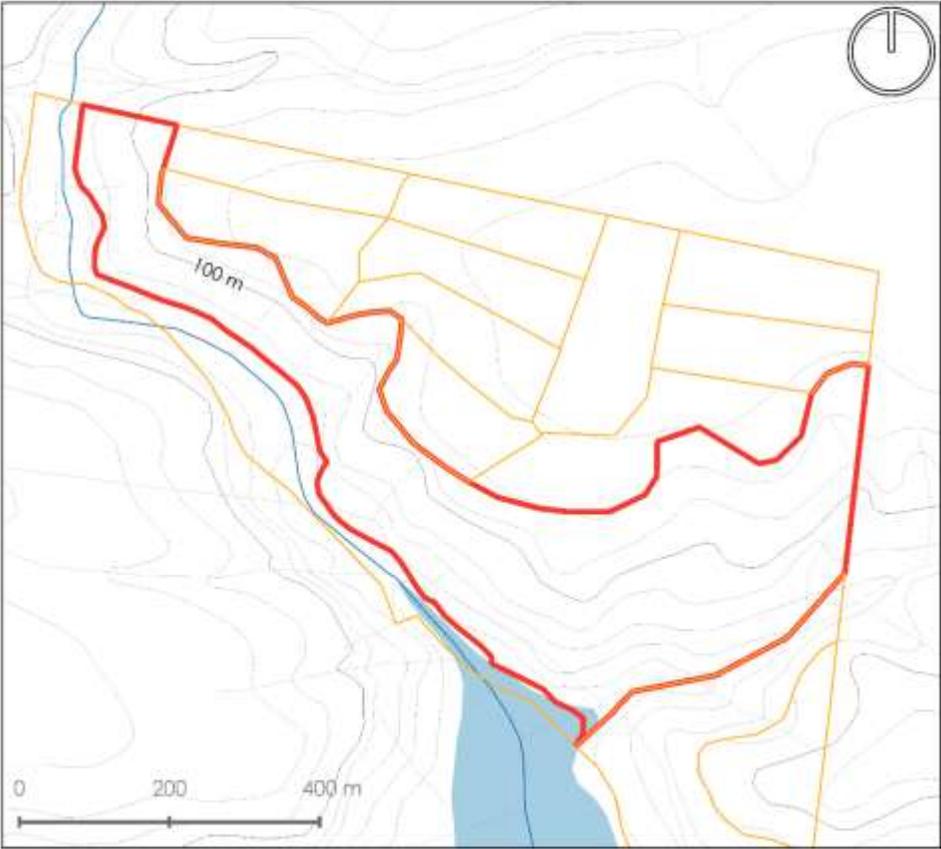
6.26.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.27 Maalgate: Management Unit MA11



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 29. Management unit MA11, Maalgate site

6.27.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA11 is 28.0 ha in extent and located along the steeper slopes on the northern part of the site. Access may require special equipment.

Topography

The MU slopes steeply downward to the south from a high point of 160 m to near sea-level at the Maalgate River and its tributaries. Access will require special equipment and training.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem. It supports Afromontane forest along the two rivers that fall within or adjacent to the MU.

Land uses

None

6.27.2 Invasive species and densities

MA11 supports indigenous forest in good condition, although the northwestern parts of the MU in particular are invaded by various alien tree species.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Moderate	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Adult

6.27.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium



This MU has difficult terrain and is likely to require rope access

6.27.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.27.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.27.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Ensure cut material is kept out of the flood zone
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Ensure cut material is kept out of the flood zone
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Ensure cut material is kept out of the flood zone
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Ensure cut material is kept out of the flood zone

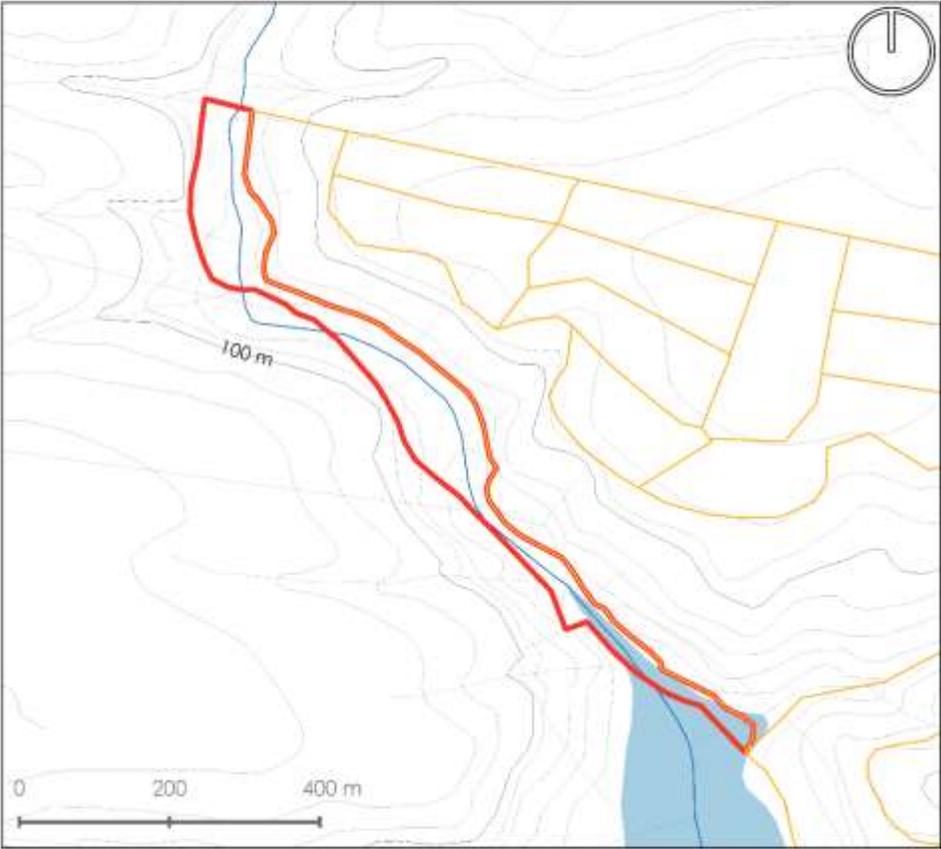
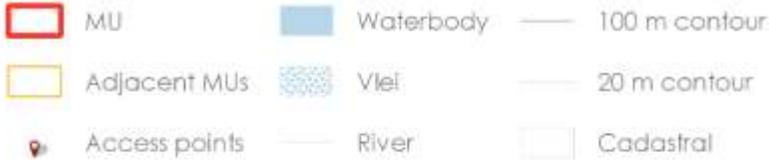
6.27.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.27.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.28 Maalgate: Management Unit MA12



Map 30. Management unit MA12, Maalgate site

6.28.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA12 is 7.1 ha in extent and includes the banks and channel of the Maalgate River. Access may require special equipment.

Topography

The MU follows the course of the Maalgate River. Banks are steep, with high cliffs in places. Access will require special equipment and training.

Sensitivities

The MU is in the Endangered Garden Route Granite Fynbos ecosystem, and follows the course of the Maalgate River. Indigenous forest occurs in the riparian area.

Land uses

None

6.28.2 Invasive species and densities

Woody alien invasive tree species occur in high densities along the banks of the Maalgate River. Within the channel and riparian area a variety of herbaceous species have established. The aquatic invasive water hyacinth *Eichhornia crassipes* was found in one location within the river.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	High	All
Plants	<i>Eichhornia crassipes</i>	Water hyacinth	1b	1	Few	Adult
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	1b here	nl	Few	Adult
Plants	<i>Sesbania punicea</i>	Red Sesbania	1b	1	Occasional	Adult
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Occasional	Adult
Plants	<i>Solanum pseudocapsicum</i>	Jerusalem cherry	1b	nl	Few	Adult

6.28.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Unknown
Freshwater fish	<i>Micropterus dolomieu</i>	Smallmouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus salmoides</i>	Largemouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus punctulatis</i>	Spotted bass	3 here	n/a	Unknown

6.28.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.28.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Eichhornia crassipes</i>	Water hyacinth	Local extirpation	Within two years	GRDM EPWP
<i>Pennisetum clandestinum</i>	Kikuyu	Local extirpation	Within five years	GRDM EPWP
<i>Sesbania punicea</i>	Red Sesbania	Local extirpation	Within five years	GRDM EPWP
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP
<i>Solanum pseudocapsicum</i>	Jerusalem cherry	Local extirpation	Within five years	GRDM EPWP
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Anas platyrhynchos</i>	Mallard	Mallard	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Micropterus dolomieu</i>	Smallmouth bass	No new introductions	n/a	n/a
<i>Micropterus salmoides</i>	Largemouth bass	No new introductions	n/a	n/a
<i>Micropterus punctulatis</i>	Spotted bass	No new introductions	n/a	n/a

6.28.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and Spray	Stack out of the flood zone
Plants	<i>Eichhornia crassipes</i>	Water hyacinth	Physically remove from River	Stack out of the flood zone
Plants	<i>Pennisetum clandestinum</i>	Kikuyu		
Plants	<i>Sesbania punicea</i>	Red Sesbania	Handpull, or Cut Stump and spray for plants that are too large for handpulling	Stack out of the flood zone
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut Stump and spray	Stack out of the flood zone
Plants	<i>Solanum pseudocapsicum</i>	Jerusalem cherry	Handpull	Stack out of the flood zone

6.28.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.28.8 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation, together with the difficulty of access, means that the value is likely to be low.

6.29 Maalgate: Management Unit MA13



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 31. Management unit MA13, Maalgate site

6.29.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA13 is 17.5 ha in extent and includes the steep slopes along the eastern edge of the Maalgate lagoon. Access may require special equipment.

Topography

The MU includes the cliffs and steep slopes that make up the eastern side of the Maalgate estuary. Access will require special equipment and training.

Sensitivities

The MU includes two Endangered ecosystems; Garden Route Granite Fynbos and Groot Brak Dune Strandveld. The Maalgate estuary is located immediately west of the MU.

Land uses

None

6.29.2 Invasive species and densities

Woody alien invasive tree species occur fairly uniformly in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Occasional	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Young

6.29.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.29.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.29.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.29.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	As far as possible, keep cut material out of the river
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut Stump	As far as possible, keep cut material out of the river
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	As far as possible, keep cut material out of the river
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	As far as possible, keep cut material out of the river

6.29.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.29.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.30 Maalgate: Management Unit MA14



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 32. Management unit MA14, Maalgate site

6.30.1 Description

Locality

The Maalgate site (also known as Brakfontein) is located approximately 4 km west of Herold's Bay, and 3 km south of the George Airport. It is accessed from MR00347, across private property. MA14 is 7.8 ha in extent and includes the upper slopes of the southern section of the site, nearest the coast.

Topography

The MU slopes downward toward the estuary, but is accessible without special equipment.

Sensitivities

The MU includes two Endangered ecosystems; Garden Route Granite Fynbos and Groot Brak Dune Strandveld. The Maalgate estuary is located west of the MU.

Land uses

None

6.30.2 Invasive species and densities

Woody alien invasive tree species occur fairly uniformly in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plant	<i>Acacia cyclops</i>	Rooikrans	1b	2	High	Adult
Plant	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Adult
Plant	<i>Hakea sericea</i>	Silky Hakea	1b	1	Occasional	Adult
Plant	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Adult
Plant	<i>Pinus radiata</i>	Radiata pine	1b here	2	Scattered	Adult

6.30.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.30.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.30.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.30.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	In densely infested areas, chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	In densely infested areas, chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut Stump	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	In densely infested areas, chip any cut material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	In densely infested areas, chip any cut material smaller than 10cm, larger trunks can be removed from site for use

6.30.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

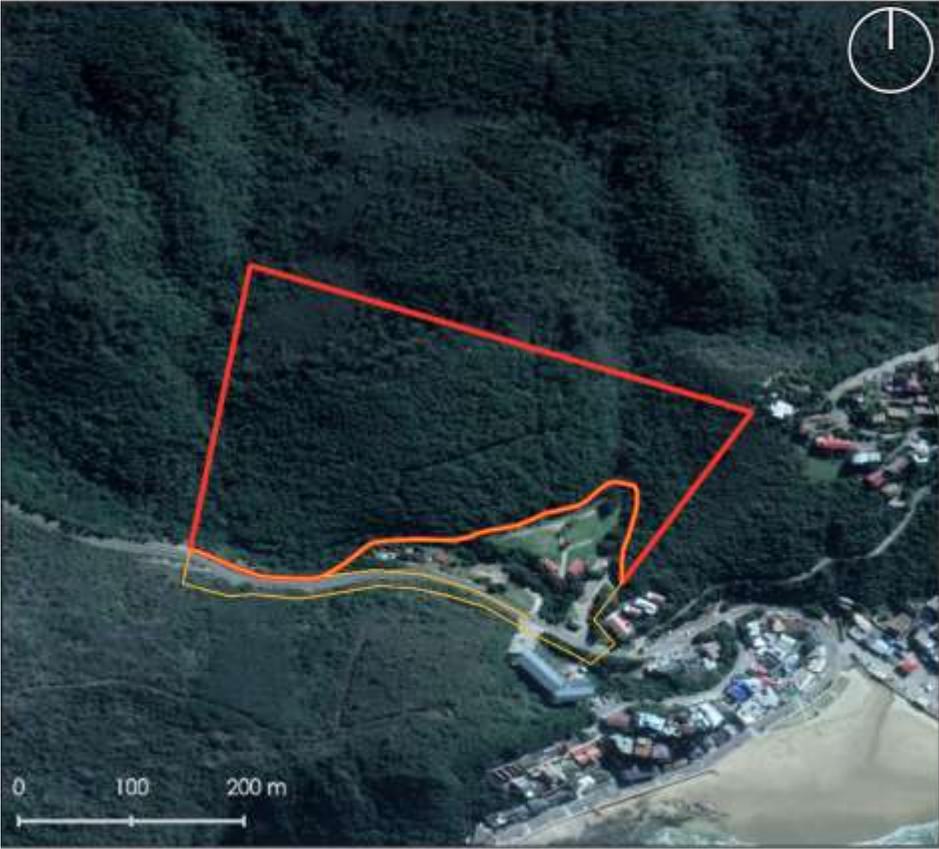
6.30.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.31 Herolds Bay: Management Unit HB01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 33. Management unit HB01, Herolds Bay site

6.31.1 Description

Locality

The Herolds Bay site is located in Herold's Bay, and incorporates the municipal campsite and adjacent hillside. It is accessed from the Herolds Bay road (MR00347). HB01 is 9.7 ha in extent and includes the slopes on the northern part of the site.

Topography

The MU slopes downward toward the municipal campsite. Its highest point is on the northern boundary at 100 m above sea level, and its lowest at the campsite, 20 m above sea level.

Sensitivities

The MU includes two Endangered ecosystems. Much of the MU is mapped as Garden Route Granite Fynbos (although it actually supports forest and coastal scrub over much of its extent), while the valley nearest the road is mapped as Groot Brak Dune Strandveld. Two watercourses flow across the MU.

Land uses

A servitude for a powerline crosses the MU above the campsite. The municipal campsite and Herolds Bay Road are adjacent to the MU.

6.31.2 Invasive species and densities

A few individuals of woody alien invasive tree species occur in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Few	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Few	Adult

6.31.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.31.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.31.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP

6.31.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Remove from river/stream by 30metres
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and Spray	Remove from river/stream by 30 metres
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Cut trees should be debranched

6.31.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

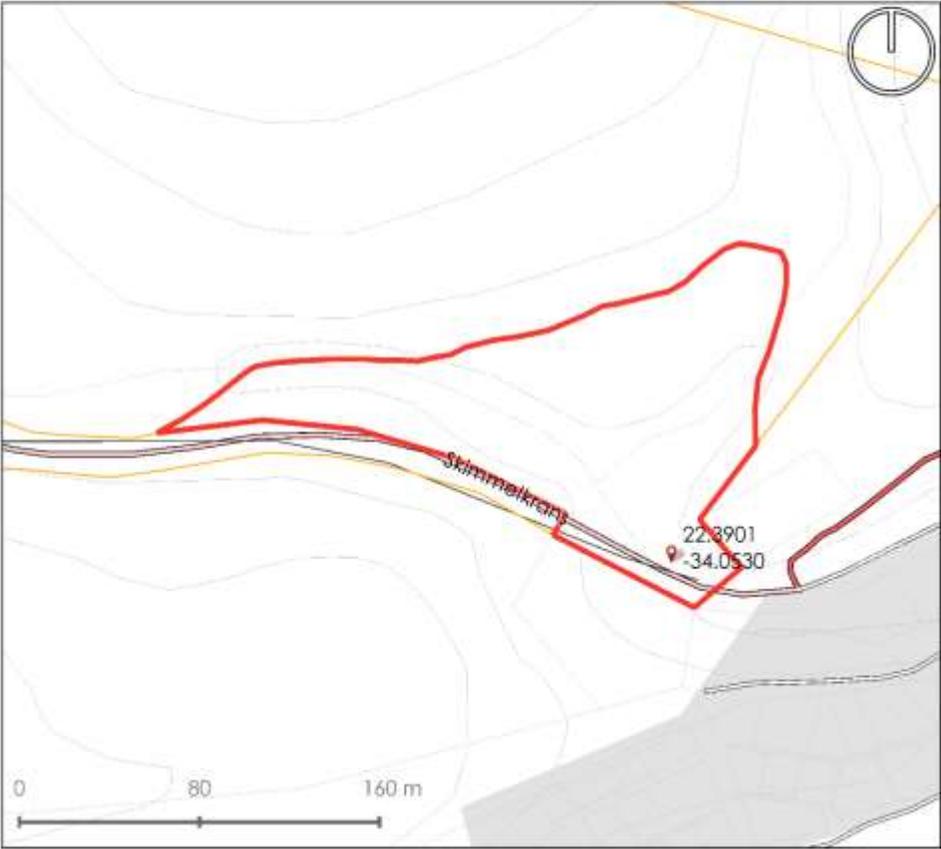
6.31.8 Economic opportunities

None identified.

6.32 Herolds Bay: Management Unit HB02



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- 📍 Access points
- River
- Cadastral



Map 34. Management unit HB02, Herolds Bay site

6.32.1 Description

Locality

The Herolds Bay site is located in Herold's Bay, and incorporates the municipal campsite and adjacent hillside. It is accessed from the Herolds Bay road (MR00347). HB02 is 2.1 ha in extent, and includes the campsite and adjacent buildings.

Topography

The MU is largely flat, at 20 m above sea level. The coast is less than 200 m to the south.

Sensitivities

The MU would historically have supported two Endangered ecosystems (Garden Route Granite Fynbos and Groot Brak Dune Strandveld), although it is largely transformed by development. Two watercourses flow across the MU.

Land uses

The municipal campsite and other municipal structures take up much of the MU.

6.32.2 Invasive species and densities

Alien invasive species in the MU include the trees planted for shade in the campsite, as well as various weedy species in the adjacent watercourses and along the roadside.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Adult
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Occasional	Adult
Plants	<i>Arundo donax</i>	Spanish reed	1b	1	Few	Adult
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	nl here	2	Few	Adult
Plants	<i>Melia azedarach</i>	Syringa	3 here	3	Few	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Adult
Plants	<i>Opuntia monacantha</i>	Drooping prickly pear	1b	1	Few	Adult
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	nl here	nl	Occasional	Adult
Plants	<i>Ricinus communis</i>	Castor-oil plant	2	2	Few	Adult
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Occasional	Adult

Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult
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6.32.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.32.4 Previous control efforts

There has been ad hoc clearing carried out by campsite staff, particularly of Rooikrans *Acacia cyclops*, which was not observed during the survey suggesting that control efforts have been effective (per comm, campsite manager).

6.32.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Anredera cordifolia</i>	Madeira vine	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Arundo donax</i>	Spanish reed	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Eucalyptus camaldulensis</i>	River red gum	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Melia azedarach</i>	Syringa	Local extirpation	Within 10 years to allow replacement shade trees to establish	GRDM EPWP or resort staff
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Opuntia monocantha</i>	Drooping prickly pear	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Pennisetum clandestinum</i>	Kikuyu	n/a	n/a	n/a

<i>Ricinus communis</i>	Castor-oil plant	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.32.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	Remove from site
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut Stump and spray	None
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut stump and Spray	Place all plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred then it will be dead and can be used as very good quality compost.
Plants	<i>Arundo donax</i>	Spanish reed	Cut Stump and spray	Remove from site
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	Cut Stump and spray	Remove any cut material below 10cm, larger trunks can be removed for use
Plants	<i>Melia azedarach</i>	Syringa	Cut Stump and spray	Remove
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut Stump	Remove
Plants	<i>Opuntia monacantha</i>	Drooping prickly pear	Foliar spray	None
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	Leave	
Plants	<i>Ricinus communis</i>	Castor-oil plant	Cut Stump and spray	Remove
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut Stump and spray	Remove
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

6.32.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species, ensuring that category 3 species have not reproduced or spread.
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

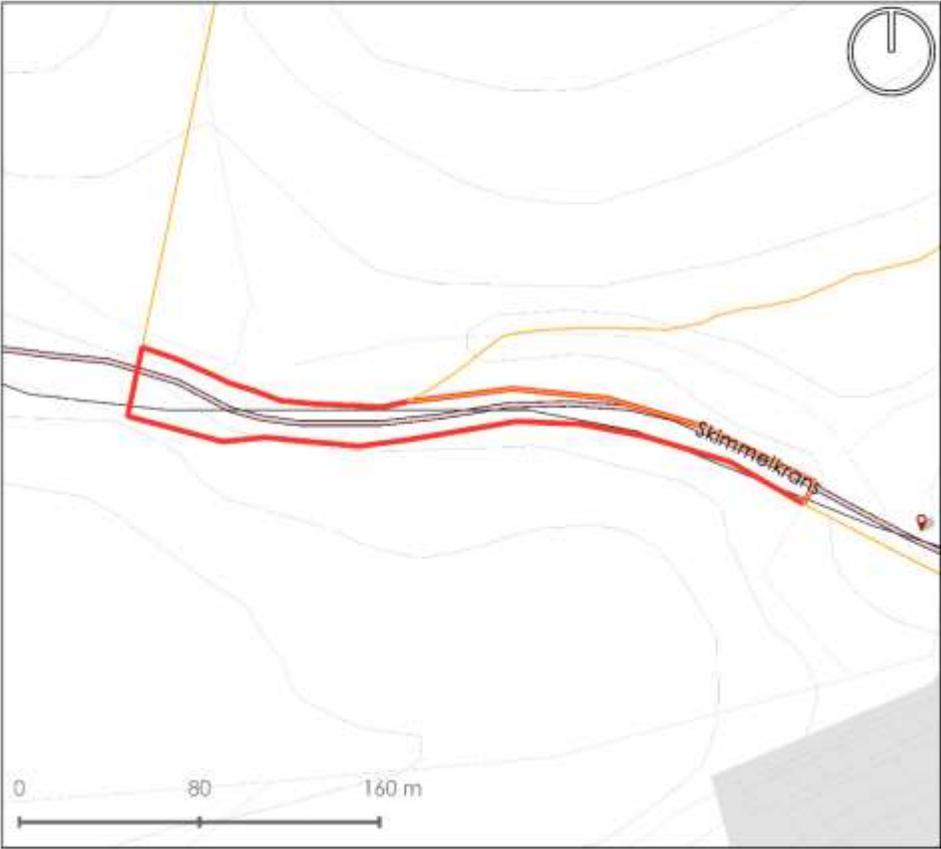
6.32.8 Economic opportunities

None identified.

6.33 Herolds Bay: Management Unit HB03



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 35. Management unit HB03, Herolds Bay site

6.33.1 Description

Locality

The Herolds Bay site is located in Herold's Bay, and incorporates the municipal campsite and adjacent hillside. It is accessed from the Herolds Bay road (MR00347). HB03 is 0.6 ha in extent and includes the steep slopes and cliffs adjacent to the Herolds Bay Road.

Topography

The MU is steeply sloping, and access requires special equipment and training.

Sensitivities

The MU would historically have supported two Endangered ecosystems (Garden Route Granite Fynbos and Groot Brak Dune Strandveld), although it is largely transformed by development. Two watercourses flow across the MU.

Land uses

The municipal campsite and other municipal structures take up much of the MU.

6.33.2 Invasive species and densities

Alien invasive species in the MU are limited to the woody *Acacia* species established on the cliffs.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Young
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Scattered	Young

6.33.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.33.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.33.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP or resort staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.33.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Remove
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Remove

6.33.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species, ensuring that category 3 species have not reproduced or spread.
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

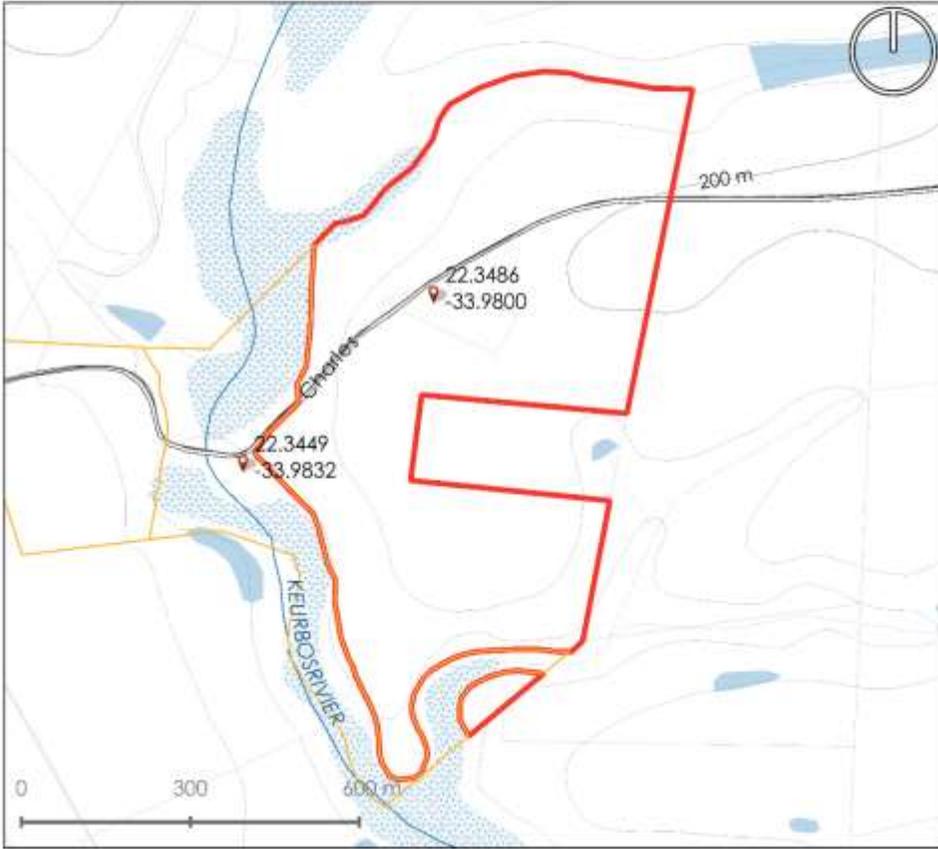
6.33.8 Economic opportunities

None identified.

6.34 Moerasrivier: Management Unit MR01



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 36. Management unit MR01, Moerasrivier site

6.34.1 Description

Locality

The Moerasriveier site is located in Geelhoutboom approximately 2.5 km north-west of the George Airport. It is accessed from the Grootbrakrivier Road (DR01599) off the R404. MR01 is 60.3 ha in extent and includes the agricultural areas on the eastern part of the site.

Topography

The MU is gently sloping, occurring between 160 and 200 m altitude.

Sensitivities

The MU would historically have supported the Endangered Garden Route Granite Fynbos ecosystem, although it is largely transformed by agricultural uses and mining. The Keurbos River flows immediately west of the MU in a broad floodplain with associated wetlands.

Land uses

The site is used for agriculture, primarily planted pastures. A gravel borrowpit is located centrally on the MU.

6.34.2 Invasive species and densities

Woody alien invasives occur along the western boundary of the site and along the roads.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Moderate	Adult
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	1b here	2	Occasional	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Occasional	Adult
Plants	<i>Lantana camara</i>	Lantana	1b	1	Few	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Adult

6.34.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Harmonia axyridis</i>	Asian ladybeetle	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aplexa marmorata</i>	Marbled tadpole snail	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Low

6.34.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.34.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Casuarina cunninghamiana</i>	Beefwood	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Lantana camara</i>	Lantana	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Harmonia axyridis</i>	Asian ladybeetle	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aplexa marmorata</i>	Marbled tadpole snail	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Anas platyrhynchos</i>	Mallard	Mallard	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.34.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip cut material smaller than 10cm diameter, larger trunks can be removed for use
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	Cut Stump and spray	Chip cut material smaller than 10cm diameter, larger trunks can be removed for use
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	Remove from site and burn if flowering heads are mature
Plants	<i>Lantana camara</i>	Lantana	Handpull	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip cut material smaller than 10cm, larger trunks can be removed for use

6.34.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.34.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.35 Moerasrivier: Management Unit MR02



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- 📍 Access points
- River
- Cadastral



Map 37. Management unit MR02, Moerasrivier site

6.35.1 Description

Locality

The Moerasriveier site is located in Geelhoutboom approximately 2.5 km north-west of the George Airport. It is accessed from the Grootbrakrivier Road (DR01599) off the R404. MR02 is 13.1 ha in extent and includes the agricultural areas west of the Keurbos river.

Topography

The MU is gently sloping, occurring between 160 and 200 m altitude.

Sensitivities

The MU would historically have supported the Endangered Garden Route Granite Fynbos ecosystem, although it is largely transformed by agricultural uses. The Keurbos River flows immediately east of the MU in a broad floodplain with associated wetlands.

Land uses

The site is used for agriculture, primarily planted pastures.

