

Red Hill Waste Management Facility

2016

Offsets Management Plan



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APPENDICES

- A. Clearing Permit CPS 5743/2
- B. EPBC Referral 2014/7354 Approval
- C. Weed Management Plan – Offsets Area – Red Hill Waste Management Facility

1 INTRODUCTION

Eastern Metropolitan Regional Council (EMRC) plans to clear 13.9 Ha of native vegetation at its Red Hill Waste Management Facility (Red Hill), near the centre of the Red Hill property, on Lot 12 to construct future waste cells for Farm Stages 3, 4 and 5. Construction is planned to commence in October 2016.

2 ENVIRONMENTAL APPROVALS

An initial application to clear 6.4 Ha of native vegetation for Farm Stage 3 was submitted to the Department of Environment Regulation in August 2013 and in early January 2014, DER's preliminary assessment determined that the vegetation to be cleared constituted feeding habitat and potential breeding habitat of several fauna species of State and Commonwealth significance. These species include the Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-Tail Cockatoo.

Further consultation was held with DER on the requirements for a referral under the Environmental Protection Act (EPBC Act) including the decision to amend the proposed cleared area from 6.4 Ha to 13.9 Ha to allow for additional waste cells, that being, Farm Stage 4 and 5.

EMRC understood that two separate approvals (state and federal) would be required prior to clearing Lot 12, which included an approval to clear under the Environmental Protection Act 1985, administered by DER and an approval to clear under the Environmental Protection and Biodiversity Conservation Act, 1999 administered by Department of the Environment (DoTE).

Following the requirements of the approvals process, black cockatoo habitat assessments were conducted at Red Hill by consultant ecologists. Offset calculations were also carried out which determined an offset area to the south of the facility (Lots 82 and 501) for the proposed cleared area of 13.9 Ha on Lot 12. As a result, a referral under the Environmental Protection and Biodiversity Conservation Act (EPBC Act) was submitted to the federal Department of the Environment (DoTE) in August 2014. DoTE determined the application as a controlled action and required additional information in November 2014. Further habitat assessment of the proposed impact area and offsets area was conducted from December 2014 to February 2015. Amendments were made to the required area of offset which was adjusted to a total of 52.5 Ha for 13.9 Ha of impact area and then submitted to DoTE and DER in June 2015. The proposal was published for public consultation in October 2015 and gained final federal approval with several attached conditions in March 2016.

EMRC received DER's clearing permit (CPS 5743/2) in November 2015 with certain attached terms, conditions and restrictions. One of these conditions included the preparation of a Weed Management Plan for the offsets area.

2.1 West Australian Environmental Approval Conditions

EMRC submitted a Weed Management Plan for the offsets area to DER in April 2016 as a requirement of Condition 3 of clearing permit CPS 5743/2.

Condition 2 of CPS 5743/2 requires EMRC to execute a Conservation Covenant on Lots 82 and 501 before it can clear 13.9 Ha of native vegetation on Lot 12. To satisfy this requirement, EMRC submitted a Statement of Undertaking for a conservation covenant over Lots 82 and 501 under the Soil and Land Conservation Act, 1945 in February 2016. The final memorial will be placed over both certificates of title.

All other remaining conditions (Condition 1, 4 and 5) will be undertaken by EMRC in order to comply with Clearing Permit CPS 5743/2 (Appendix A).

2.2 Commonwealth Environmental Approval Conditions

The Department of the Environment issued conditional approval for the clearing of Lot 12 in March 2016. The approval prescribed a number of conditions to manage impacts on threatened fauna species, specifically the black cockatoo. This document has been prepared to specifically address Condition 2 of the project approval (EPBC 2014/7354) which requires the preparation, approval and implementation of an Offset Management Plan. A copy of the project approval can be found in Appendix B.

3 SCOPE

Condition 2 of the project approval (EPBC 2014/7354) addresses issues such as the preparation and implementation of an Offset Management Plan (OMP) including audit, monitoring and reporting requirements. The OMP details:

- The objectives of the revegetation works
- Defines the offset area
- Typical revegetation plant species
- Proposed revegetation and rehabilitation works
- Management measures, such as dieback
- Revegetation monitoring and completion criteria
- Implementation timeframes
- Contingency and management actions
- Roles and responsibilities

4 OBJECTIVE

The objective of the Offset Management Plan is to offset the loss of black cockatoo habitat lost through the clearing required for the construction of waste storage cells Farm Stages 3, 4, and 5

by undertaking rehabilitation works and management measures on the offset site. This OMP documents mitigation measures to offset these impacts on the “Black Cockatoo” which includes the following listed threatened species:

- Carnaby’s Black Cockatoo
- Baudin’s Black Cockatoo
- Forest Red-tailed Black Cockatoo

5 OFFSET SITE

The offset site is shown in Figure 1 and is referred to as:

- Lot 82 – 8.7 ha of existing predominantly of Eucalyptus spp and Corymbia spp.
- Lot 501 – 43.8 ha of existing predominantly of Eucalyptus spp and Corymbia spp.

Both of these lots have been given a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945*, setting aside the covenant area for the protection and management of vegetation in perpetuity.

Figure 1 also indicates the project/impact area comprising of 13.9 ha.

5.1 Landscape and Geology

The offset site lies at the top of the Darling escarpment and is situated across an elevation range of 230m to 310m AHD. This is created by a combination of natural hills and valleys.

The geology of the region is typical for that of the Yilgarn Craton, being dominated by granitic basement rocks with occasional intrusive dolerite dykes, weathered basement and weather duplex soils. The latter consist broadly of ferruginous and lateritic gravels or lateritic hardpans, underlain by white and cream clays (referred to generally as the pallid zone) and with saprolite grits (clayey gravels and clays) overlying weathered basement. The regional groundwater table is within the fractured weathered bedrock, often semi-confined by pallid zone clays.

5.2 Flora and Vegetation

The offset area is located within majority of remnant vegetation and is connected to John Forest National Park to the west and smaller patches of unprotected bushland to the south within a residential zoned area. John Forest National Park is a Class ‘A’ Reserve as declared in 1990 and was the second area to be declared a National Park in Australia in 1947. It is vested in the Conservation Commission of WA.

The native vegetation is primarily Marri / Jarrah woodland with a mostly open low understorey of proteaceous shrubs. The area includes several species of value as foraging habitat for Black-

Cockatoos such as Marri, Jarrah, pockets of *Hakea undulata* and occasional Parrot Bush, Sheoak, Grasstree (*Xanthorrhoea preissii*), Bull Banksia and Snottygobble.

5.3 Vegetation Condition

Lots 82 and 501 support native vegetation that over most of the areas is in good condition with low levels of weed invasion and probably some over-grazing by kangaroos (Western Grey Kangaroo *Mscropus fuliginous*) on the margins. It is regrowth or secondary Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) forest over an open and patchy mid-storey of sheoak (*Allocasuarina* sp.), few Bull Banksia (*Banksia grandis*) and some thickets of Parrot Bush (*Banksia sessilis*), with a shrubby understorey (mostly low Proteaceae and Myrtaceae). There is a small area in Lot 82 where the overstorey is absent and thus the vegetation is a heath. A watercourse lies along the southern edge of Lot 501 and supports riparian thickets beneath the eucalypt/corymbia overstorey. Although historically logged, there are scattered mature and senescent Marri that have been recorded in surveys for potential nest trees for black-cockatoos. Small areas (<5ha) have been historically cleared and grazed and it is these that would be targeted for rehabilitation. Lots 82 and 501 have only a small area of Parrot Bush thicket and therefore it is proposed to investigate using a high proportion of this species in revegetation of the degraded area. The impact area (Lot 12) has a greater proportion of Parrot Bush and this could be a source of seed and brush for the revegetation. Since, the vegetation on Lots 82 and 501 is substantially native and in good condition, it is proposed to use only local plant species in revegetation to maintain the biodiversity integrity of these areas.

The vegetation of Lots 82 ad 501 is in better condition than that of the impact area (Lot 12), which almost completely lacks understorey. Bamford and Basnett (2014) provide densities of different plant species (black-cockatoo forage species) and compared with Lot 12, Lots 82 and 501 have a higher density of Marri (200 stems/ha compared with 75 stems/ha), a similar density of Jarrah (125 stems/ha compared with 150 stems/ha) but a much lower density of Parrot Bush (16.75 stems/ha compared with 1650 stems/ha) and Sheoak (4.25 stems/ha compared with 50 stems/ha).

5.4 Habitat Condition Score

This habitat quality score is a measure of how well a particular site supports a particular threatened species and contributes to its ongoing viability. There are three components that contribute to the calculation of habitat quality: site condition, site context, and species stocking rates.

Start Quality

The start quality score, which is the quality of the offset site at the time of the assessment, was rated as a 7 out of 10, as provided in the original offsets calculation which formed part of EMRC's EPBC Referral 2014/7354. Based on DoTE's assessment tools, a strong weighting was given to both the site condition and the context of the offset area.

The offset area provides remnant vegetation in very good condition for Black Cockatoo. The area includes several species of value as foraging habitat for Black-Cockatoos such as Marri, Jarrah, pockets of *Hakea undulata* and occasional Parrot Bush, Sheoak, Grasstree (*Xanthorrhoea preissii*), Bull Banksia and Snottygobble. In addition, the offset site provides potential breeding habitat, with 21 scattered potential breeding trees with DBH > 500mm.

In terms of context, the offset area is located within the known breeding range of Carnaby's Black Cockatoo, and within a region where the vegetation typically contains suitable foraging species. John Forest National Park is an "A" Class Reserve and shares the western property boundary of the offset site. The close proximity of John Forest National Park and the offset site provides excellent connectivity for foraging and breeding habitat.

Future Quality without Offset

The 'future quality without offset' is the estimate of the habitat quality in the future based on a business as usual scenario – that is, considering current management practices, use of the site and historic trends for the quality of habitat on the site. A value of 6 was assigned for the 'future quality without offset' in the Offsets Calculator as part of EMRC's EPBC Referral 2014/7354. This is based on the likelihood that the quality of the habitat for Black Cockatoo is likely to slightly decrease without an offset given the increased likelihood of disturbance, such as weed encroachment, and degradation from unauthorised access for recreational activities such as trail bike riding. In addition, there is the potential for fire, which could result in the complete loss of the habitat for Black Cockatoo. In the absence of active management of these issues the quality of the habitat is likely to be reduced.

Future Quality with Offset

The 'future quality with offset' is estimated at the time at which the ecological benefit of the offset is expected to be realised. A value of 7 was assigned for the 'future quality with offset' in the Offsets Calculator as part of EMRC's EPBC Referral 2014/7354. This value is the same as the start quality of the offset site. The quality of the habitat within the offset site for Black Cockatoo is already very good, given the current site condition and context. The offset site does not necessarily require significant improvements to maintain a future habitat score of 7. However, in accordance with the Conditions of Approval for EPBC 2014/7354, additional management protocols outlined in this OMP, such as infill planting, fencing and access controls, and weed and fire management, will maintain and increase the viability of Carnaby's Black Cockatoo habitat within the offset site.

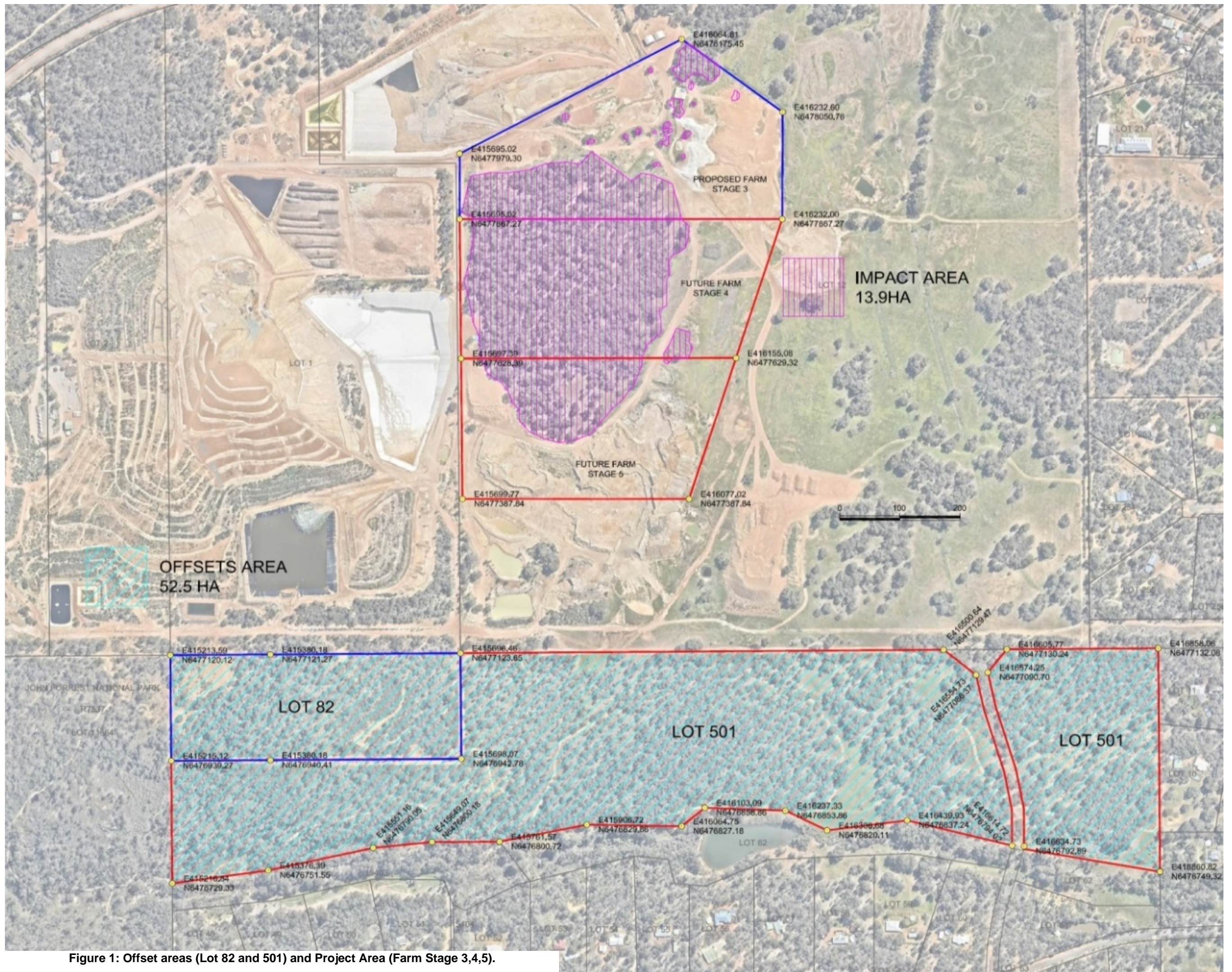


Figure 1: Offset areas (Lot 82 and 501) and Project Area (Farm Stage 3,4,5).

6 REVEGETATION IMPLEMENTATION

EMRC proposes to maintain Black Cockatoo habitat of Lot 82 and Lot 501 through management of the existing natural vegetation and revegetation/infill planting. This section provides a description of the measures that will be implemented to facilitate revegetation within the offset site including the criteria to assess performance.

The offset site contains small areas that have been previously cleared which will be a major focus for re-establishing vegetation by selective planting/seeding of native species conducive to Black Cockatoo habitat and characteristic of the surrounding existing remnant vegetation.

6.1 Revegetation Objectives and Targets

The objectives and targets for revegetation activities within the offset area are:

- Increase Black Cockatoo habitat within the offset area.
- Increase total native vegetation cover within the offset area.
- Increase connectivity of the offset area with surrounding bushland.

6.2 Revegetation Areas

Revegetation will be undertaken via tubestock planting and/or direct seeding. The majority of Lot 82 and 501 has well established native bushland. Approximately 5ha of previously cleared area exists on the eastern portions of Lot 501. These cleared areas and other areas where natural regeneration is not occurring will be the primary focus for revegetation activities. These works will be implemented by a suitably qualified person(s) and co-ordinated by the Coordinator, Environmental Operations.

Figure 2 shows the areas within the offset site that will be primary focus for revegetation works.



Figure 2: Areas of Focus for Revegetation Works

6.3 Site Preparation

Initial preparation of the area prior to revegetation works will include:

- Ripping and light scarification to improve water infiltration and root establishment
- Native plant fertiliser and/or soil ameliorant application
- Weed control through spraying selective herbicides to reduce the seed bank within the soil

6.4 Plant Species

Canopy, sub-canopy, understorey and ground strata flora species will be included in the revegetation programme. Revegetation species will be selected based on one or more of the following criteria:

- Endemic to the area making the species well adapted to the local conditions
- Structural characteristics
- Potential to offer habitat resources (breeding, roosting/nesting or foraging) for the black cockatoo.

Considerable effort will be placed on collecting seed from surrounding remnant bushland which forms part of EMRC's annual seed collection campaign for the Red Hill Rehabilitation Programme on completed landfill cells.

Table 1 presents the master species list for revegetation activities within the offset site and contains 34 species which are considered Carnaby Black Cockatoo habitat. The remaining plant species contribute to sub-canopy, understorey and ground strata plant structures. All plant species are endemic to the Red Hill area and are therefore well adapted to the local lateritic soils and climatic conditions.

6.5 Plant Densities

The planting densities will be 1 plant per 4 square metres for tubestock, together with an over seeding application rate of 5.5kg/ha. This will comprise of both canopy and understorey species as per Table 1.

