

**APPENDIX K2: INVASIVE ALIEN
VEGETATION REMOVAL PLAN**

HUGOSDALE FARM (RE/141), GREYTON, WESTERN CAPE PROVINCE.

ALIEN VEGETATION REMOVAL PLAN



March 2019

Introduction

The Department of Environmental Affairs (DEA) manages Invasive Alien Species under the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA). This plan sets out how work will be undertaken in respect of the removal of alien vegetation on the farm. The plan will be updated from time to time to ensure that compliance with best practice is followed at all times.

Target Species

Whilst all invasive alien trees and plants will be removed where possible, particular attention will be placed on the eradication of the following species:

1. Black Wattle
2. Blue Gum
3. Pine
4. Hakea

| Species | Common Name | NEMBA Category | % cover/ level of infestation | Prioritisation of each species | Risk of potential invasion |
|---------------------------|--------------------|----------------|-------------------------------|--------------------------------|----------------------------|
| <i>Acacia mearnsii</i> | Black Wattle | 1b | 82% | 1 | High |
| <i>Acacia longifolia</i> | Long-Leaved Acacia | 1b | 5% | 1 | High |
| <i>Eucalyptus sp</i> | Blue Gum | 1b | 2% | 3 | Moderate |
| <i>Pinus cf. pinaster</i> | Pine | 1b | 10% | 2 | Moderate |
| <i>Hakea sericea</i> | Hakea | 1b | 1% | 2 | High |

THE METHODS TO BE EMPLOYED IN THE CONTROL PLAN

Three types of control methods are used to control Invasive Alien Plant (IAP) species:

- **Mechanical Control:** This is the physical removal or destruction of plants and includes techniques such as hand-pulling, felling, uprooting, ringbarking, cutting/slashing, strip-barking or mowing. The type of mechanical control used will depend on the species, the level of infestation and the steepness of the slopes and accessibility on which the species occur. Controlled burns can be used in conjunction with the mechanical removal of a species.
- **Chemical Control:** This method uses herbicides (plant poison) to kill targeted plant species. It is important that the appropriate herbicide is selected for the species and purpose required as these poisons can often do more harm than good, especially when working near wetlands and water courses.
- **Biological Control:** This is the use of a species' natural enemies (biological control agents) to remove a plant's competitive advantage and thereby reduce population vigour. This method is usually only effective in the long term.

An integrated approach to control IAP species is often used and employs at least two of these primary elements of control.

Manual and Mechanical Control methods

- **Hand pulling:** The removal of the entire plant and roots by hand. This method is recommended for seedlings/juvenile plants where the plants are small enough to be pulled out successfully with the roots intact. This method is recommended for sparsely invaded areas when the soil is damp or soft.
- **Ring Barking:** The removal of the trees bark and cambium, in a horizontal 30 cm band (about 50 cm from the ground). This method is used to kill large trees. If herbicide is used it must be applied immediately after ring barking on the cut area.
- **Cut Stumping:** The cutting of trees as low to the ground as possible with a saw, chainsaw or cane knife. If herbicide is used it must be applied to the cut surface immediately.
- **Slashing:** The control of annuals by slashing seed stalks and/or branches with a cane knife, machete, slasher or brush cutter before seeds mature. This is generally a low cost method of reducing the presence of viable seeds that will germinate in the new season.
- **Strip barking:** The stripping of bark from waist height to the base of the trunk using an axe or cane knife. If herbicide is used it must be applied immediately to the stripped surface area.
- **Frilling:** The cutting of an angled groove into the bark and cambium around the entire tree trunk. Herbicide is then applied into the groove which kills the tree as it seeps into the cambium. This method is effective for small trees as it is quicker and more cost effective than ring barking or strip barking.

Chemical Control methods

- **Foliar Spraying:** The spraying of leaves, on plants below 1 m, to the point of run-off using a knapsack sprayer. This method is more cost effective than stump treatment as fewer people are required to treat large areas. However, it does require large amounts of clean water in which the herbicides are mixed. All team members using this method must be trained and certified before using this technique.
- **Handheld spraying:** The application of herbicide after cut stumping, ring barking, frilling and strip-barking using a handheld sprayer with an adjustable nozzle to achieve the correct spray width. This method is cheap and the application of herbicide is accurate. As with the foliar spray, all team members must receive training on how to use this sprayer effectively.
- **Injection:** The application of herbicide directly into the plant by drilling or punching downward slanting holes into the tree around the circumference of the stem/trunk and then injecting the chemical into these holes.

Specific Control per species

Working for Water (2007) have developed management guides for IAP that are species specific. These guides inform the user of the best method to remove each species based on its size class and where herbicides are required, provides the recommended herbicide type and dosage as well as the estimated amount of product required per hectare of land treated. A summary table for the chemical and mechanical treatment of the species found in the project area is provided in Table 1.