6.35.2 Invasive species and densities

A variety of invasive plant species are present along the roads on this MU, and occur in thick stands in the riparian area.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Scattered	Adult
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Occasional	Young
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Few	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Occasional	Adult
Plants	<i>Opuntia monacantha</i>	Drooping prickly pear	1b	1	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b	2	Occasional	Adult
Plants	<i>Populus canescens</i>	Grey Poplar	2	2	Occasional	Adult
Plants	<i>Ricinus communis</i>	Castor-oil plant	2	2	Few	Adult
Plants	<i>Sambucus nigra</i>	Elder	1b	nl	Few	Adult
Plants	<i>Solanum pseudocapsicum</i>	Jerusalem cherry	1b	nl	Few	Adult
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult

6.35.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Harmonia axyridis</i>	Asian ladybeetle	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aplexa marmorata</i>	Marbled tadpole snail	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Low

6.35.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.35.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle			
<i>Acacia melanoxylon</i>	Blackwood			
<i>Anredera cordifolia</i>	Madeira vine			
<i>Cirsium vulgare</i>	Scotch thistle			
<i>Opuntia monacantha</i>	Drooping prickly pear			
<i>Pinus radiata</i>	Radiata pine			
<i>Populus canescens</i>	Grey Poplar			
<i>Ricinus communis</i>	Castor-oil plant			
<i>Sambucus nigra</i>	Elder			
<i>Solanum pseudocapsicum</i>	Jerusalem cherry			
<i>Verbena bonariensis</i>	Purple top			
<i>Harmonia axyridis</i>	Asian ladybeetle	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aplexa marmorata</i>	Marbled tadpole snail	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Anas platyrhynchos</i>	Mallard	Mallard	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.35.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut stump and spray	In areas of dense infestation, Chip cut material smaller than 10cm in diameter, larger trunks can be removed from site for use.
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut stump and spray	In areas of dense infestation, Chip cut material smaller than 10cm in diameter, larger trunks can be removed from site for use.
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut Stump and spray	Place all plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred then it will be dead and can be used as very good quality compost.
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	Remove from site and burn if flowering heads are mature
Plants	<i>Opuntia monacantha</i>	Drooping prickly pear	Foliar spray	None
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	In areas of dense infestation, Chip cut material smaller than 10cm in diameter, larger trunks can be removed from site for use.
Plants	<i>Populus canescens</i>	Grey Poplar	Cut Stump and spray	In areas of dense infestation, Chip cut material smaller than 10cm in diameter, larger trunks can be removed from site for use.
Plants	<i>Ricinus communis</i>	Castor-oil plant	Cut Stump and spray	None
Plants	<i>Sambucus nigra</i>	Elder	Cut Stump	None
Plants	<i>Solanum pseudocapsicum</i>	Jerusalem cherry	Handpull	None
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

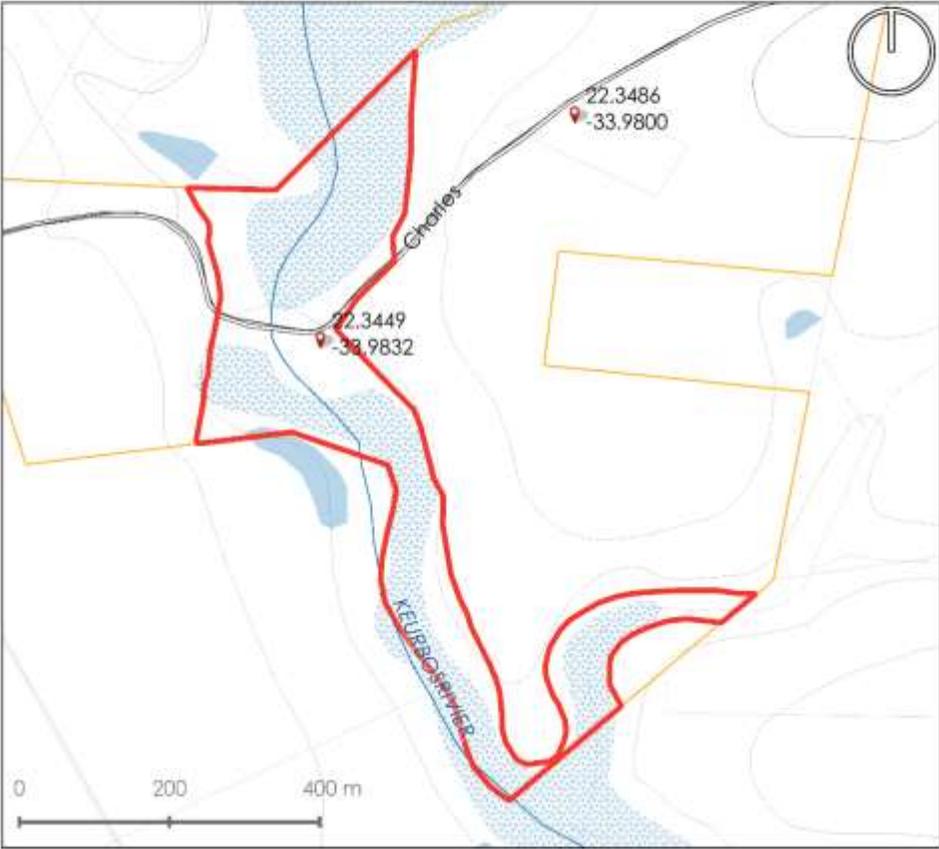
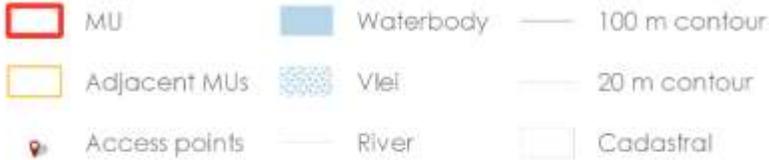
6.35.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.35.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.36 Moerasrivier: Management Unit MR03



Map 38. Management unit MR03, Moerasrivier site

6.36.1 Description

Locality

The Moerasriveier site is located in Geelhoutboom approximately 2.5 km north-west of the George Airport. It is accessed from the Grootbrakrivier Road (DR01599) off the R404. MR03 is 17.9 ha in extent and includes the Keurbos River and its floodplain wetlands.

Topography

The MU is largely flat, at 160 m altitude.

Sensitivities

The MU supports the Critically Endangered Cape Lowland Alluvial Vegetation ecosystem, with floodplain wetlands in reasonably good condition. The Keurbos River flows immediately through the MU in a broad floodplain with associated wetlands.

Land uses

None. The surrounding areas are planted pastures.

6.36.2 Invasive species and densities

A variety of invasive plant species are present along the roads on this MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Adult
Plants	<i>Paraserianthes lophantha</i>	Stinkbean	1b	1	Occasional	Adult
Plants	<i>Phytolacca octandra</i>	Forest inkberry	1b	nl	Moderate	Adult
Plants	<i>Populus canescens</i>	Grey Poplar	2	2	Moderate	Adult

6.36.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Harmonia axyridis</i>	Asian ladybeetle	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aplexa marmorata</i>	Marbled tadpole snail	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Low

6.36.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.36.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Paraserianthes lophantha</i>	Stinkbean	Local extirpation	Within five years	GRDM EPWP
<i>Phytolacca octandra</i>	Forest inkberry	Local extirpation	Within five years	GRDM EPWP
<i>Populus canescens</i>	Grey Poplar	Local extirpation	Within five years	GRDM EPWP
<i>Harmonia axyridis</i>	Asian ladybeetle	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aplexa marmorata</i>	Marbled tadpole snail	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Anas platyrhynchos</i>	Mallard	Mallard	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.36.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip cut material smaller than 10cm in diameter, larger trunks can be removed from site for use. No large material should be left within the flood zone.
Plants	<i>Paraserianthes lophantha</i>	Stinkbean	Cut Stump and spray	None
Plants	<i>Phytolacca octandra</i>	Forest inkberry	Handpull	Remove from site
Plants	<i>Populus canescens</i>	Grey Poplar	Cut Stump and Spray	Chip cut material smaller than 10cm in diameter, larger trunks can be removed from site for use. No large material should be left within the flood zone.

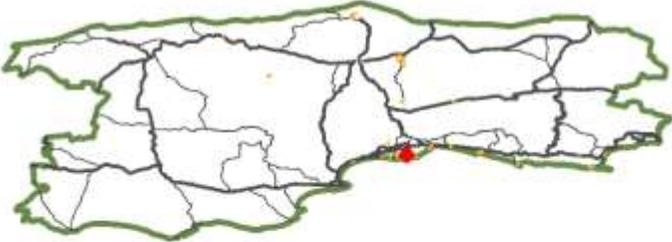
6.36.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.36.8 Economic opportunities

None identified.

6.37 Gwaing Hansmoeskraal: Management Unit GW01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 39. Management unit GW01, Gwaing Hansmoeskraal site

6.37.1 Description

Locality

The Gwaing site is located south of Pacaltsdorp in George, and northeast of Oubaai. It extends from the minor road OP06882 south to the Gwaing estuary. GW01 is the northern part of the site, and is largely flat pasture. It is 40.0 ha in extent.

Topography

The MU is largely flat, at 180 m altitude.

Sensitivities

The MU would historically have been within the Endangered Garden Route Granite Fynbos ecosystem, but is largely transformed by agricultural use.

Land uses

The MU is used for grazing of livestock.

6.37.2 Invasive species and densities

Invasive plant species are present on this MU occur primarily along the southern and northern edges.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Young
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Occasional	Young
Plants	<i>Psidium guajava</i>	Guava	nl	2	Few	Adult
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult

6.37.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Harmonia axyridis</i>	Asian ladybeetle	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aplexa marmorata</i>	Marbled tadpole snail	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Low

6.37.4 Previous control efforts

Clearing of invasive trees is apparent along the southern boundary, with material stacked in windrows.

6.37.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Psidium guajava</i>	Guava	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Anas platyrhynchos</i>	Mallard	Mallard	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Harmonia axyridis</i>	Asian ladybeetle	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aplexa marmorata</i>	Marbled tadpole snail	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.37.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	None
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	None
Plants	<i>Psidium guajava</i>	Guava	Cut Stump and spray	None
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

6.37.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.37.8 Economic opportunities

Continued use of the existing agricultural areas in the MU.

6.38 Gwaing Hansmoeskraal: Management Unit GW02



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 40. Management unit GW02, Gwaing Hansmoeskraal site

6.38.1 Description

Locality

The Gwaing site is located south of Pacaltsdorp in George, and northeast of Oubaai. It extends from the minor road OP06882 south to the Gwaing estuary. GW02 is the eastern part of the site, and slopes downward from the planted pastures that make up the northern part of the site. It is 13.6 ha in extent.

Topography

The MU slopes downward to the south, between 180 and 140 m altitude.

Sensitivities

The MU would historically have supported the Endangered Groot Brak Dune Strandveld ecosystem, but is heavily impacted by invasive alien plant species.

Land uses

None.

6.38.2 Invasive species and densities

Woody invasive alien *Acacias* occur densely throughout the MU, with other species scattered throughout.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	High	All
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Occasional	Adult
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	1b here	2	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Scattered	Adult

6.38.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. The northeastern corner appears to have been cleared of large invasive alien trees.

6.38.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus camaldulensis</i>	River red gum	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP

6.38.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	Cut Stump and spray	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site

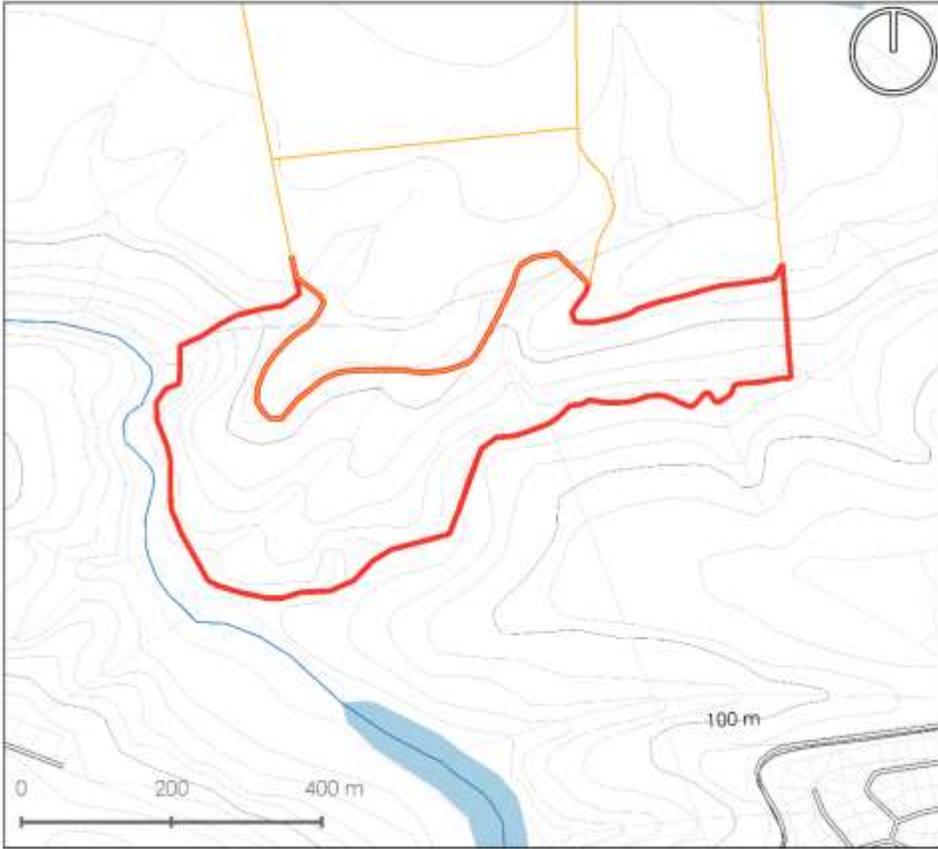
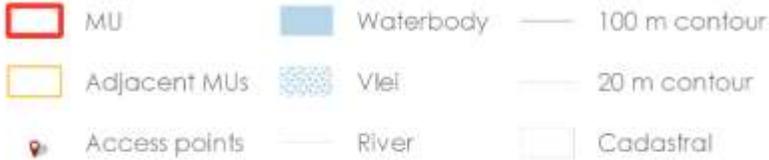
6.38.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.38.7 Economic opportunities

Mature wattles and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.39 Gwaing Hansmoeskraal: Management Unit GW03



Map 41. Management unit GW03, Gwaing Hansmoeskraal site

6.39.1 Description



This MU has difficult terrain and is likely to require rope access

Locality

The Gwaing site is located south of Pacaltsdorp in George, and northeast of Oubaai. It extends from the minor road OP06882 south to the Gwaing estuary. GW03 is the southernmost part of the site. It is 21.0 ha in extent.

Topography

The MU slopes steeply downward to the south, where a tributary of the Gwaing forms the southern boundary. The MU is situated between sea level and 100 m altitude. Access to the MU is likely to require special equipment and training.

Sensitivities

The western parts of the MU would historically have supported the Endangered Groot Brak Dune Strandveld and Garden Route Granite Fynbos ecosystems, but is heavily impacted by invasive alien plant species.

Land uses

None.

6.39.2 Invasive species and densities

Woody invasive alien trees occur throughout the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Scattered	Adult

6.39.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.39.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.39.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Ensure cut material is not smothering indigenous vegetation
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump and spray	Ensure cut material is not smothering indigenous vegetation
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump and spray	Ensure cut material is not smothering indigenous vegetation

6.39.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

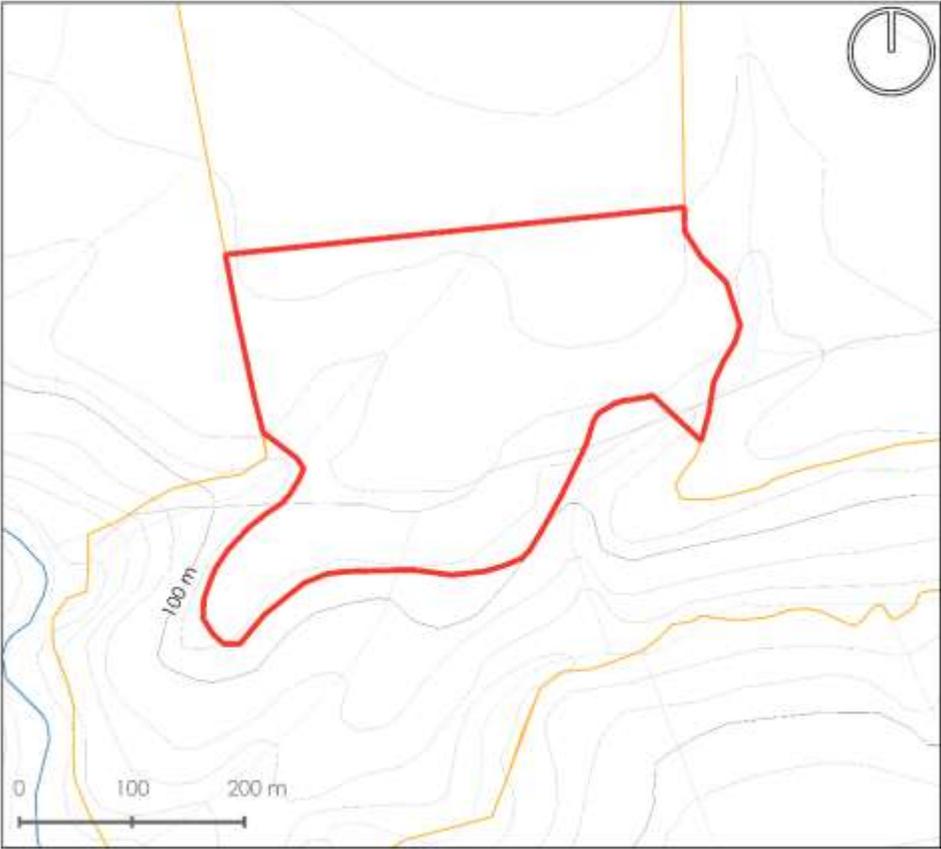
6.39.7 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.40 Gwaing Hansmoeskraal: Management Unit GW04



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 42. Management unit GW04, Gwaing Hansmoeskraal site

6.40.1 Description

Locality

The Gwaing site is located south of Pacaltsdorp in George, and northeast of Oubaai. It extends from the minor road OP06882 south to the Gwaing estuary. GW04 is the western central part of the site. It is 13.0 ha in extent.

Topography

The MU slopes gently downward to the south. The MU is situated between 100 and 160 m altitude.

Sensitivities

The MU would historically have supported the Endangered Groot Brak Dune Strandveld and Garden Route Granite Fynbos ecosystems, but is heavily impacted by invasive alien plant species.

Land uses

None.

6.40.2 Invasive species and densities

Woody invasive alien Acacias occur throughout the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Scattered	Adult

6.40.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Much of the biomass was burned in a recent fire.

6.40.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.40.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site
Plants	<i>Pinus radiata</i>	Radiata pine	Cut stump	In dense areas Chip any cut material smaller than 10cm diameter, larger trunks can be left on site

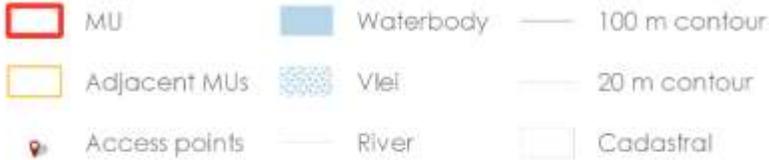
6.40.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.40.7 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.41 Hansmoeskraal coast: Management Unit HK01



Map 43. Management unit HK01, Hansmoeskraal Coast site

6.41.1 Description

Locality

The Hansmoeskraal site is located on the coast south of Pacaltsdorp in George. Access is obtained via Pacaltsdorp Beach Road, DR01595. The site extends along the coast. HK01 is the eastern portion of the site where access on foot is possible. It is 14.6 ha in extent.

Topography

The MU slopes downward to the south and is situated between 60 and 100 m altitude.

Sensitivities

The MU would historically have supported the Endangered Garden Route Granite Fynbos ecosystem. The rocky shoreline lies 50 m from the MU.

Land uses

None.

6.41.2 Invasive species and densities

The MU is dominated by a dense stand of Australian myrtle *Leptospermum laevigatum*. Lower densities of other woody tree species occur throughout.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Young
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Scattered	Young
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Young
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Scattered	Adult
Plants	<i>Leptospermum laevigatum</i>	Australian myrtle	1b	1	High	Adult
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	nl here	nl	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b / 2	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b / 2	2	Occasional	Young

6.41.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.41.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within ten years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Leptospermum laevigatum</i>	Australian myrtle	Local extirpation	Within five years	GRDM EPWP
<i>Pennisetum clandestinum</i>	Kikuyu	n/a	n/a	n/a
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP

6.41.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Chip all cut material
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Chip all cut material
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	Chip all cut material
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut Stump	Chip all cut material
Plants	<i>Leptospermum laevigatum</i>	Australian myrtle	Cut Stump (Initial), Foliar spray (follow up)	Chip all cut material
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	Handpull	Remove from site
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	Chip all cut material
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Chip all cut material

6.41.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.41.7 Economic opportunities

Limited to the sale of firewood from mature rooikrans (*Acacia cyclops*).

6.42 Hansmoeskraal coast: Management Unit HK02



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 44. Management unit HK02, Hansmoeskraal Coast site

6.42.1 Description

Locality

The Hansmoeskraal site is located on the coast south of Pacaltsdorp in George. Access is obtained via Pacaltsdorp Beach Road (DR01595) and through the private Blue Whale resort. The site extends along the coast. HK02 is the steep coastal section of the site where access on foot is not possible. It is 18.8 ha in extent.

Topography

The MU slopes steeply to the shoreline, with rock cliffs in places. Access to much of the site requires special equipment and training.

Sensitivities

The MU would historically have been within the Endangered Garden Route Granite Fynbos ecosystem, but is largely a rocky shoreline.

Land uses

None.

6.42.2 Invasive species and densities

Woody invasive aliens occur in places along the rocky slopes.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young

6.42.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Marine Invertebrates	<i>Mytilus galloprovincialis</i>	Mediterranean mussel	2	n/a	High

6.42.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.42.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Mytilus galloprovincialis</i>	Mediterranean mussel	n/a	n/a	n/a

6.42.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump if smaller than 10cm diameter at ankle height, If larger than 10cm ankle height, frill	None

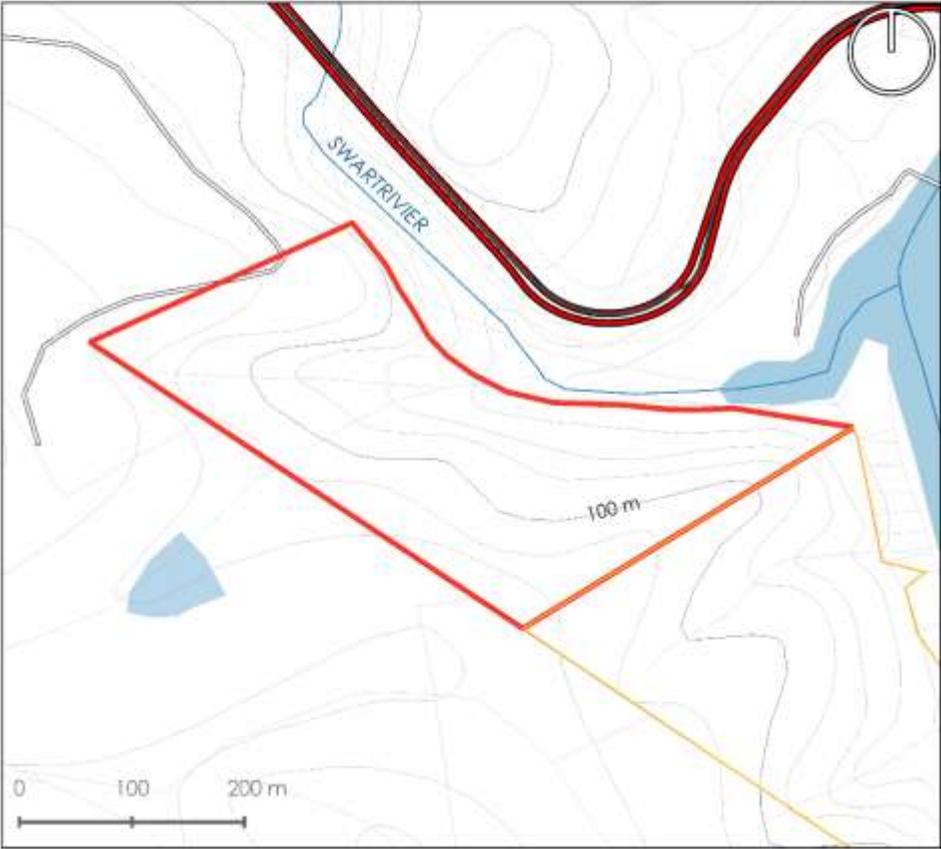
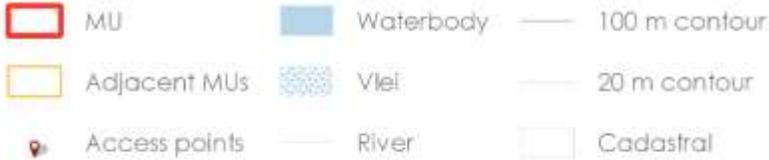
6.42.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.42.8 Economic opportunities

Limited to the sale of firewood from mature rooikrans (*Acacia cyclops*).

6.43 Kraaibosch: Management Unit KR01



Map 45. Management unit KR01, Kraaibosch site

6.43.1 Description

Locality

The site is located at the Kaaimans River Mouth and Victoria Bay beach, between George and Wilderness. KR01 is located along the cliffs above the Swart River, and is 11.1 ha in extent. Access, via the private property known as Denneberghof, will require special equipment and training.

Topography

The MU slopes steeply down to the river, with rock cliffs in places. Access to the site requires special equipment and training.

Sensitivities

The MU is mapped within the Garden Route Shale Fynbos vegetation type, a Vulnerable ecosystem.

Land uses

None.

6.43.2 Invasive species and densities

Woody invasive aliens are distributed evenly within the MU. *Acacia mearnsii* occurs in the highest densities.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Moderate	Adult
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Scattered	Adult

6.43.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.43.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.43.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.43.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray if the plant can be safely cut down with a chainsaw; on ropes the larger trees should be frilled	Chip any accessible material below 10cm diameter, remove any accessible larger trunks material from site for use. Non accessible material should be left in such a way as to prevent it from falling into the gorge below and from causing an erosion problem
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray if the plant can be safely cut down with a chainsaw; on ropes the larger trees should be frilled	Chip any accessible material below 10cm diameter, remove any accessible larger trunks material from site for use. Non accessible material should be left in such a way as to prevent it from falling into the gorge below and from causing an erosion problem
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray if the plant can be safely cut down with a chainsaw; on ropes the larger trees should be frilled	Chip any accessible material below 10cm diameter, remove any accessible larger trunks material from site for use. Non accessible material should be left in such a way as to prevent it from falling into the gorge below and from causing an erosion problem
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump if the plant can be safely cut down with a chainsaw; on ropes the larger trees should be ringbarked	Chip any accessible material below 10cm diameter, remove any accessible larger trunks material from site for use. Non accessible material should be left in such a way as to prevent it from falling into the gorge below and from causing an erosion problem

6.43.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

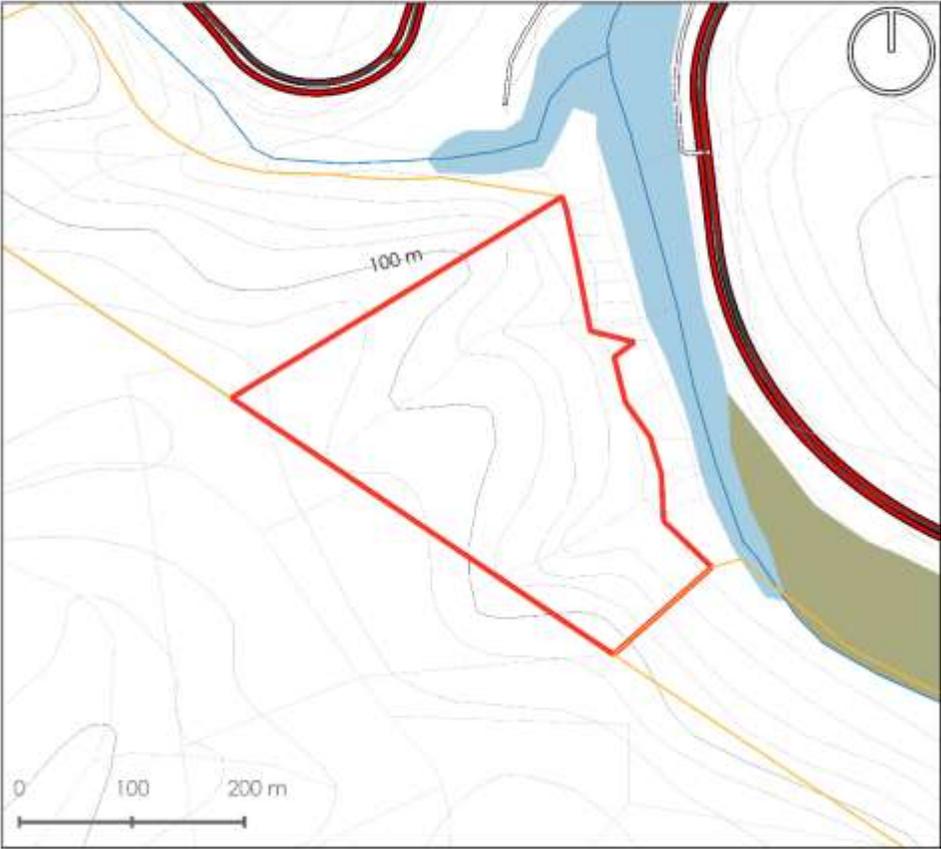
6.43.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The lack of accessibility makes it likely that costs to recover usable wood would be prohibitive.