Table 1: Master Species List for Revegetation Activities within the Offset Site

Species	Growth Form	Black Cockatoo Habitat (in accordance with DPAW's list for Plants Used by Carnaby's Black Cockatoo (Groom, 2011))
<i>Acacia celestrifolia</i>	Shrub	
<i>Acacia drummondii</i>	Shrub	
<i>Acacia extensa</i>	Shrub	
<i>Acacia meisneri</i>	Shrub	
<i>Acacia obovata</i>	Shrub	
<i>Acacia pulchella</i>	Shrub	
<i>Acacia saligna</i>	Shrub	Yes
<i>Allocasuarina fraseriana</i>	Shrub	Yes
<i>Allocasuarina huegeliana</i>	Shrub	
<i>Allocasuarina humilis</i>	Shrub	
<i>Austrostipa compressa</i>	Shrub	
<i>Banksia dallanneyi</i>	Shrub	Yes
<i>Banksia fraseri</i>	Shrub	Yes
<i>Banksia grandis</i>	Tree	Yes
<i>Banksia kippistiana</i>	Shrub	Yes
<i>Banksia leptophylla</i>	Shrub	Yes
<i>Banksia nivea</i>	Shrub	Yes
<i>Banksia sessilis</i>	Shrub	Yes
<i>Banksia squarrosa</i>	Shrub	Yes
<i>Banksia undata</i>	Shrub	Yes
<i>Callistemon phoeniceus</i>	Shrub	
<i>Calothamnus quadrifidus</i>	Shrub	
<i>Calothamnus rupestris</i>	Shrub	
<i>Calothamnus sanguineus</i>	Shrub	
<i>Conospermum glumaceum</i>	Shrub	
<i>Conostylis aculeata</i>	Herb	
<i>Conostylis candicans</i>	Herb	
<i>Conostylis juncea</i>	Herb	
<i>Conostylis setigera</i>	Herb	
<i>Conostylis setosa</i>	Herb	
<i>Corymbia calophylla</i>	Tree	Yes
<i>Cyathochaeta avenacea</i>	Shrub	
<i>Daviesia decurrens</i>	Shrub	
<i>Daviesia divaricata</i>	Shrub	
<i>Darwinia citriodora</i>	Shrub	Yes
<i>Dianella revoluta</i>	Shrub	

Species	Growth Form	Black Cockatoo Habitat (in accordance with DPAW's list for Plants Used by Carnaby's Black Cockatoo (Groom, 2011))
<i>Eremaea pauciflora</i>	Shrub	
<i>Eucalyptus marginata</i>	Tree	Yes
<i>Eucalyptus patens</i>	Tree	Yes
<i>Eucalyptus rudis</i>	Tree	Yes
<i>Eucalyptus todtiana</i>	Tree	Yes
<i>Eucalyptus wandoo</i>	Tree	Yes
<i>Gastrolobium dilatatum</i>	Shrub	
<i>Gastrolobium retusum</i>	Shrub	
<i>Gompholobium marginatum</i>	Shrub	
<i>Gompholobium polymorphum</i>	Shrub	
<i>Gompholobium tomentosum</i>	Shrub	
<i>Grevillea bipinnatifida</i>	Shrub	Yes
<i>Grevillea paniculata</i>	Shrub	Yes
<i>Haemodorum laxum</i>	Shrub	
<i>Hakea amplexicaulis</i>	Shrub	
<i>Hakea candolleana</i>	Shrub	Yes
<i>Hakea conchifolia</i>	Shrub	Yes
<i>Hakea cristata</i>	Shrub	
<i>Hakea cyclocarpa</i>	Shrub	Yes
<i>Hakea erinacea</i>	Shrub	
<i>Hakea incrassata</i>	Shrub	Yes
<i>Hakea lasiantha</i>	Shrub	Yes
<i>Hakea lissocarpa</i>	Shrub	Yes
<i>Hakea petiolaris</i>	Shrub	Yes
<i>Hakea preissii</i>	Shrub	Yes
<i>Hakea prostrata</i>	Shrub	Yes
<i>Hakea ruscifolia</i>	Shrub	Yes
<i>Hakea stenocarpa</i>	Shrub	
<i>Hakea sulcata</i>	Shrub	Yes
<i>Hakea trifurcata</i>	Shrub	Yes
<i>Hakea undulata</i>	Shrub	Yes
<i>Hakea varia</i>	Shrub	
<i>Hovea chorizemifolia</i>	Shrub	
<i>Hardenbergia comptoniana</i>	Shrub	
<i>Hemiandra pungens</i>	Shrub	
<i>Hypocalymma robustum</i>	Shrub	
<i>Isopogon asper</i>	Shrub	

Species	Growth Form	Black Cockatoo Habitat (in accordance with DPAW's list for Plants Used by Carnaby's Black Cockatoo (Groom, 2011))
<i>Isopogon dubius</i>	Shrub	
<i>Isopogon sphaerocephalus</i>	Shrub	
<i>Kennedia coccinea</i>	Shrub	
<i>Kunzea baxteri</i>	Shrub	
<i>Kunzea ericifolia</i>	Shrub	
<i>Kunzea glabrescens</i>	Shrub	
<i>Labichea punctata</i>	Shrub	
<i>Leptospermum erubescens</i>	Shrub	
<i>Lomandra preissii</i>	Shrub	
<i>Melaleuca lateritia</i>	Shrub	
<i>Melaleuca seriata</i>	Shrub	
<i>Neurachne alopecuroidea</i>	Shrub	
<i>Patersonia rudis</i>	Shrub	
<i>Petrophile striata</i>	Shrub	
<i>Pultenaea reticulata</i>	Shrub	
<i>Stirlingia latifolia</i>	Shrub	
<i>Stylidium species</i>	Shrub	
<i>Thyridolepsis multiculmis</i>	Shrub	
<i>Thysanotus sparteus</i>	Shrub	
<i>Tripterococcus brunonis</i>	Shrub	
<i>Verticordia densiflora</i>	Shrub	
<i>Viminaria juncea</i>	Shrub	
<i>Xanthorrhoea preissii</i>	Shrub	Yes

6.6 Collection and Propagation of Seed for Rehabilitation Works

EMRC has implemented a seed collection program that serves part of the Red Hill Rehabilitation program for the revegetation of capped landfill cells. The seed collection program will be extended to ensure seed banks are developed for the offset site. Local endemic seed is collected from October through to March when the majority of native species are producing seed. The seed is then stored by an appropriately licenced rehabilitation company and propagated by a suitably qualified person at a local nursery.

Efforts will also be placed towards collecting seed from native vegetation located within the proposed 13.9 ha cleared area on Lot 12 prior to clearance activities and added to the Red Hill seed bank. This area primarily consists of *Corymbia calophylla*, *Eucalyptus marginata* and *Allocasuarina* spp with an understorey of *Banksia sessilis*.

6.7 Revegetation Timing

Revegetation activities will predominantly be undertaken in autumn to improve the opportunity for plant establishment. The following table outlines the timing for preparation and revegetation works.

Table 2: Timing for Revegetation Works

Activity	Timing
Confirm areas to be revegetated within Lot 501 and Lot 82	August 2016
Define plant propagation requirements for seedling planting	September 2016
Undertake seed collection from surrounding native vegetation	October - March 2017
Undertake seedling propagation using collected native seed	January - April 2017
Determine species viability and species quantity list for autumn planting	February - March 2017
Determine if extra native seed/tubestock needs to be sourced from other suppliers	February - March 2017
Prepare areas for revegetation (i.e. scarification, weed control)	March - April 2017
Undertake direct seeding and/ tubestock planting	May - June 2017
Undertake monthly visual assessments	July – Dec 2017
Undertake infill planting as required	June 2018 onwards
Undertake routine maintenance measures, including tree guard replacement, weed control and feral animal control	July 2017 onwards

6.8 Revegetation Maintenance

A variety of maintenance activities will be conducted from the onset of revegetation to facilitate the establishment of seedlings. Routine maintenance measures will include:

- Application of supplementary native fertilisers
- The replacement of tree guards to provide protection against animal grazing and weather conditions
- Weed control
- Feral animal control

7 REVEGETATION MONITORING PROGRAM

Assessment of the revegetation works within the Offset Area will be undertaken annually against the Revegetation Completion Criteria outlined in Section 15.

7.1 Monthly Assessments

Visual assessments of revegetated areas will be undertaken by an Environmental Officer on a monthly basis to identify plant survival rates, impact of predators and weed invasions. These assessments will be undertaken for the first six months from when rehabilitation activities begin and all observations will be recorded. Corrective actions will be taken if triggers identified in Section 16 – Contingency Measures (Table 6) occur.

7.2 Area Wide Annual Assessment – Qualitative Assessment

Each rehabilitation area will be traversed and assessed to describe the general condition of the vegetation overall, together with the identification of maintenance issues such as weed invasion, erosion issues, poor growth and survival rates. This will be carried out by walking over the revegetation sites and studying vegetation condition, taking voucher samples for species identification (if required), and taking photographs. Information that will be noted about each site includes:

- Areas of low native vegetation density that may require additional seeding or in fill planting;
- weed species (especially woody weeds that may require physical removal); and
- maintenance requirements (erosion gullies, repairs to fencing, etc).

7.3 Monitoring Transects

Monitoring transects are used to measure the success of revegetation against the revegetation completion criteria which are outlined in Section 15.

Transects will be established by installing two metal fence droppers 50 m apart in a straight line within each revegetation area that provide an accurate representation of the site conditions. Additional transects within the remnant vegetation areas of the offset site will be included to act as control sites. Each dropper will be numbered with the appropriate location reference code. Each transect will be monitored for one metre either side of the transect line so that a total area of 100m² is assessed for each transect. The following information will be reported for each transect:

- Native species diversity (number of native plant species)
- Native species density (number of plant germinates/m²)
- Percentage foliage cover (native and weed);
- Dominant native species
- Photos of transect

The percentage foliage cover method utilises an assessment by visualising the total native species cover across the monitoring transect or quadrat. Gaps between the leaves or branches of a plant are not included in the total cover estimate. Only live weed plant material is counted towards weed cover.

This information will allow the following parameters to be assessed, and to be monitored over time:

- Which native species are present in rehabilitated areas?
- Is native plant cover increasing or decreasing?
- Is the number of species (diversity) increasing or decreasing?
- Is coverage of weeds increasing or decreasing?

Transects will be surveyed annually during November as many plants flower during this time which makes identification easier. Monitoring transects will be surveyed for the duration of the approval and will provide a measure of the progress of vegetation establishment against performance criteria.

Once a target percentage cover has been established (>80% cover of native species), detailed transect surveys will be replaced by periodic 10 m x 10 m quadrat vegetation surveys.

7.4 Monitoring Quadrats

Quadrats will be established by installing four steel fence droppers in a square measuring 10 m x 10 m (total area 100 m²). Each permanent quadrat will be marked with the appropriate location reference code. Recordings will be taken using the same methodology as for transects.

The methodology for monitoring weed coverage across the entire offset area, including performance criteria for percentage weed cover, is detailed in Appendix C – Offset Weed Management Plan.

8 HABITAT ENHANCEMENT – ARTIFICIAL NEST BOXES

Habitat enhancement activities were undertaken within the offset areas in October 2015 as an EMRC initiative. This involved the placement of 14 nest boxes within Lot 501 and Lot 82 by a qualified ornithologist using harnessing and tree climbing techniques. Each nest box was placed in suitable habitat for birds and arboreal mammals. Some nest boxes, such as the black cockatoo box, were placed 30-40m above ground level within the tree canopy (see photos below). Nest boxes were installed for the following fauna:

- Black Cockatoo
- Possum/Owl
- Phascogale
- Bat
- Parrot

The locations of these nest boxes are shown in Figure 3.

All nest-boxes have been designed and constructed by a consultant ornithologist and have been constructed to be long-lasting and not fall or be easily damaged (see below for more information).

Nest-boxes are constructed from recycled wood, consisting of 18 mm form-ply, which is waterproof and weather-resistant. Sacrificial woodchips used to fill the nest chamber (small/medium boxes), and/or chewing posts fixed to the inside (cockatoo boxes), as well as the wood's smooth surface, assist with preventing occupant fauna from chewing the inside of the box and reducing its life. Nest boxes are not fixed to trees using coach bolts or similar fasteners which may be harmful to the tree and may lead to unnecessary infection or damage. Furthermore, tests have shown the tree will eventually 'push' the box off as it grows and sheds bark, posing a safety risk, and reducing the box's lifespan, thus diminishing/reducing wildlife habitat. Boxes are therefore hung using either wire (small boxes) or chain (cockatoo boxes) which is threaded through plastic or rubber pipe to protect the tree's bark, then looped around a solid fork in the tree. Sufficient length is used to allow growth of the tree's trunk/limbs and in some instances, springs are attached to wire to accommodate for tree species which undergo rapid secondary growth (i.e. limb thickening).

8.1 Monitoring of Nest Boxes

Monitoring of nest boxes will be undertaken twice per year (September/October and November/December) by EMRC Environmental Officers based on the likelihood of the boxes being occupied by breeding fauna at that time of year. Monitoring in spring overlaps with most bird species breeding times with the follow-up inspection providing more information as well as making allowances for particular years when some species (e.g. Black Cockatoos) may breed later if rainfall is delayed.

The implementation of an ongoing monitoring regime to gather data on nest-box occupancy and condition will provide up-to-date feedback information that will be used for nest-box management/maintenance, if required.

Unforeseen weather events may cause some nest-boxes (2 of ~300 installed to date) to become dislodged/damaged and fall to the ground. Regular monthly monitoring at Red Hill (and potentially targeted inspections after extreme weather events) will allow such incidents to be detected early and nest-boxes can be repaired/reinstalled as soon as possible.

8.2 Nest Box Occupancy

Unwanted or 'rogue'/pest species such as Galahs (*Eolophus roseicapillus*) and corellas (*Cacatua* spp.) have been known to displace black-cockatoos from natural tree-hollows and occasionally from large nest-boxes. The cockatoo nest-boxes at Red Hill are vertically orientated and being 'top entry' they aim to be less favourable to such rogue species (Johnstone et al. 2015). Should they take up residence, however, regular and ongoing monitoring should allow early detection and the species can be removed.

Nest-boxes work best if they are positioned correctly during installation and left in one location, then given time for local fauna to discover them and take up residence. Fauna nesting/roosting ecology is complex and the use of hollows is a dynamic ecosystem process, impacted by various factors including seasonal variation in food resources and competition between species. Occupancy is usually not instant and it may take several years for fauna to take up residence. Moving nest-boxes may be an option if several years of monitoring confirm that no box has been used, but normally every box is used by some type of fauna (especially invertebrates) within the first 12 months after installation.

If Red Hill cockatoo nest-boxes are found to be occupied by Threatened black-cockatoos, the construction of additional boxes and installation in close proximity to existing sites will be explored by EMRC.

Red Hill Nest Box Locations

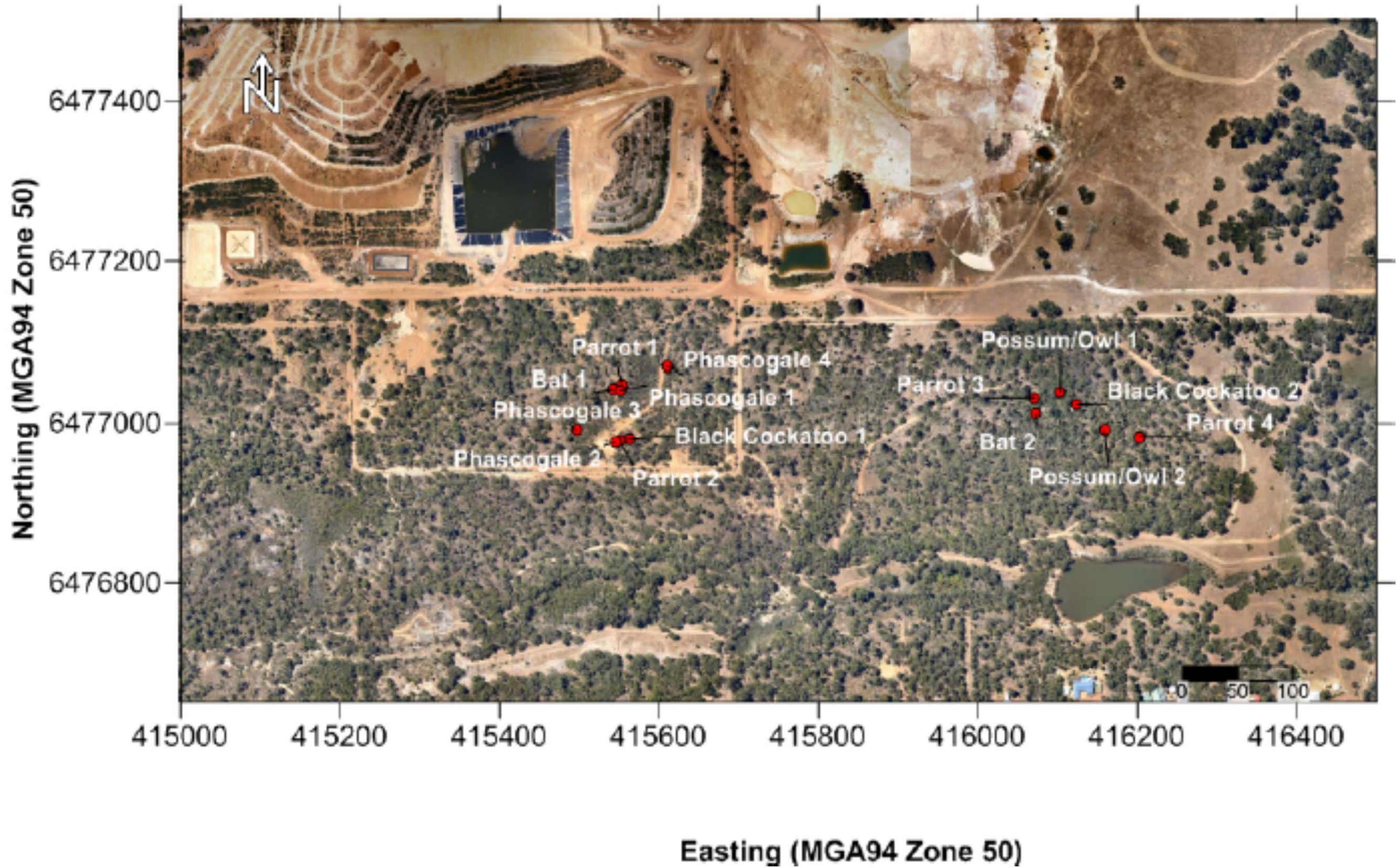


Figure 3: Nest box locations in Offset Areas



Photo A: Installing Nest Box



Photo B: Black Cockatoo Nest in Mature Marri Tree

9 FENCING

Lot 82 has an existing 1.8m perimeter chain mesh fence, whilst Lot 501 has a 1.8m chain mesh fence on the northern boundary and standard galvanised ring-lock fencing on the eastern and southern boundaries. The current fencing structures surrounding the offset area limit foot and vehicle traffic incursions from the public and other neighbouring properties. Approximately 200m of the western boundary of Lot 501 which adjoins the John Forrest National Park will not be fenced in the interests of maintaining ecological connectivity.

There are no gates on the southern boundary of Lot 501 which could potentially provide access to trail bike riders. Signs will be erected to warn unauthorised access.

Site Supervisors will monitor the offset areas for any evidence of unauthorised access, which will include integrity of fences, on a weekly basis. Any faults and repairs will be initiated as required.

10 WEED CONTROL

An Offsets Area Weed Management Plan was prepared and submitted to DER in April 2016 and the actions EMRC will take to manage weeds within Lots 82 and 501 for the duration of the clearing permit CPS 5743/2, that being 1 August 2015 to 1 August 2020. The plan details targets set for weed coverage and diversity, as well as survey methodologies, monitoring programs and removal techniques. A copy of the weed management plan is found in Appendix C.