Stacking

The cut material should be stacked in heaps or windrows along the mountain contours to reduce erosion and allow for easy access for follow up activities and monitoring (Cape Nature, unknown date). The material can be stockpiled into piles of 2 m high and 3 m wide. To reduce the risk of uncontrolled fire, stacks must be kept well apart (not less than 5 m) to prevent fires from crossing easily and stack light branches separately from heavy timber (75 mm or more). If feasible, remove heavy branches to reduce the potential fuel load.

Disposal of Plant Material

Plant material without seeds can be used beneficially where possible. Large timber can be sold as firewood to offset some of the clearing costs associated with this plan. Other material can be chipped and used as mulch or compost, provided there are no seeds present.

Material that cannot be used because of the presence of seeds must be disposed of at a registered and approved waste disposal site.

Restoration

If the soil is relatively undisturbed and there are areas of intact vegetation, the natural regeneration of indigenous vegetation is likely to occur. This should be managed by regular follow-ups that remove new and emerging IAPs. These areas should also be protected from grazing, uncontrolled fires, erosion and vehicular traffic (including bicycles and motorbikes).

In heavily impacted areas indigenous vegetation may need to be planted in cleared areas. These areas can be hydroseeded with indigenous seeds or seeds can be planted *in-situ*. If this is done, indigenous species from the area must be used. Plants used for rehabilitation purposes must be sourced from within 50 km of the rehabilitation site to ensure that the genetic composition of the introduced plants is similar to the plants naturally occurring in the rehabilitation areas.

Removal Method to be used for this project

This plan will be informed by the general methods described above. The removal of all aliens will be undertaken by trained staff who will be provided with appropriate equipment to ensure compliance with the relevant national occupational health and safety legislation under which all farming operations fall. All equipment will be maintained daily and subject to periodic servicing. The methodology shall include but not be limited to the following activities:

1. Felling and removal of all trees and bushes
2. Painting of all stumps with approved herbicide and diesel/paint mixture
3. Harvesting of all useable timber (firewood, poles, droppers etc)
4. Constructing of heaps with all unusable material
5. Chipping all heaped material for use as orchard mulch or for composting
6. Repairing of any natural drainage courses
7. Protecting of top soil in exposed areas as required

Monitoring and Maintenance

Invasive alien vegetation will attempt to re-establish itself immediately after removal. Ongoing maintenance of the site is required so as to allow the natural vegetation to regain its dominance of the area. The following maintenance actions will be required:

1. After three months, or any extended rainfall, remove all seedlings by hand or herbicide spray
2. Annual inspection and removal of alien regrowth using the removal method above.
3. Monitor regrowth of natural vegetation and streams
4. fixed point photographs will be taken every three months to show progress

Special Care

Special care and attention shall be paid to the use of herbicides when undertaking this plan. Only products approved by the DWAS for the specific purposes of alien vegetation removal shall be used. All staff shall be properly briefed on the correct handling of all hazardous or toxic products. Strict compliance with supplier user instructions shall be adhered to. Direct skin contact or spray inhalation shall be avoided. The necessary safety gear shall be provided. No spraying shall be undertaken in the immediate proximity of any watercourse. No spraying shall be allowed during windy periods.

Implementation Strategy for the property

The removal of aliens on the entire property will commence prior to the start of the construction of the dam and continue as part of an annual maintenance programme. The programme will be divided into three distinct methodologies based on the nature of the areas under consideration, notably intensive, extensive and sensitive work. The intensive methods will be used for the construction site and dam basin to ensure the removal of all material which could affect the dam water quality and operations. The extensive methods will be used across the entire farm on a camp by camp basis to systematically remove alien and invasive trees on an ongoing basis. Special attention will be paid to the removal of aliens along water courses and in wetland areas with a view to encourage the re-establishment of the indigenous vegetation and will be referred to as sensitive methods.

References

1. Invasive Species of South Africa: <http://www.invasives.org.za/>
2. Cape Nature Alien Vegetation Management: <https://www.capenature.co.za/care-for-nature/conservation-in-action/integrated-catchment-management/alien-vegetation-management/>
3. Agricultural Research Council: <http://www.arc.agric.za/arc-ppri/Pages/Weeds%20Research/Fact-Sheets-on-Invase-Alien-Plants-and-their-Biological-Control-Agents.aspx>