6.44 Kraaibosch: Management Unit KR02



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 46. Management unit KR02, Kraaibosch site

6.44.1 Description

Locality

The site is located at the Kaaimans River Mouth and Victoria Bay beach, between George and Wilderness. KR02 is located along the cliffs above the Kaaimans River, and is 9.4 ha in extent. Access, via private property in Victoria Heights or from the Kaaimans River, will require special equipment and training.

Topography

The MU slopes steeply down to the river, with rock cliffs in places. Access to the site requires special equipment and training.

Sensitivities

The MU is within the Garden Route Shale Fynbos vegetation type, a Vulnerable ecosystem.

Land uses

None.

6.44.2 Invasive species and densities

Woody invasive aliens are distributed evenly within the MU. *Acacia mearnsii* occurs in the highest densities.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Adult

6.44.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.44.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.44.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.44.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Debranch and stack cut material so as to ensure it does not roll/get blown down into the river below
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	Debranch and stack cut material so as to ensure it does not roll/get blown down into the river below

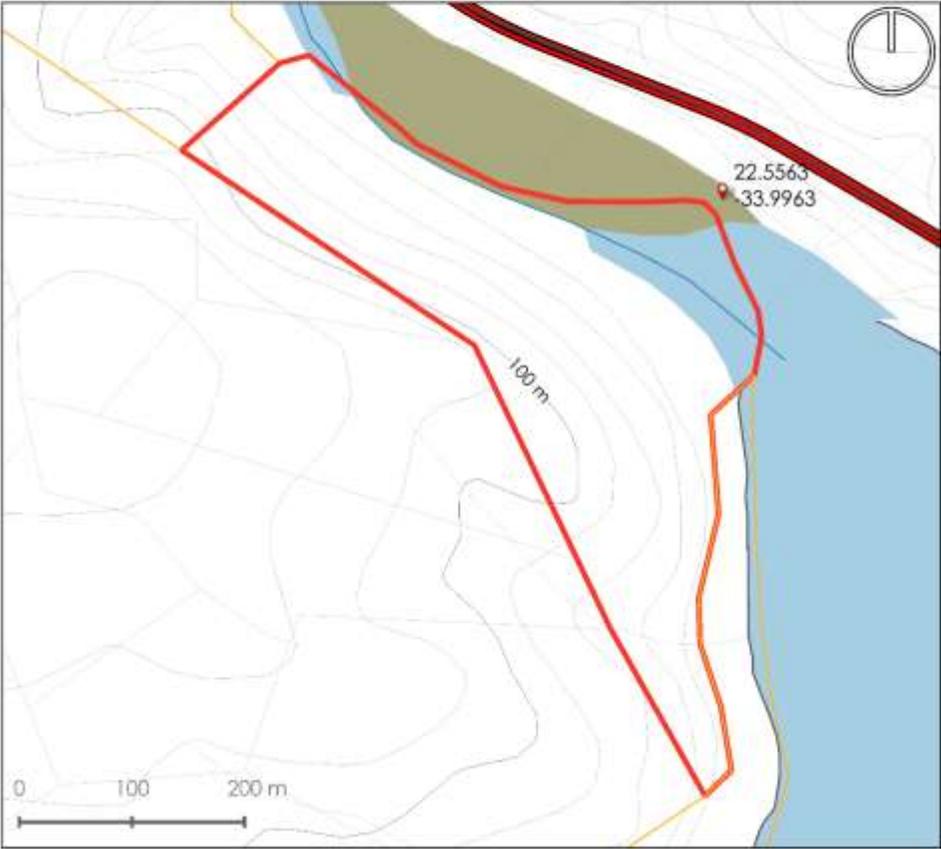
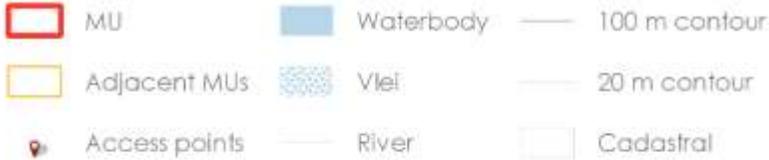
6.44.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.44.8 Economic opportunities

Mature pines and other trees may have value as timber, pulp, or firewood. The lack of accessibility makes it likely that costs to recover usable wood would be prohibitive.

6.45 Kraibosch: Management Unit KR03



Map 47. Management unit KR03, Kraibosch site

6.45.1 Description

Locality

The site is located at the Kaaimans River Mouth and Victoria Bay beach, between George and Wilderness. KR03 is located along the cliffs above the Kaaimans Estuary, and is 13.1 ha in extent. Access, via private property in Victoria Heights or from the Kaaimans River, will require special equipment and training.

Topography

The MU slopes steeply down to the river and the coast, with rock cliffs in places. Access to the site requires special equipment and training.

Sensitivities

The MU is within the Garden Route Shale Fynbos vegetation type, a Vulnerable ecosystem.

Land uses

None.

6.45.2 Invasive species and densities

Woody invasive aliens are distributed evenly within the MU. *Acacia mearnsii* occurs in the highest densities.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult

6.45.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.45.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.



This MU has difficult terrain and is likely to require rope access

6.45.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.45.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Debranch and stack on the ground in such a way that the material will not roll/be blown down into the river

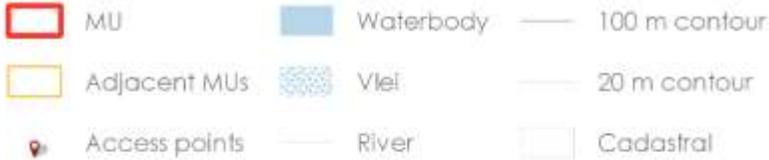
6.45.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.45.8 Economic opportunities

Mature rooikrans may be saleable as firewood, but the cost / effort of recovery is likely to outweigh the value.

6.46 Kraibosch: Management Unit KR04



Map 48. Management unit KR04, Kraibosch site

6.46.1 Description

Locality

The site is located at the Kaaimans River Mouth and Victoria Bay beach, between George and Wilderness. KR04 is located along the railway line between Victoria Bay and the Kaaimans River railway bridge, and is 8.6 ha in extent. Access is obtained via a footpath from Victoria Bay.

Topography

The MU is flat, lying along the coastal railway line that links George to Wilderness. It drops steeply to the coast and rises sharply on the inland side.

Sensitivities

The MU is within the Garden Route Shale Fynbos vegetation type, a Vulnerable ecosystem.

Land uses

None.

6.46.2 Invasive species and densities

The MU is relatively disturbed and a variety of invasive alien species have established along the railway line.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Adult
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Few	Adult
Plants	<i>Cortaderia selloana</i>	Pampas grass	1b	1	Occasional	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Young
Plants	<i>Nicotiana glauca</i>	Wild tobacco	1b	1	Few	Young
Plants	<i>Pinus halepensis</i>	Aleppo pine	3	2	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Young
Plants	<i>Psidium cattleianum</i>	Cherry guava	1b	3	Few	Young
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Few	Young
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult

6.46.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low
Marine Invertebrates	<i>Mytilus galloprovincialis</i>	Mediterranean mussel	2	n/a	High

6.46.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.46.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Anredera cordifolia</i>	Madeira vine	Local extirpation	Within five years	GRDM EPWP
<i>Cortaderia selloana</i>	Pampas grass	Local extirpation	Within five years	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP
<i>Nicotiana glauca</i>	Wild tobacco	Local extirpation	Within five years	GRDM EPWP
<i>Pinus halepensis</i>	Aleppo pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Psidium cattleianum</i>	Cherry guava	Local extirpation	Within five years	GRDM EPWP
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Mytilus galloprovincialis</i>	Mediterranean mussel	n/a	n/a	n/a
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.46.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	None
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	None
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut Stump and spray	None
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut Stump and spray	Place all plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred the material may be used as compost.
Plants	<i>Cortaderia selloana</i>	Pampas grass	Foliar spray	None
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut Stump	None
Plants	<i>Nicotiana glauca</i>	Wild tobacco	Cut Stump	None
Plants	<i>Pinus halepensis</i>	Aleppo pine	Cut Stump	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	None
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	None
Plants	<i>Psidium cattleianum</i>	Cherry guava	Handpull	None
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut Stump and spray	None
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

6.46.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.46.8 Economic opportunities

Mature acacias and other trees may have value as firewood.

6.47 Kraibosch: Management Unit KR05



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 49. Management unit KR05, Kraibosch site

6.47.1 Description

Locality

The site is located at the Kaaimans River Mouth and Victoria Bay beach, between George and Wilderness. KR05 includes the Victoria Bay municipal resort, beach and surrounding areas, and is 12.6 ha in extent. Access is obtained via Victoria Bay Road (MR00350).

Topography

The MU is in a broad valley and is relatively flat, sloping down to the beach.

Sensitivities

The MU is within the Groot Brak Dune Strandveld vegetation type, an Endangered ecosystem.

Land uses

- The Victoria Bay municipal campground is located in the MU
- The MU includes the popular Victoria Bay beach and extensive parking areas

6.47.2 Invasive species and densities

Invasive alien plants are present along the roads and parking areas.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Few	Adult
Plants	<i>Callistemon viminalis</i>	Weeping bottlebrush	3	nl	Few	Adult
Plants	<i>Cortaderia selloana</i>	Pampas grass	1b	1	Few	Adult
Plants	<i>Ipomoea purpurea</i>	Morning glory	1b	3	Few	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Few	Adult
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Few	Adult

6.47.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low
Marine Invertebrates	<i>Mytilus galloprovincialis</i>	Mediterranean mussel	2	n/a	High

6.47.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.47.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Anredera cordifolia</i>	Madeira vine	Local extirpation	Within five years	GRDM EPWP
<i>Callistemon viminalis</i>	Weeping bottlebrush	Local extirpation	Within five years	GRDM EPWP
<i>Cortaderia selloana</i>	Pampas grass	Local extirpation	Within five years	GRDM EPWP
<i>Ipomoea purpurea</i>	Morning glory	Local extirpation	Within five years	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP
<i>Mytilus galloprovincialis</i>	Mediterranean mussel	n/a	n/a	n/a
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.47.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed for use
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut Stump and spray	Place all plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred then it will be dead and can be used as very good quality compost.
Plants	<i>Callistemon viminalis</i>	Weeping bottlebrush	Cut Stump and spray	Remove to licensed landfill site
Plants	<i>Cortaderia selloana</i>	Pampas grass	Foliar spray	None
Plants	<i>Ipomoea purpurea</i>	Morning glory	Foliar spray	None
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut Stump	Remove to licensed landfill site
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump	Chip any cut material smaller than 10cm diameter, larger trunks can be removed for use
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut Stump	Remove to licensed landfill site

6.47.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.47.8 Economic opportunities

Continued use of the MU for tourism and related activities.

6.48 Kraibosch: Management Unit KR06



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 50. Management unit KR06, Kraibosch site

6.48.1 Description

Locality

The site is located at the Kaaimans River Mouth and Victoria Bay beach, between George and Wilderness. KR06 includes the hillside above the campsite and extends down to Lands End. It is 9.0 ha in extent. Access is obtained via Victoria Bay Road (MR00350).

Topography

The MU is in a broad valley and is relatively flat, sloping down to the beach.

Sensitivities

The MU is within the Groot Brak Dune Strandveld vegetation type, an Endangered ecosystem.

Land uses

None

6.48.2 Invasive species and densities

Woody alien invasives are distributed across the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Adult

6.48.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.48.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. A fire break along the top of the hill appears to have been cleared recently.



This MU has difficult terrain and is likely to require rope access

6.48.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans			
<i>Pinus radiata</i>	Radiata pine			
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.48.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Debranch cut material and stack in such a manner as to ensure it does not get blown or roll downhill
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	None

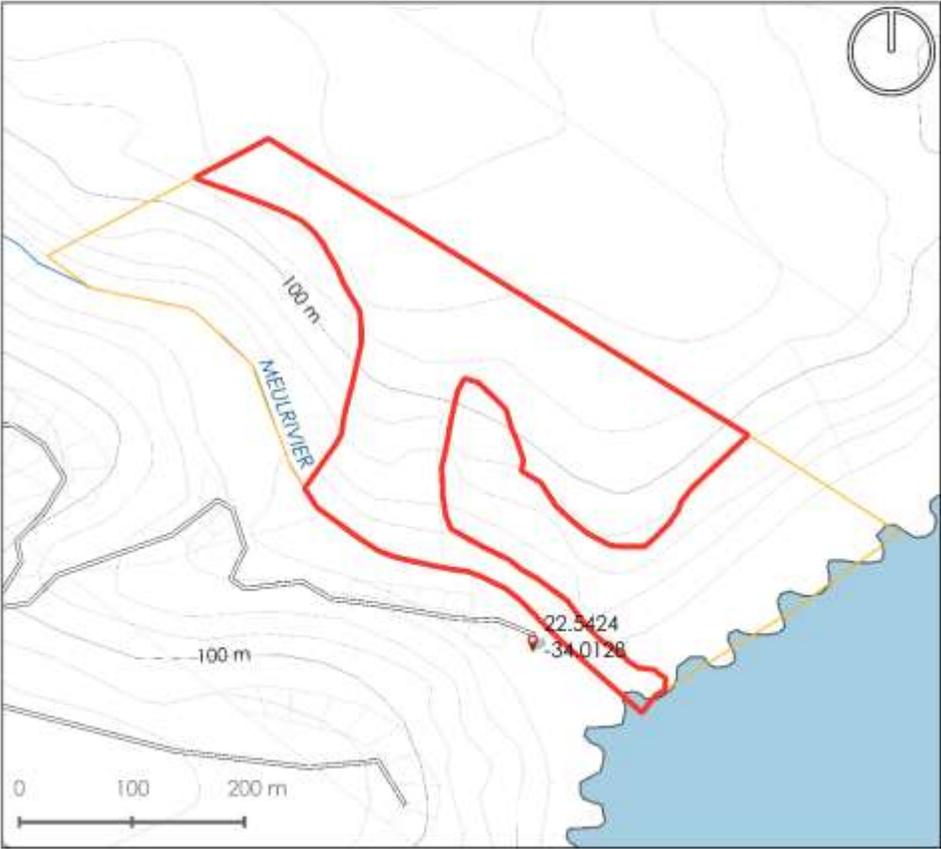
6.48.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.48.8 Economic opportunities

Mature acacias may have value as firewood, although the cost of recovering the wood may exceed its value.

6.49 Meul River Mouth: Management Unit BB01



Map 51. Management unit BB01, Meul River Mouth site

6.49.1 Description

Locality

The site is located approximately a kilometre south-west of Victoria Bay, at the mouth of the Meul River. The site is accessed via private property on the road to Ballots Bay, through the Carmel resort. It may also be accessed across the estuary from Ballots Bay. BB01 lies along the eastern boundary of the site, at the top of the hill and extending down the slope to the river. It is 8.7 ha in extent.

Topography

The MU slopes down to the west from the plateau at 140 m altitude, towards the Meul River estuary at sea level.

Sensitivities

The MU is within the Groot Brak Dune Strandveld vegetation type, an Endangered ecosystem. The Meul River estuary lies immediately west of the site.

Land uses

None

6.49.2 Invasive species and densities

Woody alien invasives occur in high densities throughout the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Moderate	Young
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Moderate	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Scattered	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Few	Adult

6.49.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Wattles were cleared in the past along the northern boundary, but have re-established in the absence of follow-up and maintenance activities.

6.49.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP

6.49.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	In the dense areas at the top of the site, Chip any cut material smaller than 10cm diameter, larger trunks can be removed for use. In less accessible and dense areas, material can be left where it is cut
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	In the dense areas at the top of the site, Chip any cut material smaller than 10cm diameter, larger trunks can be removed for use. In less accessible and dense areas, material can be left where it is cut
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut stump	In the dense areas at the top of the site, Chip any cut material smaller than 10cm diameter. In less accessible and dense areas, material can be left where it is cut
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	In the dense areas at the top of the site, Chip any cut material smaller than 10cm diameter, larger trunks can be removed for use. In less accessible and dense areas, material can be left where it is cut
Plants	<i>Pinus radiata</i>	Radiata pine	Cut Stump	In the dense areas at the top of the site, Chip any cut material smaller than 10cm diameter, larger trunks can be removed for use. In less accessible and dense areas, material can be left where it is cut

6.49.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

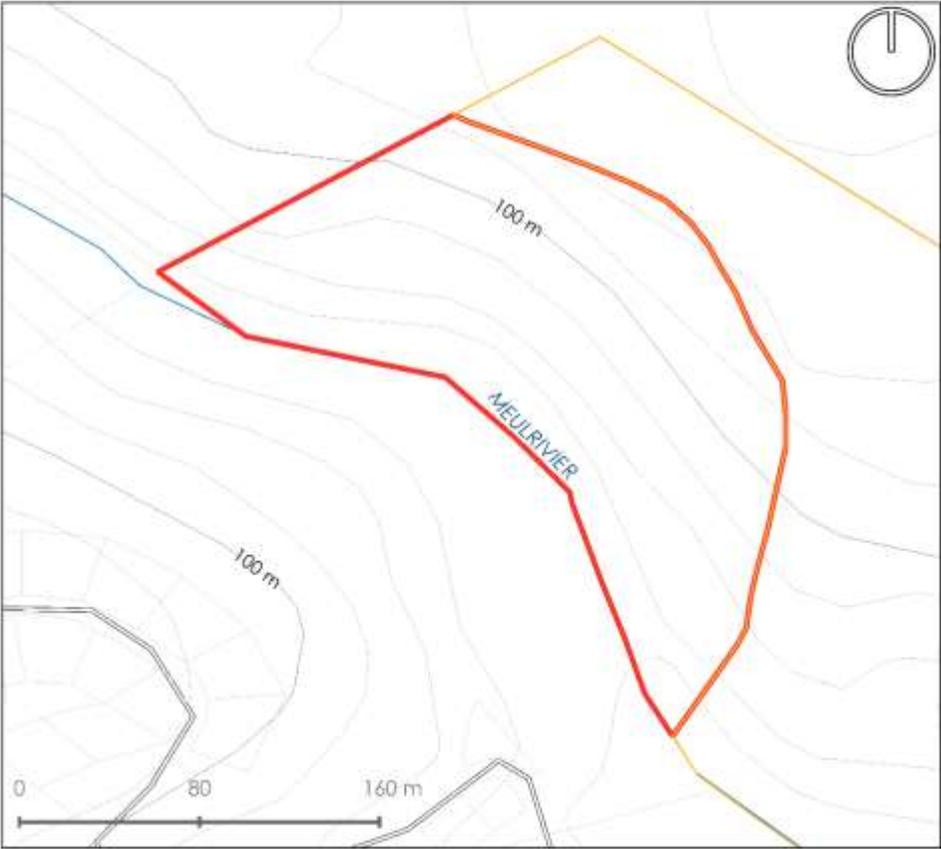
6.49.7 Economic opportunities

Mature wattles and other trees may have value as timber, droppers, or firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and may not outweigh the costs of harvesting the trees for gain. It is recommended that the GRDM obtain an opinion in this regard from a suitably qualified forestry professional.

6.50 Meul River Mouth: Management Unit BB02

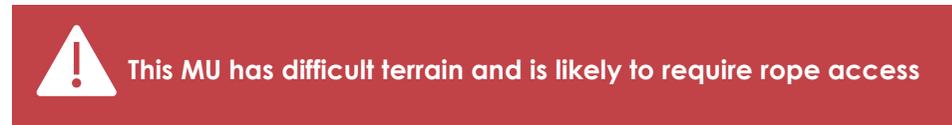


- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 52. Management unit BB02, Meul River Mouth site

6.50.1 Description



Locality

The site is located approximately a kilometre south-west of Victoria Bay, at the mouth of the Meul River. The site is accessed via private property on the road to Ballots Bay, through the Carmel resort. It may also be accessed across the estuary from Ballots Bay. BB02 includes the steeper slopes at the northern end of the site. It is 3.8 ha in extent.

Topography

The MU slopes steeply down to the west from 140 m altitude to the estuary. Access is likely to require special equipment and training.

Sensitivities

The MU is within the Groot Brak Dune Strandveld vegetation type, an Endangered ecosystem. The Meul River estuary lies immediately west of the site.

Land uses

None

6.50.2 Invasive species and densities

Woody alien invasives occur in low densities throughout the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Few	Adult
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Few	Adult

6.50.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.50.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP

6.50.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut Stump and spray	None
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut Stump and spray	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump and spray	None

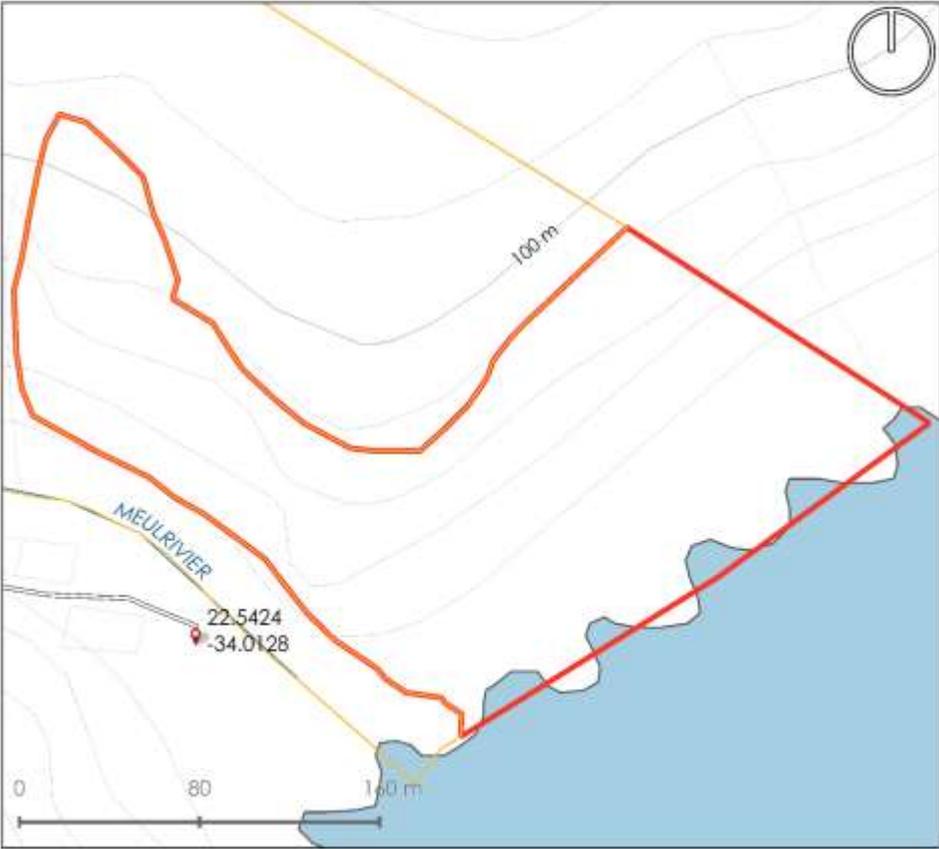
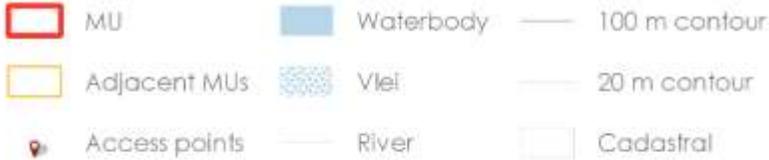
6.50.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.50.7 Economic opportunities

Mature trees may have value as firewood. The fact that the site has not been managed as a plantation means that the value is likely to be low, and the added challenge of accessibility means that the costs of harvesting the trees will certainly outweigh their value.

6.51 Meul River Mouth: Management Unit BB03



Map 53. Management unit BB03, Meul River Mouth site

6.51.1 Description

Locality

The site is located approximately a kilometre south-west of Victoria Bay, at the mouth of the Meul River. The site is accessed via private property on the road to Ballots Bay, through the Carmel resort. It may also be accessed across the estuary from Ballots Bay. BB03 includes the steeper slopes at the southern end of the site, including the coastal cliffs. It is 5.4 ha in extent.

Topography

The MU slopes steeply down to the west and south from 140 m altitude to the estuary and coastline. Access is likely to require special equipment and training.

Sensitivities

The MU is within the Groot Brak Dune Strandveld vegetation type, an Endangered ecosystem. The Meul River estuary lies immediately west of the site, and the coast is immediately to the south.

Land uses

None

6.51.2 Invasive species and densities

Woody alien invasives occur in low densities throughout the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Few	Adult
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Few	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Few	Adult

6.51.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Marine Invertebrates	<i>Mytilus galloprovincialis</i>	Mediterranean mussel	2	n/a	High



This MU has difficult terrain and is likely to require rope access

6.51.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.51.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Mytilus galloprovincialis</i>	Mediterranean mussel	n/a	n/a	n/a

6.51.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	None
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut stump and spray	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut Stump and spray	None

6.51.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.51.8 Economic opportunities

None identified.

6.52 Kleinkrantz: Management Unit KL01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 54. Management unit KL01, Kleinkrantz site

6.52.1 Description

Locality

The Kleinkrantz site is located west of Kleinkrantz and east of Wilderness, along the N2. It is accessed either directly from the N2 or via Lakes Road. KL01 is the section of the site that lies to the north of the N2. It is 15.0 ha in extent.

Topography

The MU slopes gently down from 40 m above sea level, northward to Island Lake.

Sensitivities

The MU is within the Endangered Southern Cape Dune Fynbos ecosystem. Approximately 100 m north of the MU is Island Lake, which forms part of the Wilderness Lakes Ramsar site – a wetland system of international conservation importance.

Land uses

None, although illegal dumping appears to have taken place in places.

6.52.2 Invasive species and densities

Rooikrans (*Acacia cyclops*) occurs throughout the site. Other invasives are present in low numbers along old roadways on the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Eucalyptus conferruminata</i>	Spider gum	1b here	1	Few	Adult
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	1b here	nl	Few	Adult
Plants	<i>Vinca major</i>	Greater periwinkle	1b	nl	Few	Adult

6.52.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.52.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. A firebreak has been partially cleared from the northern edge near the yacht club.

6.52.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus conferruminata</i>	Spider gum	Local extirpation	Within five years	GRDM EPWP
<i>Pennisetum clandestinum</i>	Kikuyu	Local extirpation	Within five years	GRDM EPWP
<i>Vinca major</i>	Greater periwinkle	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.52.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Debranch and ensure that the wind cannot blow cut material onto the road
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Eucalyptus conferruminata</i>	Spider gum	Cut Stump and spray	None
Plants	<i>Pennisetum clandestinum</i>	Kikuyu	Handpull	Remove to licensed landfill site
Plants	<i>Vinca major</i>	Greater periwinkle	Handpull	Remove to licensed landfill site

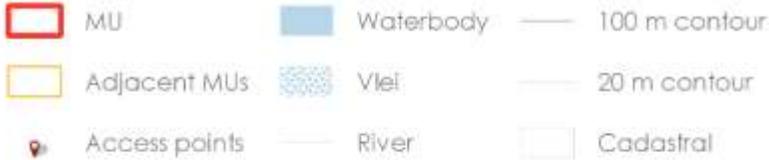
6.52.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.52.8 Economic opportunities

None identified.

6.53 Kleinkrantz: Management Unit KL02



Map 55. Management unit KL02, Kleinkrantz site

6.53.1 Description

Locality

The Kleinkrantz site is located west of Kleinkrantz and east of Wilderness, along the N2. It is accessed either directly from the N2 or via Kleinkrantz. KL02 is the section of the site that lies to the south of the N2, other than the steepest coastal cliffs. It is 14.4 ha in extent.

Topography

The MU slopes gently down from 40 m above sea level, southward to the coast.

Sensitivities

The MU is within the Endangered Southern Cape Dune Fynbos ecosystem. The beach is immediately south of the MU.

Land uses

An abandoned coastal resort is present on the eastern part of the MU.

6.53.2 Invasive species and densities

Rooikrans (*Acacia cyclops*) occurs fairly densely on the site, along with lower densities of the two pine species.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Occasional	Adult

6.53.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.53.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. The area surrounding the abandoned resort has been partially cleared, possibly for firewood.

6.53.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.53.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Debranch and ensure that the wind cannot blow cut material onto the road
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	Debranch and cross cut the larger trees and remove from the site
Plants	<i>Pinus radiata</i>	Radiata pine	Cut stump	Debranch and cross cut the larger trees and remove from the site

6.53.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

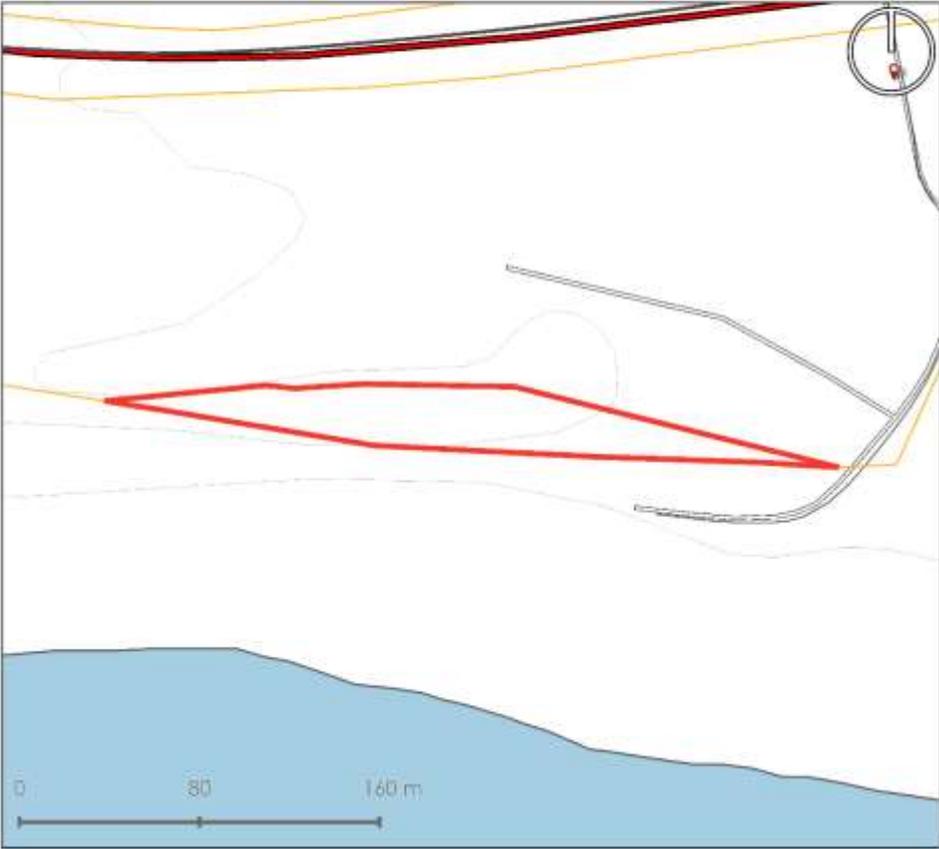
6.53.8 Economic opportunities

None identified.