10.1 Weed Control Methodology

Condition 3(a) of DER clearing permit CPS 5743/2 states that at least once in each 12 month period EMRC must take action to remove or kill weeds in the Offset Conservation Covenant Area. To achieve this requirement the following methodology will be adopted:

1. The area will be surveyed for weeds three times per year as per the Weed Management Timeline in Section 6. EMRC Environmental Officers will walk grid lines with the aid of GPS units. Timing of the first survey shall be approximately late autumn after the first initial rains which cause the onset of winter weeds. The second shall be approximately early spring and the third survey during summer.
2. Detailed records will be taken during the field surveys of weed infestations and will include the following:
 - GPS location
 - Species identification
 - Size of infestation
 - Proposed removal technique and possible removal problems
 - Photo image for reference purposes

-
3. Small weed infestations found during the field surveys will be removed immediately as long as effective removal can be performed. Removing weeds and leaving the material on the ground allows the potential for germination again from seeds. Plant debris accumulated from manual removal will be disposed of appropriately.
 4. After the 2016 field surveys, methodology of future field surveys will be reviewed and will depend on information gathered in the initial surveys. Following surveys will be more concentrated in areas where weeds are known to be.
 5. Surveys, control and monitoring will be conducted three times per year within both lots as per the Weed Management Timeline (Table 3).
 6. It is expected most weeds have already been identified in areas along vehicle tracks, near creek lines and open areas where weeds can out compete and colonise over native vegetation. It is likely weed infestations will be low or absent in areas of high density natural vegetation.
 7. Weed control beyond the northern boundary of the offset area, will be managed through the Red Hill Site Weed Management Plan. In particular, EMRC's Environmental Officer will conduct ongoing assessments of areas along the northern boundary which are susceptible to weed infestation. These areas will become a focus for weed management control. For example, where surface water run-off flows into the offset area from capped landfill areas of the site.
 8. EMRC is unable to control weed infestations outside the boundary of the offset area, except for the northern boundary, which is approximately 1.5km. This is because EMRC does not have property ownership to these areas.

10.2 Weed Control Timeline

Below is the weed management plan timeline showing three weed management periods per year encompassing four months each which will be conducted over a period of 5 years commencing 1 August 2015. Each weed management period is made up of initial surveying for weeds in the two lots followed by weed control then finally monitoring effectiveness of the weed control with possible follow up control. Note that the start and end times for each control period may vary depending on weather conditions, in any case three control periods will be run each year.

Table 3: Weed management plan timeline.

Control Period	Month	Action
One	April / May	Survey of the entire offset area to identify weed locations, species, areas covered, densities, control issues, etc.
	May / June	Control of weeds identified as outlined in section 8. Weed species & suitable control methods.
	June / July	Monitoring of control performed in May / June, followed by control of weeds not eradicated. Note that monitoring & control will continue until targeted weeds are eradicated.
Two	August / September	Survey of the entire offset area to identify weed locations, species, areas covered, densities, control issues, etc.
	September / October	Control of weeds identified as outlined in section 8. Weed species & suitable control methods.
	October / November	Monitoring of control performed in September / October, followed by control of weeds not eradicated. Note that monitoring & control will continue until targeted weeds are eradicated.
Three	December / January	Survey of the entire offset area to identify weed locations, species, areas covered, densities, control issues, etc.
	January / February	Control of weeds identified as outlined in section 8. Weed species & suitable control methods.
	February / March	Monitoring of control performed in January / February, followed by control of weeds not eradicated. Note that monitoring & control will continue until targeted weeds are eradicated.

10.3 Weed Survey – Current Weed Status of Offset Area

As per the Offsets Area Weed Management Plan, a weed survey was conducted in June 2016. The entire offsets site was surveyed by EMRC Environmental Officers walking grid lines with the aid of GPS units.

Small weed infestations found during the field surveys were removed immediately whilst other areas identified were attended using cut and paint methods after the survey was completed. Figure 4 details the location of weeds identified during the June survey.

Location of Weeds Within Lots 82 and 501 (June 2016)

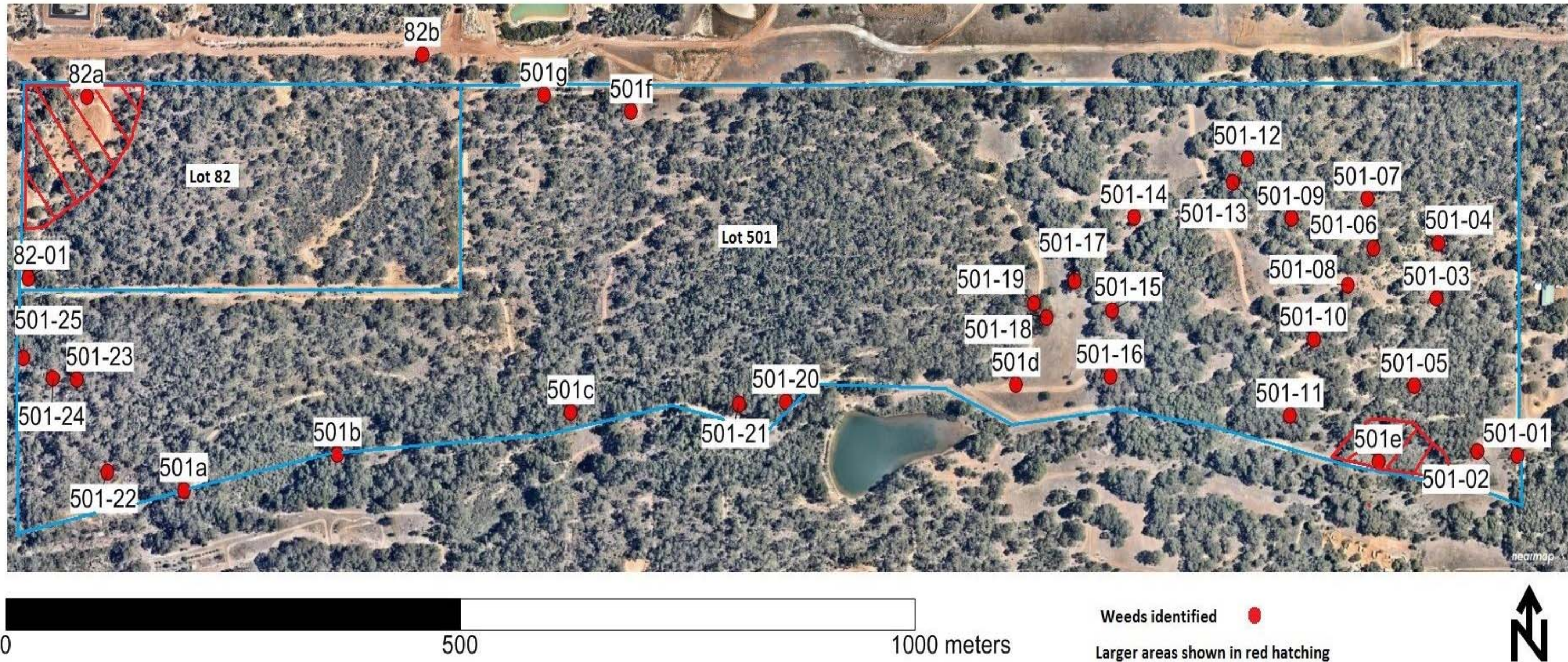


Figure 4: Results of weed mapping from June 2016 survey.

11 FERAL ANIMAL CONTROL

The European Rabbit (*Oryctolagus cuniculus*), European Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*) are introduced animal species which have been recorded within the Red Hill Waste Management Facility premise boundary. To avoid and mitigate impacts from introduced fauna species, EMRC will extend current feral animal control management practices conducted within the licensed premise boundary to the offset areas of Lot 501 and Lot 82.

Feral animal control at the Red Hill Waste Management Facility will be undertaken by qualified contractors and the methodology of control is outlined below.

European Rabbit

- Regular site assessments for the presence of rabbits. These site assessments will be increased during breeding season as required;
- Regular fumigation of active rabbit warrens using aluminium phosphine tablets or other approved fumigants. Fumigation is followed by warren destruction to stop rabbits returning to the area;
- Control of rabbits through the release of rabbit haemorrhagic disease virus (RHDV) where rabbit activity has been detected and can't be managed through fumigation and warren destruction; and
- Humane disposal of captured rabbits in accordance with the Animal Welfare Act.

European Fox

- Regular site assessment for the presence of foxes. These site assessments will be increased during breeding season as required;
- Trapping of foxes through the use of soft foot-hold traps and cage traps;
- Location of areas frequented by foxes and location of denning sites using a conservation detection dog; and
- Humane disposal of captured foxes in accordance with the Animal Welfare Act.

Feral Cat

- Regular site assessment for the presence of cats;
- Control of feral cats through the use of cage traps in areas where they are regularly sighted or reports from the client come through;
- Location of areas frequented by cats and areas where cats sleep or hide kittens using a conservation detection dog; and
- Humane disposal of captured cats in accordance with the Animal Welfare Act.

The relevance of these pest fauna species to Black-Cockatoo conservation and management is as follows:

- *European Rabbit*: May affect revegetation and may also affect natural recruitment of shrubs and trees in the forest, although Rabbits are only common on the edges of Lots 82 and 501 as they rely heavily on pasture plants for feeding. Therefore, control mostly needed in the early stages of revegetation. Weed control in disturbed areas would reduce the food supply for Rabbits. Including understorey species that are naturally toxic to Rabbits in the revegetation mix should be considered.
- *Red Fox*: Of little if any relevance to Black-Cockatoos, but clearly a predator of other native fauna found within the offsets area.
- *Feral Cat*: Has been recorded preying upon Black-Cockatoo chicks in nests (Bamford Consulting, 2016). A difficult species to control, especially as some of the 'Feral' Cats in the area may be Domestic Cats. The number of truly Feral Cats will also be supplemented by uncontrolled breeding and wandering by Domestic Cats. Therefore, educating neighbours to keep their cats indoors (preferably at all times but at least at night) would be very helpful in Cat control. Trapping of cats can be conducted around the waste disposal facility to suppress numbers.

The schedule of control programs is shown in Table 4. Site inspections will be undertaken of the project area on a regular basis. In the lead up to each trapping period the frequency will be increased, but generally the inspections will be undertaken at least once per month during non-trapping periods. Fox and cat trapping will be undertaken at least twice each year and there may be a release of RHDV in autumn (if required). The RHDV program will involve a pre-feeding period to accustom rabbits to the bait prior to infection with the virus. Fumigation of warrens will occur twice per year and on an ongoing basis when they are found during the monthly inspections.

Depending on the results of the monthly site inspections, additional trapping programs for foxes and cats may be completed.

Table 4: Schedule of Pest Animal Control

	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	Jun	July	Aug
Site inspections	■	■	■	■	■	■	■	■	■	■	■	■
Fumigation	■	■	■	■	■	■	■	■	■	■	■	■
Rabbit - RHDV	■	■	■	■	■	■	■	■	■	■	■	■
Cat trapping	■	■	■	■	■	■	■	■	■	■	■	■
Fox trapping	■	■	■	■	■	■	■	■	■	■	■	■

Scheduled	■
Ongoing	■

12 DIEBACK CONTROL

P. cinnamomi is the most destructive of the *Phytophthora* species and proliferates in warm, moist soil conditions. The fungus forms a parasitic association within the vascular tissue of the root and basal region of the stem in susceptible plant species. It inhibits the uptake of water and nutrients and eventually kills the plants that it has infected.

The major causal factor contributing to the rapid spread of Dieback is human activities where infected soil is carried from one area to another, such as road construction, earthmoving and stock and vehicle movements on unsealed roads. Fungi causing Dieback also spreads through soil naturally, but at a much slower rate.

A Dieback survey conducted by CALM in 2002 identified areas of remnant vegetation on Lots 1, 2, 11, 12 and 82 (Lot 501 was not owned by EMRC at the time) that were assessed as free of Dieback infection (Refer to Figure 3 & 4). Earlier surveys have reported indications of Dieback infection in and around operational areas of the site. Lot 501 was purchased in mid-2004 and has not been formally surveyed for Dieback.

Dieback management will be implemented at the site to reduce the spread of Dieback in and around operational areas of the site and within the offset areas.

12.1 Prevention – Red Hill Waste Management Facility

- All trucks will wash down wheels and undercarriage prior to exiting the site, using vehicle wash facilities located at the facility exit.
- All light vehicles that have accessed unsealed roads during wet weather conditions will wash down wheels and undercarriage prior to exiting the site, using vehicle wash facilities located at the facility exit.

12.2 Prevention – Offset Areas

- A follow-up dieback survey from the survey carried out in 2002 will be undertaken in both Offset areas in 2016 by a qualified consultant to determine the status of potentially dieback impacted areas.
- Fences around the perimeter of Lot 501 will be maintained to restrict access from adjoining properties.
- Inspection of boundary fences for damage will be undertaken on a weekly basis by site operations staff.
- Access into Lot 501 and Lot 82 by vehicles will be limited, especially during wet weather conditions when mud and soil can be inadvertently transported on vehicles or boots.
- Vehicle access will be limited to existing roads and tracks.
- Signage will be installed at appropriate locations around the offset areas, in order to ensure that staff and contractors are aware of dieback-prevention procedures.

-
- All relevant personnel and contractors will receive appropriate training and awareness on their responsibilities associated with Dieback hygiene procedures on site and the controlled access restrictions to offset areas.
 - Firebreaks and boundary roads around Lots 82 and 501 will be maintained in good condition, with works carried out during dry months.

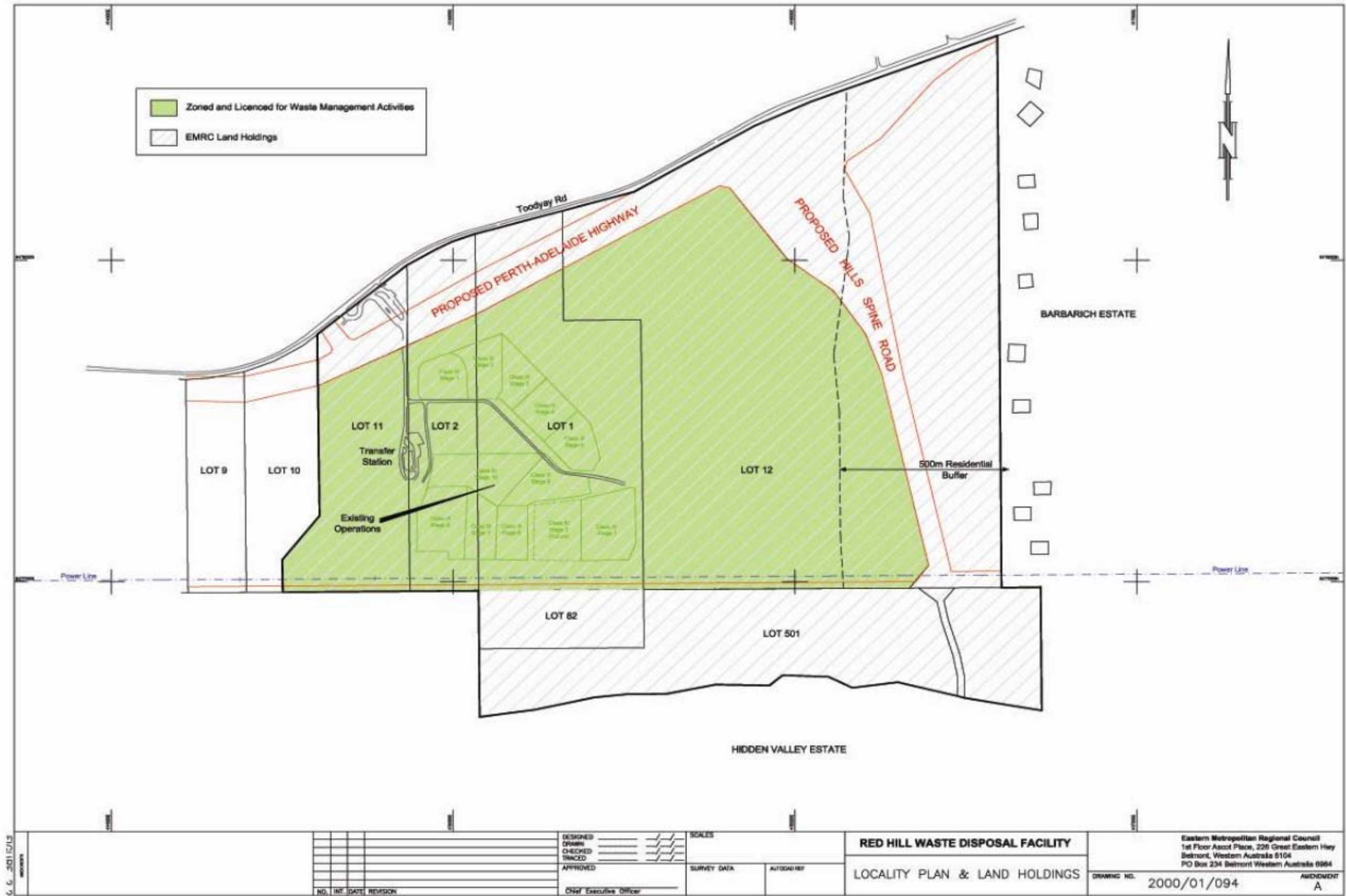


Figure 5: Red Hill Waste Management Facility Locality Map

RED HILL WASTE FACILITY AND FARM

PHYTOPHTHORA CINNAMOMI OCCURRENCE MAP

MAP LEGEND

- UNINFESTED**
 Determined by a qualified interpreter to be free of plant disease symptoms which indicates the presence of *Phytophthora*
- UNINTERPRETABLE**
 Where susceptible plants are absent or too few to enable the interpretation of *Phytophthora* presence or absence.
- INFESTED**
 Determined by a qualified interpreter to have plant disease symptoms consistent with the presence of *Phytophthora*
- Sample Site
 + PC Positive
 - PC Negative
- BOUNDARY OF INTERPRETATION

*NB - Boundaries determined from field interpretation by qualified interpreters and transferred from large scale Dispositives or Base plan.
 Map Limitations - The smallest areas of interpretation that can be portrayed on this map are 1 millimetre in diameter, representing 10.0 metres diameter on the ground. Areas less than this are symbolised to this size.

Interpreted & Compiled By - A.V.S.

Completed - December 2001

INTERPRETED USING STRIP LINE SURVEY.
 INTERPRETED USING 1:20 000 PHOTOGRAPHY.
 BOUNDARIES CAPTURED USING GPS.
 BOUNDARIES POSITIONED RELATIVE TO MAP FEATURES.