Annexure A

| TREATMENT DETAIL | | | | APPLICATION DETAIL | | | | PLANNING DETAIL | | |
|------------------------------------------|------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------|--------------|------------|------------|-----------------|---------------------------------------|---------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| Gums - All (Euc. spp.) | Seedlings | Hand pull | None | | | | | | | |
| | Mature plants | Cut stump NB: for trial, not registered | glyphosate (ammonium) 680 g/kg WG <i>Roundup Max 680 WG (L6790)</i> | 265gr / 10 Litres water and 0.1% Dye | 0.265 | 10 | 2.65 | Closed / Dense | 5.30 | 200 |
| Pine | All | Cut down low | None | | | | | | | |
| | | Ring bark | None | | | | | | | |
| Pine - Pinaster | All | Frill NB: for trial, not registered | glyphosate (sodium) 500 g/kg WG <i>Kilo 500 WSG (L7431)</i> | 2,000 grams / 10 Litres water | 2 | 10 | 20 | Closed / Dense | 40.00 | 200 |
| Port jackson (<i>Acacia saligna</i>) | Seedlings | Hand pull | None | | | | | | | |
| Wattle, Black (<i>Acacia mearnsii</i>) | Seedlings | Hand pull | None | | | | | | | |
| | Seedlings and up to 1 m tall | Foliar spray | clopyralid / triclopyr (-amine salt) 90 / 270 g/L SL <i>Confront 360 SL (L7314)</i> | 30ml / 10 Litres water and 0.5% Wetter & Dye | 0.03 | 10 | 0.3 | Closed / Dense | 0.90 | 300 |

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|------------------|------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------|---------------|---------------|-----------------|------------------------------------------------|---------------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| | | | fluroxypyr 200 g/L EC <i>Starane 200 EC (L4918), Tomahawk 200 EC (L6652), Voloxypyr 200 EC (7776)</i> | 12.5ml / 10 Litres water and 0.5% Wetter & Dye | 0.0125 | 10 | 0.125 | Closed / Dense | 0.38 | 300 |
| | | | glyphosate (ammonium) 680 g/kg WG <i>Roundup Max 680 WG (L6790)</i> | 80gr / 10 Litres water and 0.1% Dye | 0.08 | 10 | 0.8 | Closed / Dense | 2.40 | 300 |
| | | | glyphosate (isopropylamine) 240 g/L SL <i>Tumbleweed 240 SL (L4781)</i> | 112.5ml / 10 Litres water and 0.1% Dye | 0.1125 | 10 | 1.125 | Closed / Dense | 3.38 | 300 |
| | | | glyphosate (isopropylamine) 360 g/L SL <i>Glyph 360 SL (L4767), Mamba 360 SL (L4817), Roundup 360 SL (L407), Springbok 360 SL (L6719)</i> | 150ml / 10 Litres water and 0.1% Dye | 0.15 | 10 | 1.5 | Closed / Dense | 4.50 | 300 |

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|------------------|------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------|------------|------------|-----------------|---------------------------------------|---------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| | | | glyphosate (isopropylamine) 450 g/L SL <i>RoundUp Turbo 450 SL (L7166)</i> | 120ml / 10 Litres water and 0.1% Dye | 0.12 | 10 | 1.2 | Closed / Dense | 3.60 | 300 |
| | | | glyphosate (isopropylamine) 480 g/L SL <i>Mamba Max 480 SL (L7714)</i> | 110ml / 10 Litres water and 0.1% Dye | 0.11 | 10 | 1.1 | Closed / Dense | 3.30 | 300 |
| | | | glyphosate (sodium) 500 g/kg WG <i>Kilo 500 WSG (L7431)</i> | 100gr / 10 Litres water and 0.1% Dye | 0.1 | 10 | 1 | Closed / Dense | 3.00 | 300 |
| | | | triclopyr (butoxy ethyl ester) 240 g/L EC <i>Ranger 240 EC adjuvant incl. (L6179)</i> | 50ml / 10 Litres water and 0.1% Dye | 0.05 | 10 | 0.5 | Closed / Dense | 1.50 | 300 |
| | | | triclopyr (butoxy ethyl ester) 480 g/L EC <i>Garlon 4 EC (L3249) & 480 EC (L4916), Triclon EC (L6661), Viroaxe EC (L6663)</i> | 25ml / 10 Litres water and 0.5% Wetter & Dye | 0.025 | 10 | 0.25 | Closed / Dense | 0.75 | 300 |