6.54 Kleinkrantz: Management Unit KL03



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 56. Management unit KL03, Kleinkrantz site

6.54.1 Description



This MU has difficult terrain and is likely to require rope access

Locality

The Kleinkrantz site is located west of Kleinkrantz and east of Wilderness, along the N2. It is accessed either directly from the N2 or via Kleinkrantz. KL03 is the steep coastal section of the site that lies to the south of the N2, other than the steepest coastal cliffs. It is 0.7 ha in extent.

Topography

The MU slopes steeply down to the coast. Access is likely to require special equipment and training.

Sensitivities

The MU is within the Endangered Southern Cape Dune Fynbos ecosystem. The beach is immediately south of the MU.

Land uses

None

6.54.2 Invasive species and densities

Rooikrans (*Acacia cyclops*) occurs fairly densely on the site, along with lower densities of the two pine species.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young

6.54.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Low

6.54.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.54.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans			

<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
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6.54.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	None

6.54.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

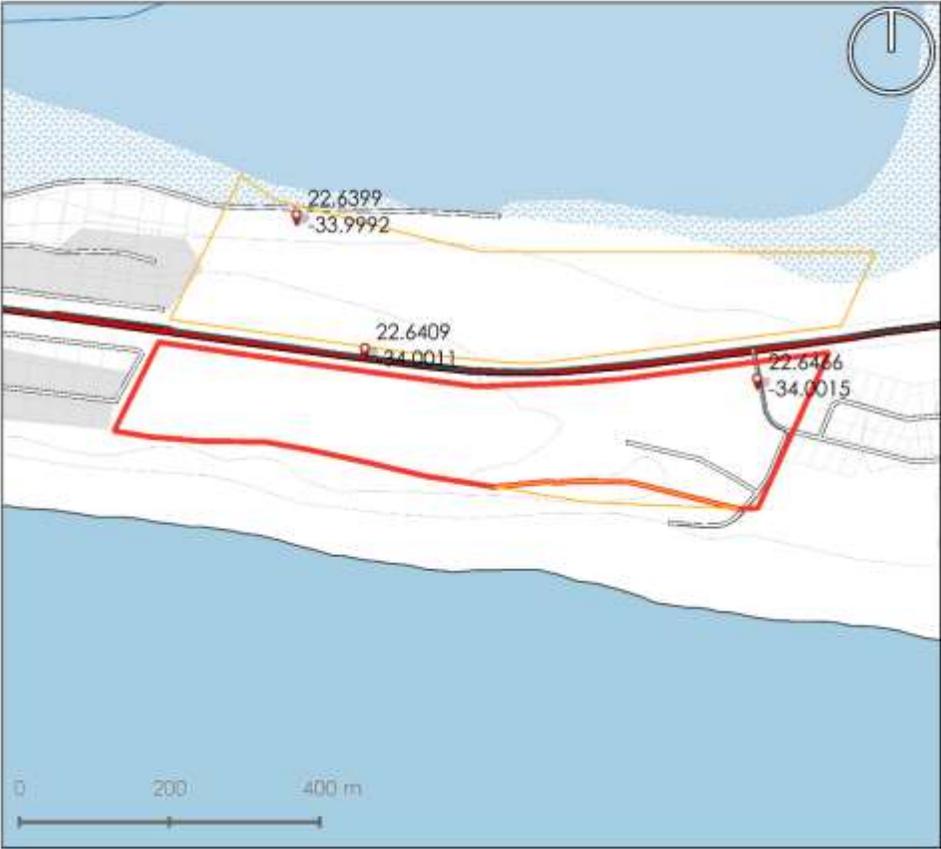
6.54.8 Economic opportunities

None identified.

6.55 Woodville: Management Unit WV01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 57. Management unit WV01, Woodville site

6.55.1 Description

Locality

The Woodville site is located on the Seven Passes Road (MR00355) north of Hoekwil in the George Local Municipality. It is 26.4 ha in extent and is currently farmed. The site has a single management unit, WV01.

Topography

The MU is gently sloping, with its lowest point at the southwestern corner.

Sensitivities

The MU is within the Endangered Garden Route Granite Fynbos ecosystem, but has been transformed by agricultural activities. A watercourse flows across the western part of the site.

Land uses

The site is cultivated for lucerne.

6.55.2 Invasive species and densities

Woody alien invasives are planted in windbreaks at the western edge of the site. Remaining species are associated with the road verges, while much of the site is cultivated field.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Occasional	Adult
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Occasional	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Few	Adult
Plants	<i>Melia azedarach</i>	Syringa	1b here	3	Few	Adult
Plants	<i>Rubus cuneifolius</i>	American bramble	1b	1	Few	Adult
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Few	Adult
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult

6.55.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Harmonia axyridis</i>	Asian ladybeetle	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Freshwater Invertebrates	<i>Aplexa marmorata</i>	Marbled tadpole snail	1b	n/a	Unknown
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.55.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.55.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Melia azedarach</i>	Syringa	Local extirpation	Within five years	GRDM EPWP
<i>Rubus cuneifolius</i>	American bramble	Local extirpation	Within five years	GRDM EPWP
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Harmonia axyridis</i>	Asian ladybeetle	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Aplexa marmorata</i>	Marbled tadpole snail	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.55.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut Stump and spray	Remove smaller cut material from the road reserve and stack it inside the fence. Larger cut material will need to be stacked at least 20m away from the road, outside of the productive farmland
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut Stump and spray	Remove smaller cut material from the road reserve and stack it inside the fence. Larger cut material will need to be stacked at least 20m away from the road, outside of the productive farmland
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	If the flowering heads are mature, remove from site and burn.
Plants	<i>Melia azedarach</i>	Syringa	Cut stump and spray	Remove smaller cut material from the road reserve and stack it inside the fence. Larger cut material will need to be stacked at least 20m away from the road, outside of the productive farmland
Plants	<i>Rubus cuneifolius</i>	American bramble	Foliar spray	None
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut stump and spray	Remove smaller cut material from the road reserve and stack it inside the fence.
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	Remove from the road reserve and stack it inside the fence.

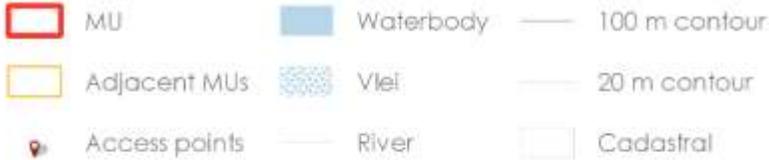
6.55.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.55.8 Economic opportunities

None identified.

6.56 Swartvlei: Management Unit SW01



Map 58. Management unit SW01, Swartvlei site

6.56.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW01 includes the beach and a strip of vegetated dunes immediately inland. It is 32.1 ha in extent. Access is obtained via DR01063, the road which provides access to the Gerickes Point beach.

Topography

The MU includes the beach and the first line of dunes above the highwater mark.

Sensitivities

The MU is on the coast and supports natural dune vegetation. The Sedgefield estuary forms the eastern boundary of the MU.

Land uses

The beach is a popular tourist and fishing destination, as is the estuary to the east.

6.56.2 Invasive species and densities

Extremely dense Rooikrans (*Acacia cyclops*) covers much of the MU above the beach. A few individual plants of the other identified species occur along the informal roads on the western part of the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Closed	Adult
Plants	<i>Datura stramonium</i>	Common thorn apple	1b	1	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Few	Young
Plants	<i>Ricinus communis</i>	Castor-oil plant	2	2	Few	Young

6.56.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.56.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within ten years – initial clearing delayed to reduce erosion potential.	GRDM EPWP
<i>Datura stramonium</i>	Common thorn apple	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Ricinus communis</i>	Castor-oil plant	Local extirpation	Within five years	GRDM EPWP

6.56.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use
Plants	<i>Datura stramonium</i>	Common thorn apple	Handpull	Remove from site
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Ricinus communis</i>	Castor-oil plant	Cut stump and spray	None

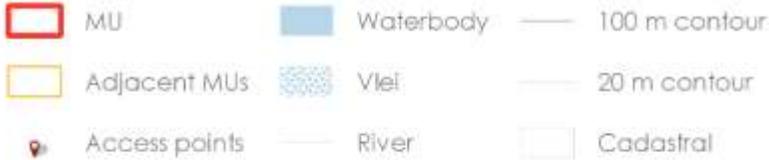
6.56.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.56.7 Economic opportunities

Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.57 Swartvlei: Management Unit SW02



Map 59. Management unit SW02, Swartvlei site

6.57.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW02 is an east-west strip from the centre of the site to the western beach access. It is 11.2 ha in extent. Access is obtained via DR01063, the road which provides access to the Gerickes Point beach.

Topography

The MU is part of a coastal dunefield, with gently undulating terrain.

Sensitivities

The MU is near the coast and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

None

6.57.2 Invasive species and densities

Dense Rooikrans (*Acacia cyclops*) covers much of the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	High	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young

6.57.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.57.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP

6.57.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use

6.57.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

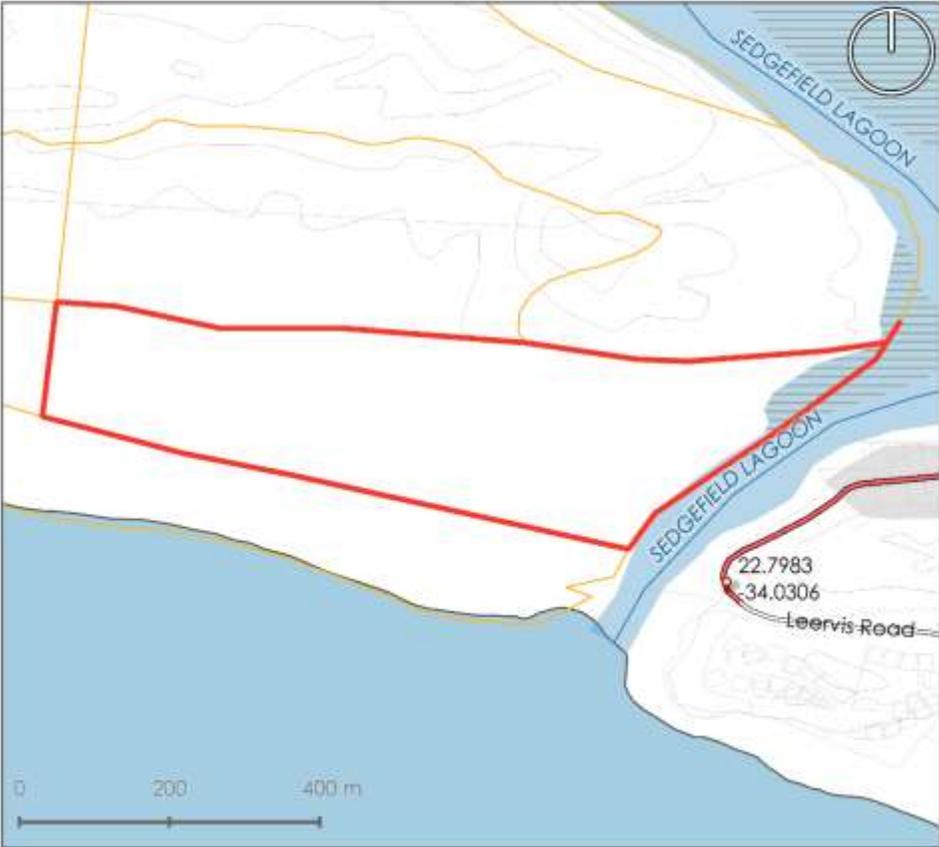
6.57.7 Economic opportunities

Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.58 Swartvlei: Management Unit SW03



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 60. Management unit SW03, Swartvlei site

6.58.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW03 is an east-west strip from the centre of the site to the eastern estuary. It is 23.9 ha in extent. Access is obtained either via DR01063, the road which provides access to the Gerickes Point beach, or from across the estuary on the Sedgefield side.

Topography

The MU is part of a coastal dunefield, with gently undulating terrain.

Sensitivities

The MU is near the coast and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed. The Sedgefield estuary forms the eastern boundary of the MU.

Land uses

None

6.58.2 Invasive species and densities

Dense Rooikrans (*Acacia cyclops*) covers much of the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	High	Adult

6.58.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.58.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP

6.58.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Where cut material can be accessed by the chipper, chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use. In further areas, debranch cut material and stack it to facilitate the establishment of the indigenous vegetation

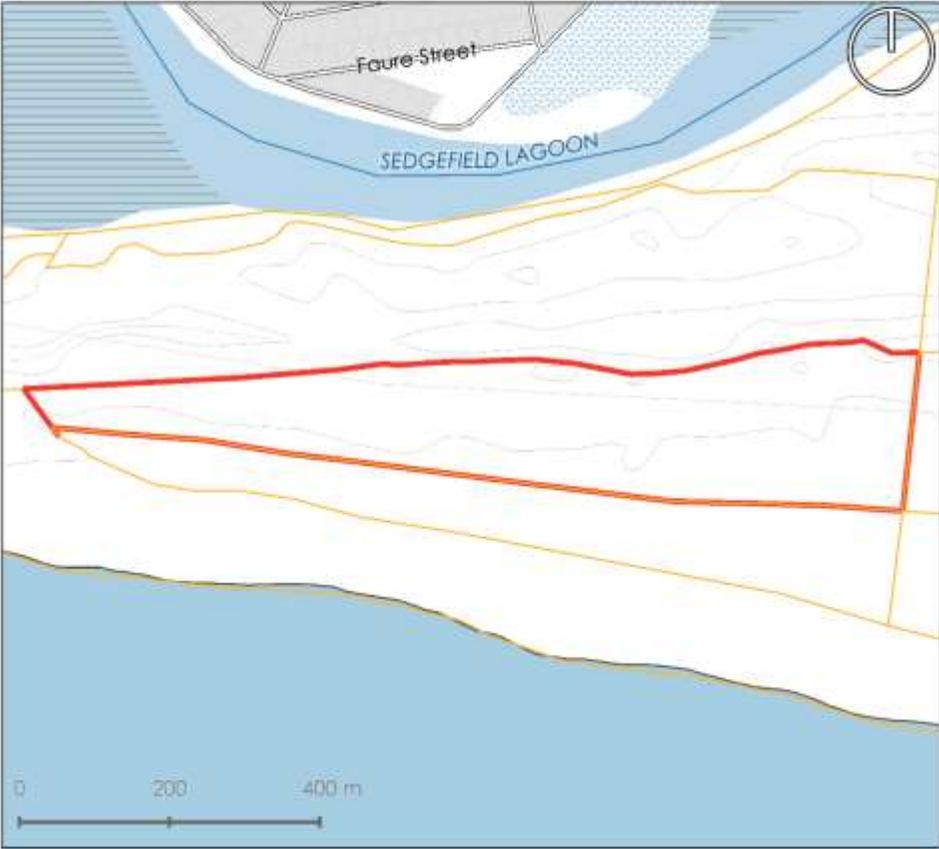
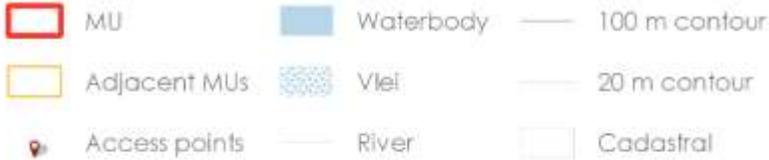
6.58.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.58.7 Economic opportunities

Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.59 Swartvlei: Management Unit SW04



Map 61. Management unit SW04, Swartvlei site

6.59.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW04 is an east-west strip from the centre of the site to near the western edge. It is 19.7 ha in extent. Access is obtained via DR01063, the road which provides access to the Gerickes Point beach.

Topography

The MU is part of a coastal dunefield, with gently undulating terrain.

Sensitivities

The MU is near the coast and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

None

6.59.2 Invasive species and densities

Moderately dense Rooikrans (*Acacia cyclops*) covers much of the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young

6.59.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.59.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within ten years – initial clearing delayed to reduce erosion potential.	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within ten years – initial clearing delayed to reduce erosion potential.	GRDM EPWP

6.59.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use

6.59.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.59.7 Economic opportunities

Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.60 Swartvlei: Management Unit SW05



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 62. Management unit SW05, Swartvlei site

6.60.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW05 is an east-west strip from the centre of the site to the eastern estuary. It is 19.9 ha in extent. Access is obtained either via DR01063, the road which provides access to the Gerickes Point beach, or from across the estuary on the Sedgefield side.

Topography

The MU is part of a coastal dunefield, with gently undulating terrain. In SW05 the dunes rise to a high point about 60 m above sea level.

Sensitivities

The MU is near the coast and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed. The Sedgefield estuary forms the eastern boundary of the MU.

Land uses

None

6.60.2 Invasive species and densities

Moderately dense Rooikrans (*Acacia cyclops*) covers much of the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult

6.60.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.60.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within ten years – initial clearing delayed to reduce erosion potential.	GRDM EPWP

6.60.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	Acacia cyclops	Rooikrans	Cut stump and spray	Where cut material can be accessed by the chipper, chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use. In further areas, debranch cut material and stack it to facilitate the establishment of the indigenous vegetation

6.60.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.60.7 Economic opportunities

Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.61 Swartvlei: Management Unit SW06



- | | | |
|---------------|-----------|---------------|
| MU | Waterbody | 100 m contour |
| Adjacent MUs | Vlei | 20 m contour |
| Access points | River | Cadastral |



Map 63. Management unit SW06, Swartvlei site

6.61.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW06 is an east-west strip from the centre of the site to near the western edge. It is 30.3 ha in extent. Access is obtained via the municipal campsite.

Topography

The MU is part of a coastal dunefield, with gently undulating terrain. SW06 is a high dune ridge at up to 60 m above sea level.

Sensitivities

The MU is near the coast and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

None

6.61.2 Invasive species and densities

Moderately dense Rooikrans (*Acacia cyclops*) covers much of the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Young

6.61.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.61.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP

6.61.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Chip any cut material smaller than 10cm diameter, larger trunks can be removed from site for use

6.61.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

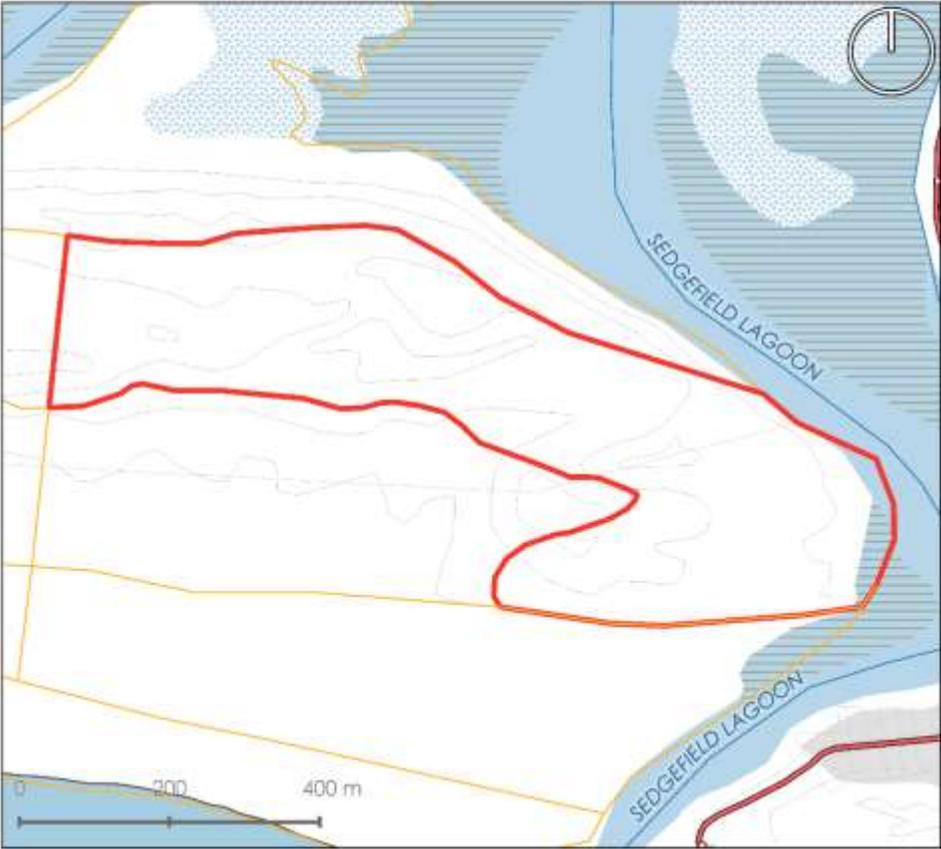
6.61.7 Economic opportunities

Larger acacia trees may be used for firewood, possibly for sale within the Swartvlei campsite.

6.62 Swartvlei: Management Unit SW07



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 64. Management unit SW07, Swartvlei site

6.62.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW07 is an east-west strip from the centre of the site to the eastern estuary. It is 33.0 ha in extent. Access is obtained either via DR01063, the road which provides access to the Gerickes Point beach, or from across the estuary on the Sedgefield side.

Topography

The MU is part of a coastal dunefield, with gently undulating terrain. In SW07 the dunes rise to about 40 m above sea level.

Sensitivities

The MU is near the coast and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed. The Sedgefield estuary forms the eastern boundary of the MU.

Land uses

None

6.62.2 Invasive species and densities

Low densities of Rooikrans (*Acacia cyclops*) occur in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult

6.62.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.62.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP

6.62.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Due to the difficulty in getting a chipper to this area, debranch the larger cut material and stack out of the flood zone.

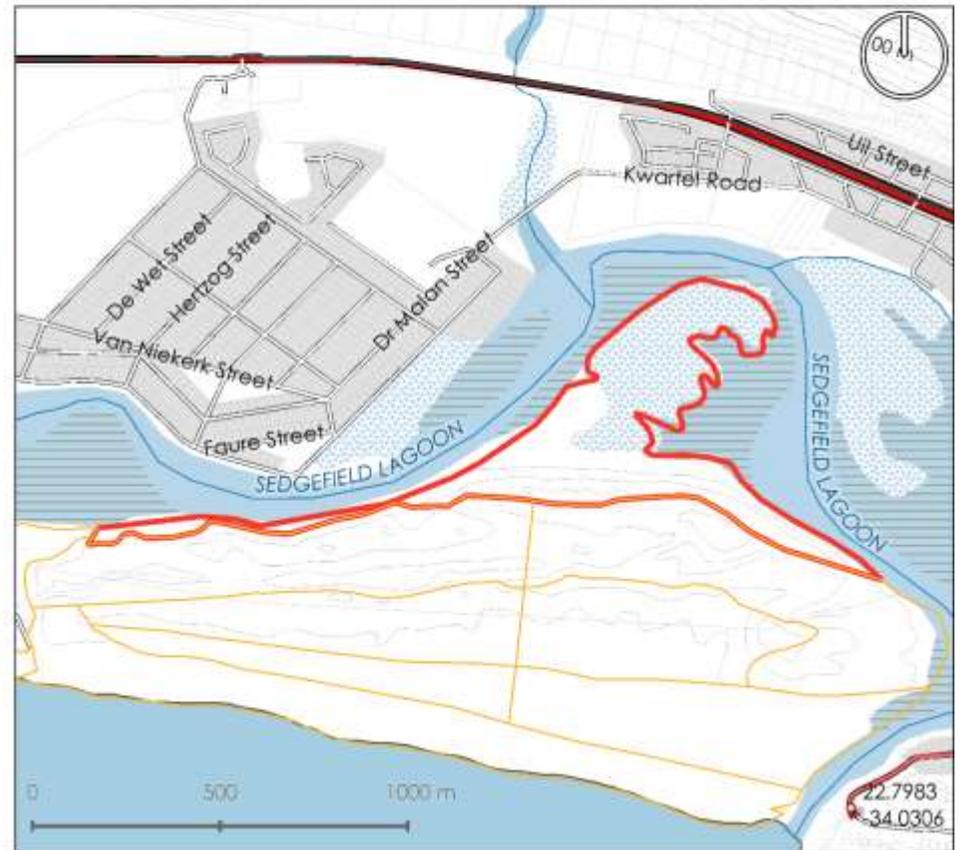
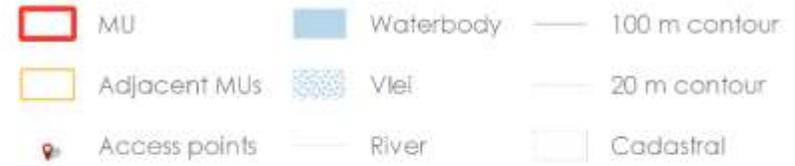
6.62.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.62.7 Economic opportunities

None identified

6.63 Swartvlei: Management Unit SW08



Map 65. Management unit SW08, Swartvlei site

6.63.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW08 is the southern shore of Swartvlei, including the peninsula that juts out to the north. It is 35.6 ha in extent and is accessed either via the municipal Swartvlei campsite or by boat.

Topography

The MU is the low shoreline of the Swartvlei, and an adjoining dune ridge rising to about 40 m above sea level.

Sensitivities

The MU is on a coastal lake and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

None

6.63.2 Invasive species and densities

Scattered alien acacias occur in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Scattered	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Young

6.63.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Freshwater Invertebrates	<i>Aedes albopictus</i>	Asian tiger mosquito	1b	n/a	Unknown
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Unknown
Freshwater fish	<i>Micropterus dolomieu</i>	Smallmouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus salmoides</i>	Largemouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus punctulatis</i>	Spotted bass	3 here	n/a	Unknown
Freshwater fish	<i>Gambusia affinis</i>	Mosquito-fish	3 where it occurs, 1b in protected areas	n/a	Unknown

6.63.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.63.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Aedes albopictus</i>	Asian tiger mosquito	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Anas platyrhynchos</i>	Mallard	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Micropterus dolomieu</i>	Smallmouth bass	No new introductions	n/a	n/a
<i>Micropterus salmoides</i>	Largemouth bass	No new introductions	n/a	n/a
<i>Micropterus punctulatis</i>	Spotted bass	No new introductions	n/a	n/a
<i>Gambusia affinis</i>	Mosquito-fish	No new introductions	n/a	n/a

6.63.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Due to the difficulty in getting a chipper to this area, debranch and stack smaller material out of the flood zone, larger material can be removed from site or left on site
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut Stump and spray	Due to the difficulty in getting a chipper to this area, debranch and stack smaller material out of the flood zone, larger material can be removed from site or left on site

6.63.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.63.8 Economic opportunities

Larger acacias may be used for firewood, possibly for sale within the Swartvlei campsite.

6.64 Swartvlei: Management Unit SW09



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 66. Management unit SW09, Swartvlei site

6.64.1 Description



This MU has difficult terrain and is likely to require rope access

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW09 is the steep coastal section west of the beach parking lot. It is 4.6 ha in extent and is accessed either via DR01603 or via private property to the west.

Topography

The MU is a coastal sandstone cliff and will require specialist equipment and training to access.

Sensitivities

The MU is on a coastal lake and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

None

6.64.2 Invasive species and densities

Invasive alien rooikrans (*Acacia cyclops*) occurs in moderate densities in the MU.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult

6.64.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.64.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP

6.64.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	None

6.64.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.64.7 Economic opportunities

Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.65 Swartvlei: Management Unit SW10



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 67. Management unit SW10, Swartvlei site

6.65.1 Description

Locality

The Swartvlei site is located west of Sedgefield, incorporating the coastal dunefield between the Sedgefield estuary and the Swartvlei lake. SW10 is the municipal campsite and a small section of coastal dunes to the west. It is 9.1 ha in extent and is accessed via DR01603. The western section may also be accessed via private property.

Topography

The campsite is flat and near sea-level, while the western section of the MU rises to 100 m above sea level.

Sensitivities

The MU is on a coastal lake and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

The Swartvlei municipal campsite occupies the eastern part of the MU.

6.65.2 Invasive species and densities

Invasive alien rooikrans (*Acacia cyclops*) occurs primarily in the western part of the site. Several invasive alien tree species are planted as shade trees within the campsite.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Adult
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	1b / 2	2	Few	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Adult
Plants	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	3	3	Few	Adult

6.65.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Biocontrol agents are visible on the *Acacia cyclops* but have not reduced the infestation notably.

6.65.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within ten years – initial clearing delayed to reduce erosion potential.	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within ten years to allow replacement indigenous shade trees to be planted.	GRDM EPWP
<i>Casuarina cunninghamiana</i>	Beefwood	Local extirpation	Within ten years to allow replacement indigenous shade trees to be planted.	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Prevent further spread	n/a	GRDM / resort staff
<i>Schinus terebinthifolius</i>	Brazilian pepper tree	Prevent further spread	n/a	GRDM / resort staff

6.65.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Chip cut material that is smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Remove from site
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	Cut stump and spray	Remove from site
Plants	<i>Myoporum tenuifolium</i>	Manatoka	None, prevent further spread by handpulling	None
Plants	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	None, prevent further spread by handpulling	None

6.65.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.65.7 Economic opportunities

Continued use of the MU as a campsite. Larger rooikrans may be used for firewood, possibly for sale within the Swartvlei campsite.