This File - red hill ang.occ
 Related Files -
 Print File - red hill ang.occ10.ps

AREA STATEMENT

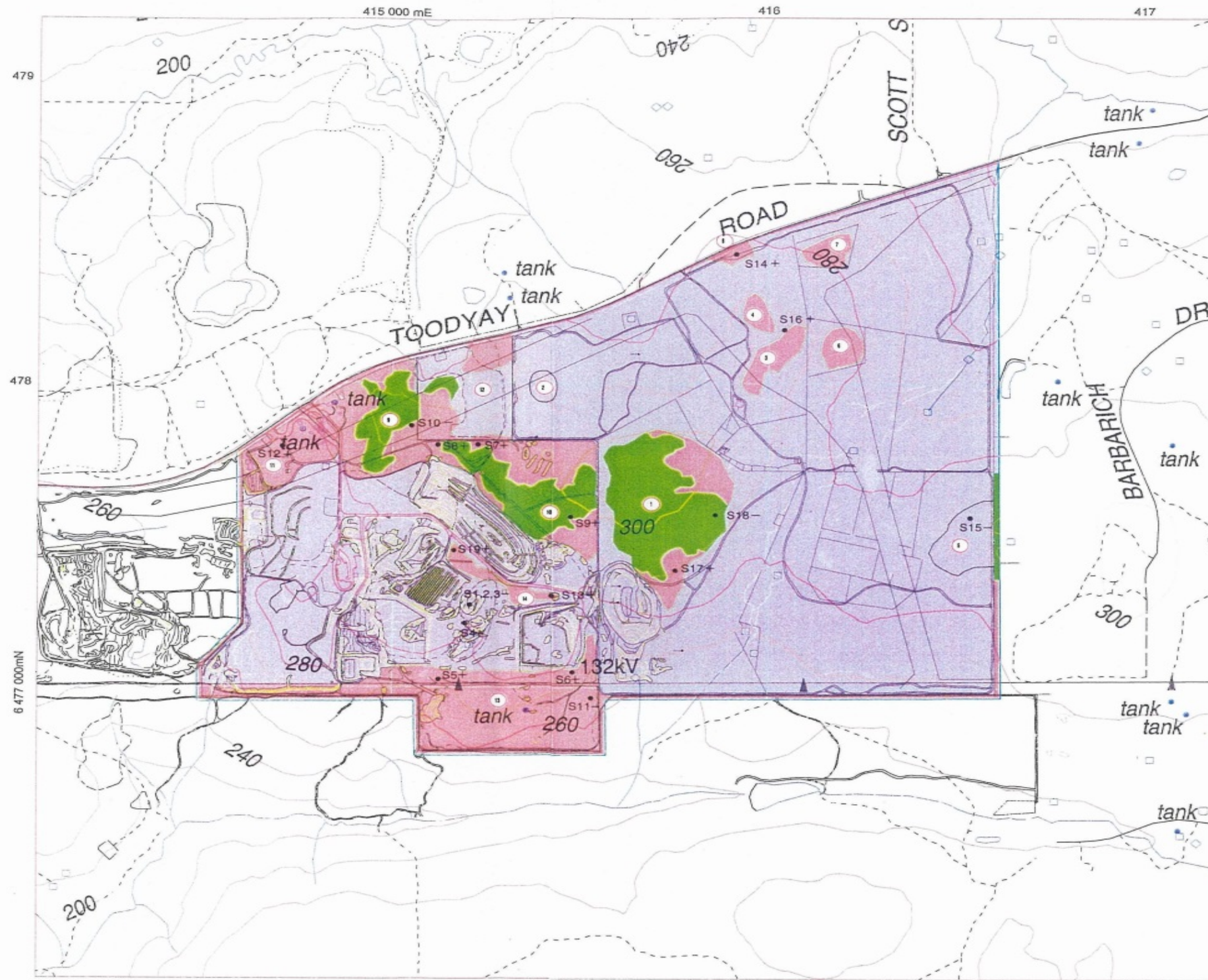
Categories	Area ha	Notes
UNINFESTED	18.2ha	
UNINTERPRETABLE	212.7ha	
INFESTED	51.3ha	
TOTAL AREA	282.2ha	

AGE LIMITS FOR THIS MAP

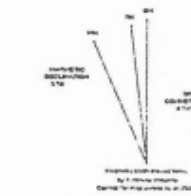
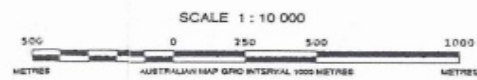
Map Boundaries should be checked before Operations proceed if the map is older than 1 year (December 2002)
 This map should not be used if it is older than 3 years (December 2004)
 Areas that have had an Operation in them become unreliable and should be checked prior to Further / New activities.



PREPARED BY THE FOREST MANAGEMENT BRANCH UNDER THE DIRECTION OF KEVIN MONAGHAN ACTING EXECUTIVE DIRECTOR OF THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT, WESTERN AUSTRALIA
 THIS MAP IS COPYRIGHT. APART FROM ANY USE PERMITTED UNDER THE COPYRIGHT ACT, NO PART MAY BE REPRODUCED BY ANY PROCESS WITHOUT THE PERMISSION OF CALM.



- LEGEND**
- 2 LANE SEALED ROAD
 - 1 LANE UNSEALED ROAD
 - 1 LANE SEALED ROAD
 - 1 LANE UNSEALED ROAD
 - VEHICULAR TRACK
 - POWERLINE PULCH No.
 - REFERENCE TREE
 - HYDROLOGY
 - CONTOUR (10 METRE INTERVAL)
 - SWAMP
 - DAM
 - LOADING PUMP
 - WATER POINT
 - SPOT HEIGHT



Note: Information on this map is referenced to the Australian Geodetic Datum (AGDS84).

Figure 6: Dieback Survey Map Produced by CALM in 2002

13 FIRE MANAGEMENT

EMRC has previously engaged Shire of Mundaring Fire Protection Officers to conduct fuel load audits within Lots 501 and 82. This has resulted in prescribed burns being conducted under favourable weather conditions in accordance with the Bush Fires Act 1954.

A threshold of 8 tonnes/hectare was used as the threshold to determine whether a prescribed burn needs to be initiated. Each prescribed burn has been conducted in a mosaic format. The mosaic approach ensures a dual purpose of firstly reducing fuel loads and the severity of bushfires and secondly maintaining biodiversity.

Cell 1 was the first area subject to a control burn in November 2013 and Cell 2 in September 2014. Cell 3 which is the eastern most portion of Lot 501 will be subject to a control burn in 2017 and will be conducted during permitted burning periods and in accordance with the Shire of Mundaring Fire Management protocols. Depending on weather conditions, the time of year that burning is likely to occur, is sometime between June - September. The majority of areas that are a focus for rehabilitation activities have not been earmarked for prescribed burning as previous fuel audits indicated low fuel loads within these areas.

It is the responsibility of the Site Manager to ensure fuel audits of the offset area are conducted annually and prescribed burns administered in accordance with the Bush Fires Act 1954 by qualified Fire Protection Officers. The Site Manager will ensure that neighbouring residents are notified in advance of scheduled burns.



CELL 1 – Prescribed Burn Conducted November 2013
CELL 2 – Prescribed Burn Conducted September 2014

Figure 7: Prescribed Burns within Offset Area

14 TIMEFRAMES AND IMPLEMENTATION

Table 5 below details works proposed for both offset lots – Lot 82 and Lot 501.

Table 5: Lot 82 and Lot 501 Proposed Actions and Timing

Management	Action	Person Responsible	Measurable Outcome	Frequency	Timing
1. Weed Control	1.1 Implement Offset Area Weed Management Program (Refer to Appendix C)	Environmental Officer	Weed control targets are met	As per Weed Management Plan	May 2016 – August 2020
2. Fencing	2.1 Assess integrity of existing 1.8m chain mesh fencing surrounding the perimeter of Lot 82 and the existing galvanised ring-lock fence surrounding the perimeter of Lot 501	Environmental Officer	Access to offset area is restricted from unauthorised entry.	As required	July 2016
	2.2 Undertake any structural/integrity improvement requirements to the fences	Site Manager		As required	August 2016
	2.3 Ensure access is restricted to the offset area from neighbouring properties and appropriate unauthorised access signage is erected.	Site Manager		n/a	July 2016 - December 2026
	2.4 Conduct routine inspections of perimeter fencing to offset area to ensure no unauthorised entry or loss of integrity to fencing structures.	Site Manager		Weekly	July 2016 - December 2026
3. Revegetation	3.1 Define areas to be revegetated within Lot 501 and Lot 82	Environmental Officer	Revegetation targets are met.	As required	July 2016
	3.2 Define plant propagation requirements for seedling planting				August 2016
	3.3 Undertake seed collection from surrounding native vegetation				October - March 2017
	3.4 Undertake seedling propagation using collected native seed				January - April 2017
	3.5 Determine species viability and species quantity list for autumn planting				February - March 2017
	3.6 Determine if extra native seed/tubestock needs to be sourced from other suppliers				February - March 2017
	3.7 Prepare areas for revegetation (i.e. scarification, weed control)				March - April 2017
	3.8 Undertake direct seeding and/ tubestock planting				May - June 2017
	3.9 Undertake infill planting as required				June 2018 onwards
4. Habitat Enhancement	4.1 Monitor activity in nest boxes installed within the Offset Areas twice per year	Environmental Officer/Environmental Field Officer	Habitat enhancement initiatives are successful (i.e. Black Cockatoo activity in artificial nest boxes)	Twice yearly	Nest box activity - Every September and October from 2016 - 2026
	4.2 Monitor integrity of nest boxes (i.e. storm damaged, fallen down)			Monthly	
5. Pest and other fauna control	5.1 Install tree guards for seedling protection	Environmental Officer/Environmental Field Officer	Feral animal population is controlled through control programs and the feral animal population does not adversely impact on revegetation efforts.	As required	During seedling installation
	5.2 Engage licensed contractor to implement pest management control program			Four times per year	July 2016 - December 2026

Management	Action	Person Responsible	Measurable Outcome	Frequency	Timing
6. Dieback Control	6.1 Undertake follow-up dieback survey of Offset Areas	Environmental Officer	Dieback management protocols are implemented.	n/a	July 2016
	6.2 Implement dieback management controls				July 2016 - December 2026
7. Fire Management	7.1 Undertake regular fuel audits of offset area	Site Manager	Prevents the spread, intensity and extension of bush fires within the area.	Audits to be carried out annually Prescribed burns to be conducted as per results of fuel audits	Prescribed burns to be conducted when fuel loads reach 8 tonne/hectare and to be done during May – September fire burning season.
	7.2 Coordinate prescribed burns as per the outcomes of fuel audits and in accordance with Bush Fires Act, 1954	Site Manager			
8. Revegetation Monitoring Program	8.1 Engage suitably qualified contractor to undertake revegetation monitoring program annually in October of each year	Environmental Officer	Monitoring programs for revegetation success are implemented in accordance with OMP.	Annually	October/November 2017 followed by annual monitoring each October/November until 2026. Monthly visual inspections are to be conducted for a period of six months after rehabilitation activities.
	8.2 Undertake routine inspections of rehabilitation areas to assess mortality and success rates.			Monthly	
9. Record Keeping	8.1 Develop Offsets Management Register	Environmental Officer	Appropriate registers are developed and maintained to record all relevant OMP activities.	n/a	July 2016
	8.2 Maintain Offsets Management Register				July 2016 - December 2026
10. Reporting	9.1 Development and Submission of Annual Compliance Report to the Department of the Environment	Manager, Environmental Operations	All legislative reporting requirements under EPBC Referral/ 2014/7354 are met.	Annually	Within three months of every 12 month anniversary of the commencement of the action

15 COMPLETION CRITERIA

The revegetation completion criteria shown in Table 6 for the Offset Site are based on the following objectives:

- Increasing Black Cockatoo habitat within the offset area.
- Increasing total native vegetation cover within the offset area.
- Increasing connectivity of the offset area with surrounding bushland.

The completion criteria will be used to assess the performance of revegetation areas and identify areas that require additional planting. If these completion criteria are not met then remedial action including supplementary planting will be undertaken as required so that the targets can be satisfied.

The completion targets for species richness and density are lower at completion than after one year because some species like *Acacia* have a shorter longevity (~7 years) and there will always be a factor of more dominant species outcompeting other species for nutrients and light and become better adapted to local conditions overtime.

Table 6: Revegetation Completion Criteria

Objective: Offset the loss of Black Cockatoo Habitat Targets: Revegetate infill areas within the Offset Area Revegetation method: Direct Seeding and Tubestock Monitoring method: Transects - Quantitative			
Criterion	After one year	After three years	Completion Target
Native vegetation foliage cover (%)	10	50	>80
Native species density (number of individual plants/m ²)	3	2.5	2.5
Native species richness (number of species)	12	10	10
Tubestock survival rate (%)	80	80	80

16 CONTINGENCY MEASURES

Contingency actions shall be implemented if monitoring during the establishment period indicates that completion criteria are not being met or are unlikely to be achieved. The following table outlines potential triggers and actions.

Table 7: Contingency Measures for Rehabilitation Areas

Trigger	Action
Insufficient provenance seed volumes or propagated seedlings collected from seed collection program	Obtain additional seed and tubestock from other local seed suppliers that meet local provenance requirements.
<p>If mortality rates exceed 20% during routine inspections/monitoring</p> <p>AND/OR</p> <p>If % cover, species richness or species density does not meet targets at the pre-determined timeframes within the Completion Criteria (Table 5).</p>	<ol style="list-style-type: none"> 1. Identify cause. 2. Implement corrective actions which could include: <ul style="list-style-type: none"> ○ Collecting additional seed for direct seeding or plant propagation ○ Undertake infill planting/seeding at appropriate seasonal times. ○ Application of native fertilisers/wetting agents to improve soil ○ Install further protection from predators 3. Monitor success of corrective actions
Significant changes to native flora species diversity, richness and/or cover between monitoring periods	<ol style="list-style-type: none"> 1. Identify cause, which could include: <ul style="list-style-type: none"> ○ Spatial and seasonal variation is attributing to succession within plant communities ○ Limiting environmental factors such as disease, predation, soil fertility 2. Implement corrective actions which could include: <ul style="list-style-type: none"> ○ Review species list and reduce application rates in seed mix of dominant species
Unacceptable weed infestations	<ol style="list-style-type: none"> 1. Identify cause. 2. Identify weed species, location and coverage. 3. Enhance weed control program for the rehabilitation areas. 4. Monitor success of weed control.

17 ROLES AND RESPONSIBILITIES

EMRC has established roles and responsibilities to oversee the implementation and operation of the Offsets Management Plan. These are outlined below:

Manager, Environmental Operations

The position of Manager Environmental Operations has responsibilities for:

- Managing the development, implementation and review of the Offsets Management Plan;
- Ensuring all procedures and tasks relating to the Offsets Management Plan are adequately resourced;
- Ensuring accurate records are maintained and compliance reporting is undertaken in accordance with approval conditions.

Site Manager, Red Hill Operations

The position of Site Manager, Red Hill Operations has responsibilities for:

- Ensuring that all relevant Red Hill site staff and contractors are familiar with operational controls set out in the Offset Management Plan;
- Ensuring that no unauthorised access occurs into the Offset areas;
- Reporting any Offset Area management issues to the Manager, Environmental Operations.

Environmental Operations Coordinator

The position of Coordinator Environmental Operations has responsibilities for:

- Coordinating the implementation of monitoring programs, control programs and revegetation activities associated with the Offsets Management Plan;
- Allocating Offset Management tasks to appropriate Environmental Operations Team members and qualified contractors/consultants where required;
- Maintaining accurate records associated with the Offset Management Plan;
- Providing training to relevant contractors and site personnel regarding Offset Management plan controls.

Environmental Officer

The position of Environmental Field Officer has responsibilities for:

- Undertaking the monitoring programs, control programs and revegetation activities associated with the Offsets Management Plan;
- Preparing documentation and reports associated with the Offsets Management Plan.

Environmental Field Officer

The position of Environmental Field Officer has responsibilities for:

- Assisting in the implementation of the monitoring programs, control programs and revegetation activities associated with the Offsets Management Plan;
- Assisting in preparation of documentation and reports associated with the Offsets Management Plan.

18 COMPLIANCE AND REPORTING

18.1 Record Keeping

As per Condition 10 in the EPBC Approval (2014/7354), EMRC will develop an offsets management register that maintains accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the plan. These records will be used to inform the report required to satisfy Condition 11 in the EPBC Approval (2014/7354).

18.2 Reporting

As per Condition 11 An Annual Compliance Report will be developed for submission to the Department of the Environment within three months of every 12 month anniversary of the **commencement of the action** addressing compliance with each of the conditions of this approval, including implementation of the Offset Management Plan as specified in the conditions. The Annual Compliance Report will also be published on the EMRC's website.

19 REFERENCES

- Weed Management Plan – Offsets Area (April 2016) – Red Hill Waste Management Facility
- Black Cockatoo Habitat Tree Assessment (February 2014) – Bamford Consultants
- Red Hill Waste Management System – Environmental Management System Manual – ISO 14001 Accredited
- EPBC Referral Document – Red Hill Waste Management Facility – EPBC 2014/7354
- Red Hill Waste Management Facility (2015) – Revegetation Monitoring Report
- Red Hill Waste Management Facility (2015) – Annual Monitoring and Compliance Report – 2015
- Johnstone, R. E., Kirkby, T. and Mannion, M. (2015). Trials on the use and effectiveness of artificial nest hollows for Carnaby's Cockatoo at Cataby, Western Australia. *The Western Australian Naturalist* 29 (4), 250-262.
- Turpin, J. and Cerriman, S. (2013). Nesting records of Carnaby's Cockatoo (*Calyptorhynchus latirostris*) in the Porongurup Range, South-west Western Australia. *The Western Australian Naturalist* 29 (1), 1-7.

APPENDICES

Appendix A - Clearing Permit CPS 5743/2

Appendix B - EPBC Referral 2014/7354 Approval

Appendix C – Offset Weed Management Plan – Lot 82 and Lot 501



Government of **Western Australia**
Department of **Environment Regulation**

RECEIVED

24 NOV 2015

Your ref:
Our ref: CPS 5743/2
Enquiries: Jessica Burton
Phone: 9333 7493
Email: nvp@der.wa.gov.au

Mr Stephen Fitzpatrick
Director Waste Services
Eastern Metropolitan Regional Council
PO Box 234
BELMONT WA 6984

Attn: Ms Rachael Lovegrove

Dear Mr Fitzpatrick

AMENDED PERMIT TO CLEAR NATIVE VEGETATION UNDER THE *ENVIRONMENTAL PROTECTION ACT 1986*

I refer to Eastern Metropolitan Regional Council's (EMRC) application to amend Clearing Permit CPS 5743/1 to increase the area covered by permit CPS 5743/1 from 3.4 hectares to 13.9 hectares within Lot 12 on Plan 26468, Gidgegannup, to amend the approved offset proposal and to amend condition 2.

As previously advised in Department of Environment Regulation's (DER) letter of 15 October 2015, a conservation covenant under the *Soil and Land Conservation Act 1945* is required to be in place over the offset site prior to clearing and therefore condition 2 cannot be amended.

In an email dated 12 November 2015, Ms Racheal Lovegrove requested to waive the 28 day notification period.

Please find enclosed amended Clearing Permit CPS 5743/2 to clear native vegetation granted under s.51E of the *Environmental Protection Act 1986*. This amended permit replaces Clearing Permit 5743/1 and gives EMRC approval to clear, subject to certain terms, conditions or restrictions.

A copy of the amended permit is now available for the public to view, as required by the regulations.