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|------------------|-------------------------|------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------|------------|------------|-----------------|---------------------------------------|---------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| | Up to 2m tall & Coppice | Spot spray | clopyralid / triclopyr (-amine salt) 90 / 270 g/L SL <i>Confront 360 SL (L7314)</i> | 50ml / 10 Litres water and 0.5% Wetter & Dye | 0.05 | 10 | 0.5 | Closed / Dense | 1.50 | 300 |
| | | | fluroxypyr / picloram 80 / 80 g/L ME <i>Plenum 160 ME (L7702)</i> | 75ml / 10 Litres water and 0.5% Wetter & Dye | 0.075 | 10 | 0.75 | Closed / Dense | 2.25 | 300 |
| | | | glyphosate (isopropylamine) 240 g/L SL <i>Tumbleweed 240 SL (L4781)</i> | 150ml / 10 Litres water and 0.1% Dye | 0.15 | 10 | 1.5 | Closed / Dense | 4.50 | 300 |
| | | | glyphosate (potassium) 500 g/L SL <i>Touchdown Forte Hitech 500 SL adjuvant incl.(L7305)</i> | 100ml / 10 Litres water and 0.1% Dye | 0.1 | 10 | 1 | Closed / Dense | 3.00 | 300 |
| | | | triclopyr (butoxy ethyl ester) 240 g/L EC <i>Ranger 240 EC adjuvant incl. (L6179)</i> | 150ml / 10 Litres water and 0.1% Dye | 0.15 | 10 | 1.5 | Closed / Dense | 4.50 | 300 |

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|------------------|------------|------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------|------------|------------|-----------------|---------------------------------------|---------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| | | | triclopyr (butoxy ethyl ester) 480 g/L EC <i>Garlon 4 EC (L3249) & 480 EC (L4916), Triclon EC (L6661), Viroaxe EC (L6663)</i> | 75ml / 10 Litres water and 0.1% Wetter & Dye | 0.075 | 10 | 0.75 | Closed / Dense | 2.25 | 300 |
| | Mature | Bark strip | None | Strip into the ground | | | | | | |
| | | Cut stump | fluroxypyr / picloram 80 / 80 g/L ME <i>Plenum 160 ME (L7702)</i> | 200ml / 10 Litres water and 0.5% Wetter & Dye | 0.2 | 10 | 2 | Closed / Dense | 4.00 | 200 |
| | | | imazapyr 100 g/L SL <i>Chopper 100 SL (L3444), Hatchet 100 SL (L7409)</i> | 1000ml / 10 Litres Water and 0.1% Dye | 1 | 10 | 10 | Closed / Dense | 20.00 | 200 |
| | | | picloram (potassium salt) 240 g/L SL <i>Access 240 SL (L4920), Browser 240 SL (L7357)</i> | 150ml / 10 Litres Water and 0.5% Wetter & Dye | 0.15 | 10 | 1.5 | Closed / Dense | 3.00 | 200 |

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|---------------------------------------|---------------------------------|--------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------|------------|------------|-----------------|---------------------------------------|---------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| | | | triclopyr (-amine salt) 360 g/L SL <i>Lumberjack 360 SL (L7295), Timbrel 360 SL (L4917)</i> | 300ml / 10 Litres Water and 0.5% Wetter & Dye | 0.3 | 10 | 3 | Closed / Dense | 6.00 | 200 |
| | | Frill | picloram (potassium salt) 240 g/L SL <i>Access 240 SL (L4920), Browser 240 SL (L7357)</i> | 600ml / 10 Litres Water and 2% Wetter & Dye | 0.6 | 10 | 6 | Closed / Dense | 12.00 | 200 |
| Wattle, Long Leaf (Acacia longifolia) | Seedlings | Hand pull | None | | | | | | | |
| | Seedlings, saplings and coppice | Foliar spray | clopyralid / triclopyr (-amine salt) 90 / 270 g/L SL <i>Confront 360 SL (L7314)</i> | 50ml / 10 Litres water and 0.5% Wetter & Dye | 0.05 | 10 | 0.5 | Closed / Dense | 1.50 | 300 |
| | | | triclopyr (butoxy ethyl ester) 240 g/L EC <i>Ranger 240 EC adjuvant incl. (L6179)</i> | 120ml / 10 Litres water and 0.1% Dye | 0.12 | 10 | 1.2 | Closed / Dense | 3.60 | 300 |

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|------------------|--------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------|---------------|---------------|-----------------|------------------------------------------------|---------------------------------|
| Species | Size class | Treatment | Herbicide | Dosage | a.i. Litres | Mix Litres | % Mix a.i. | Density | Estimated Product Litres / Ha (or kg) | if Mix volume Litres / Ha |
| | | | triclopyr (butoxy ethyl ester) 480 g/L EC <i>Garlon 4 EC (L3249) & 480 EC (L4916), Triclon EC (L6661), Viroaxe EC (L6663)</i> | 60ml / 10 Litres water and 0.5% Wetter & Dye | 0.06 | 10 | 0.6 | Closed / Dense | 1.80 | 300 |
| | Mature/Adult | Cut stump / Frill NB: for trial, not registered | triclopyr (-amine salt) 360 g/L SL <i>Lumberjack 360 SL (L7295), Timbrel 360 SL (L4917)</i> | 300ml / 10 Litres Water and 0.5% Wetter & Dye | 0.3 | 10 | 3 | Closed / Dense | 6.00 | 200 |