6.66 Walkers Point: Management Unit WP01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 68. Management unit WP01, Walkers Point site

6.66.1 Description

Locality

The Walkers Point site is located in Buffels Baai, west of Knysna in the Knysna local municipality. WP01 is the western part of the site, and includes the municipal campsite and adjacent coastal dunes. The Buffalo Bay Road (MR00346) crosses the site. WP01 is 24.2 ha in extent.

Topography

The coastal dunes on which the campsite is located rise to about 40 m above sea level. Much of the MU is on the coast.

Sensitivities

The MU is coastal and supports natural dune vegetation. The alien invasive rooikrans plays a role in stabilising the dune sands – its removal must be carefully managed.

Land uses

The Buffalo Bay municipal campsite is part of the MU.

6.66.2 Invasive species and densities

Invasive alien acacias occur sparsely, largely on the coastal strip. The remaining species were found within the campsite and its access route.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Few	Adult
Plants	<i>Ipomoea purpurea</i>	Morning glory	1b	3	Few	Adult
Plants	<i>Melia azedarach</i>	Syringa	1b here	3	Few	Young

6.66.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.66.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Next to roads and buildings, facilitate establishment of indigenous growth before removal. Otherwise, within five years	Campsite staff / GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Anredera cordifolia</i>	Madeira vine	Local extirpation	Within five years	GRDM EPWP
<i>Ipomoea purpurea</i>	Morning glory	Local extirpation	Within five years	GRDM EPWP
<i>Melia azedarach</i>	Syringa	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.66.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Where cut material is close to the road and likely to cause damage, remove from site, otherwise, stack in order to promote indigenous plant growth and due stabilisation
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Move at least 20m away from buildings
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut stump and spray	Place all plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred the material may be used as compost.
Plants	<i>Ipomoea purpurea</i>	Morning glory	Foliar spray	None
Plants	<i>Melia azedarach</i>	Syringa	Cut stump and spray	Stack at least 20m away from buildings

6.66.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.66.7 Economic opportunities

Larger acacias may be used for firewood, possibly for sale within the Buffels Bay campsite.

6.67 Walkers Point: Management Unit WP02



Map 69. Management unit WP02, Walkers Point site

6.67.1 Description

Locality

The Walkers Point site is located in Buffels Baai, west of Knysna in the Knysna local municipality. WP02 is the southeastern part of the site, and includes the municipal waterworks and adjacent coastal dunes. Access is obtained from the town of Buffalo Bay. WP02 is 15.8 ha in extent.

Topography

The coastal dunes rise to about 40 m above sea level. Dense indigenous and invasive vegetation make access to much of the MU difficult.

Sensitivities

The MU is coastal and supports natural dune vegetation.

Land uses

The site borders the town of Buffalo Bay and includes a municipal water treatment works and an abandoned or closed landfill site.

6.67.2 Invasive species and densities

Invasive alien acacias occur sparsely, largely in the dunes. The remaining species were found in and around the municipal water works.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young
Plants	<i>Arundo donax</i>	Spanish reed	1b	1	Few	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Few	Adult
Plants	<i>Ricinus communis</i>	Castor-oil plant	2	2	Few	Adult

6.67.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.67.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Next to roads and buildings, facilitate establishment of indigenous growth before removal. Otherwise, within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Next to roads and buildings, facilitate establishment of indigenous growth before removal. Otherwise, within five years	GRDM EPWP
<i>Arundo donax</i>	Spanish reed	Local extirpation	Within five years	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Ricinus communis</i>	Castor-oil plant	Local extirpation	Within five years	GRDM EPWP

6.67.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Where cut material is close to the road and likely to cause damage, remove from site, otherwise, stack in order to promote indigenous plant growth and due stabilisation
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Where cut material is close to the road and likely to cause damage, remove from site, otherwise, stack in order to promote indigenous plant growth and due stabilisation
Plants	<i>Arundo donax</i>	Spanish reed	Cut stump and spray	Move cut material at least 20m away from buildings or roads. Cut the material into shorter pieces and spread it out over an area to increase speed of decomposition and reduce fire hazard
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut stump	Move cut material at least 20m away from any buildings and roads
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Ricinus communis</i>	Castor-oil plant	Cut stump and spray	None

6.67.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

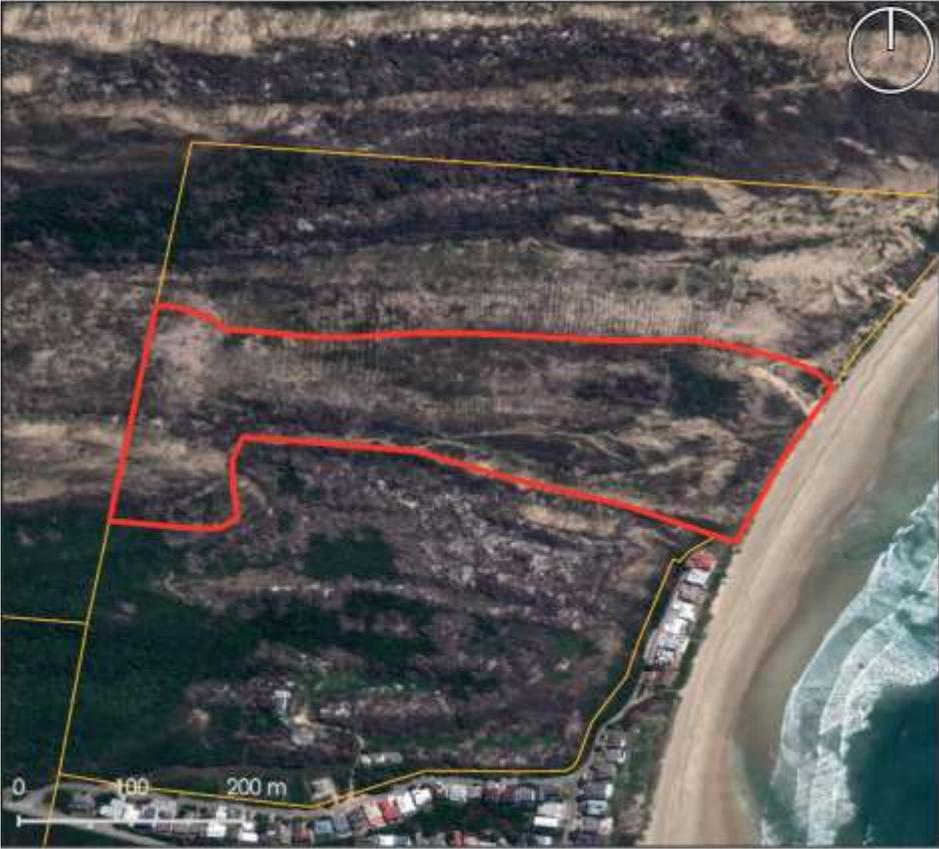
6.67.7 Economic opportunities

Larger acacias may be used for firewood, possibly for sale within the Buffels Bay campsite.

6.68 Walkers Point: Management Unit WP03



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 70. Management unit WP03, Walkers Point site

6.68.1 Description

Locality

The Walkers Point site is located in Buffels Baai, west of Knysna in the Knysna local municipality. WP03 is a dunefield north of the town, approximately 9.5 ha in extent. Access is obtained from the town of Buffalo Bay or via the beach. The Buffalo Bay Trail, a footpath from the campsite, crosses the MU.

Topography

The coastal dunes rise to about 40 m above sea level.

Sensitivities

The MU is coastal and supports natural dune vegetation.

Land uses

None.

6.68.2 Invasive species and densities

The MU is invaded by two species of Australian *Acacia*, both of which appear in places to have been deliberately planted in dense rows, possibly after fire, to stabilise dune sands.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Moderate	Young

6.68.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Conversely, it appears that deliberate planting of both species took place in the recent past.

6.68.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP

6.68.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Stack along windrows to promote dune stabilisation
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Stack along windrows to promote dune stabilisation

6.68.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.68.7 Economic opportunities

Larger acacias may be used for firewood, possibly for sale within the Buffels Bay campsite.

6.69 Walkers Point: Management Unit WP04



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 71. Management unit WP04, Walkers Point site

6.69.1 Description

Locality

The Walkers Point site is located in Buffels Baai, west of Knysna in the Knysna local municipality. WP04 is in the dunefield north of the town, approximately 12.2 ha in extent. Access is obtained from the town of Buffalo Bay or via the beach.

Topography

The coastal dunes rise to about 40 m above sea level.

Sensitivities

The MU is coastal and supports natural dune vegetation.

Land uses

None.

6.69.2 Invasive species and densities

The MU is invaded by two species of Australian *Acacia*, both of which appear in places to have been deliberately planted in dense rows, possibly after fire, to stabilise dune sands.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Moderate	Young

6.69.3 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. Conversely, it appears that deliberate planting of both species took place in the recent past.

6.69.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP

6.69.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Stack along windrows to promote dune stabilisation
	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Stack along windrows to promote dune stabilisation

6.69.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

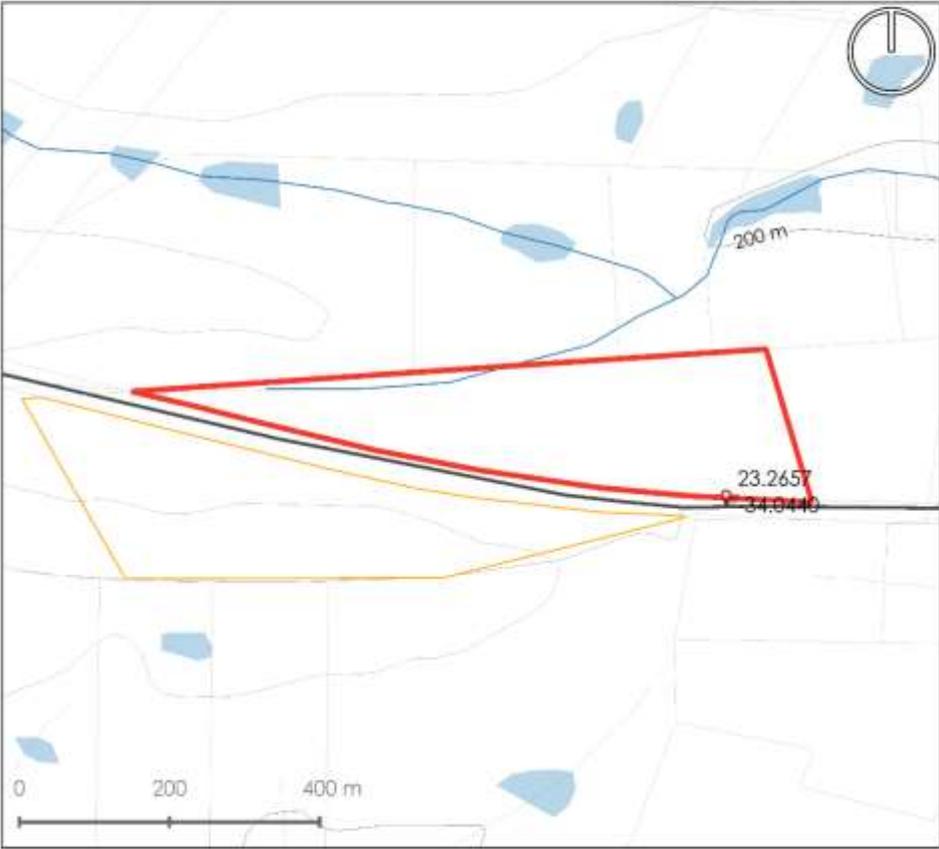
6.69.7 Economic opportunities

Larger acacias may be used for firewood, possibly for sale within the Buffels Bay campsite.

6.70 Harkerville: Management Unit HA01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 72. Management unit HA01, Harkerville site

6.70.1 Description

Locality

The Harkerville site is located on the N2 near Harkerville, in the Bitou Municipality. HA01 is the portion of the site located north of the highway. It is 12.5 ha in extent.

Topography

The site is flat, at an altitude of about 200 m above sea level.

Sensitivities

The site is on the N2, a scenic route. A watercourse is mapped at the northwestern edge of the MU.

Land uses

The MU is grazed by cattle.

6.70.2 Invasive species and densities

A variety of species occur in low numbers, following what appears to have been a concerted effort to clear the site of invasive species in the past few years.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Few	Young
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Few	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Young
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Few	Adult
Plants	<i>Datura stramonium</i>	Common thorn apple	1b	1	Few	Adult
Plants	<i>Eucalyptus grandis</i>	Saligna gum	2 here	2	Few	Young
Plants	<i>Nephrolepis cordifolia</i>	Erect sword fern	1b	nl	Few	Adult
Plants	<i>Phytolacca octandra</i>	Forest inkberry	1b	nl	Occasional	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Few	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b / 2	2	Few	Adult
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Few	Young
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult

6.70.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.70.4 Previous control efforts

The MU appears to have been recently cleared of large *Eucalyptus grandis* and other invasive tree species. The grazing of the site by cattle has assisted in keeping regrowth in check, but many of the trees have coppiced as they were not appropriately treated with herbicide.

6.70.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Datura stramonium</i>	Common thorn apple	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus grandis</i>	Saligna gum	Local extirpation	Within five years	GRDM EPWP
<i>Nephrolepis cordifolia</i>	Erect sword fern	Local extirpation	Within five years	GRDM EPWP
<i>Phytolacca octandra</i>	Forest inkberry	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.70.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut stump and spray	If the biomass load is low, then the plants can be left on site, stacked at least 20m away from any road or fenceline. If the site is worked later and the biomass is a high load, then it should be chipped
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut stump and spray (Initial), foliar spray if sucker roots grow (follow up)	If the biomass load is low, then the plants can be left on site, stacked at least 20m away from any road or fenceline. If the site is worked later and the biomass is a high load, then it should be chipped
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	Stack at least 20m away from any road or fenceline
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	If the flowering head is mature, then remove from site and burn, otherwise leave on site
Plants	<i>Datura stramonium</i>	Common thorn apple	Handpull	None
Plants	<i>Eucalyptus grandis</i>	Saligna gum	Cut stump and spray	Cross cut and remove from site for use
Plants	<i>Nephrolepis cordifolia</i>	Erect sword fern	None	None
Plants	<i>Phytolacca octandra</i>	Forest inkberry	Handpull	Remove from site
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	Chip material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut stump	Chip material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut stump and spray	Chip
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

6.70.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

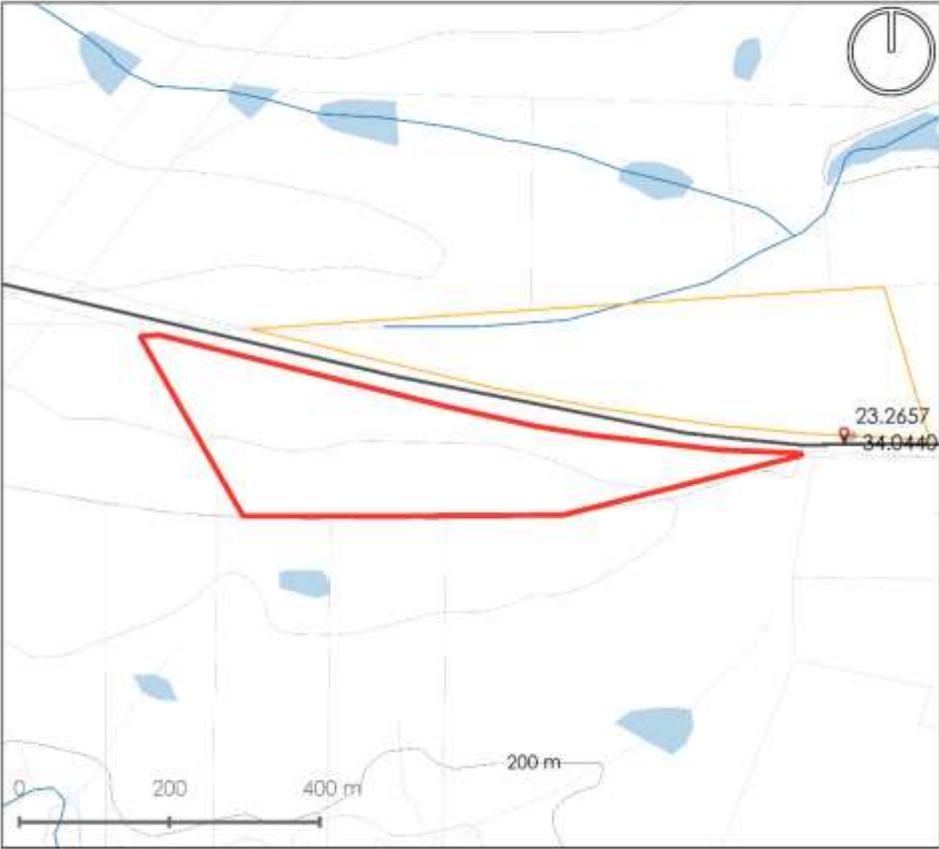
6.70.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp.

6.71 Harkerville: Management Unit HA02



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- 📍 Access points
- River
- Cadastral



Map 73. Management unit HA02, Harkerville site

6.71.1 Description

Locality

The Harkerville site is located on the N2 near Harkerville, in the Bitou Municipality. HA02 is the portion of the site located north of the highway. It is 12.0 ha in extent.

Topography

The site is flat, at an altitude of about 200 m above sea level.

Sensitivities

The site is on the N2, a scenic route.

Land uses

The MU is grazed by cattle.

6.71.2 Invasive species and densities

A variety of species occur in low numbers, following what appears to have been a concerted effort to clear the site of invasive species in the past few years.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Moderate	Young
Plants	<i>Acacia melanoxylon</i>	Blackwood	2	2	Scattered	Young
Plants	<i>Agave sisalana</i>	Sisal	2	2	Few	Adult
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Few	Adult
Plants	<i>Datura stramonium</i>	Common thorn apple	1b	1	Few	Adult
Plants	<i>Eucalyptus grandis</i>	Saligna gum	2 here	2	Few	Adult
Plants	<i>Phytolacca octandra</i>	Forest inkberry	1b	nl	Occasional	Adult
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young
Plants	<i>Pinus radiata</i>	Radiata pine	1b here	2	Few	Adult
Plants	<i>Sambucus nigra</i>	Elder	1b	nl	Few	Young
Plants	<i>Solanum mauritianum</i>	Bugweed	1b	1	Few	Young
Plants	<i>Verbena bonariensis</i>	Purple top	1b	nl	Occasional	Adult

6.71.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Medium

6.71.4 Previous control efforts

The MU appears to have been recently cleared, but regrowth has been very rapid.

6.71.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia melanoxylon</i>	Blackwood	Local extirpation	Within five years	GRDM EPWP
<i>Agave sisalana</i>	Sisal	Local extirpation	Within five years	GRDM EPWP
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Datura stramonium</i>	Common thorn apple	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus grandis</i>	Saligna gum	Local extirpation	Within five years	GRDM EPWP
<i>Phytolacca octandra</i>	Forest inkberry	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Sambucus nigra</i>	Elder	Local extirpation	Within five years	GRDM EPWP
<i>Solanum mauritianum</i>	Bugweed	Local extirpation	Within five years	GRDM EPWP
<i>Verbena bonariensis</i>	Purple top	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.71.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut stump and spray	If the biomass load is low, then the plants can be left on site, stacked at least 20m away from any road or fenceline. If the site is worked later and the biomass is a high load, then it should be chipped
Plants	<i>Acacia melanoxylon</i>	Blackwood	Cut stump and spray (Initial), foliar spray if sucker roots grow (follow up)	If the biomass load is low, then the plants can be left on site, stacked at least 20m away from any road or fenceline. If the site is worked later and the biomass is a high load, then it should be chipped
Plants	<i>Agave sisalana</i>	Sisal	Foliar spray	None
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	If the flowering head is mature, then remove from site and burn, otherwise leave on site
Plants	<i>Datura stramonium</i>	Common thorn apple	Handpull	None
Plants	<i>Eucalyptus grandis</i>	Saligna gum	Cut stump and spray	Cross cut and remove from site for use
Plants	<i>Phytolacca octandra</i>	Forest inkberry	Handpull	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	Chip material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut stump	Chip material smaller than 10cm, larger trunks can be removed from site for use
Plants	<i>Sambucus nigra</i>	Elder	Cut stump	Chip
Plants	<i>Solanum mauritianum</i>	Bugweed	Cut stump and spray	Chip
Plants	<i>Verbena bonariensis</i>	Purple top	Handpull	None

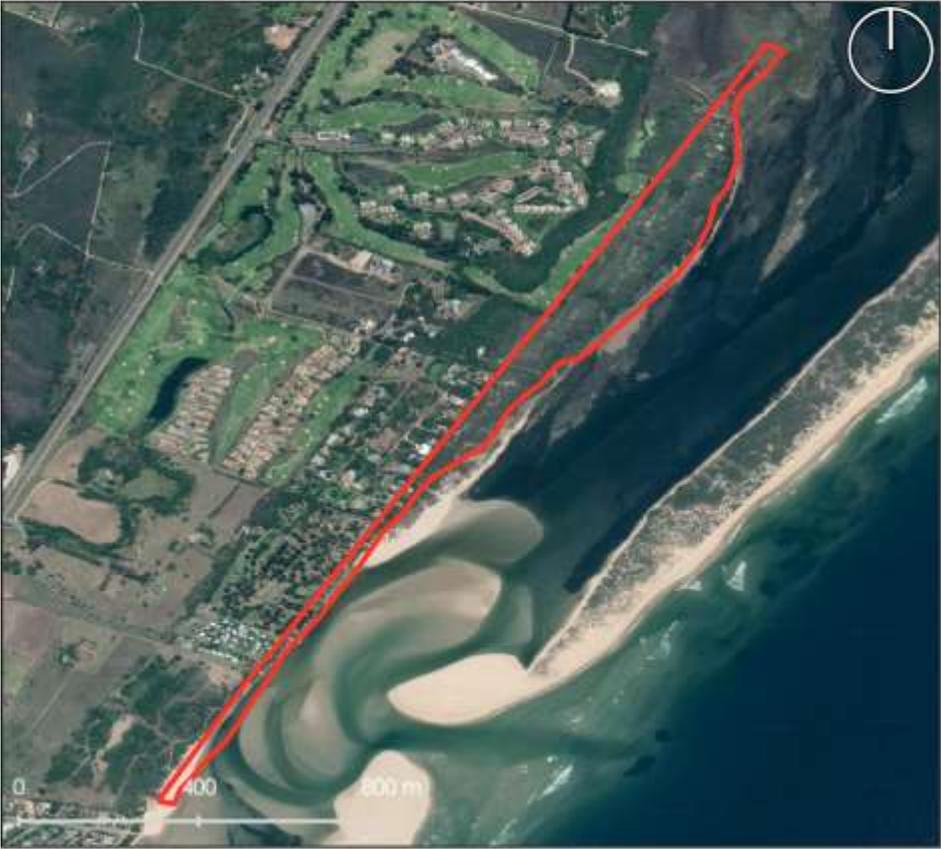
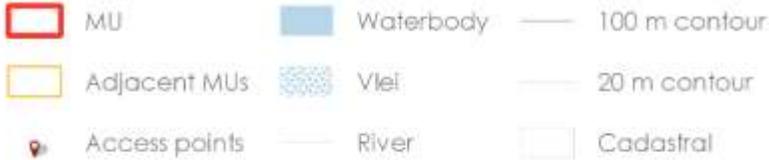
6.71.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.71.8 Economic opportunities

Mature pines and other trees may have value as timber or wood pulp.

6.72 Lagoon Edge: Management Unit LA01



Map 74. Management unit LA01, Lagoon Edge site

6.72.1 Description

Locality

The Lagoon Edge site is located in Plettenberg Bay along the Bitou River estuary, in the Bitou Municipality. The site has only one management unit, LA01. It is 18.4 ha in extent, with an elongated north-south alignment.

Topography

The site is flat and lies just above sea level.

Sensitivities

The site is on the Bitou River estuary, and supports coastal vegetation mapped as the Vulnerable Garden Route Shale Fynbos.

Land uses

Recreational users access the lagoon via the northern part of the MU, while the southernmost section includes part of a campsite.

6.72.2 Invasive species and densities

The northern and central parts of the site are invaded by Australian acacias and other woody species. The campsite at the southern end includes various invasive tree species as planted shade trees.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Moderate	Adult
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Few	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	1b / 2	2	Few	Adult
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	1b / 2 / nl	2	Few	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Adult
Plants	<i>Pinus halepensis</i>	Aleppo pine	3	2	Occasional	All
Plants	<i>Pinus pinaster</i>	Cluster pine	1b / 2	2	Few	Young

6.72.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Freshwater fish	<i>Gambusia affinis</i>	Mosquito-fish	3 where it occurs, 1b in protected areas	n/a	Unknown

6.72.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.72.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Casuarina cunninghamiana</i>	Beefwood	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus camaldulensis</i>	River red gum	Local extirpation	Within five years	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP
<i>Pinus halepensis</i>	Aleppo pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Gambusia affinis</i>	Mosquito-fish	No new introductions	n/a	n/a

6.72.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Debranch cut material and stack smaller material at least 20m from shoreline and fenceline, larger material to be removed from site for use
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut stump and spray	None
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	None
Plants	<i>Casuarina cunninghamiana</i>	Beefwood	Cut stump and spray	Cross cut and remove from site
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	Cut stump and spray	Cross cut and remove from site for use
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut stump	Remove from site
Plants	<i>Pinus halepensis</i>	Aleppo pine	Cut stump	Remove cut material at least 20m away from fenceline or shoreline
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	Remove cut material at least 20m away from fenceline or shoreline

6.72.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.72.8 Economic opportunities

Mature acacias may have value as firewood.

6.73 Roodefontein: Management Unit KH01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 75. Management unit KH01, Roodefontein site

6.73.1 Description

Locality

The Roodefontein site is located near Krantzhoek, south of the Plettenberg Bay airport in the Bitou Municipality. It is a section of coastline, with rocky cliffs falling steeply to the sea. Access is obtained from an unpaved road that leads south to the northwestern corner of KR01, from the minor road DR01770. KR01 is the western part of the site, with an extent of 39.1 ha.

Topography

The MU slopes down toward the coastal cliffs, lying between 60 and 100 m above sea level.

Sensitivities

The site supports South Outeniqua Sandstone Fynbos, which is recovering after a fire in 2017.

Land uses

None.

6.73.2 Invasive species and densities

Invasive alien species have been effectively controlled on the site since the recent fire, but saplings are present in low densities.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Few	Young
Plants	<i>Leptospermum laevigatum</i>	Australian myrtle	1b	1	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b here	2	Occasional	Young

6.73.3 Previous control efforts

The site has been actively and effectively managed since the 2017 fires to control the resurgence of invasive alien species. Compared with adjacent properties, the site has very low densities of invasives.

6.73.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans			
<i>Acacia saligna</i>	Port Jackson willow			
<i>Leptospermum laevigatum</i>	Australian myrtle			
<i>Pinus pinaster</i>	Cluster pine			

6.73.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Handpull if possible, otherwise Cut stump and spray	None
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	None
Plants	<i>Leptospermum laevigatum</i>	Australian myrtle	Handpull if possible, otherwise Cut stump	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Handpull if possible, otherwise Cut stump	None

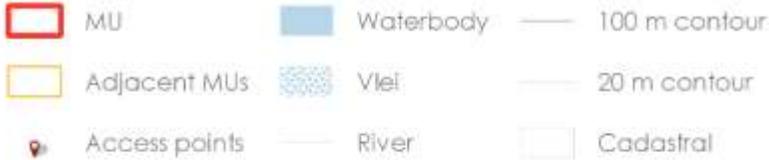
6.73.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.73.7 Economic opportunities

None identified.

6.74 Roodefontein: Management Unit KH02



Map 76. Management unit KH02, Roodefontein site

6.74.1 Description

Locality

The Roodefontein site is located near Krantzhoek, south of the Plettenberg Bay airport in the Bitou Municipality. It is a section of coastline, with rocky cliffs falling steeply to the sea. Access is obtained from an unpaved road that leads south to the northeastern corner of KR02, from the minor road DR01770. KR02 is the eastern part of the site, with an extent of 14.9 ha.

Topography

The MU slopes down toward the coastal cliffs, lying between 60 and 100 m above sea level.

Sensitivities

The site supports South Outeniqua Sandstone Fynbos, which is recovering after a fire in 2017.

Land uses

None.

6.74.2 Invasive species and densities

Invasive alien species have been effectively controlled on the site since the recent fire, but saplings are present in low densities.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young
Plants	<i>Acacia saligna</i>	Port Jackson willow	1b	2	Occasional	Young

6.74.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Marine Invertebrates	<i>Mytilus galloprovincialis</i>	Mediterranean mussel	2	n/a	High

6.74.4 Previous control efforts

The site has been actively and effectively managed since the 2017 fires to control the resurgence of invasive alien species. Compared with adjacent properties, the site has very low densities of invasives.

6.74.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Acacia saligna</i>	Port Jackson willow	Local extirpation	Within five years	GRDM EPWP
<i>Mytilus galloprovincialis</i>	Mediterranean mussel	None	n/a	n/a

6.74.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Handpull if possible, otherwise Cut stump and spray	None
Plants	<i>Acacia saligna</i>	Port Jackson willow	Cut stump and spray	None

6.74.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.74.8 Economic opportunities

None identified.

6.75 Roodefontein: Management Unit KH03



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 77. Management unit KH03, Roodefontein site

6.75.1 Description



This MU has difficult terrain and is likely to require rope access

Locality

The Roodefontein site is located near Krantzhoek, south of the Plettenberg Bay airport in the Bitou Municipality. It is a section of coastline, with rocky cliffs falling steeply to the sea. Access is obtained either from the west or from the east, on unpaved roads off the minor road DR01770. KR03 includes coastal cliffs and central valley on the site, with an extent of 27.9 ha. Access will require specialist equipment and training.