Please read the permit carefully. If you wish to discuss the permit, contact the DER immediately. There are penalties for failing to comply with the requirements of the permit.

Please also note that in determining the amount of native vegetation authorised to be cleared under this permit, the Permit Holder is to have regard to avoiding clearing, minimising clearing, and reducing the impacts of clearing on any environmental value.

Compliance with the terms, conditions or restrictions of this permit does not absolve the Permit Holder from responsibility for compliance with the requirements of all Commonwealth, State and Local Government legislation.

Please note, as the permit requires the submission of a report, this should be provided electronically via email to: nvp@der.wa.gov.au.

The Atrium, 168 St Georges Terrace, Perth WA 6000
Phone: (08) 6467 5000
Postal address: Locked Bag 33, Cloisters Square, Perth WA 6850
www.der.wa.gov.au

If you have any queries regarding this matter, please contact Clearing Regulation Officer Mrs Jessica Burton on 9333 7493.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Jane Clarkson', written in a cursive style.

Jane Clarkson
A/SENIOR MANAGER
CLEARING REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

19 November 2015

Attached: Clearing Permit (CPS 5743/2, Plan 5743/2) and Decision Report
Fact Sheet: Complying with your Clearing Permit



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: 5743/2
File Number: DER2013/000382-1
Duration of Permit: From 1 August 2015 to 1 August 2020

PERMIT HOLDER

Eastern Metropolitan Regional Council

LAND ON WHICH CLEARING IS TO BE DONE

Lot 12 on Deposited Plan 26468, Gidgegannup

AUTHORISED ACTIVITY

The Permit Holder shall not clear more than 13.9 hectares of native vegetation within the area cross-hatched yellow on attached Plan 5743/2.

CONDITIONS

1. Dieback and weed control

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no *dieback* or *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared;
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared;

2. Offsets – conservation covenant

Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall:

- (a) give a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945* setting aside the *covenant area* for the protection and management of vegetation in perpetuity; and
- (b) provide to the CEO a copy of the executed conservation covenant no later than 30 June 2016.

3. Offset - weed management

The Permit Holder shall:

- (a) prior to 31 January 2016, prepare a Weed Management Plan to the satisfaction of the CEO, outlining the actions the Permit Holder will take at least once in each 12 month period for the term of this Permit to remove or kill weeds within the *covenant area*; and
- (b) implement and adhere to the Weed Management Plan.

4. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
 - (i) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (ii) the date that the area was cleared; and
 - (iii) the size of the area cleared (in hectares).

- (b) In relation to the activities done pursuant to condition 3:
 - (i) a description of the weed management undertaken; and
 - (ii) a copy of each weed management monitoring report.

5. Reporting

- (a) The Permit Holder must provide to the CEO on or before 1 July of each year, a written report:
 - (i) of records required under condition 4 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 July to 30 June of the preceding financial year.
- (b) If no clearing authorised under this Permit was undertaken between 1 July to 30 June of the preceding financial year, a written report confirming that no clearing under this permit has been carried out, must be provided to the CEO on or before 1 July of each year.
- (c) Prior to 1 May 2020 the Permit Holder must provide to the CEO a written report of records required under condition 5 of this Permit where these records have not already been provided under condition 5(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

Covenant area means the area of land cross-hatched red on attached Plan 5743/2

dieback means the effect of *Phytophthora* species on native vegetation;

fill means material used to increase the ground level, or fill a hollow;

mulch means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

weed/s means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or
- (b) published in a Department of Parks and Wildlife Regional Weed Rankings Summary, regardless of ranking; or
- (c) not indigenous to the area concerned.



Jane Clarkson
A/SENIOR MANAGER
CLEARING REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

19 November 2015

Plan 5743/2

31.829222°S

31.829222°S

116.095097°E

116.123156°E




31.840609°S

31.840609°S

116.095097°E

116.123156°E

Legend

-  Clearing Instruments Offets
-  Imagery
-  Clearing Instruments Activities
-  Local Government Authority



1:12,063

(Approximate when reproduced at A4)

GDA 94 (Lat/Long)

Geocentric Datum of Australia 1994

J Clarkson Date 19/11/15
J Clarkson

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986



GOVERNMENT OF WESTERN AUSTRALIA
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1. Application details

1.1. Permit application details

Permit application No.: 5743/2
Permit type: Area Permit

1.2. Applicant details

Applicant's name: Eastern Metropolitan Regional Council

1.3. Property details

Property: LOT 12 ON PLAN 26468, GIDGEGANNUP
Colloquial name:
Local Government Authority: SWAN, CITY OF
DER Region: Greater Swan
DPaW District: PERTH HILLS
LCDC:
Localities: RED HILL and GIDGEGANNUP

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
13.9		Mechanical Removal	Geotechnical investigations

1.5. Decision on application

Decision on Permit: Granted
Application:
Decision Date: 19 November 2015

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Mapped vegetation association described as Medium jarrah-marri (Shepherd et al 2001). Mattiske vegetation complex 'D2' is described as open forest of Eucalyptus marginata subsp. marginata-Corymbia calophylla on lateritic uplands in subhumid and semiarid zones (Mattiske and Havel 1998).	Beard is 3 hectares of native vegetation within Lot 12 on Plan 26468, Toodyay, for the purpose of geotechnical investigations.	Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994). To Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994).	The area under application consists predominately of Jarrah (Eucalyptus marginata), Marri (Corymbia calophylla), Banksia sessilis and Sheoak. The area contains very little midstorey and no understorey (DER 2013). Helena Holdings WA (2010) identified that the condition of the remnant bushland within the application area varied from good to degraded (Keighery 1994). The impacts of past logging, animal grazing and middle storey shrub deaths due to senescence were evident within the application area (DER 2013). The vegetation condition and description was determined from a site inspection (DER 2013), fauna assessment undertaken by Bamford Consulting Ecologists (2010) and flora and vegetation assessment undertaken by Helena Holdings WA (2010).

3. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments: **Proposed clearing is not likely to be at variance to this Principle**
The amended application is to clear 13.9 hectares of native vegetation within Lot 12 on Plan 26468, Toodyay

for the purpose of geotechnical investigations.

A Flora and Vegetation Assessment conducted within Lot 12 on 27 October 2010, including the area under application, recorded a total of 39 native taxa from a diverse range of 18 Families (Helena Holdings WA 2010). Helena Holdings WA (2010) identified that the condition of the remnant bushland within the application area varied from good to degraded (Keighery 1994) and consisted of forest of *Corymbia calophylla* (Marri), *Eucalyptus marginata* (Jarrah) and *Allocasuarina fraseriana* (she oak) over thicket of *Banksia sessilis* var. *sessilis* over occasional shrubs and herbs. The impacts of past logging, animal grazing and middle storey shrub deaths due to senescence were evident within the application area (Helena Holding WA 2010).

Twenty seven priority flora species have been recorded within the local area (ten kilometre radius). A Flora and Vegetation Assessment conducted within Lot 12 did not identify any priority flora species occurring within the application area (Helena Holdings WA 2010).

Seven fauna species listed as rare or likely to become extinct under the Wildlife Conservation Act 1950 have been recorded within the local area (ten kilometre radius), including: *Calyptorhynchus banksii* subsp. *naso* (forest red-tailed black cockatoo), *Calyptorhynchus baudinii* (Baudin's cockatoo), *Calyptorhynchus latirostris* (Carnaby's cockatoo), *Dasyurus geoffroii* (chuditch) and *Phascogale tapoatafa* subsp. *tapoatafa* (southern brush-tailed phascogale) (Parks and Wildlife 2007-). The vegetation proposed to be cleared is foraging habitat and possible breeding habitat for black cockatoo species. Given the lack of understorey present within the area under application the vegetation proposed to be cleared is not likely to provide significant habitat for ground dwelling fauna.

Given the condition of the vegetation and impacts of historic logging and grazing, it is not likely to contain a high biological diversity.

The clearing is not likely to be at variance to this principle.

Methodology

References:

- Helena Holdings WA (2010)
 - Parks and Wildlife (2007-)
 - Keighery (1994)
- GIS Database:
- SAC Bio Datasets September 2015

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments

Proposed clearing is at variance to this Principle

Seven fauna species listed as rare or likely to become extinct under the Wildlife Conservation Act 1950 have been recorded within the local area (five kilometre radius) including: *Calyptorhynchus banksii* subsp. *naso* (forest red-tailed black cockatoo), *Calyptorhynchus baudinii* (Baudin's cockatoo), *Calyptorhynchus latirostris* (Carnaby's cockatoo), *Dasyurus geoffroii* (chuditch) and *Phascogale tapoatafa* subsp. *tapoatafa* (southern brush-tailed phascogale) (Parks and Wildlife 2007-).

Bamford Consulting Ecologists (2010) undertook a fauna assessment of the vegetation located within Lot 12 including the area under application. Bamford Consulting Ecologists (2010) identified a number of conservation significant species that may occur within the application area including: carpet python (*Morelia spilota imbricata*), fork-tailed swift (*Apus pacificus*), forest red-tailed black cockatoo, Baudin's cockatoo, Carnaby's Cockatoo, peregrine falcon (*Falco peregrinus*), rainbow bee-eater (*Merops ornatus*), chuditch and southern brush-tailed phascogale.

Bamford Consulting Ecologists (2010) advised that the application area may be too degraded for ground dwelling fauna and given the lack of substantial understorey it is not likely to be significant habitat for these species. Bamford Consulting Ecologists (2010) advised that the peregrine falcon and rainbow bee-eater may utilise the area under application but their habitat is widespread and therefore the vegetation within the application area is not likely to be significant habitat for these species.

A black cockatoo assessment was undertaken on 7 April 2014 by Bamford Consulting Ecologists (2014). This assessment identified that the application area contained several species of value as foraging habitat for black cockatoos including Marri, Jarrah, Parrot Bush and Sheoak with scattered Bull Banksia and Snottygobble. Very old signs of forest red-tailed black cockatoo feeding on marri were identified within the vegetation under application. In addition, Baudin's cockatoo was recorded during the fauna survey, with evidence of foraging observed throughout the application area (Bamford Consulting Ecologists 2010).

Approximately nine trees with Diameter at Breast Height (DBH) of greater than 50 centimetres were recorded within the area under application (Bamford Consulting 2014). During the black cockatoo assessment no active nests were found. One potential suitable hollow was identified within Lot 12, the remaining trees identified have the potential to develop suitable breeding hollows in the future (Bamford Consulting Ecologists 2014). Only a limited number of quadrats were undertaken within the application area and therefore the number of potential black cockatoo breeding trees is expected to be larger than the nine trees identified (Bamford Consulting Ecologists 2014).

Carnaby's cockatoo is listed as endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Carnaby's cockatoo was once abundant in Western Australia. Since the late 1940s the species has suffered a 30 per cent contraction in range, a 50 per cent decline in population, and between 1968 and 1990 disappeared from more than a third of its breeding range (Saunders 1990; Johnstone and Storr 1998; Saunders and Ingram 1998; Garnett et al. 2011).

Basic ecological theory, expert opinion and recent evidence suggests that the foraging habitat on the Swan Coastal Plain is just sufficient to support the current population of Carnaby's cockatoo. Therefore any reduction in the amount of food source will result in a reduction in the carrying capacity of the region and therefore a decline in the population of Carnaby's cockatoo.

Given the above, the clearing of 13.9 hectares of native vegetation is likely to have an impact on significant habitat for the forest red-tailed black cockatoo, Baudin's cockatoo and Carnaby's Cockatoo.

Therefore, the clearing as proposed is at variance to this principle.

To address the environmental impacts identified in this assessment the applicant has provided an offset package which consists of retaining in perpetuity 52.5 hectares of native vegetation in good (Keighery 1994) condition, which contains foraging and potential breeding habitat for the black cockatoo species.

Methodology

References:

- Bamford Consulting Ecologists (2010)
 - Bamford Consulting Ecologists (2014)
 - Garnett et al (2011)
 - Johnstone and Storr (1998)
 - Keighery (1994)
 - Parks and Wildlife (2007-)
 - Saunders (1990)
 - Saunders and Ingram (1998)
- GIS Database:
-Sac Biodata sets - accessed September 2015

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments

Proposed clearing is not likely to be at variance to this Principle

Six species of rare flora has been recorded within the local area (ten kilometre radius).

Four out of the six rare flora species are found on granite slopes or granite outcrops (Brown et al. 1998; Western Australian Herbarium 1998-). Suitable habitat for these species is not located within the area under application.

One species is found in low heath on hilltops, slopes and in gullies (Brown et al. 1998). Suitable habitat for this species is not located within the area under application.

One species is found in open heathland and banksia woodland, usually in yellow sandy loam over laterite (Brown et al. 1998). Suitable habitat for this species is not located within the area under application.

A Flora and Vegetation Assessment conducted within Lot 12, including the area under application, on 27 October 2009 did not identify any rare flora species within the application area (Helena Holdings Pty Ltd 2010).

Given the above the clearing as proposed is not likely to be at variance to this principle.

Methodology

References:

- Brown et al (1998)
 - Helena Holdings WA (2010)
 - Western Australian Herbarium (1998-)
- GIS Database:
-Sac Biodata sets - accessed September 2015

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments

Proposed clearing is not likely to be at variance to this Principle

Four Threatened Ecological Communities (TEC) have been recorded within the local area of the area under application (ten kilometre radius). These are Eucalyptus calophylla - Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain, Shrublands and woodlands of the eastern side of the Swan Coastal Plain, Eucalyptus calophylla - Kingia australis woodlands on heavy soils, Swan Coastal Plain and Banksia attenuata and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain. The closest recording of a TEC to the application area is Eucalyptus calophylla - Xanthorrhoea preissii woodlands and shrublands

occurring 5 kilometres east of the application area.

A flora and vegetation survey undertaken by Helena Holdings WA Pty Ltd (2010) did not identify any TECs within the area under application.

The vegetation proposed to be cleared is in a degraded to good (Keighery 1994) condition. The impacts of past logging, animal grazing and middle storey shrub deaths due to senescence are evident within the application area. The area contains very little midstorey and no understorey (DER 2013).

Given the above the clearing as proposed is not likely to be at variance to this principle.

Methodology References:
 - DER (2013)
 - Helena Holdings WA (2010)
 - Keighery (1994)
 GIS Database:
 -Sac Biodata sets - accessed September 2015

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments **Proposed clearing is not likely to be at variance to this Principle**
 The area under application is located within the Jarrah Forest Interim Biogeographic Regionalisation of Australia (IBRA) bioregion. This IBRA bioregion has approximately 54 per cent of its Pre European vegetation extent remaining (Government of Western Australia 2014).
 The vegetation under application is mapped as Beard Vegetation Association 3, Mattiske Vegetation Complex 'D2' and Heddle Vegetation Complex 'Dwellingup Complex In Medium to High Rainfall', which have approximately 67, 83 and 82 per cent of their Pre-European extent remaining, respectively (Government of Western Australia 2014 Parks and Wildlife 2015).
 The National Objectives and Targets for Biodiversity Conservation include a target that prevents the clearance of ecological communities with an extent below 30 per cent of that present pre-European settlement (Commonwealth of Australia, 2001).
 Digital imagery indicates that the local area (ten kilometre radius) surrounding the area under application retains approximately 45 per cent vegetation cover.
 The application area contains foraging and possible breeding habitat for protected fauna therefore the vegetation proposed to be cleared is considered to be a significant remnant. However, given that the local area (ten kilometre radius) retains approximately 45 per cent vegetation cover, the area under application is not considered to be located within an extensively cleared area.
 Given the above, the clearing as proposed is not likely to be at variance to this principle.

	Current Extent (ha)	Remaining Extent in Parks and Wildlife Managed Lands (ha)	(%)	(%)
IBRA Bioregion*				
Jarrah Forest	4,506,660	2,425,551	54	69
Shire*				
City of Swan	104,436	44,924	43	28
Beard Vegetation Association*				
3	2,390,591	1,613,658	67	80
Heddle Vegetation Complex **				
Dwellingup Complex In Medium\ To High Rainfall	86,128	71,243	83	68
Mattiske Vegetation Complex **				
D2	83,659	68,868	82	67

Methodology References:
 - *Government of Western Australia (2014)
 - Commonwealth of Australia (2001)
 - **Parks and Wildlife (2015)
 GIS Databases:
 - Heddle Vegetation
 - IBRA Australia
 - Local Government Authority
 - Mattiske (1998)

- Pre-European vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposed clearing is not at variance to this Principle

No wetlands are located within five kilometres of the application area. The closest minor watercourse is located approximately 400 metres north of the application area.

The closest major watercourse is 'Susannah Brook' located approximately 1.4 kilometres north of the application area.

A Flora and Vegetation Assessment undertaken by Helena Holdings WA (2010) did not identify any riparian vegetation on site and given the distance to the closest watercourse the vegetation proposed to be cleared is not growing in association with a watercourse or wetland.

Therefore the clearing as proposed is not at variance to this principle.

Methodology

References:

- Helena Holdings WA (2010)

GIS Databases:

- Geomorphic Wetlands, Swan Coastal Plain

- Hydrology, linear

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments Proposed clearing may be at variance to this Principle

The chief soils mapped within application area are ironstone gravels with sandy and earthy matrices; the soils blanket the slopes and ridges extending down into the upper ends of the minor valleys (Northcote et al 1960-1968). Given the presence of gravel in the soil, the proposed clearing is not likely to cause wind erosion.

Land degradation mapping on the Department of Agriculture and Food WA's website indicates that the majority of the area under application falls within the following category for water erosion risk ;50-70 per cent of map unit has a high to extreme water erosion risk' (DAFWA 2015). However, the proposed clearing is not likely to cause appreciable land degradation in the form of water erosion given its position in the landscape and the distance to the nearest watercourse.

The majority of the area under application is mapped as a low risk of salinity. Given this low risk and the highly vegetated local area (10 kilometre radius) the proposed clearing is not likely to contribute to an increase in salinity.

Given the above the clearing as proposed is not likely to be at variance to this principle.

Methodology

References:

- Northcote et al. (1960-1968)

- DAFWA (2015)

GIS Databases:

- Soils, statewide

- Salinity risk

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments Proposed clearing may be at variance to this Principle

John Forrest National Park is located approximately 490 metres south west of the area under application.

The vegetation located within the area under application contains habitat for the forest red-tailed black-cockatoo, Baudin's cockatoo and Carnaby's cockatoo which are specially protected under the Environment Protection and Biodiversity Conservation Act 1999 and Wildlife Conservation Act 1950. The vegetation may act as a stepping stone for avifauna moving between conservation areas and remnant vegetation within the local area (ten kilometre radius). The clearing of 13.9 hectares of native vegetation may decrease the capacity for fauna dispersal between these areas.

Given the above the clearing as proposed may be at variance to this principle.

Methodology

GIS Databases:

- Parks and Wildlife Tenure

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments Proposed clearing is not at variance to this Principle

No wetlands are located within five kilometres of the application area. The closest minor watercourse is located approximately 400 metres north of the application area. The closest major watercourse is 'Susannah Brook' located approximately 1.4 kilometres north of the application area.

Given the distance to the closest watercourse the clearing as proposed is not likely to cause deterioration in the quality of surface water.

Groundwater salinity is mapped between 500 – 1000 milligrams/Litre total dissolved solids which is considered to be 'marginal'. Given this and the highly vegetated local area (ten kilometre radius), the clearing of 13.9 hectares of vegetation within the application is not likely to cause deterioration in the quality of underground water.

Given the above the clearing as proposed is not at variance to this principle.

Methodology GIS Databases:
- Groundwater salinity
- Hydrology, linear

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments Proposed clearing is not at variance to this Principle

No wetlands are located within five kilometres of the application area. The closest minor watercourse is located approximately 400 metres north of the application area. The closest major watercourse is 'Susannah Brook' located approximately 1.4 kilometres north of the application area.

The chief soils mapped within application area are ironstone gravels with sandy and earthy matrices; the soils blanket the slopes and ridges extending down into the upper ends of the minor valleys (Northcote et al 1960-1968).

Land degradation mapping on the Department of Agriculture and Food WA's website indicates that the majority of the area under application falls within the following category for flooding; '3 per cent of map unit has a high to moderate flooding risk' (DAFWA 2015).

Given this, the soils present within the application area, distance to watercourses and position in the landscape, the proposed clearing is not expected to cause or exacerbate the incidence or intensity of flooding. Therefore, the clearing as proposed is not at variance to this principle.

Methodology References:
- Northcote et al. (1960-1968)
- DAFWA (2015)
GIS Databases:
- Soils, statewide

Planning instruments and other relevant matters.

Comments The amended application is to clear 13.9 hectares of native vegetation within Lot 12 on Plan 26468, Toodyay for the purpose of geotechnical investigations. The original permit area was 3.4 hectares. The applicant also applied to amend condition 2 of Permit 5743/1 to remove the requirement of providing a conservation covenant over the offset area prior to clearing and to amended the offset area from 13.9 hectares to 52.5 hectares.

A conservation covenant under the Soil and Land Conservation Act 1945 is required to be in place over the offset site prior to clearing and therefore condition 2 cannot be amended.

The Western Australia Planning Commission (2013) has granted the applicant Approval to Commence Development within Lot 12 on Deposited Plan 26468 for excavation and expansion of landfill.

The proposal has been referred to the Commonwealth Department of Environment and on the 29 October 2014 it was determined that the proposal to clear native vegetation for geotechnical investigations and to construct waste disposal storage cells was a controlled action to be assessed by preliminary documentation under the Environmental Protection and Biodiversity Conservation Act 1999. This assessment of this proposal is currently ongoing and has recently been advertised for public comment.

The applicant has advised that geotechnical investigations are required prior to obtaining a works approval for waste disposals cells.

The application area is mapped within an Aboriginal Site of Significance 'Darling Range'. It is the proponent's responsibility to comply with the Aboriginal Heritage Act 1972 and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

The application area is zoned as 'Special Use' under the local Town Planning Scheme

To address the environmental impacts identified in this assessment the applicant has provided an offset package which consists of retaining in perpetuity 52.5 hectares of native vegetation in good (Keighery 1994) condition which contains foraging and potential breeding habitat for the black cockatoo species.

Methodology References:
-Western Australia Planning Commission (2013)
GIS Databases:
- Aboriginal Sites of Significance
- Town Planning Scheme Zones

4. References

- Bamford Consulting Ecologists (2010) Red Hill Waste Management Facility Lot 12 (Site 2) Toodyay Rd, Fauna Assessment. Western Australia. (DER Ref: A687583)
- Brown A., Thomson-Dans C. and Marchant N. (1998). Western Australia's Threatened Flora, Department of Conservation and Land Management, Western Australia.
- DER (2013) Site Inspection Report for Clearing Permit Application CPS 5743/1, Lot 12 Toodyay Road, Toodyay. Site inspection undertaken 15 October 2013. Department of Environment Regulation, Western Australia (DER Ref: A687582).
- Garnett, S., Szabo, J. and Dutton, G. (2011). The Action Plan for Australian Birds 2010. CSIRO Publishing, Melbourne, Victoria.
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Complying with your permit to clear native vegetation

Environmental Protection Act 1986

Purpose

This fact sheet provides information about clearing permits granted under the *Environmental Protection Act 1986* (EP Act).

Clearing permits

A clearing permit allows for legal clearing of native vegetation.

Clearing permit holders are responsible for ensuring the requirements of the clearing permit are followed.

Clearing permits should be stored in a secure place which can be accessed if details need to be checked.

If there are any particulars of the clearing permit that are unclear, please contact the Department of Environment Regulation (DER) on +61 8 6467 5000. If the clearing permit is for a mining or petroleum project please contact the Department of Mines and Petroleum (DMP) on +61 8 9222 3333.

Types of clearing permits

Clearing permits either allow the clearing of a specific area (area permit) or for a specific purpose (purpose permit):

Area permits

An area permit specifies how and where the clearing will be undertaken.

- **Land on which clearing is to be done**—describes the land covered by the clearing permit. The clearing permit plan will show where on this land clearing is allowed.

- **Authorised activity:** Describes how the clearing is to be carried out.

Purpose permits

Conditions set within the clearing permit will describe for what purpose and areas where clearing is allowed.

Clearing permits may contain conditions

Area permits and purpose permits may be subject to conditions. The types of conditions that are placed on a clearing permit depend on the outcome of the environmental impact assessment. Conditions are used to prevent, control, abate or mitigate environmental harm or to offset the loss of the cleared vegetation.

Conditions may relate to record keeping, reporting, revegetating or other actions.

- **Record keeping and submitting reports:** If the clearing permit requires the holder to keep records or submit reports, they must be submitted by the due date. If this is not possible DER or DMP should be notified.
- **Revegetating:** Some clearing permits require land to be revegetated. A range of companies and organisations provide advice and services to achieve this.

Some clearing permits will have no conditions attached.

Definitions of terms specific to the conditions may be included to clarify what is required. Additional terms may be defined separately in the EP Act.

DER or DMP can be contacted for more information about the terms used in clearing permits.

When can you start clearing?

Check the commencement date on the clearing permit. Generally the start date is set a month after the permit is issued.

Holders with clearing permits subject to an appeal will be notified by the Appeals Convenor. Clearing must not commence until notice of the outcome is provided.

Clearing permits have an expiry date and clearing must not continue past the expire date.

If additional time is needed:

- apply to amend the clearing permit before it expires; or
- apply for a new clearing permit if your clearing permit has expired.

Are clearing permits publically available?

The EP Act clearing provisions require that the details of clearing permits are published on [DER's website](#). Copies of clearing permits and the decision report can be requested by the public.

Ensuring compliance

Monitoring compliance—a range of technologies exist to monitor changes in vegetation. This information is cross analysed with clearing permits.

Compliance inspections—may be conducted to audit clearing permits (fact sheet, [Compliance inspections and clearing laws](#)).

Breach of requirements or conditions of clearing permits (or clearing an area or in a way not permitted)

If a breach has occurred, permit holders should:

- correct the breach as soon as possible to minimise the level of environmental harm;
- notify DER/DMP immediately; and
- review operating procedures to ensure that the breach does not occur again.

Prompt notification will be considered as a mitigating factor if enforcement action is taken. Refer to [DER's Enforcement and Prosecution Policy \(2013\)](#) for further information about voluntary disclosure.

Will the clearing permit be affected by a breach?

Enforcement action may lead to clearing permits being suspended or revoked. A vegetation conservation notice may be given to the responsible person (such as the permit holder or land owner). The notice may specify measures to be undertaken to rectify the environmental impact caused by the breach.

Can clearing permits be amended, transferred or surrendered during the duration of the clearing permit?

Clearing permits can be amended to correct issues such as clerical mistakes, administrative changes, the size of the areas to be cleared, and dates to comply with permit conditions. Applications ([Form C4](#)) for an amendment are assessed.

The clearing permit holder, or any person, may appeal to the Minister for Environment against an amendment. The appeal must be lodged within 21 days of the clearing permit holder being notified of the amendment. Information on the appeal process and how to

lodge an appeal can be found on the [Office of the Appeals Convenor's website](#).

Area permits may be transferred to a new property owner by submitting a 'Notification of change of land ownership' ([Form C5](#)). The clearing permit will not be valid until this transfer is completed.

Permit holders who no longer wish to clear or have completed clearing before the end of the permitted period may submit an 'Application to surrender a clearing permit' ([Form C6](#)) to end the clearing permit and any conditional requirements.

On completion of clearing or expiry of the clearing permit, ensure all required records have been submitted.

More information

For advice on native vegetation clearing, or related matters, please contact DER on +61 8 6467 5000 and for State Agreements, mining or petroleum contact DMP on +61 8 9222 3333.

This document is available in alternative formats and other languages on request.

Related documents

More guidelines and fact sheets on native vegetation clearing processes are available from [DER's website](#).

Legislation

This document is provided for guidance only. It should not be relied upon to address every aspect of the relevant legislation. Please refer to the State Law Publisher (SLP) for copies of the relevant legislation, available electronically from the [SLP website](#).

Disclaimer

The information contained in this document is provided by DER in good faith as a public service. However, DER does not guarantee the accuracy of the information contained in this document and it is the responsibility of recipients to make their own enquiries as to its accuracy, currency and relevance. The State of Western Australia, DER and their servants and agents expressly disclaim liability, in negligence or otherwise, for any act or omission occurring in reliance on the information contained in this document or for any consequence of such act or omission.

Limitation

The Western Australian Government is committed to providing quality information to the community and makes every attempt to ensure accuracy, currency and reliability of the data contained in this document. However, changes in circumstances after the time of publication may impact on the quality of information. Confirmation of the information may be sought from the relevant originating bodies or the department providing the information. DER and the State of Western Australia reserve the right to amend the content of this document at any time without notice.

Legal advice

The information provided to you by DER in relation to this matter does not constitute legal advice. Due to the range of legal issues potentially involved in this matter, DER recommends that you obtain independent legal advice.



Ms Rachael Lovegrove
Manager, Environmental Operations
Eastern Metropolitan Regional Council
PO Box 234
BELMONT WA 6984

Dear Ms Lovegrove

Decision on approval
Construction of waste storage cells, Farm stage 3, 4 and 5, Red Hill Waste Facility,
Red Hill, Western Australia

I am writing to you in relation to a proposal to clear native vegetation for geotechnical investigations and to construct waste disposal storage cells at the Red Hill Waste Facility, Red Hill, Western Australia.

I have considered the proposal in accordance with Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and have decided to grant an approval to Eastern Metropolitan Regional Council. The details of my decision are attached. The project must be undertaken in accordance with the conditions specified in the approval.

I would appreciate your assistance by informing me when you provide the information specified in the conditions and who will be the contact person responsible for the administration of the approval decision.

Please note, any plans required as conditions of approval will be regarded as public documents unless you provide sufficient justification to warrant commercial-in-confidence status.

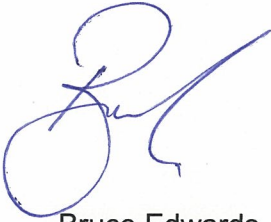
You should also note that this EPBC Act approval does not affect obligations to comply with any other laws of the Commonwealth, state or territory that are applicable to the action. Neither does this approval confer any right, title or interest that may be required to access land or waters to take the action.

The Department has an active audit program for proposals that have been referred or approved under the EPBC Act. The audit program aims to ensure that proposals are implemented as planned and that there is a high degree of compliance with any associated conditions. Please note that your project may be selected for audit by the Department at any time and all related records and documents may be subject to scrutiny. Information about the Department's compliance monitoring and auditing program is enclosed.

I have also written to the Western Australian Office of the Environmental Protection Authority and the Western Australian Department of Environment Regulation to advise them of this decision.

If you have any questions about this decision, please contact the project manager, Justin Williams, by email to justin.williams@environment.gov.au, or telephone (02) 6275 9492 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely



Bruce Edwards
Assistant Secretary
Assessments (WA, SA, NT) and Air Branch

24 February 2016



COMPLIANCE MONITORING AND AUDITING

This fact sheet provides an overview of the compliance monitoring and auditing program in place for projects referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and permits granted under the *Environment Protection (Sea Dumping) Act 1981* (the Sea Dumping Act).

What is the EPBC Act?

The EPBC Act is Australia's key national environment law. Under the EPBC Act, proposals which are likely to have a significant impact on matters of national environmental significance must be referred, assessed, and a decision made by the Minister or his delegate on whether to approve the proposal.

What is the Sea Dumping Act?

The Sea Dumping Act regulates the loading and dumping of waste at sea. The Sea Dumping Act fulfils Australia's international obligations under the London Protocol to prevent marine pollution by dumping of wastes and other matter. Permits are required from the Department for all ocean disposal activities.

What is compliance monitoring and auditing for?

The Department has implemented a program to monitor and audit projects that have been referred under the EPBC Act and the Sea Dumping Act to ensure they are complying with their approval/permit conditions or particular manner requirements and the legislation.

Compliance monitoring activities, including inspections and audits, aim to ensure projects with the potential to impact on nationally protected matters are implemented as planned. Monitoring and audits help the Australian Government to understand how well conditions or requirements are being understood and applied, and contribute to improving the effectiveness of the Department's operations.

All compliance monitoring activities, and any subsequent enforcement activities, are conducted in accordance with the Department's Compliance and Enforcement Policy.

What is a monitoring inspection?

Approved projects are subject to monitoring inspections to ensure and verify compliance with the conditions or requirements of the approval or permit. Projects are selected for a monitoring inspection based on a risk-based process informed through a number of factors, including sector, location, compliance history and the potential impact on listed matters (such as threatened species and ecological communities).

What is a compliance audit?

A compliance audit is an objective assessment of a project's compliance against selected criteria. Projects are audited against conditions or requirements. A compliance audit usually takes the form of a desktop document review and may include a site inspection, if necessary. In some cases, the document review provides the Department with enough information to verify that a project is compliant.

Projects can be chosen for audit based on a random selection process or a risk-focused selection process. If your project is selected for an audit, you will be contacted by a Departmental officer who will explain the process. All audit report summaries are posted on the Department's website. The results of audits may also be publicised through the general media.

Further information

For further information on the compliance monitoring and auditing program, please visit the Department's website at www.environment.gov.au or contact:

The Director, Compliance Monitoring Section
Department of the Environment
GPO Box 787 CANBERRA ACT 2601
Telephone: (02) 6274 1111
Email: EPBCmonitoring@environment.gov.au





Approval

Construction of waste storage cells, Farm stage 3, 4 and 5, Red Hill Waste Facility, Red Hill, Western Australia (EPBC 2014/7354)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted Eastern Metropolitan Regional Council

proponent's ACN (if applicable) ABN 89 631 866 056

proposed action To clear native vegetation to undertake geotechnical investigations and construct waste disposal storage cells at the Red Hill Waste Facility, Red Hill, Western Australia
[See EPBC Act referral 2014/7354]

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approve

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 31 December 2026.

Decision-maker

name and position Bruce Edwards
Assistant Secretary
Assessments (WA, SA, NT) and Air Branch

signature

date of decision 24 February 2016

Conditions attached to the approval

1. The **approval holder** must not **clear** more than 13.9 hectares (ha) of **black cockatoo habitat** within the **Project Area**.
2. The **approval holder** must prepare and submit an Offset Management Plan (Plan), for the approval of the **Minister**, to offset the loss of **black cockatoo habitat**. The **approval holder** must not **commence clearing** unless the **Minister** has approved the Plan.

The Plan must include, but is not limited to:

- i. an outline of how the 52.5 ha of **black cockatoo habitat** within the **Offset Area** will be **revegetated**
- ii. objectives, targets and completion criteria for the **revegetation**, including site preparation works, seedling planting program, success rates and details of replanting requirements, if success rates are not achieved
- iii. management measures including fencing, access controls and the control of *Phytophthora cinnamomi* (**dieback**) spread
- iv. timeframes and implementation for the above measures
- v. descriptions of the roles and responsibilities of personnel associated with implementation of each of the above measures
- vi. **offset attributes** and a **shapefile**.

If the **Minister** approves the Plan then the approved Plan must be implemented.

3. For the better protection of **Black Cockatoos**, the approval holder must comply with conditions 1, 2, 3, 4 and 5 of the **Western Australian Approval**.
4. The **approval holder** may choose to revise a Plan approved by the **Minister** under condition 2 without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the revised Plan would not be likely to have a **new or increased impact**. If the approval holder makes this choice they must:
 - i. notify the **Department** in writing that the approved Plan has been revised and provide the **Department** with an electronic copy of the revised Plan;
 - ii. implement the revised Plan from the date that the Plan is submitted to the **Department**; and
 - iii. for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised Plan would not be likely to have a **new or increased impact**.
5. The **approval holder** may revoke their choice under condition 4 at any time by notice to the **Department**. If the **approval holder** revokes the choice to implement a revised Plan, without approval under section 143A of the **EPBC Act**, the Plan approved by the **Minister** must be implemented.
6. Condition 4 does not apply if the revisions to the approved Plan include changes to environmental offsets provided under the Plan in relation to a matter protected by a controlling provision for the action, unless otherwise agreed in writing by the **Minister**. This does not otherwise limit the circumstances in which the taking of

the action in accordance with a revised Plan would, or would not, be likely to have **new or increased impacts**.

7. If the **Minister** gives a notice to the **approval holder** that the **Minister** is satisfied that the taking of the action in accordance with the revised Plan would be likely to have a **new or increased impact**, then:

- i. Condition 4 does not apply, or ceases to apply, in relation to the revised Plan; and
- ii. The **approval holder** must implement the Plan approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 4, 5 and 6 in the period before the day the notice is given.

At the time of giving the notice the **Minister** may also notify that, for a specified period of time, condition 4 does not apply for one or more specified Plan required under the approval.

8. Conditions 4, 5, 6 and 7 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the **approval holder** to submit a revised Plan to the **Minister** for approval.

9. Within 30 days after the **commencement of the action**, the **approval holder** must advise the **Department** in writing of the actual date of **commencement**.

10. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the Plan and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.

11. Within 3 months of every 12 month anniversary of the **commencement of the action**, the **approval holder** must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published.

12. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.

13. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish the Plan referred to in these conditions of approval on their website. The Plan must be published on the website within 1 month of being approved by the **Minister** and remain for the life of the approval.

14. If, at any time after 5 years from the date of this approval, the **approval holder** has not **commenced the action**, then the **approval holder** must not **commence the action** without the written agreement of the **Minister**.

Definitions:

Approval holder is the person to whom the approval is granted, or to whom the approval is transferred under section 145B of the **EPBC Act**.