Topography

The MU includes the coastal cliffs and adjoining steep terrain. Access will require specialist equipment and training.

Sensitivities

The site supports South Outeniqua Sandstone Fynbos, which is recovering after a fire in 2017.

Land uses

None.

6.75.2 Invasive species and densities

Invasive alien species have been effectively controlled on the site since the recent fire, but saplings are present in low densities.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Young

6.75.3 Previous control efforts

The site has been actively and effectively managed since the 2017 fires to control the resurgence of invasive alien species. Compared with adjacent properties, the site has very low densities of invasives.

6.75.4 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans			

6.75.5 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	None

6.75.6 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

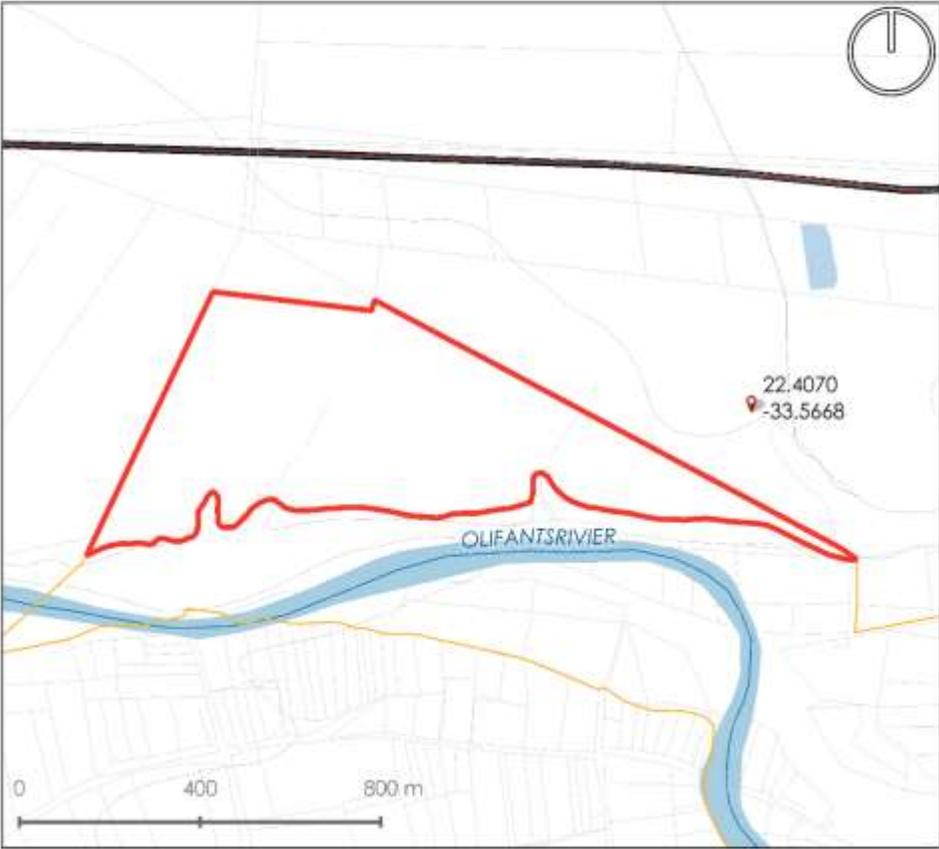
6.75.7 Economic opportunities

None identified.

6.76 Dysselsdorp Erf 2: Management Unit DY01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 78. Management unit DY01, Dysselsdorp Erf 2

6.76.1 Description

Locality

Dysselsdorp Erf 2 is located in Dysselsdorp approximately 15 km south west of De Rust in the Oudtshoorn Local Municipality. Management unit DY01 is at the northern edge of the property, and is 53 ha in extent. Access is obtained via the quarry access road leading west from MR00359.

Topography

The MU is a flat plateau north of the Olifants River.

Sensitivities

The vegetation is of the Eastern Little Karoo type, a Vulnerable ecosystem. South of the MU, the Olifants River flows in a deep valley.

Land uses

Informal grazing

6.76.2 Invasive species and densities

Invasive alien cacti predominate in the MU, with torch cactus particularly common in dense stands.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Occasional	Adult
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	1b	3	Few	Adult
Plants	<i>Cylindropuntia imbricata</i>	Imbricate cactus	1b	1	Few	Adult
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	1b	1	Moderate	Adult
Plants	<i>Nicotiana glauca</i>	Wild tobacco	1b	1	Few	Adult
Plants	<i>Opuntia aurantiaca</i>	Jointed cactus	1b	1	Occasional	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Scattered	Adult

6.76.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.76.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. The biocontrol agent cochineal is present on several of the *Opuntia* invasives in the area, with varying effectiveness.

6.76.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Local extirpation	Within five years	GRDM EPWP
<i>Cylindropuntia imbricata</i>	Imbricate cactus	Local extirpation	Within five years	GRDM EPWP
<i>Echinopsis schickendantzii</i>	Torch cactus	Local extirpation	Within five years	GRDM EPWP
<i>Nicotiana glauca</i>	Wild tobacco	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia aurantiaca</i>	Jointed cactus	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Stumus vulgaris</i>	Common starling	None	n/a	n/a

6.76.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Handpull	None
Plants	<i>Cylindropuntia imbricata</i>	Imbricate cactus	Foliar spray	None
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	Foliar spray	None
Plants	<i>Nicotiana glauca</i>	Wild tobacco	Cut stump	None
Plants	<i>Opuntia aurantiaca</i>	Jointed cactus	Foliar spray	None
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

6.76.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

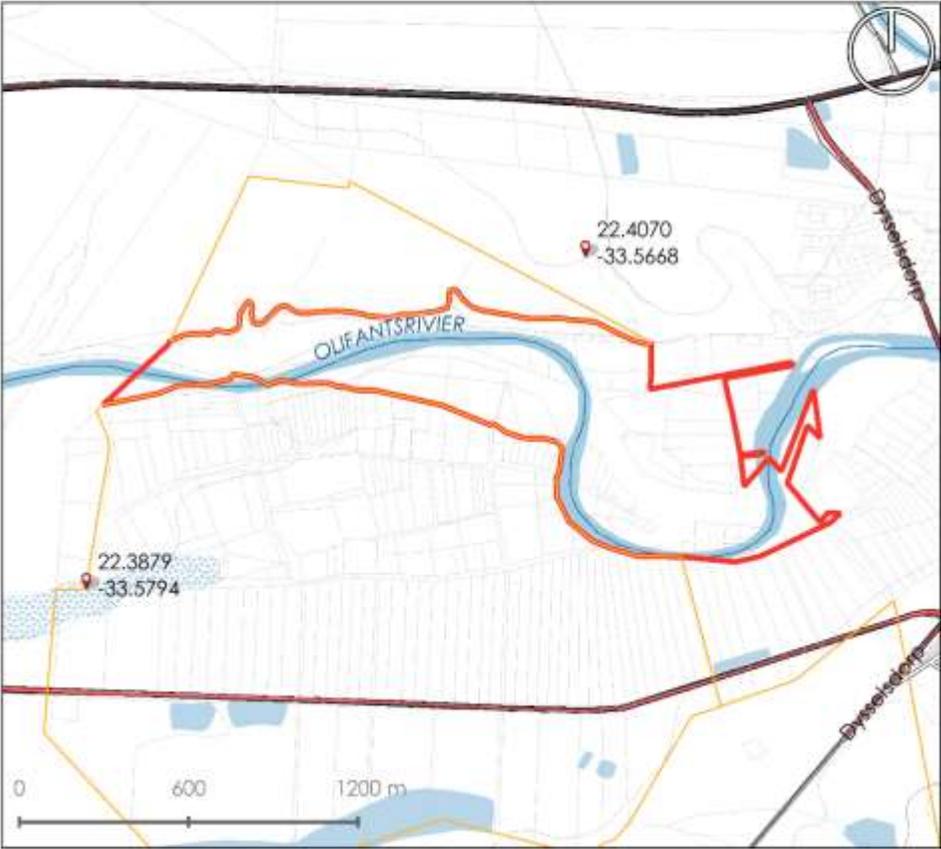
6.76.8 Economic opportunities

Effective invasive species management has the potential to improve the grazing and agricultural ability of this commonage.

6.77 Dysselsdorp Erf 2: Management Unit DY02



- MU
- Waterbody
- 100 m contour
- Adjacent MUs
- Vlei
- 20 m contour
- Access points
- River
- Cadastral



Map 79. Management unit DY02, Dysselsdorp Erf 2

6.77.1 Description

Locality

Dysselsdorp Erf 2 is located in Dysselsdorp approximately 15 km south west of De Rust in the Oudtshoorn Local Municipality. Management unit DY02 is the Olifants River valley, which on its northern bank is deeply incised. Access is obtained via the quarry access road leading west from MR00359, or along the river channel from the east. DY02 has an extent of 111.4 ha.

Topography

The MU is a flat river valley with a steep northern bank.

Sensitivities

The vegetation is of the Muscadel Riviere type, a Critically Endangered ecosystem. The Olifants River flows through the MU.

Land uses

Informal grazing

6.77.2 Invasive species and densities

Invasive alien species are sparsely distributed in the MU, which is heavily vegetated by indigenous *Vachellia* scrub.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Cirsium vulgare</i>	Scotch thistle	1b	1	Occasional	Adult
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	1b	1	Occasional	Adult
Plants	<i>Nicotiana glauca</i>	Wild tobacco	1b	1	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Occasional	Adult
Plants	<i>Xanthium spinosum</i>	Spiny cocklebur	1b	1	Few	Adult

6.77.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown
Birds	<i>Anas platyrhynchos</i>	Mallard	2	n/a	Unknown
Freshwater fish	<i>Micropterus dolomieu</i>	Smallmouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus salmoides</i>	Largemouth bass	3 here	n/a	Unknown
Freshwater fish	<i>Micropterus punctulatis</i>	Spotted bass	3 here	n/a	Unknown

6.77.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. The biocontrol agent cochineal is present on several of the *Opuntia* invasives in the area, with varying effectiveness.

6.77.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Cirsium vulgare</i>	Scotch thistle	Local extirpation	Within five years	GRDM EPWP
<i>Echinopsis schickendantzii</i>	Torch cactus	Local extirpation	Within five years	GRDM EPWP
<i>Nicotiana glauca</i>	Wild tobacco	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Xanthium spinosum</i>	Spiny cocklebur	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Anas platyrhynchos</i>	Mallard	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a
<i>Micropterus dolomieu</i>	Smallmouth bass	No new introductions	n/a	n/a
<i>Micropterus salmoides</i>	Largemouth bass	No new introductions	n/a	n/a
<i>Micropterus punctulatis</i>	Spotted bass	No new introductions	n/a	n/a

6.77.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Cirsium vulgare</i>	Scotch thistle	Handpull	If the flowering head is mature, then remove from site and burn
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	Foliar spray	None
Plants	<i>Nicotiana glauca</i>	Wild tobacco	Cut stump	None
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Xanthium spinosum</i>	Spiny cocklebur	Handpull	None

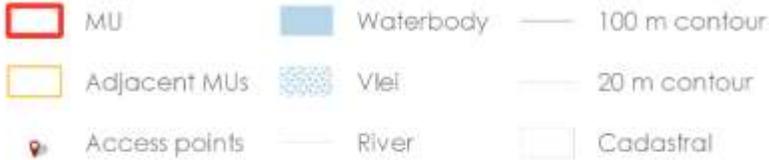
6.77.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.77.8 Economic opportunities

Effective invasive species management has the potential to improve the grazing and agricultural ability of this commonage.

6.78 Dysselsdorp Erf 2: Management Unit DY03



Map 80. Management unit DY03, Dysselsdorp Erf 2

6.78.1 Description

Locality

Dysselsdorp Erf 2 is located in Dysselsdorp approximately 15 km south west of De Rust in the Oudtshoorn Local Municipality. Management unit DY03 is the agricultural area south of the Olifants River, Access is obtained from the DR01692. DY03 has an extent of 375.3 ha.

Topography

The MU is in the broad Olifants River valley, and is flat.

Sensitivities

The vegetation would historically have been of the Muscadel Riviere type, a Critically Endangered ecosystem which in the MU has been transformed by agriculture and human settlement.

Land uses

Small-scale agriculture and livestock farming.

6.78.2 Invasive species and densities

Most invasive species identified in the MU are within the area of small-scale farms, and occur in low numbers.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Anredera cordifolia</i>	Madeira vine	1b	1	Few	Adult
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	1b	3	Occasional	Adult
Plants	<i>Atriplex nummularia</i>	Old man saltbush	2	2	Occasional	Adult
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	1b / 2 / nl	2	Few	Adult
Plants	<i>Prosopis glandulosa</i>	Honey mesquite	1b	2	Occasional	Adult
Plants	<i>Tamarix ramosissima</i>	Tamarisk	1b	1	Few	Adult
Plants	<i>Tecoma stans</i>	Yellow bells	1b	1	Few	Adult

6.78.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Unknown

6.78.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.78.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Anredera cordifolia</i>	Madeira vine	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Atriplex nummularia</i>	Old man saltbush	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Eucalyptus camaldulensis</i>	River red gum	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Prosopis glandulosa</i>	Honey mesquite	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Tamarix ramosissima</i>	Tamarisk	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Tecoma stans</i>	Yellow bells	Where invasives occur outside of privately owned portions of this MU, extirpate locally. Work with residents to control invasives on privately owned portions.	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.78.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Anredera cordifolia</i>	Madeira vine	Cut stump and spray	Place all plant material (NB: including nodules) carefully into black plastic bags. Remove from site and then double up the bags and cover with a tarpaulin or similar covering that will completely keep out the sun. After 6 months, if no growth has occurred then it will be dead and can be used as very good quality compost.
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Handpull	None
Plants	<i>Atriplex nummularia</i>	Old man saltbush	Cut stump	Where dense, stack to reduce impact on roads, fencelines and agricultural land
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	Cut stump and spray	Cross cut and remove from site
Plants	<i>Prosopis glandulosa</i>	Honey mesquite	Cut stump and spray	Remove trunks larger than 10cm from site. Smaller material can be left
Plants	<i>Tamarix ramosissima</i>	Tamarisk	Cut stump and spray	None
Plants	<i>Tecoma stans</i>	Yellow bells	Cut stump	None

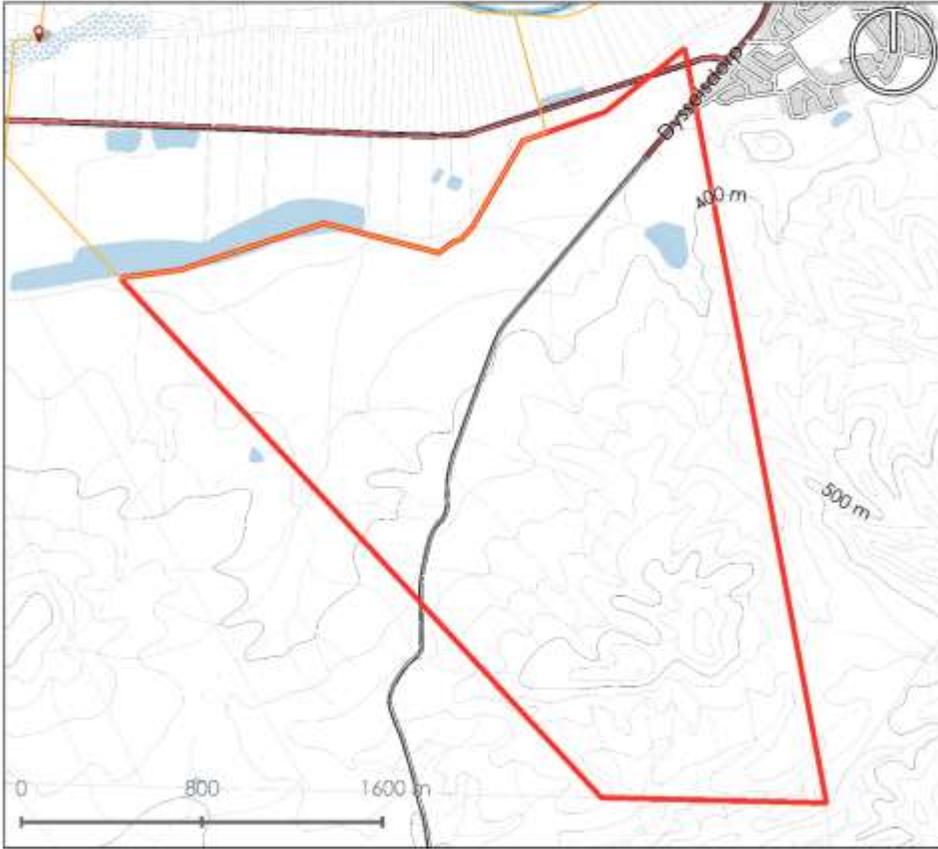
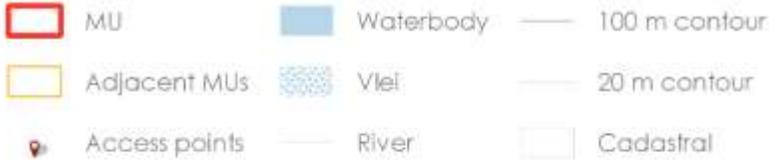
6.78.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.78.8 Economic opportunities

Effective invasive species management has the potential to improve the grazing and agricultural ability of this commonage.

6.79 Dysselsdorp Erf 2: Management Unit DY04



Map 81. Management unit DY04, Dysselsdorp Erf 2

6.79.1 Description

Locality

Dysselsdorp Erf 2 is located in Dysselsdorp approximately 15 km south west of De Rust in the Oudtshoorn Local Municipality. Management unit DY04 is the extensive mountainous area south of the town. Access is obtained from the MR00359. DY04 has an extent of 616.9 ha.

Topography

The MU rises gently from the Olifants valley at 360 m, southward to a high point of 520 m before dropping again to the southern boundary.

Sensitivities

Vegetation on the site is Eastern Little Karoo, a Vulnerable ecosystem which in the MU is in fairly good condition, albeit impacted by grazing and by dumping. Seasonal watercourses and a major water transfer scheme pass through the MU.

Land uses

Dumping of waste has occurred extensively near the main road that passes through the MU.

6.79.2 Invasive species and densities

Invasive species were found only in the disturbed areas surrounding the dumpsites and along the road.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Scattered	Adult
Plants	<i>Atriplex nummularia</i>	Old man saltbush	2	2	Occasional	Adult
Plants	<i>Salsola kali</i>	Tumbleweed	1b	nl	Occasional	Adult
Plants	<i>Tamarix ramosissima</i>	Tamarisk	1b	1	Few	Young

6.79.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium

6.79.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.79.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Atriplex nummularia</i>	Old man saltbush	Local extirpation	Within five years	GRDM EPWP
<i>Salsola kali</i>	Tumbleweed	Local extirpation	Within five years	GRDM EPWP
<i>Tamarix ramossissima</i>	Tamarisk	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.79.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Atriplex nummularia</i>	Old man saltbush	Handpull	None
Plants	<i>Salsola kali</i>	Tumbleweed	Handpull or dig out	None
Plants	<i>Tamarix ramossissima</i>	Tamarisk	Cut stump and spray	None

6.79.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

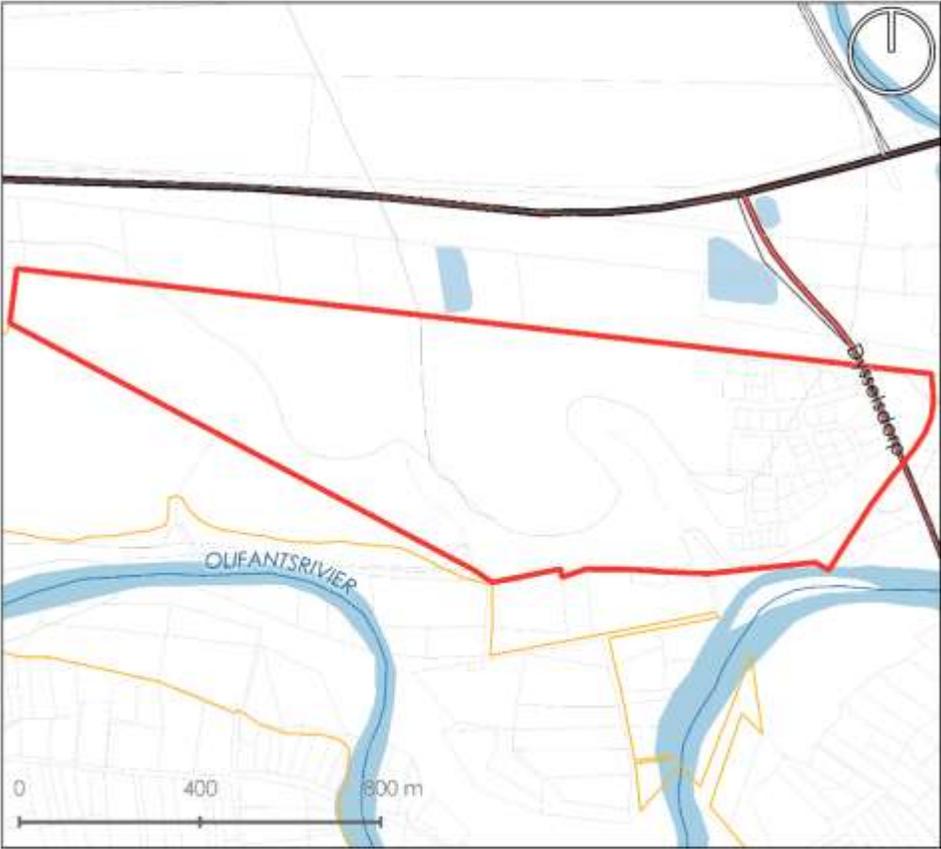
6.79.8 Economic opportunities

None identified.

6.80 Dysselsdorp 975: Management Unit DY05



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 82. Management unit DY05, Dysselsdorp Erf 975

6.80.1 Description

Locality

Dysselsdorp Erf 975 is located in Dysselsdorp approximately 15 km south west of De Rust in the Oudtshoorn Local Municipality. Management unit DY01 is the entire site and is 95.9 ha in extent. Access is obtained from MR00359.

Topography

The MU is a flat plateau north of the Olifants River, with deeply incised drainage lines.

Sensitivities

The vegetation is primarily of the Eastern Little Karoo type, a Vulnerable ecosystem. The southern boundary of the MU is the Olifants River, in the Critically Endangered Muscadel Riviere ecosystem.

Land uses

The MU contains a large gravel quarry, several packsheds and houses, and is informally grazed. Illegal dumping occurs throughout.

6.80.2 Invasive species and densities

Invasive alien cacti predominate in the MU, with exceptionally dense stands of torch cactus on the eastern part of the MU. Agave is also widespread.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Scattered	Adult
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	1b	3	Scattered	All
Plants	<i>Austrocylindropuntia cylindrica</i>	Cane cactus	1a	nl	Few	Adult
Plants	<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	1b	1	Few	Adult
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	1b	1	Moderate	All
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	1b / 2 / nl	2	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Scattered	Adult
Plants	<i>Opuntia microdasys</i>	Yellow bunny-ears	1b	nl	Few	Adult
Plants	<i>Opuntia stricta</i>	Pest pear of Australia	1b	1	Few	Adult
Plants	<i>Pennisetum setaceum</i>	Fountain grass	1b	1	Occasional	All

6.80.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.80.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. The biocontrol agent cochineal is present on several of the *Opuntia* invasives in the area, with varying effectiveness.

6.80.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Local extirpation	Within five years	GRDM EPWP
<i>Austrocylindropuntia cylindrica</i>	Cane cactus	Eradication (category 1a)	Within one year	GRDM EPWP
<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Echinopsis schickendantzii</i>	Torch cactus	Local extirpation	Within five years	GRDM EPWP
<i>Eucalyptus camaldulensis</i>	River red gum	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia microdasys</i>	Yellow bunny-ears	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia stricta</i>	Pest pear of Australia	Local extirpation	Within five years	GRDM EPWP
<i>Pennisetum setaceum</i>	Fountain grass	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.80.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Handpull	None
Plants	<i>Austrocylindropuntia cylindrica</i>	Cane cactus	Physical removal	Remove from site and burn
Plants	<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	Foliar spray	None
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	Foliar spray	None
Plants	<i>Eucalyptus camaldulensis</i>	River red gum	Cut stump and spray	Large material can be used. Stack smaller material on site.
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None
Plants	<i>Opuntia microdasys</i>	Yellow bunny-ears	Stem inject	None
Plants	<i>Opuntia stricta</i>	Pest pear of Australia	Foliar spray	None
Plants	<i>Pennisetum setaceum</i>	Fountain grass	Foliar spray	None

6.80.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

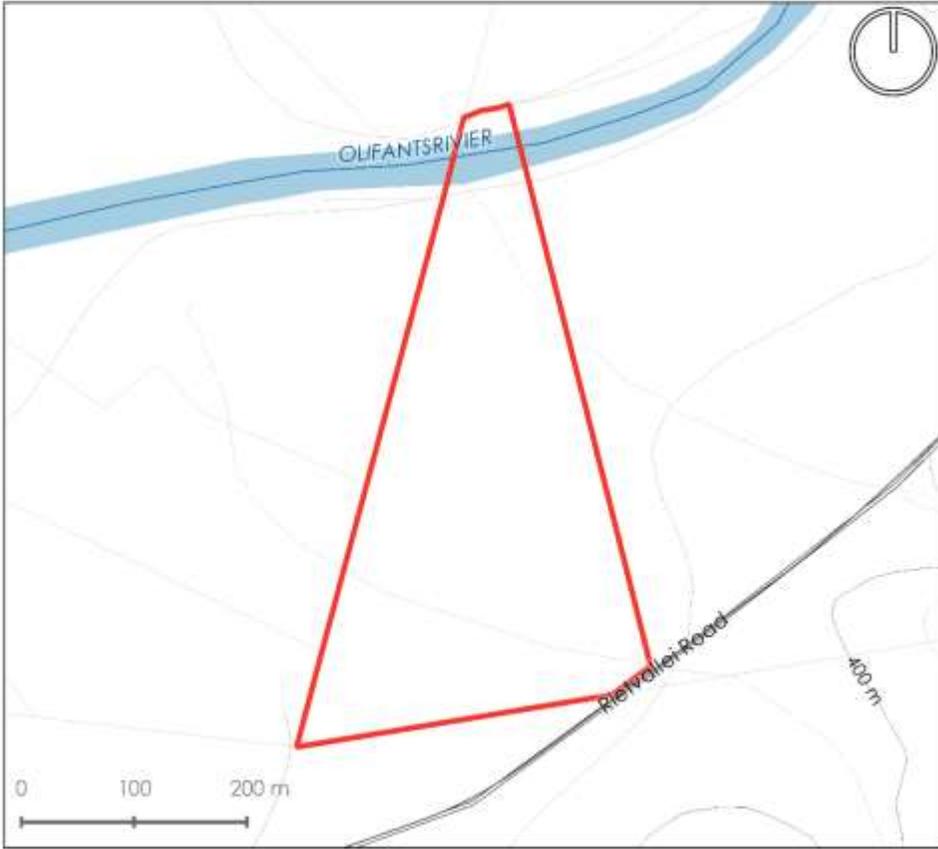
6.80.8 Economic opportunities

Effective invasive species management has the potential to improve the grazing and agricultural ability of this commonage.

6.81 Annex Haasejagt: Management Unit AH01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 83. Management unit AH01, Annex Haasejagt site

6.81.1 Description

Locality

The Annex Haasejagt site is located in Dysselsdorp approximately 15 km south west of De Rust in the Oudtshoorn Local Municipality. Management unit AH01 is the entire site, approximately 11.3 ha in extent. Access is obtained via DR01694.

Topography

The MU is a flat river valley with a steep northern bank.

Sensitivities

The vegetation is of the Muscadel Riviere type, a Critically Endangered ecosystem. The Olifants River flows across the northern part of the MU.

Land uses

Informal grazing

6.81.2 Invasive species and densities

Invasive alien species are sparsely distributed in the MU. Disturbed areas have higher densities of *Atriplex*.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	1b	3	Scattered	All
Plants	<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	1b	1	Few	Adult
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	1b	1	Occasional	Adult
Plants	<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	1b	1	Occasional	Adult

6.81.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium

6.81.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU. The biocontrol agent cochineal is present on several of the *Opuntia* invasives in the area, with varying effectiveness.

6.81.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Local extirpation	Within five years	GRDM EPWP
<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Echinopsis schickendantzii</i>	Torch cactus	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.81.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Atriplex inflata</i>	Sponge-fruit Saltbush	Handpull	None
Plants	<i>Cylindropuntia imbricata</i>	Imbricate prickly pear	Foliar spray	None
Plants	<i>Echinopsis schickendantzii</i>	Torch cactus	Foliar spray	None
Plants	<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	Stem inject	None

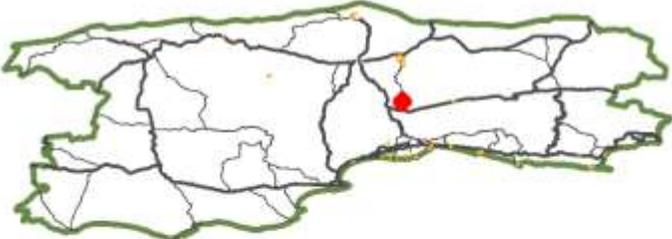
6.81.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

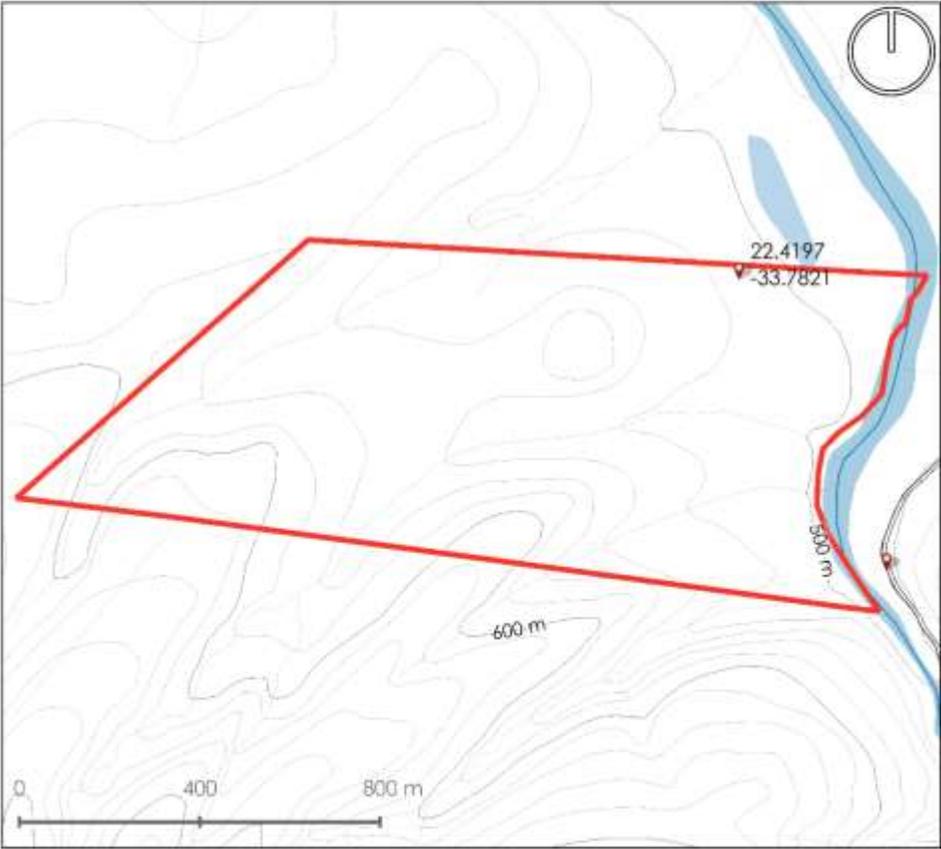
6.81.8 Economic opportunities

Effective invasive species management has the potential to improve the grazing and agricultural ability of this commonage

6.82 Doornberg: Management Unit DO01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- 100 m contour
- 20 m contour
- Cadastral



Map 84. Management unit DO01, Doornberg site

6.82.1 Description

Locality

The Doornberg site is located in the Paardepoort area north of Herold, in the Oudtshoorn Local Municipality. The site has only one management unit, DO01, with an extent of 127.2 ha. Access is obtained via private property from the west.

Topography

The site includes three high points of about 60 m above the surroundings, with gentle slopes.

Sensitivities

Vegetation on the site is Uniondale Shale Renosterveld and North Outeniqua Sandstone Fynbos, although parts of the site have been farmed in the recent past. The seasonal Doring River flows along the eastern boundary.

Land uses

Agriculture

6.82.2 Invasive species and densities

Acacias are found along the riverbed to the east; the remaining species occur sparsely in the central parts of the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia mearnsii</i>	Black wattle	2	2	Scattered	Adult
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Few	Adult

6.82.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium

6.82.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.82.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia mearnsii</i>	Black wattle	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.82.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia mearnsii</i>	Black wattle	Cut stump and spray	Remove 30m from the riverline, cut material larger than 10cm diameter should be removed from site for use
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut stump	None
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

6.82.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

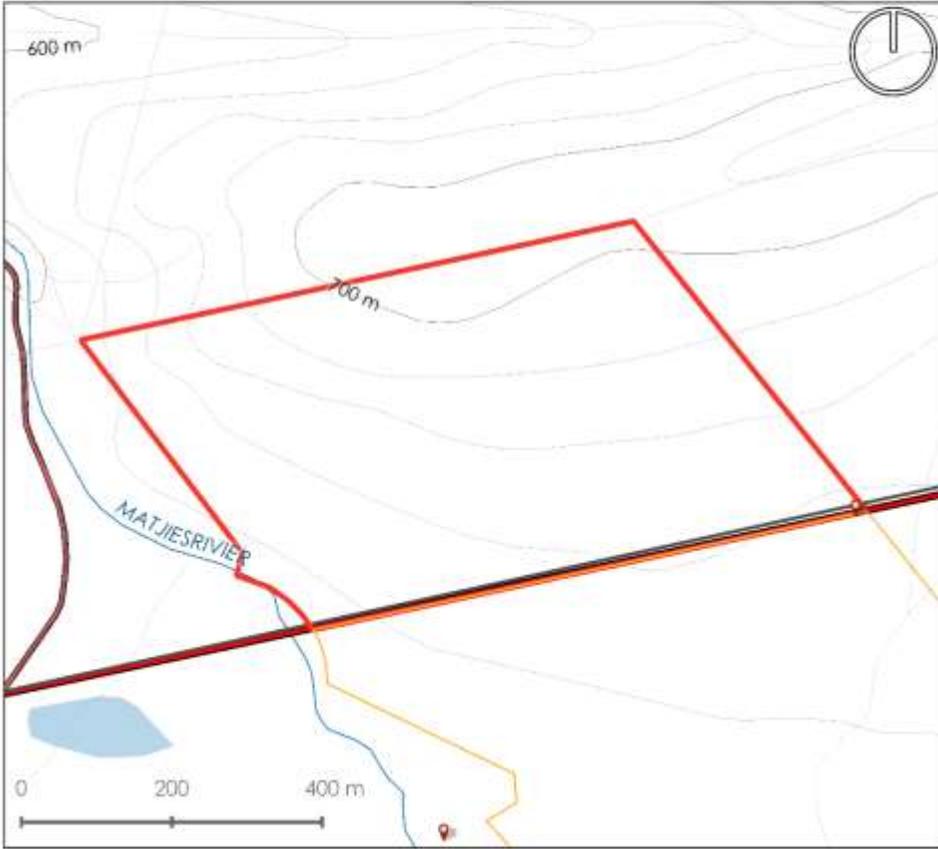
6.82.8 Economic opportunities

Large wattles can be used for firewood, timber or droppers.

6.83 Schooneberg: Management Unit SC01



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 85. Management unit SC01, Schooneberg site

6.83.1 Description

Locality

The Schooneberg site is located at Louvain on the N9, in the George Local Municipality. SC01 is the part of the site that lies north of the R62, with an extent of 39.9 ha.

Topography

The site slopes upward to the north, with a high point approximately 60 m above the road.

Sensitivities

Vegetation on the site is North Outeniqua Sandstone. The Matjies River flows along the western boundary.

Land uses

None

6.83.2 Invasive species and densities

Invasive alien species are sparsely distributed on the site, many of them having reseeded after a fire. *Echium plantagineum* was found along the road reserve of the R62.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Echium plantagineum</i>	Patterson's curse	1b	1	Few	Adult
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b / 2	2	Scattered	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b / 2	2	Occasional	Young

6.83.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium

6.83.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.83.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Echium plantagineum</i>	Patterson's curse	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.83.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Echium plantagineum</i>	Patterson's curse	Handpull	None
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut stump	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	Debranch, cut material larger than 10cm can be removed from site for use
Plants	<i>Pinus radiata</i>	Radiata pine	Cut stump	Debranch, cut material larger than 10cm can be removed from site for use

6.83.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

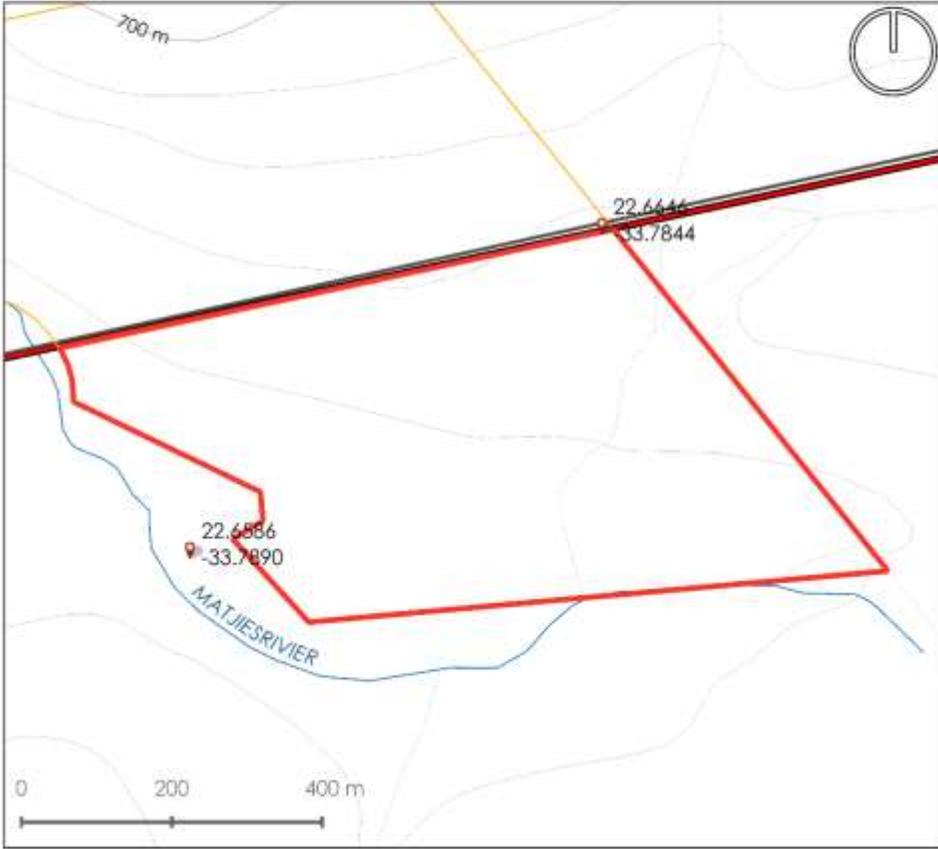
6.83.8 Economic opportunities

May be suitable for agricultural use.

6.84 Schooneberg: Management Unit SC02



- MU
- Adjacent MUs
- Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 86. Management unit SC02, Schooneberg site

6.84.1 Description

Locality

The Schooneberg site is located at Louvain on the N9, in the George Local Municipality. SC01 is the part of the site that lies south of the R62, with an extent of 40.7 ha.

Topography

The site is essentially flat.

Sensitivities

Vegetation on the site would historically have been North Outeniqua Sandstone and the critically endangered Langkloof Shale Renosterveld, but has been transformed for planted pastures.

Land uses

Agriculture (grazing)

6.84.2 Invasive species and densities

Invasive alien species are sparsely distributed on the site, many of them having reseeded after a fire. *Echium plantagineum* was found along the road reserve of the R62.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Echium plantagineum</i>	Patterson's curse	1b	1	Few	Adult
Plants	<i>Hakea sericea</i>	Silky Hakea	1b	1	Occasional	Young
Plants	<i>Pinus pinaster</i>	Cluster pine	1b / 2	2	Occasional	Adult
Plants	<i>Pinus radiata</i>	Radiata pine	1b / 2	2	Occasional	Young

6.84.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Terrestrial Invertebrates	<i>Linepithema humile</i>	Argentine ant	1b	n/a	Medium

6.84.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.84.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Echium plantagineum</i>	Patterson's curse	Local extirpation	Within five years	GRDM EPWP
<i>Hakea sericea</i>	Silky Hakea	Local extirpation	Within five years	GRDM EPWP
<i>Pinus pinaster</i>	Cluster pine	Local extirpation	Within five years	GRDM EPWP
<i>Pinus radiata</i>	Radiata pine	Local extirpation	Within five years	GRDM EPWP
<i>Linepithema humile</i>	Argentine ant	Prevent establishment	Monitor during clearing and follow-ups, thereafter every five years.	GRDM staff

6.84.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Echium plantagineum</i>	Patterson's curse	Handpull	None
Plants	<i>Hakea sericea</i>	Silky Hakea	Cut stump	None
Plants	<i>Pinus pinaster</i>	Cluster pine	Cut stump	None, ensure cut material is left at least 20m away from the road
Plants	<i>Pinus radiata</i>	Radiata pine		None, ensure cut material is left at least 20m away from the road

6.84.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

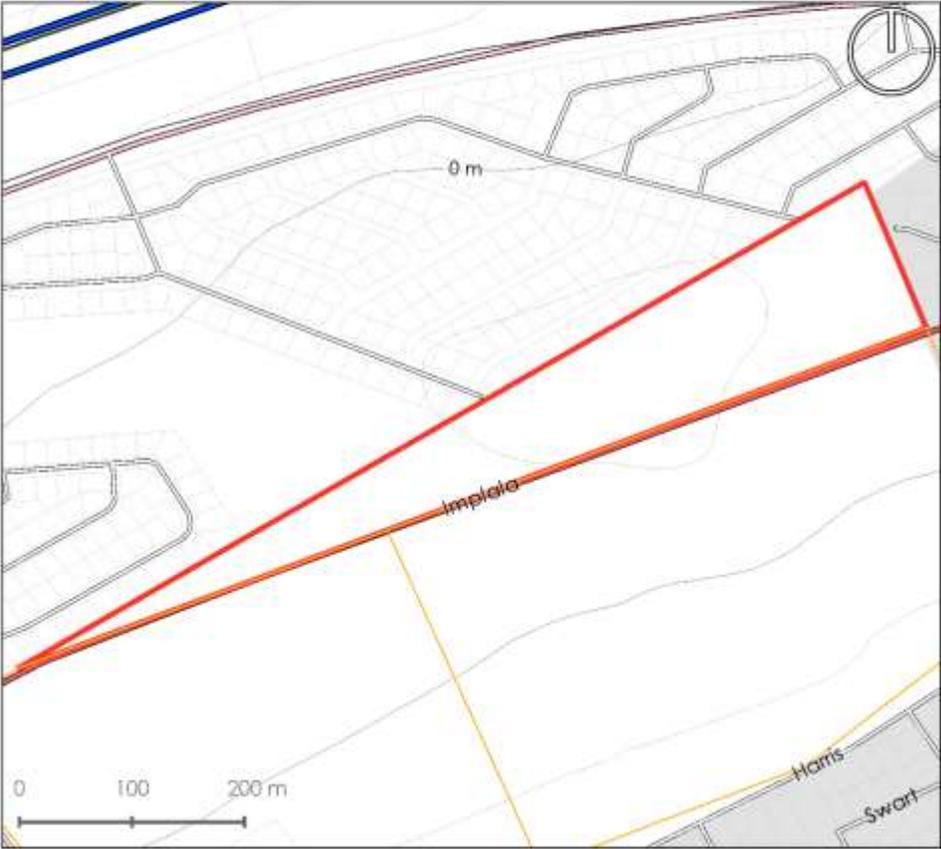
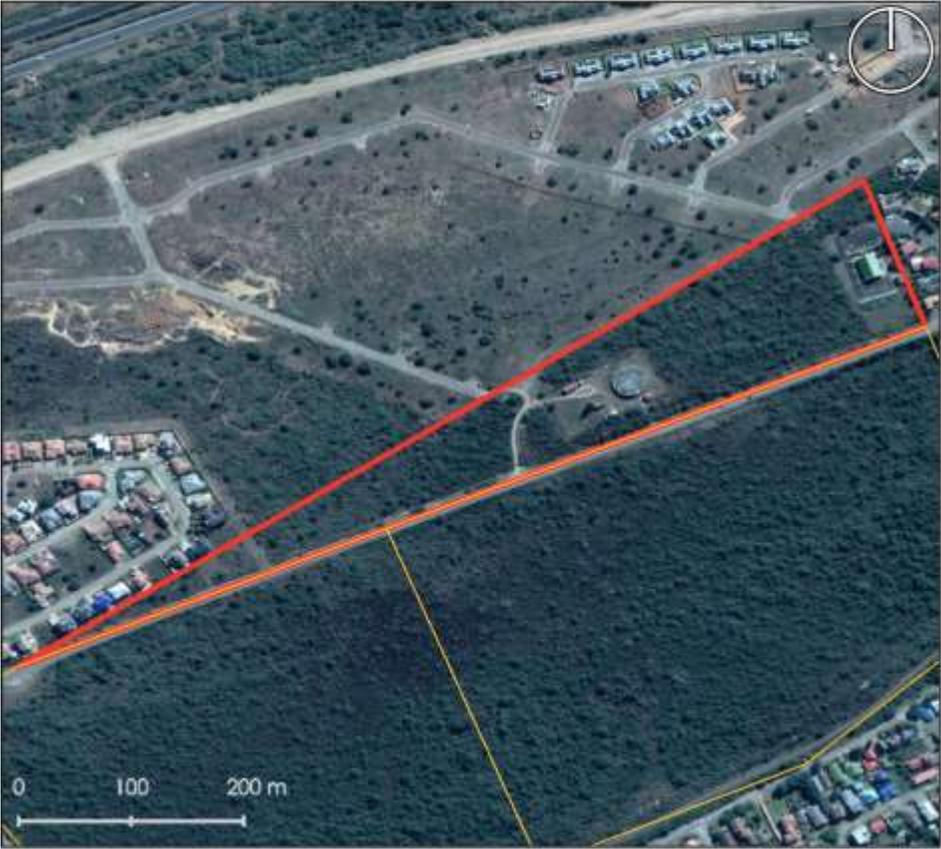
6.84.8 Economic opportunities

Continued agricultural use.

6.85 Reebok: Management Unit RE01



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 87. Management unit RE01, Reebok site

6.85.1 Description

Locality

The Reebok site is located in Reebok, east of Kleinbrak in the Mossel Bay Local Municipality. RE01 is the part of the site that lies north of Impala Road, with an extent of 7.2 ha.

Topography

The site is essentially flat.

Sensitivities

Vegetation on the site is dense Canca Limestone Fynbos.

Land uses

Municipal infrastructure is located on the site, including two reservoirs.

6.85.2 Invasive species and densities

Invasive alien species are sparsely distributed on the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Agave americana</i>	Agave	3	nl	Few	Adult
Plants	<i>Cestrum laevigatum</i>	Inkberry	1b	1	Few	Adult
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Scattered	Adult

6.85.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.85.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.85.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Agave americana</i>	Agave	Local extirpation	Within five years	GRDM EPWP
<i>Cestrum laevigatum</i>	Inkberry	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Stumus vulgaris</i>	Common starling	None	n/a	n/a

6.85.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Agave americana</i>	Agave	Foliar spray	None
Plants	<i>Cestrum laevigatum</i>	Inkberry	Cut stump and spray	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

6.85.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

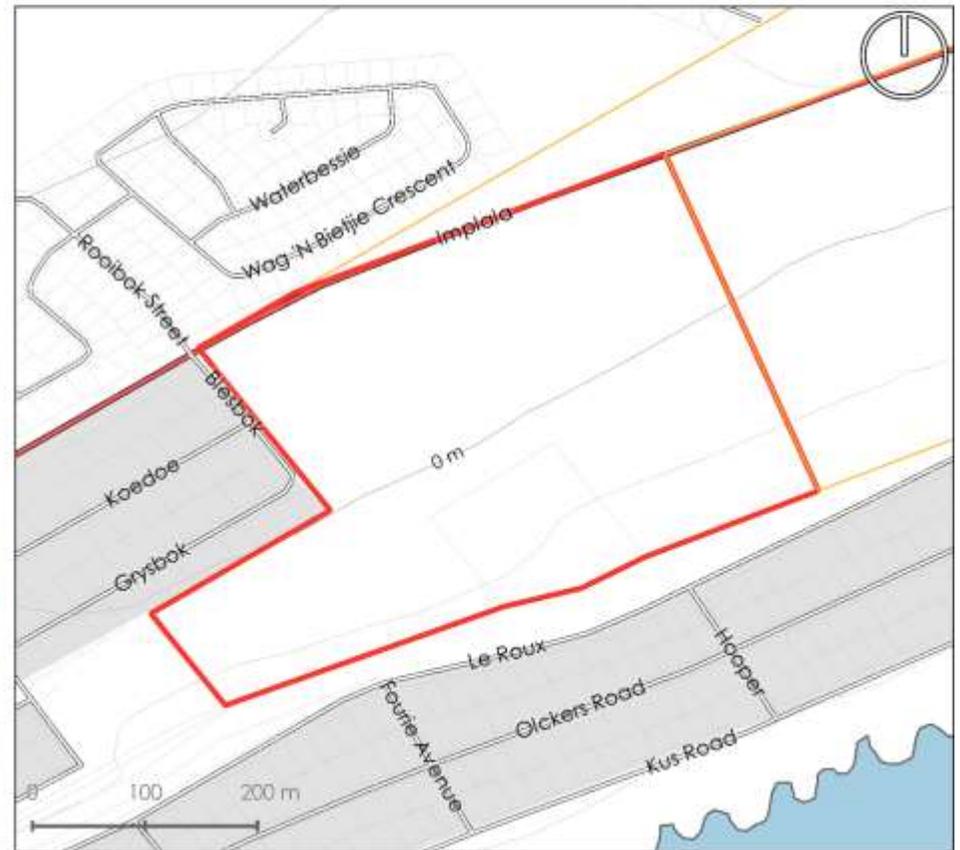
6.85.8 Economic opportunities

None identified.

6.86 Reebok: Management Unit RE02



- | | | |
|---------------|-----------|---------------|
| MU | Waterbody | 100 m contour |
| Adjacent MUs | Vlei | 20 m contour |
| Access points | River | Cadastral |



Map 88. Management unit RE02, Reebok site

6.86.1 Description

Locality

The Reebok site is located in Reebok, east of Kleinbrak in the Mossel Bay Local Municipality. RE01 is the western half of the site south of Impala Road, with an extent of 18.6 ha.

Topography

The site is essentially flat.

Sensitivities

Vegetation on the site is dense Canca Limestone Fynbos.

Land uses

None. A railway line forms the southern boundary.

6.86.2 Invasive species and densities

Invasive alien species are sparsely distributed on the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Young
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Occasional	Adult

6.86.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.86.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.86.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.86.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut stump	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

6.86.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

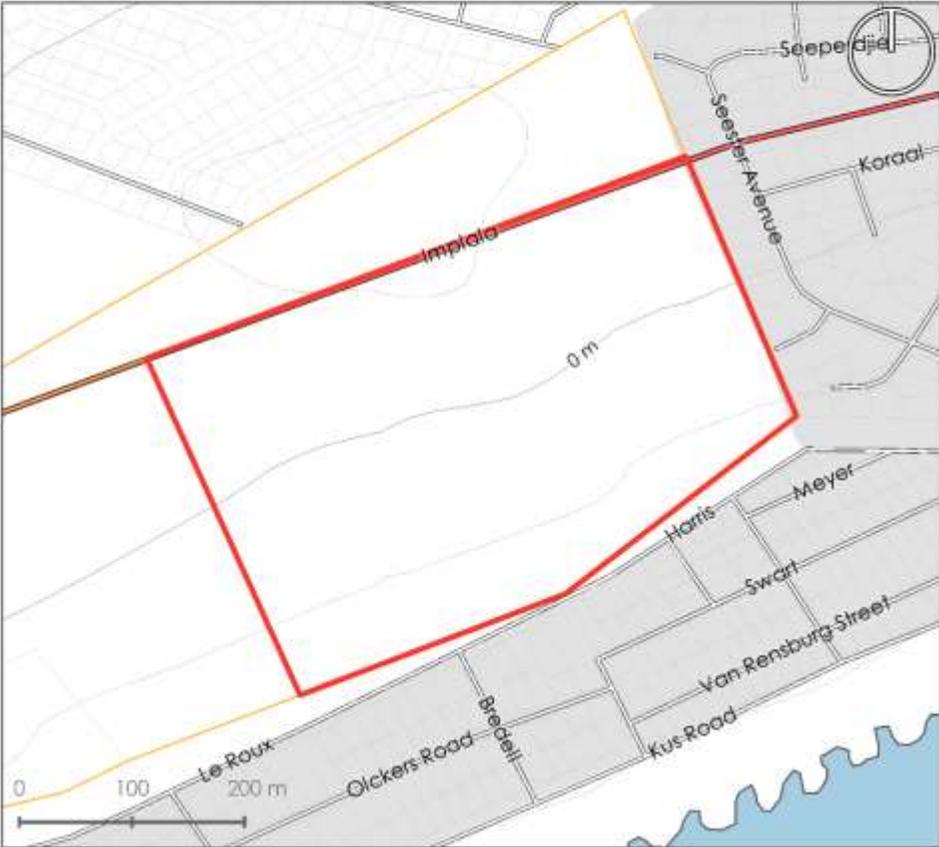
6.86.8 Economic opportunities

None identified.

6.87 Reebok: Management Unit RE03



- MU
- Adjacent MUs
- 📍 Access points
- Waterbody
- Vlei
- River
- 100 m contour
- 20 m contour
- Cadastral



Map 89. Management unit RE03, Reebok site

6.87.1 Description

Locality

The Reebok site is located in Reebok, east of Kleinbrak in the Mossel Bay Local Municipality. RE01 is the eastern half of the site south of Impala Road, with an extent of 18.6 ha.

Topography

The site is essentially flat.

Sensitivities

Vegetation on the site is dense Canca Limestone Fynbos.

Land uses

None. A railway line forms the southern boundary.

6.87.2 Invasive species and densities

Invasive alien species are sparsely distributed on the site.

Group	Species	Common name	NEMBA	CARA	Density	Size class
Plants	<i>Acacia cyclops</i>	Rooikrans	1b	2	Occasional	Adult
Plants	<i>Cestrum laevigatum</i>	Inkberry	1b	1	Few	Adult
Plants	<i>Myoporum tenuifolium</i>	Manatoka	3	3	Few	Young
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	1b	1	Occasional	Adult

6.87.3 Expected invasive species not found during surveys

Species which were not identified during surveys, but which may occur or invade in the MU include those in the table below.

Group	Species	Common name	NEMBA	CARA	Likelihood of occurrence / invasion
Birds	<i>Sturnus vulgaris</i>	Common starling	3	n/a	Unknown

6.87.4 Previous control efforts

No information is available on the history of past efforts to control invasive species in the MU.

6.87.5 Objectives per species

Species	Common name	Objectives	Timeframes	Implementation
<i>Acacia cyclops</i>	Rooikrans	Local extirpation	Within five years	GRDM EPWP
<i>Cestrum laevigatum</i>	Inkberry	Local extirpation	Within five years	GRDM EPWP
<i>Myoporum tenuifolium</i>	Manatoka	Local extirpation	Within five years	GRDM EPWP
<i>Opuntia ficus-indica</i>	Sweet prickly pear	Local extirpation	Within five years	GRDM EPWP
<i>Sturnus vulgaris</i>	Common starling	None	n/a	n/a

6.87.6 Control methods and biomass

Group	Species name	Common name	Control Methods	Biomass management
Plants	<i>Acacia cyclops</i>	Rooikrans	Cut stump and spray	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Cestrum laevigatum</i>	Inkberry	Cut stump and spray	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Myoporum tenuifolium</i>	Manatoka	Cut stump	Remove material at least 30m away from roads, houses or train lines
Plants	<i>Opuntia ficus-indica</i>	Sweet prickly pear	Stem inject	None

6.87.7 Monitoring and evaluation

1. Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid.
2. Evaluate success after initial clearing. All alien invasive plants in the MU to have been controlled according to the prescribed methods before initial clearing is considered completed.
3. Monitor annually, assessing
 - a. the extent and density of listed invasive species
 - b. the presence of any new invasions
 - c. the need for follow-up clearing activities.

6.87.8 Economic opportunities

None identified.



WORKLOAD ASSESSMENTS

7 Workload Assessments

This section provides an estimate of the effort and time (expressed as person-days) required to implement initial and follow-up control on each MU. Please see section 4.6 for an outline of the workload assessment methodology.