Black Cockatoos are the **EPBC Act** listed endangered Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*), and the **EPBC Act** listed vulnerable Baudin's Black-Cockatoo (*Calyptorhynchus baudinii*) and Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*).

Black Cockatoo habitat includes foraging and potential breeding habitat as defined in the *EPBC Act Referral Guidelines for three species of Western Australian black cockatoos: Carnaby's Black-Cockatoo (Calyptorhynchus latirostris), (Endangered) Baudin's Black-Cockatoo (Calyptorhynchus baudinii) (Vulnerable) and Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso) (Vulnerable) (October 2012).*

Clear or clearing is the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ring-barking, uprooting, mulching or burning of native vegetation.

Commence, commenced or commencement of the action is any preparatory works required to be undertaken including **clearing**, the erection of any fences, signage or on-site temporary structures and the use of construction or excavation equipment on-site for the purpose of breaking the ground for buildings, infrastructure or resource extraction.

Department is the Australian Government Department administering the **EPBC Act**.

Dieback is the effect of *Phytophthora cinnamomi* on native vegetation.

EPBC Act is the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

Minister is the Minister administering the **EPBC Act** and includes a delegate of the Minister.

New or increased impact means a new or increased impact on any matter protected by the controlling provisions for the action, when compared to the plan that has been approved by the Minister.

Offset Area means Lots 82 and 501, Parkerville, Western Australia, as shown at Attachment A, where it is depicted as the 'Maximum Offset Area' and marked with blue hatching.

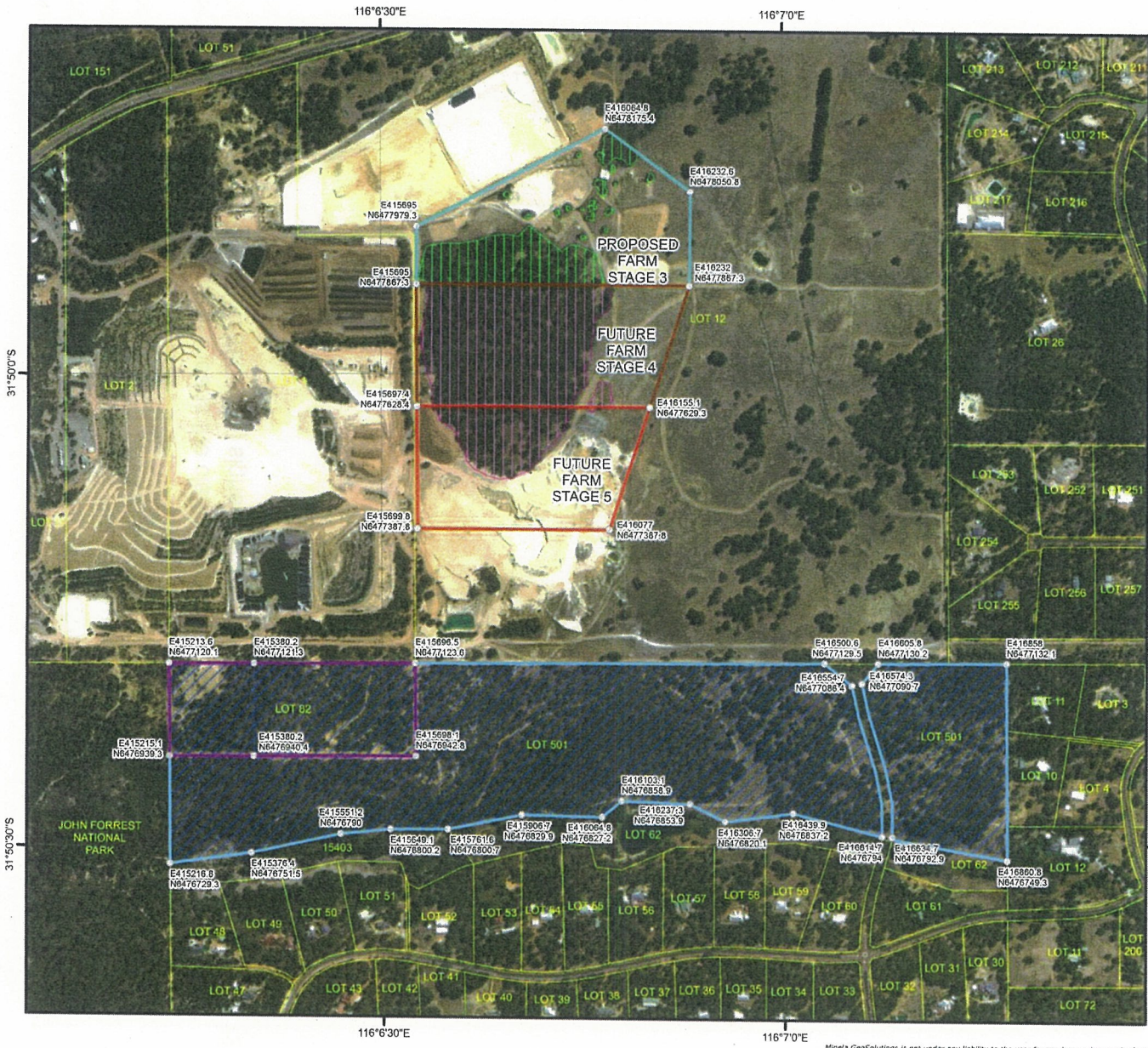
Offset attributes is an excel file ('.xls') capturing relevant attributes of the **Offset Area**, including the corresponding EPBC Act reference ID number, the physical address of the **Offset Area**, coordinates of the boundary points in decimal degrees, the **EPBC Act** protected matters for which the offset compensates, any additional **EPBC Act** protected matters that are benefiting from the **Offset Area**, the size of the **Offset Area** in hectares and the legal mechanism used to protect and conserve the **Offset Area**.

Project Area means Proposed Farm Stage 3, Future Farm Stage 4 and Future Farm Stage 5 within Lot 12 Toodyay Road, Red Hill, Western Australia, as shown at Attachment A.

Revegetated or Revegetation means to recreate or improve vegetation on remnant or cleared areas.

Shapefile is an ESRI shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the offset area, including the shape, **EPBC Act** reference ID number and **EPBC Act** protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

Western Australian Approval means the clearing permit granted under section 51E of the *Environmental Protection Act 1986* (WA) signed on 19 November 2015 (Permit Number 5743/2) as varied from time to time.



KD-1
PTY LTD
PO Box 4336
Mosman Park South
WA 6012
+61 (0) 8 9481 7880



PROJECT: Offset Proposal Plan
TITLE: Offset Areas : Stage 3, 4 & 5

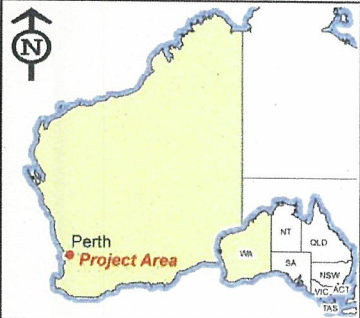
DATE: 14/01/2016

SCALE: 1:10,000 (A4) MGA Zone 50
0 100 200 400
Metres

- Legend**
- Border Coordinates
 - ▭ Proposed Farm Stage 3 (11.9ha)
 - ▭ Future Farm Stage 4 (11.9ha)
 - ▭ Future Farm Stage 5 (10.1ha)
 - ▭ LOT 82 (8.7ha)
 - ▭ LOT 501 (43.8ha)
 - ▭ Maximum Offset Area (52.5ha)
 - ▭ Farm Stage 3 Disturbance Footprint (3.4ha)
 - ▭ Farm Stage 4 & 5 Disturbance Footprint (10.5ha)
 - ▭ Cadastral Boundaries

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGR, swisstopo, and the GIS User Community
Cadastral - Landgate 2014

PREPARED BY:
mipela GeoSolutions
Phone: 1300 807 770
Phone: +61-7-3252 5589
Web: www.mipela.com.au
Email: support@mipela.com.au



Rev C

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Red Hill Waste Management Facility
Weed Management Plan
Offsets Area - Lots 501 & 82



Ricinus communis



Photos: J. Dodd & K.R. Thiele

DOCUMENT CONTROL

EMRC Environmental Operations - Waste Services Directorate

1st Floor, Ascot Place
226 Great Eastern Highway
Belmont

PO Box 234
Belmont 6984

Ph: 9424 2222
Fax: 9277 7598

Document Information

Document Title	Red Hill Waste Management Facility – Weed Management Plan – Offsets Area (Lot 82 & Lot 501)
Document Record	D2016/04642
Author	Carl Danzi – BEng (Hons) (Mechatronic)
Technical Review	Rachael Lovegrove – BSc (Hons) (Environmental Science)
Acknowledgements	The author wishes to thank: <ul style="list-style-type: none"> • Bill Carroll from Spuds Gardening Service for his assistance in compiling current weed species identified on site and within the offset areas.
Recommended Reference	<i>2015 Environmental Management System Manual – Red Hill Waste Management Facility</i> , Eastern Metropolitan Regional Council, Belmont, WA.

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1. Introduction

Eastern Metropolitan Regional Council (EMRC) plans to clear 13.9 Ha of native vegetation at its Red Hill Waste Management Facility (Red Hill), near the centre of the Red Hill property, on Lot 12 to construct future waste cells for Farm Stages 3, 4 and 5.

2. Background

An initial application to clear 6.4 Ha of native vegetation for Farm Stage 3 was submitted to the Department of Environment Regulation in August 2013 and in early January 2014, DER's preliminary assessment determined that the vegetation to be cleared constituted feeding habitat and potential breeding habitat of several fauna species of State and Commonwealth significance. These species include the Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-Tail Cockatoo.

Further consultation was held with DER on the requirements for a referral under the Environmental Protection Act (EPBC Act) including the decision to amend the proposed cleared area from 6.4 Ha to 13.9 Ha to allow for additional waste cells, that being, Farm Stage 4 and 5.

EMRC understood that two separate approvals (state and federal) would be required prior to clearing Lot 12, which included an approval to clear under the Environmental Protection Act 1985, administered by DER and an approval to clear under the Environmental Protection and Biodiversity Conservation Act, 1999 administered by Department of the Environment (DoTE).

Following the requirements of the approvals process, black cockatoo habitat assessments were conducted at Red Hill by consultant ecologists. Offset calculations were also carried out which determined an offset area to the south of the facility (Lots 82 and 501) for the proposed cleared area of 13.9 Ha on Lot 12. As a result, a referral under the Environmental Protection and Biodiversity Conservation Act (EPBC Act) was submitted to the federal Department of the Environment (DoTE) in August 2014. DoTE determined the application as a controlled action and required additional information in November 2014. Further habitat assessment of the proposed impact area and offsets area was conducted from December 2014 to February 2015. Amendments were made to the required area of offset which was adjusted to a total of 52.5 Ha for 13.9 Ha of impact area and then submitted to DoTE and DER in June 2015. The proposal was published for public consultation in October 2015 and gained final federal approval in March 2016.

EMRC received DER's clearing permit (CPS 5743/2) in November 2015 with certain attached terms, conditions and restrictions. One of these conditions included the preparation of a Weed Management Plan for the offsets area.

3. Regulatory Requirements

Condition 3 of clearing permit CPS 5743/2, requires EMRC to prepare and implement a Weed Management Plan for the offset area, Lot 82 and Lot 501. In addition, condition 2 requires EMRC to execute a Conservation Covenant on Lots 82 and 501 before it can clear 13.9 Ha of native vegetation on Lot 12.

In February 2016, EMRC submitted a Statement of Undertaking for a conservation covenant over Lots 82 and 501 under the Soil and Land Conservation Act, 1945. The final memorial will be placed over both certificates of title.

4. Scope

This document forms the Offsets Area Weed Management Plan and details the actions EMRC will take to manage weeds within Lots 82 and 501 for the duration of the clearing permit CPS 5743/2, that being 1 August 2015 to 1 August 2020. A weed management plan for Red Hill (Lots 1, 2, 11 and 12) is detailed within a separate document referred to as “Red Hill Waste Management Facility – Site Weed Management Plan” and forms part of the Red Hill Environmental Management System.



Figure 1: Offset areas - Lot 82 and 501.

5. Methodology

Condition 3(a) of DER clearing permit CPS 5743/2 states that at least once in each 12 month period EMRC must take action to remove or kill weeds in the Offset Conservation Covenant Area. To achieve this requirement the following methodology will be adopted:

1. The area will be surveyed for weeds three times per year as per the Weed Management Timeline in Section 6. EMRC Environmental Officers will walk grid lines with the aid of GPS units. Timing of the first survey shall be approximately late autumn after the first initial rains which cause the onset of winter weeds. The second shall be approximately early spring and the third survey during summer.
2. Detailed records will be taken during the field surveys of weed infestations and will include the following:
 - GPS location
 - Species identification
 - Size of infestation
 - Proposed removal technique and possible removal problems
 - Photo image for reference purposes
3. Small weed infestations found during the field surveys will be removed immediately as long as effective removal can be performed. Removing weeds and leaving the material on the ground allows the potential for germination again from seeds. Plant debris accumulated from manual removal will be disposed of appropriately.
4. After the 2016 field surveys, methodology of future field surveys will be reviewed and will depend on information gathered in the initial surveys. Following surveys will be more concentrated in areas where weeds are known to be.
5. Surveys, control and monitoring will be conducted three times per year within both lots as per the Weed Management Timeline (Table 1).
6. It is expected most weeds have already been identified in areas along vehicle tracks, near creek lines and open areas where weeds can out compete and colonise over native vegetation. It is likely weed infestations will be low or absent in areas of high density natural vegetation.

6. Weed Management Plan Timeline

Below is the weed management plan timeline showing three weed management periods per year encompassing four months each which will be conducted over a period of 5 years commencing 1 August 2015. Each weed management period is made up of initial surveying for weeds in the two lots followed by weed control then finally monitoring effectiveness of the weed control with possible follow up control. Note that the start and end times for each control period may vary depending on weather conditions, in any case three control periods will be run each year.

Table 1: Weed management plan timeline.

Control Period	Month	Action
One	April / May	Survey of the entire offset area to identify weed locations, species, areas covered, densities, control issues, etc.
	May / June	Control of weeds identified as outlined in section 8. Weed species & suitable control methods.
	June / July	Monitoring of control performed in May / June, followed by control of weeds not eradicated. Note that monitoring & control will continue until targeted weeds are eradicated.
Two	August / September	Survey of the entire offset area to identify weed locations, species, areas covered, densities, control issues, etc.
	September / October	Control of weeds identified as outlined in section 8. Weed species & suitable control methods.
	October / November	Monitoring of control performed in September / October, followed by control of weeds not eradicated. Note that monitoring & control will continue until targeted weeds are eradicated.
Three	December / January	Survey of the entire offset area to identify weed locations, species, areas covered, densities, control issues, etc.
	January / February	Control of weeds identified as outlined in section 8. Weed species & suitable control methods.
	February / March	Monitoring of control performed in January / February, followed by control of weeds not eradicated. Note that monitoring & control will continue until targeted weeds are eradicated.

7. Current Known Weed Status in Lots 82 & 501

For several years EMRC has been controlling weeds over the entire Red Hill site. In Lots 82 and 501, the areas which have had the main weed control efforts are 82A in lot 82 (see Figure 2), and along the southern boundary of lot 501 (areas 501A to 501E, see Figures 3 & 4) on the fringe of Christmas Tree Creek. The creek fringe is where weeds are more likely to infest due to damper conditions. Areas along the northern boundary of both lots are susceptible to weed infestation from the Red Hill site to the north (uphill side). Weeds on the Red Hill site uphill of both lots will continue to be controlled to prevent their inundation into both lots.

Details about weeds in both lots from previously known information and recent surveys are detailed in this section. Surveys were conducted in both lots during October 2015 and February 2016. Table 2 below shows GPS locations of weed infestations.

Table 2: GPS locations of identified areas of weed infestations in Lots 82 & 501.

Area identifier	GPS location of area (datum: WGS84)
82A	S31.83849° E116.10469°
82B	S31.83817° E116.10859°
501A	S31.84173° E116.10579°
501B	S31.84145° E116.10758°
501C	S31.84112° E116.11029°
501D	S31.84093° E116.11547°
501E	S31.84159° E116.11968°
501F	S31.83865° E116.11102°
501G	S31.83851° E116.11001°

Current Weed Status - Lot 82

Weeds have been found in area's labelled 82A and 82B as shown on the vegetation map on Figure 2.

Area 82A

This is the most significantly weeded area within the two lots and is approximately 1.2Ha (12000m²) in size. This area has previously been disturbed by earth moving equipment, exposing the soil to weed invasion. Some weeds potentially have been brought to the area by uncleaned machines. The area is no longer subject to disturbance and will be targeted for future infill planting and rehabilitation.

Storm water runoff from beyond the northern boundary of Lot 82 may create potential for weed seeds to travel down to area 82A. Weed control will be extended to areas north of Lot 82 to prevent invasion and enhance eradication controls within area 82A.

To the west of area 82A is John Forrest National Park which contains similar weeds dominated by Victorian Tea Tree in an area of approximately 1 Ha. It would be beneficial to the success of the overall weed management if these weeds in John Forrest National Park were also controlled to prevent recolonization in area 82A.

Area 82A has approximately 25% weed coverage which is listed below. The approximate coverages are given where a large amount of the weed is present:

- Victorian Tea tree (*Leptospermum laevigatum*) – 15 - 20% of Area 82A
- Stinkwort (*Dittrichia graveolens*) – (400m²) 3% of Area 82A
- Flinders Range Wattle (*Acacia iteaphylla*)
- Blackberry Nightshade (*Solanum nigrum*)
- Cottonbush (*Gomphocarpus fruticosus*)
- Castor oil plant (*Ricinus communis*)
- Tagasaste (*Chamaecytisus palmensis*)
- Fleabane (*Conyza bonariensis*)
- Pattersons Curse (*Echium plantagineum*)
- Paddy Melon (*Cucumis Myriocarpus*)
- Introduced Geraniums / Pelargoniums

Castor oil plant and Cottonbush have been controlled in the area for several years and their infestations are now minor but seedlings continue to germinate in the area, more so in the case of castor oil plant. Both weeds are toxic, problem weeds and will continue to be targeted as a priority.



Figure 2: Weed infestations - Lot 82.

Area 82B

There are only a small number of weeds in this area, and therefore this area should be relatively easy to eradicate and prevent further spread of weeds. A small number of Flinders Range Wattle have been identified in the area invading areas of undisturbed natural vegetation. These will be targeted in accordance with control methods outlined in sections 9 and 10.

Current Weed Status - Lot 501

Weeds have been found in area's labelled 501A through to 501G shown on the vegetation maps in Figure 3 (western half of lot 501) and Figure 4 (eastern half of lot 501).



Figure 3: Weed infestations - Lot 501 (western half).