MU	Initial clearing	Follow-up 1	Follow-up 2	Follow-up 3	Follow-up 4	Follow-up 5	Follow-up 6	Follow-up 7	Follow-up 8	Follow-up 9
DH01	10				5					5
DH02	60	20	10	5	5	5	5	5	5	5
DH03	199	120	100	80	60	60			50	
DH04	13	10	5		5					5
CA01	54	40	30	20			20			20
CA02	68	55	45		25		20			20
CA03	41	35	30	20			20			20
OP01	4		4			4				4
BU01	89	70	40	20	20		20			10
RO01	7	5		5			5			5
DF01	15	10			5					5
HO01	149	100	90	80	80		80		70	
HO02	55	40	32	25	25		25		20	
HO03	417	280	250	200	180		150		130	
HO04	22	10	10		10		10		5	
HO05	25	10	10		10		10		5	
MA01	98	80	60	60	40		40		30	
MA02	89	70	50	50	35		35		25	
MA03	165	120	90	90	65		65		50	
MA04	125	90	70	70	55		55		40	
MA05	79	55	45	45	35					
MA06	82	55	45	45	35					
MA07	116	80	60	60	50					
MA08	116	80	60	60	50					
MA09	107	45	60	60	50					
MA10	140	100	75	75	60					
MA11	273	190	150	150	120		120		120	

MU	Initial clearing	Follow-up 1	Follow-up 2	Follow-up 3	Follow-up 4	Follow-up 5	Follow-up 6	Follow-up 7	Follow-up 8	Follow-up 9
MA12	126	85	70	70	70		70		70	
MA13	172	120	95	95	75		75		75	
MA14	149	100	80	80	65					
HB01	26	10		10		5			5	
HB02	20	15		10		5		5		5
HB03	19	20	20	15		10		5		5
MR01	432	300	230	200	100		60		60	
MR02	42	35	35	30	25		25		25	
MR03	175	150	115	100	50		50		50	
GW01	29	20	15	10	10		5		5	
GW02	197	140	120	120	90		60		50	
GW03	169	120	100	80	60		45		45	
GW04	194	130	110	110	80		50		40	
HK01	189	130	100	70	45		35		35	
HK02	76	55	50	40	20		20		20	
KR01	251	175	140	100	70		70		60	
KR02	152	100	80	60	50		35		30	
KR03	158	130	110	90	65		65		60	
KR04	28	20	15		15		10		10	
KR05	65	50	40	30	30		20		20	
KR06	126	90	70	50	35		30		30	
BB01	174	120		95		80			50	
BB02	25	15		10		10			5	
BB03	78	55		40		20			15	
KL01	129	90	70		35		35		35	
KL02	128	90	70		35		35		35	
KL03	6	5	5		5		5		5	
WV01	46	32	25	15	15		15		15	
SW01	230	165	130	110	90		90		60	
SW02	93	70	55	45	35		35		20	
SW03	192	140	110	90	70		70		40	
SW04	129	95	75	55	35		35		20	

MU	Initial clearing	Follow-up 1	Follow-up 2	Follow-up 3	Follow-up 4	Follow-up 5	Follow-up 6	Follow-up 7	Follow-up 8	Follow-up 9
SW05	130	95	75	55	35		35		20	
SW06	192	140	110	90	70		70		40	
SW07	166	120	95	75	55		55		30	
SW08	136	100	80	60	40		40		25	
SW09	40	30	30	25	25		25		15	
SW10	30	25	20	15	10		10		10	
WP01	27	20	20	15	15		15		10	
WP02	42	30	25	20	20		20		15	
WP03	72	50	40	30	30		30		20	
WP04	86	60	45	35	35		35		20	
HA01	50	40	30	30	25		25		20	
HA02	77	55	45	45	40		40		30	
LA01	146	100	80	70	50		50		30	
KH01	30	20	20	20	20		20		20	
KH02	11	10	10	10	10		10		10	
KH03	112	100	90	80	80		80		80	
DY01	134	90	70		40			40		
DY02	62	40	30		15			15		
DY03	90	60	50		25			25		
DY04	62	40	30		15			15		
DY05	120	90		60			60			120
AH01	15	10		10			10			15
DO01	87	60	50	40	40		40		30	
SC01	61	40	35	30	25		25		15	
SC02	42	30	25	20	15		15		15	
RE01	11	7	5	5	5		5		5	
RE02	71	50	40	40	30		30		30	
RE03	73	50	40	40	30		30		30	

7.1 Sites requiring rope access

The following MUs have been identified as requiring special equipment and training for access. It is likely that rope access will be required for implementation in these MUs.

MU_ID	Area in ha	Site	Description
HO04	0.61	Hoogekraal	Cliffs above road
HO05	2.42	Hoogekraal	Central valley
MA11	28.02	Maalgate River Mouth	Lower northern slopes
MA13	17.48	Maalgate River Mouth	Lower southern slopes
HB03	0.60	Herolds Bay	Steep roadside slopes
GW03	21.02	Gwaing Hansmoeskraal	Western slopes
HK02	18.75	Hansmoeskraal Coastal	Coastal cliffs
KR01	11.15	Kaaimans Mouth - Victoria Bay	Swart River
KR02	9.44	Kaaimans Mouth - Victoria Bay	Kaaimans north
KR03	13.09	Kaaimans Mouth - Victoria Bay	Kaaimans south
KR06	8.98	Kaaimans Mouth - Victoria Bay	Victoria hill
BB02	3.84	Meul River mouth	Northern slopes
BB03	5.37	Meul River mouth	Coastal cliffs
KL03	0.66	Kleinkrantz	Coastal cliffs
SW09	4.66	Swartvlei	Coastal cliffs
KH03	27.92	Roodefontein Kranshoek	Cliffs and river valley



MANAGEMENT UNIT PRIORITISATION

8 Management Unit Prioritisation

In a context of limited budget and capacity, it may be necessary to focus control efforts on certain MUs where municipal priorities are highest. A framework for the prioritisation of clearing is outlined in section 4.4 of this plan. Management units have been assigned ratings for the following factors:



Fire risk (based on the potential for invasive alien species to increase fire risk or damage)



Biodiversity protection (based on the status of natural vegetation on the site and the risk posed by invasive species)



Tourism and amenity (based on the location or use of the site for tourism or other economic purposes)



Water resource protection (based on whether invasion on the site affect water resources important for human use or ecosystems)



Productive potential (based on the potential for invasive alien species to reduce agricultural production on the site)



Flooding and erosion risk



The sum of these ratings is then converted to a value between zero and 10, where higher values indicate a relatively higher priority.

Table 5 overleaf provides the ranked priority weightings assigned to each MU.

Table 5. Ranked Management Unit Prioritisation

MU							
BB01	3	3	1	2	0	1	5.6
BB02	3	3	1	1	0	0	4.4
BB03	3	3	1	1	0	0	4.4
BU01	3	3	0	2	0	3	6.1
GW02	3	3	0	1	0	1	4.4
GW03	3	3	0	1	0	1	4.4
GW04	3	3	0	2	0	2	5.6
HB03	3	3	3	0	0	1	5.6
HO01	3	3	3	1	0	2	6.7
HO02	3	3	3	1	0	2	6.7
HO03	3	3	3	1	0	2	6.7
HO04	3	3	3	1	0	2	6.7
HO05	3	3	3	1	0	2	6.7
KH01	3	2	2	0	0	0	3.9
KH02	3	2	2	0	0	0	3.9
KH03	3	2	2	0	0	0	3.9
KR01	3	3	3	1	0	1	6.1
KR02	3	3	3	1	0	1	6.1
KR03	3	3	3	1	0	1	6.1
KR06	3	3	3	0	0	1	5.6
MA01	3	3	0	1	0	1	4.4
MA02	3	3	0	1	0	1	4.4
MA03	3	3	0	1	0	1	4.4
MA04	3	3	0	1	0	1	4.4
MA05	3	3	0	1	0	1	4.4
MA06	3	3	0	1	0	1	4.4
MA07	3	3	0	1	0	1	4.4
MA08	3	3	0	1	0	1	4.4
MA09	3	3	0	1	0	1	4.4
MA10	3	3	0	1	0	1	4.4
MA12	3	3	0	1	0	2	5.0
MA13	3	3	2	1	0	1	5.6
MA14	3	3	2	1	0	1	5.6
MR03	3	3	1	3	0	2	6.7
RE01	3	1	2	0	0	0	3.3
RE02	3	1	2	0	0	0	3.3
RE03	3	1	2	0	0	0	3.3
CA01	2	1	2	0	0	0	2.8
CA03	2	3	2	2	2	1	6.7
DH02	2	1	1	1	0	0	2.8
DH03	2	2	3	2	1	1	6.1
DY03	2	1	0	2	3	1	5.0
HA01	2	1	3	0	2	0	4.4

								
HA02	2	1	3	3	0	2	0	4.4
HB01	2	2	2	2	0	0	0	3.3
HB02	2	1	3	3	0	0	0	3.3
KL01	2	1	3	3	0	0	0	3.3
KL02	2	1	3	3	0	0	0	3.3
LA01	2	3	3	3	2	0	1	6.1
MR01	2	2	2	1	1	2	1	5.0
MR02	2	2	2	1	1	2	1	5.0
SW02	2	2	2	2	0	0	0	3.3
SW03	2	2	2	2	0	0	0	3.3
SW04	2	2	2	2	0	0	0	3.3
SW05	2	2	2	2	0	0	0	3.3
SW06	2	2	2	2	0	0	0	3.3
SW07	2	2	2	2	0	0	0	3.3
SW10	2	2	2	3	0	0	0	3.9
WV01	2	1	1	1	0	2	0	3.3
AH01	1	3	3	0	2	2	1	5.0
DF01	1	2	2	0	0	2	0	2.8
DH01	1	1	1	0	1	0	0	1.7
DH04	1	1	1	0	1	1	0	2.2
DO01	1	1	1	0	0	1	0	1.7
DY01	1	3	3	1	2	0	0	3.9
DY02	1	3	3	2	2	2	2	6.7
DY04	1	2	2	1	0	0	0	2.2
DY05	1	3	3	0	2	2	1	5.0
HK01	1	3	3	3	0	0	1	4.4
HK02	1	3	3	2	0	0	1	3.9
KL03	1	1	1	1	0	0	0	1.7
KR04	1	3	3	2	0	0	0	3.3
KR05	1	1	1	3	0	0	0	2.8
MA11	1	1	1	0	1	0	1	2.2
SC01	1	1	1	1	0	1	0	2.2
SC02	1	1	1	1	0	1	0	2.2
SW08	1	2	2	3	0	0	0	3.3
SW09	1	2	2	2	0	0	0	2.8
WP01	1	3	3	3	0	0	0	3.9
WP02	1	3	3	2	0	0	0	3.3
WP03	1	3	3	2	0	0	0	3.3
WP04	1	3	3	2	0	0	0	3.3
CA02	0	0	0	2	0	0	0	1.1
GW01	0	1	1	1	1	2	0	2.8
OP01	0	1	1	0	0	0	0	0.6
RO01	0	1	1	0	0	0	0	0.6
SW01	0	2	2	3	0	0	0	2.8



IMPLEMENTATION AND MONITORING FRAMEWORK

9 Implementation and monitoring framework

9.1 Roles and coordination

9.1.1 Implementation

The implementation of this plan will be the primary responsibility of the Expanded Public Works Programme office within the GRDM, with technical support provided by the Environmental Management and Properties offices.

9.1.2 Land users

Where GRDM property is leased or is managed as a tourist resort, the users of the land have a key role to play in implementation. Similarly, for commonage sites such as the Dysselsdorp property, the small-scale farmers who utilise the property for grazing and cultivation are key roleplayers in invasive control efforts. It is recommended that site-specific engagement be carried out in advance of implementation to explain the programme, obtain buy-in, and allocate roles.

9.1.3 Other agencies

It is recommended that the GRDM engage with other agencies (DEA's Natural Resource Management programmes, local municipalities and conservation authorities) to share its area management plan, coordinate control efforts for adjacent properties, and access available funding and support.

9.1.4 Other key roleplayers

It is further recommended that the GRDM engage with the Southern Cape Fire Protection Association (<https://www.scfpa.co.za/>) and associations of land owners and managers such as the Southern Cape Landowners Initiative (<http://www.scli.org.za/>) to share this plan and to coordinate control efforts at the landscape scale.

9.2 Funding sources

9.2.1 Capital expenditure

Many of the costs associated with control efforts are of a capital nature, such as the provision of equipment (chainsaws, hand tools, chippers) and vehicles. Although a detailed financial analysis is beyond the scope of this plan, it is recommended that the GRDM consider the purchase or lease of high-value assets such as chippers and vehicles, rather than renting them on an ad hoc basis.

9.2.2 Operational expenditure

Operational funding for invasive species management may be obtained from various sources:

- the municipal budget,
- EPWP grants,
- or via existing budgets for, e.g., property and facilities management.

Municipalities are able to access grant funding from the EPWP, and it is recommended that the workload assessments and associated budgets in this plan be utilised to support applications for grant funding.

9.3 Budgeting and timeframes

Two scenarios have been determined for consideration by the GRDM based on budget availability and operational capacity.

The 'person-day' workload and budget assessment outlined in section 4.6 of this report is the standard method of determining implementation costs in the 'Working for/on' programmes implemented nationally. Based on Working for Water norms and industry experience, an estimated person-day rate has been determined for each management unit based on the terrain, the nature of the control methods (i.e. tree-felling vs hand-pulling), and the accessibility of the site (rope-access or not). This rate has been adjusted based on estimates of operational expenditure figures and wages provided by the GRDM's EPWP office, which suggest that GRDM implementation costs are approximately 30% higher than industry norms. This is due in large part to the GRDM's policy of paying a 'living wage' rather than the lower wages usual in EPWP implementation.

There are many assumptions implicit in the budget, and it is suggested that a detailed operational budget be drawn up by the GRDM taking these scenarios as a starting point. Perhaps the most significant assumption is the assumed effectiveness of implementation of physical control methods, which is itself a function of the effectiveness of management of the staff and contractors responsible for implementation. The workload, budget and timeframe assessments are entirely dependent on the quality of management and on the scheduled implementation, follow-up and monitoring.

9.3.1 Timeframe scenarios

Scenario 1 envisages immediate (2019/20) clearing on most municipal properties, followed by maintenance and follow-up.

Certain MUs (SW01, SW04, SW05, and SW08) are delayed to allow reestablishment of indigenous vegetation on dunes and prevent major erosion after clearing). Others (DH02, CA01, KR05 and SW10) are delayed to allow planting of replacement shade trees in campsites and resorts before clearing mature invasive trees.

Scenario 2 envisages immediate (2019/20) clearing on high-priority MUs, and staged initial clearing on lower-priority MUs according to the prioritisation in section 4.4. Dune and resort MUs are delayed as in Scenario 1.

The matrices overleaf indicate the timing of initial implementation and follow up work on each MU as follows:

	Year 1	Year 2	Year 3	Year 4
MU	Initial clearing	Follow-up clearing	Follow-up clearing	Follow-up clearing
MU	Initial clearing	Follow-up clearing	Follow-up clearing	Follow-up clearing

Table 6. Implementation timeframes for MUs under Scenario 1

MU	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
DH01	Initial									
DH02										Initial
DH03	Initial									
DH04	Initial									
CA01										Initial
CA02	Initial									
CA03	Initial									
OP01	Initial									
BU01	Initial									
RO01	Initial									
DF01	Initial									
HO01	Initial									
HO02	Initial									
HO03	Initial									
HO04	Initial									
HO05	Initial									
MA01	Initial									
MA02	Initial									
MA03	Initial									
MA04	Initial									
MA05	Initial									
MA06	Initial									
MA07	Initial									
MA08	Initial									
MA09	Initial									
MA10	Initial									
MA11	Initial									
MA12	Initial									
MA13	Initial									
MA14	Initial									
HB01	Initial									
HB02	Initial									
HB03	Initial									
MR01	Initial									
MR02	Initial									
MR03	Initial									
GW01	Initial									
GW02	Initial									
GW03	Initial									
GW04	Initial									
HK01	Initial									
HK02	Initial									
KR01	Initial									
KR02	Initial									

MU	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
KR03	Initial									
KR04	Initial									
KR05										Initial
KR06	Initial									
BB01	Initial									
BB02	Initial									
BB03	Initial									
KL01	Initial									
KL02	Initial									
KL03	Initial									
WV01	Initial									
SW01					Initial					
SW02	Initial									
SW03	Initial									
SW04			Initial							
SW05			Initial							
SW06	Initial									
SW07	Initial									
SW08					Initial					
SW09	Initial									
SW10										Initial
WP01	Initial									
WP02	Initial									
WP03	Initial									
WP04	Initial									
HA01	Initial									
HA02	Initial									
LA01	Initial									
KH01	Initial									
KH02	Initial									
KH03	Initial									
DY01	Initial									
DY02	Initial									
DY03	Initial									
DY04	Initial									
DO01	Initial									
SC01	Initial									
SC02	Initial									
RE01	Initial									
RE02	Initial									
RE03	Initial									
DY05	Initial									
AH01	Initial									

Table 7. Implementation timeframes for MUs under Scenario 2

MU	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
DH01			Initial							
DH02										Initial
DH03	Initial									
DH04			Initial							
CA01										Initial
CA02			Initial							
CA03	Initial									
OP01			Initial							
BU01	Initial									
RO01			Initial							
DF01			Initial							
HO01	Initial									
HO02	Initial									
HO03	Initial									
HO04	Initial									
HO05	Initial									
MA01	Initial									
MA02	Initial									
MA03	Initial									
MA04	Initial									
MA05	Initial									
MA06		Initial								
MA07		Initial								
MA08		Initial								
MA09		Initial								
MA10		Initial								
MA11			Initial							
MA12		Initial								
MA13	Initial									
MA14	Initial									
HB01			Initial							
HB02			Initial							
HB03	Initial									
MR01		Initial								
MR02		Initial								
MR03	Initial									
GW01			Initial							
GW02			Initial							
GW03			Initial							
GW04	Initial									
HK01		Initial								
HK02			Initial							
KR01	Initial									
KR02	Initial									

MU	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
KR03	Initial									
KR04			Initial							
KR05										Initial
KR06	Initial									
BB01	Initial									
BB02		Initial								
BB03		Initial								
KL01			Initial							
KL02			Initial							
KL03			Initial							
WV01			Initial							
SW01					Initial					
SW02	Initial									
SW03	Initial									
SW04			Initial							
SW05			Initial							
SW06	Initial									
SW07	Initial									
SW08					Initial					
SW09	Initial									
SW10										Initial
WP01			Initial							
WP02			Initial							
WP03			Initial							
WP04			Initial							
HA01		Initial								
HA02		Initial								
LA01	Initial									
KH01		Initial								
KH02		Initial								
KH03		Initial								
DY01		Initial								
DY02	Initial									
DY03	Initial									
DY04			Initial							
DO01			Initial							
SC01			Initial							
SC02			Initial							
RE01			Initial							
RE02			Initial							
RE03			Initial							
DY05	Initial									
DY03	Initial									

9.3.2 Summary budgets

Table 8 and Figure 1 are summaries of the detailed budgets in Annexure 1. An 8% escalation per annum has been assumed.

Table 8. Summary budgets for implementation of the two scenarios

Budget year	Scenario 1	Scenario 2
2019/2020	R 5 145 760	R 2 957 180
2020/2021	R 2 683 884	R 2 838 567
2021/2022	R 2 516 572	R 3 166 751
2022/2023	R 2 085 893	R 2 420 719
2023/2024	R 2 374 699	R 2 707 475
2024/2025	R 314 625	R 1 220 456
2025/2026	R 1 753 682	R 1 592 381
2026/2027	R 208 182	R 450 839
2027/2028	R 1 802 203	R 1 571 423
2028/2029	R 274 947	R 597 462

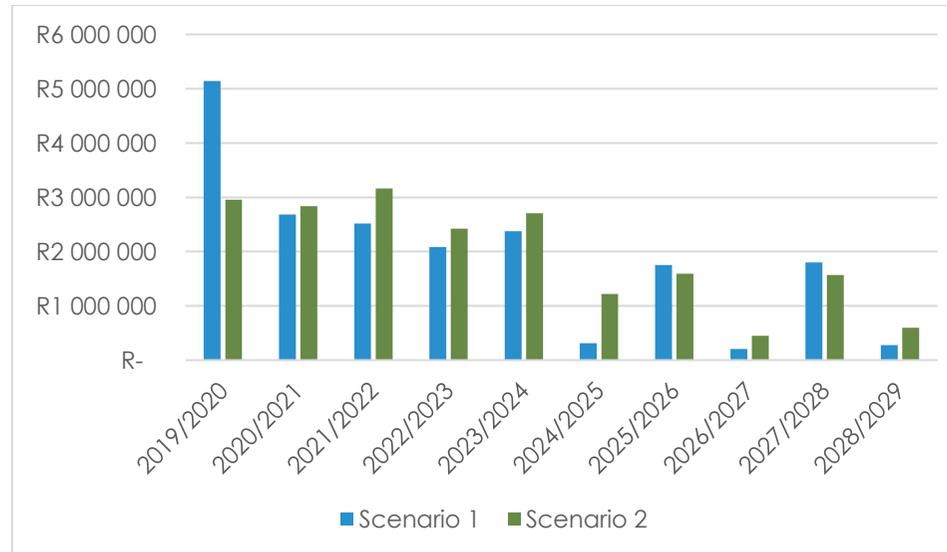


Figure 1. Summary budgets

9.4 Monitoring framework

In order to assess the impact of the control measures, it is necessary to monitor and evaluate regularly.

At minimum, the following monitoring schedule has been proposed for each MU:

9.4.1 Pre-implementation assessment

Reassess density six months prior to initial clearing to confirm control methods and workload assessments remain valid. Keep photographic records of the area prior to clearing, and compare with densities assessed at the planning stage.

9.4.2 Implementation monitoring

Keep simple records of daily operations during initial clearing activities: area cleared, number of labour units and amount of herbicide used. Keep regular photographic records as clearing progresses.

9.4.3 Post-implementation evaluation

Keep photographic records of the area immediately after initial clearing has been completed. Evaluate the success of initial clearing, by determining whether all alien invasive plants in the MU have been controlled according to the prescribed methods.

9.4.4 Annual monitoring

Monitor annually, assessing

- the extent and density of listed invasive species
- the presence of any new invasions
- the need for follow-up clearing activities.



SAFETY AND ENVIRONMENTAL GUIDELINES

10 Safety and environmental guidelines

A safe working environment is of utmost importance during the implementation of alien invasive management. Implementing staff often work in remote areas, with inherently hazardous tools and chemicals. The GRDM as implementer is responsible for ensuring a safe working environment and adherence to certain minimum safety requirements. Furthermore, many of the sites are in sensitive environments which could easily be harmed if inadequate attention is given to mitigating potential risks.

10.1.1 Basic health and safety

Basic health and safety requirements are provided below. These should be adapted to site-specific and project-specific conditions and requirements to ensure a safe working environment.



Emergency procedures in place and familiar to all team members.



Daily safety toolbox talks by a certified Safety Officer or SHE representative.



First aid kit readily available on site and trained first aiders with every team.



Fully charged cellphone on site with local emergency numbers saved, especially in remote areas.



Water readily available for drinking and mixing of herbicides.
Containers with drinking water clearly labelled and not used for other purposes.



All staff provided with appropriate personal protective clothing and equipment.



Sufficient toilets available and maintained for the duration of the operation.



Areas used for eating must be kept clean. A bin for litter must be made available and its use strictly enforced.



Smoking areas must be designated, well away from fuel stores and natural vegetation. Cigarette butts must be disposed of in bins, not dropped on site.

10.1.2 Herbicide safety

The following recommendations are minimum best-practice in the use of herbicides. Crew supervisors and workers using herbicides should undergo herbicide applicator training and apply the generic specifications to each site.

Choosing a herbicide

- Herbicides contain active ingredients that make them effective against particular plants.
- Only herbicides registered for the target species may be used.
- The concentration of the active ingredient may vary in purchased herbicides. It is critical that the mixing ratio be adhered to, to ensure that the correct concentration.

Storage

- Always store herbicides in the original container in a secure storage area out of reach of children or animals.
- At the worksite, keep herbicide in the shade to keep it cool.
- Keep herbicide containers on a waterproof surface, such as a tarpaulin or in a larger plastic bucket.
- Keep a spill kit in the storage facility, containing at minimum a bucket of clean sand, a spade and thick plastic bags. Absorbent pads and cushions are useful additions. In the event of a spill the sand and absorbent material should be used to soak up the spilled chemical, then collected in bags or buckets for safe disposal.
- Keep the material safety datasheet for each herbicide in the storage facility.

Mixing

- All containers in which herbicide is mixed must be clearly marked (e.g. "Lumberjack mix")
- All persons must wear the appropriate personal protective equipment when working with herbicides, including rubber gloves and overalls.
- Avoid skin contact with herbicides, and do not breathe in the vapour.
- Use a measuring jug to ensure the correct quantity is used.
- Half-fill an appropriately sized mixing container with water, then add herbicide. Close the container and shake before adding the rest of the water.

Disposal

- All empty herbicide containers, or herbicides that have reached their expiry date, need to be safely disposed of at a registered chemical recycling company.
- Spike all empty containers before disposal to ensure that they cannot later be used for carrying drinking water or food.

10.1.3 Personal Protective Equipment

The use of personal protective equipment and clothing (PPE and PPC) is a legal requirement, and the employer is responsible for providing equipment that enables workers to carry out their tasks safely. Different PPE is required for different control methods and personnel – see Table 9

Table 9. PPE requirements for implementation personnel

Item	Crew supervisor	Chainsaw operator	General workers, First Aider, SHE rep	Herbicide applicator
T-shirt	✓	✓	✓	✓
Overall Two-piece 100% cotton overalls or Conti suit	✓	✓	✓	✓
Safety boots With ankle support and steel toecap	✓	✓	✓	✓
Gumboots When working in wetlands or riverine environments	✓		✓	✓
Chainsaw safety boots		✓		
Chainsaw operators' trousers		✓		
Leather gloves Wrist-length, for hand-tools and machine use	✓	✓	✓	✓
Rubber gloves Wrist-length, for handling, mixing and applying herbicides				✓
Wide-brim hat For sun protection, particularly during follow-up operations	✓		✓	✓
Hard hat When working near chainsaws, under large trees, or on steep slopes	✓		✓	✓
Hard hat with visor and certified earmuffs For chainsaw operators		✓		
Face mask To cover nose and mouth, when mixing or applying herbicides				✓
Rain suit Standard two-piece, for use in rainy conditions	✓	✓	✓	✓
Safety goggles	✓	✓	✓	✓

10.1.4 Health and Safety representatives and First Aiders

For every 20 people employed, one person needs to be trained as a First Aider and a separate person as a Health and Safety Representative. Appointments must be made in writing and the person must clearly understand his/her responsibilities before signing.

Persons appointed can be one of the workers, with these appointments bearing additional responsibilities.

It is advisable to train an extra person for each role in case of resignation or absence.

First Aider Responsibilities

- Provide first aid in case of injury
- Manage the first aid kit
- Record usage of first aid material:
 - o Which first aid materials were used;
 - o To whom these materials were issued/used; and
 - o When these materials were used/issued.
- Report to manager when stock is low in the first aid kit
- Attend health and safety meetings when required

Health and Safety Representative Responsibilities

- Conduct regular safety talks with workers to ensure everyone is aware of the relevant safety precautions.
- Record near misses and all (minor/ major) injuries.
- Assist the supervisor in identifying possible hazards or risks and reporting these to the relevant persons for action.
- Encourage workers to report unsafe conditions including faulty equipment or PPE that could pose a risk to their health or well-being.
- Attend safety meetings when required.
- Assist the supervisor in ensuring that all workers are wearing their PPE.

10.1.5 Environmental Specifications

Invasive species management can cause damage to sensitive environments if not implemented with due care and caution. The following generic measures should be adhered to when implementing the plan. Site-specific sensitivities are noted elsewhere in this report and must be considered. It is recommended that the GRDM's Environmental Management Department be involved to provide guidance in planning for implementation in a given MU.

Access

- Vehicle and pedestrian movement can damage sensitive natural vegetation and wetlands, and poorly-placed access routes can cause erosion and damage to soils.
- Minimise the number of access routes to a site, especially where there is indigenous vegetation or other sensitivities.
- Wherever possible make use of existing footpaths, roads or transformed areas (e.g. agricultural fields) to access a site rather than creating new paths.
- Keep vehicles out of areas of indigenous vegetation, wetlands and other sensitive areas.
- Designate a single site camp area where vehicles can be parked, equipment can be stored, and ablution and eating facilities can be provided. The site camp should be in an already-transformed area wherever possible, and should have as small a footprint as possible.

Waste and ablutions

- Improper disposal of waste or inadequate provision of ablution facilities can pose a health risk and cause damage to the natural environment.
- Provide garbage bags to each crew for collection of litter at mealtimes and in the course of the day. Ensure that filled bags are collected at end of day and disposed of in a municipal bin or at a licensed landfill facility.
- Provide ablution facilities where required, at a rate of one toilet per 15 crew. If chemical toilets are used, ensure they are adequately secured to prevent them from toppling, and ensure regular emptying and maintenance so that they do not overflow.
- Place ablution facilities at least 50 metres from any resource (stream, wetland, dam) on the site.

Handling herbicides, fuels and chemicals

- Herbicides and fuels can cause significant damage to indigenous vegetation and watercourses if incorrectly used or if they are spilled. See the basic 'herbicide safety' specifications above.
- Herbicides should not be used in aquatic (rivers, streams, wetlands) environments or within 15 metres of any water resource.
- Fuels must be stored in appropriate leakproof containers (e.g. jerry cans) and correctly labelled. Refuelling of equipment must take place well away from watercourses and sensitive features. A basic spill kit should be kept with the vehicle in case of fuel spills.

Fire and other emergencies

- Allow smoking only within designated areas, such as at the site camp or vehicles. Cigarette butts to be disposed of in bins and not discarded.
- Prohibit the lighting of fires for heating, cooking, or waste disposal on site.
- Where conditions are favourable for wildfires (e.g. high fuel load and high fire danger index – see <https://www.afis.co.za/>), teams should be provided with basic firefighting equipment (at least two fire beaters) and training.
- Crew supervisors to have a charged cellphone with airtime and with local emergency numbers saved.

Noise and nuisance

- Restrict noise-generating activities to working hours, namely 07:00 to 17:00 on week days and 07:00 to 14:00 on Saturdays.
- Keep neighbours who are likely to be affected informed of the work to be undertaken, and provide them with contact details in case of issues.

10.1.6 Training recommendations

The table below outlines courses that are legally compulsory, courses that are necessary to enable the teams to perform their duties, and recommended additional training for employee development.

Table 10. Training requirements for implementation personnel

Course	Manager	Crew supervisor	Chainsaw operator	Brushcutter operator	First Aider	Health & Safety rep. (1/20 staff)	General Worker	Specialised rope access worker
Compulsory training courses (for legal compliance)								
First Aid Level 2 / 3 Valid for 2 years	✓	✓			✓			
Health & Safety Rep course	✓	✓				✓		
Chainsaw Operator Annual refreshers		✓	✓					
Brushcutter Operator Annual refreshers		✓		✓				
Basic Wildfire Suppression Where operations require it	✓	✓	✓	✓	✓	✓	✓	
Rope access training For specified MUs	✓	✓			✓	✓		✓
Other essential courses								
Site induction *	✓	✓	✓	✓	✓	✓	✓	
Herbicide Applicator		✓	✓	✓	✓	✓	✓	
Species Identification	✓	✓	✓	✓	✓	✓	✓	
Recommended additional training								
Environmental Awareness		✓	✓	✓	✓	✓	✓	
Personal finance management / life skills		✓	✓	✓	✓	✓	✓	

* To cover contract requirements, type of work to be performed, hours of work, payment, what is required of the employee and employer, emergency procedures, protective clothing and equipment issuing and responsibility thereof, introduction to manager, first aider and health and safety representative, transportation procedures, safety in the workplace, and environmental awareness.

Annexure 1: Budgets