Area 501A

This area is on the northern fringe of Christmas Tree Creek and comprises of the following two species:

- Blackberry (*Rubus fruticosus*): An area of 200m² (20m E/W x 10m N/S) with approximately 25% coverage.
- Flaxleaf Broom (*Genista linifolia*): An area of 100m² (10m x 10m) with approximately 20% coverage.

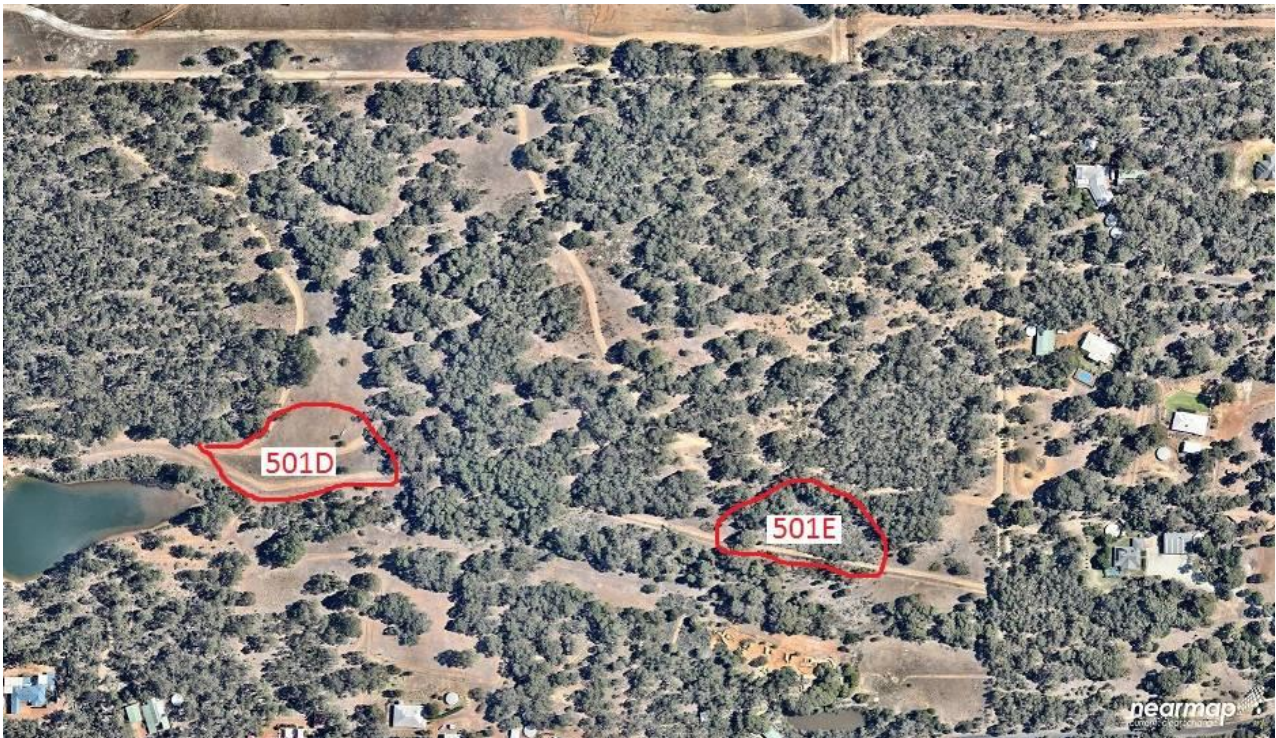


Figure 4: Weed infestations – Lot 501 (eastern half).

Area 501B

This area is on the northern fringe of Christmas Tree Creek, covering 450m² (30m E/W x 15m N/S). Blackberry covers approximately 10% and Sydney Golden Wattle (*Acacia longifolia*) covers approximately 10% of the area.

Area 501C

This area is on the northern fringe of Christmas Tree Creek, where an ephemeral creek flows in from the north. To the west is a small area of Blackberry of about 10m² (10m x 1m). To the east is an area of about 20m² of Blackberry Nightshade (*Solanum Nigrum*).

Area 501D

This area is on the northern fringe of Christmas Tree Creek, it has been previously cleared and contains no natural vegetation. The area is about 2500m² (Refer to figure 3) and is made up of the following weeds:

- Paddy Melon (*Cucumis Myriocarpus*) - 10% coverage
- Afghan Thistle (*Solanum hoplopetalum*) - 5% coverage
- Cape Tulip (*Moraea miniata & flaccida*) – 10% coverage
- Bridle Creeper (*Asparagus asparagoides*) – 5% coverage
- Pattersons Curse (*Echium plantagineum*) – 15% coverage

Area 501E

This area is on the south / eastern corner of the Lot and on the northern fringe of Christmas Tree Creek with an area of about 2000m². This is a low lying, damp area of vegetation infested with the following weeds:

- Flinders Range Wattle (*Acacia Iteaphylla*) – 10% coverage
- Sydney Golden Wattle (*Acacia longifolia*) – 5% coverage
- Pine tree (*Pinus Radiata*) – 2 plants, each approx. 5m tall, seedlings possibly present.
- Stinkwort (*Dittrichia graveolens*) – 2% coverage

Area 501F

This is an area on the northern boundary of Lot 501 where an ephemeral creek flows in from the Red Hill site. Figure 3 shows the location and estimated area which is approximately 1500m². The most dominant weed is Wild Mint with populations of Stinkwort and Nightshade. Some Cottonbush seedlings also exist, likely due to stream flow into lot 501 from the north. Estimated coverage percentages of the dominant weed species are as follows:

- Wild Mint (*Mentha sp*) – 25% coverage
- Stinkwort (*Dittrichia graveolens*) – 10% coverage
- Blackberry Nightshade (*Solanum nigrum*) – 1% coverage
- Cottonbush (*Gomphocarpus fruticosus*) – 1% coverage

Area 501G

This is a small area of about 30m² just west of 501F containing Stinkwort (15%) and Wild Mint (5%). These weeds are again a possible result of stormwater flow from the North.

8. Weed Control Targets

Weed Control Targets to reduce coverage and diversity are nominated for Lot 82 and Lot 501 and are shown in the following table.

Table 3: Completion Targets for weed coverage and diversity.

Area	Coverage Target	Diversity Target	Timeframe
Lot 82	Reduce weed coverage across the entire lot to 10% or less.	Eradicate castor oil, cotton bush, flax leaf broom, blackberry and pine tree.	By the end of the five year term, that being 1 st August 2020, under clearing permit CPS 5743/2.
Lot 501	Reduce weed coverage across the entire lot to 10% or less.	Eradicate castor oil, cotton bush, flax leaf broom, blackberry and pine tree.	By the end of the five year term, that being 1 st August 2020, under clearing permit CPS 5743/2.

Data collected from weed surveys and monitoring will determine whether targets are being achieved. These results will be reported each year to DER as per conditions of clearing permit CPS 5743/2.

9. Control Methods

Manual Methods

In areas where weeds are infested amongst natural vegetation, manual eradication is preferred over chemical control as it will prevent overspray of harmful chemicals onto native vegetation.

Manual Removal

Using hand tools and in some cases mechanical tools may help make the job easier and quicker. Care will be taken not to damage the environment if mechanical tools are used. In many cases hand pulling of weeds is the best method where weed numbers are small, as long as the ground has sufficient moisture to allow weeds to be removed easily without breaking the root system below ground level.

Grubbing

Removal via grubbing uses a tool such as a hoe or shovel to cut the weed at ground level. This method is only suitable for weeds which will not re-germinate from the residual plant after treatment.

Chemical Methods

Chemical methods used to eradicate weeds should take into account environmental factors such as toxicity of chemicals to the environment. For example, chemical application near waterways will be avoided, however if this is deemed the only practical method then herbicides that are less toxic and registered for use near aquatic systems will be used.

Non Selective Sprays

Glyphosate and other chemicals will eradicate most plants, including weeds. Leaves are sprayed using the foliar spraying method. A surfactant may be used to improve the adherence of the chemical to the leaves/stem of the leaves. Plants will deteriorate and die after some time usually within one month.

Selective Sprays

It may be possible to use a selective spray to eradicate some weeds without harming natural vegetation. A selective spray will be sourced and applied where available as this is a preferred method of chemical control.

Cut & Paint

The cut and paint method is carried out by cutting the weed off at the base using manual removal and then disposing of the plant material. Weed chemicals such as, Glyphosate 360, are painted at high concentration on the stump (within 15 seconds of cutting) to kill the plant.

Basal Barking

Basal Barking is a chemical method of weed control where a suitable chemical mix is applied by spraying around the full circumference of the plants trunk, usually to a height of about 0.5m, but this will vary according to the size of the plant. It is suitable for thinly barked woody weeds and trees. The method allows the herbicide to enter the underground organs and slowly kill the plant. It is best performed by a qualified and licensed contractor.

Environmentally Friendly Sprays

Bioactive sprays will be used in weed infested areas that have close proximity to waterways as they are less sensitive to aquatic life such as frogs and macro-invertebrates.

Alternative Methods

Steam Weeder

EMRC has recently acquired a *Weedtechnics SW900* steam weeder for weed management programs across the eastern metropolitan region as part of Eastern Hills Catchment Management Program. Trials using this environmental sensitive method will be conducted at the Red Hill Waste Management Facility. This is an innovative, relatively uncommon and more environmentally friendly way of eradicating weeds as no chemicals are used. The method relies on killing weeds by using the intense heat of steam to heat the weeds beyond their tolerance point.

Rehabilitation

It has been shown that re-planting with native vegetation reduces the colonisation and spread of weeds. EMRC will revegetate open areas within Lots 82 and 501 with local native species as part of Red Hill's Annual Rehabilitation program. EMRC conducts an annual endemic seed collection program within the local area. Seeds collected are stored appropriately within temperature and humidity controlled facilities and form part of the master species list for the following year's site rehabilitation program. This initiative will be used for in-fill plantings within Lots 82 and 501.

Limit spread of weeds

All vehicles, equipment, clothing, shall be cleaned of weed seeds and other contaminants which may spread weeds before entering the offsets area. Efforts will also be made to limit or preferably eradicate the spread of weeds when issues arise.

10. Weed Species and Suitable Control Methods

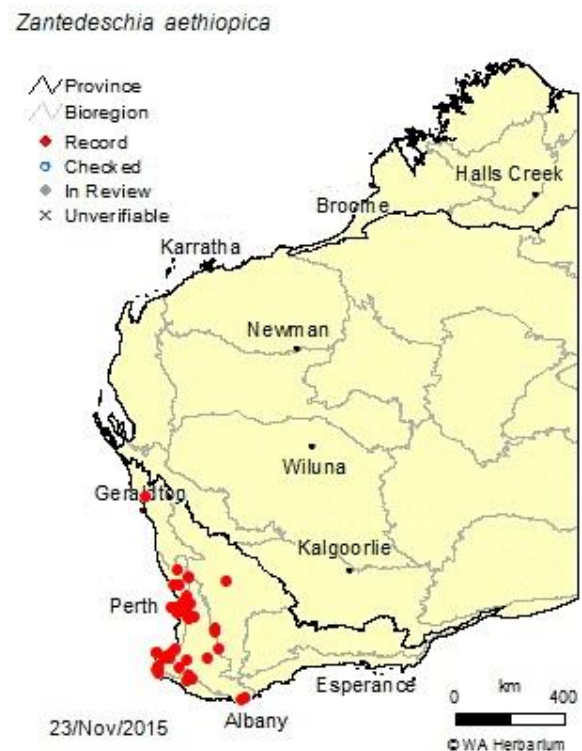
As well as using suitable control methods other factors need to be taken into account such as best time of year to control the weeds, for example when the adult plants are most likely to die and seeds are unlikely to be spread. The following is a list of suitable control methods for weeds listed as currently being in the covenant area, Lots 82 and 501.

Arum Lily (*Zantedeschia aethiopica*)

Originates from South Africa and a garden escapee now found in moist areas such as creeks, rivers and wetlands. Out competes with native plants and stops water flow.



Figure 5: Arum lily images & extent of infestation in WA. Florabase web site.



Method of management and control

Spray with glyphosate and surfactant between June and September for best control results, and target times when water level is dry to avoid contamination. Herbicide application can send some tubers into dormancy, therefore any control program needs to continue for at least five years. Early management prevents flowering and seed set but may miss later sprouting tubers. Manual removal is only effective with young plants and only if all root fragments are removed. Cut flowers and dispose of to prevent birds and other animals spreading seeds.

Blackberry (*Rubus fruticosus* / *Robus* L, Rosaceae family)

A weed of national significance originating from Europe. A serious weed of creeklines, spreading into forest and woodlands along water courses. The fruit is edible. Many species in the *Rubus* genus in the Rosaceae family are included and also hybrids. The taxonomy of the blackberries has historically been confused partly because of hybridization, so that species have often been grouped together and called species aggregates. For example, the entire subgenus *Rubus* has been called the *Rubus fruticosus* aggregate.



Rosaceae

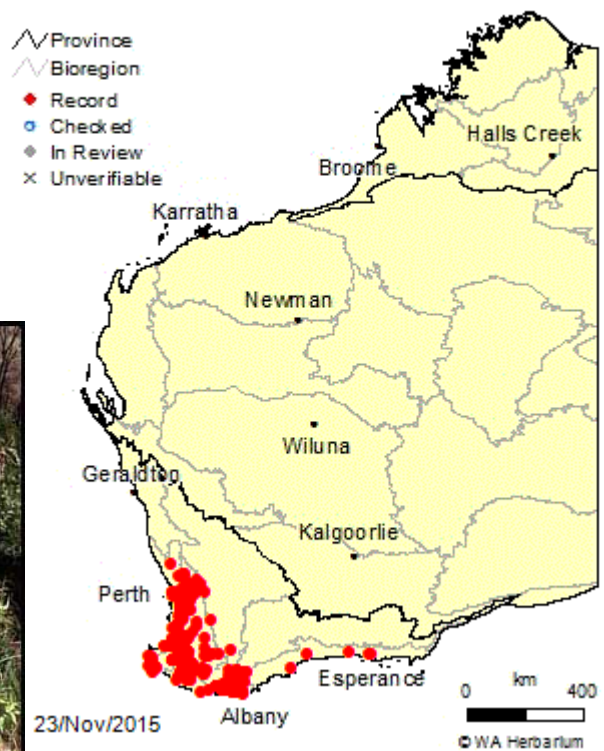


Figure 6: Blackberry images & distribution. Florabase web site.

Method of management and control

Spray with non-selective herbicide + wetting agent in summer-autumn. Will require follow up for a number of years. For small infestations or in sensitive areas hand pull small plants or seedlings, best done when soil is moist. For larger plants cut and paint with 20-50% glyphosate or slash canes. Selective spray also can be used.

Bridal Creeper (*Asparagus asparagoides*)

A garden escape which originates from Southern Africa. Weed of National Significance which is a major threat to biodiversity and forms dense root mats. First recorded in Australia in 1857 and by 1870 was a common garden plant. Extremely invasive, smothers vegetation, forms monocultures, increases fire risk during summer die-off phase. Generally survives fire and is spread by animals, water, soil movement, machinery and movement of garden refuse.

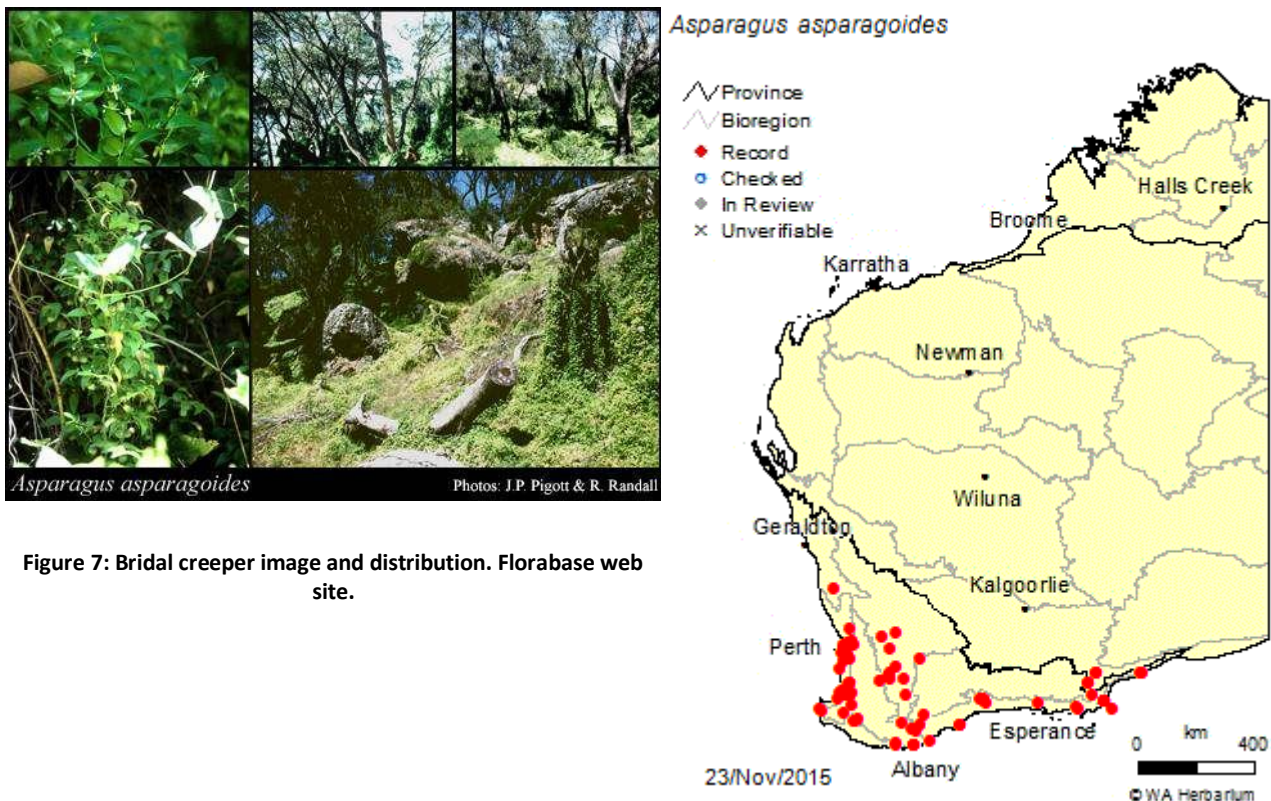


Figure 7: Bridal creeper image and distribution. Florabase web site.

Method of management and control

Small infestations can be successfully controlled by digging out the root mat, taking care to remove all rhizomes and tubers. Larger infestations can be controlled by spraying with metsulfuron (contractors only). There are also biological control methods available in the form of a leaf hopper, a rust fungus and a leaf beetle. A combination of all the above methods may be most successful. Optimum treatment time is winter.

Cape tulip (*Moraea miniata* & *flaccida*)

Originates in South Africa and is a garden escapee which is now a serious weed throughout southern Australia. Difficult to control chemically due to dormancy of corms below ground. Highly toxic to stock and may invade pastures. Grows to 0.75 m high in seasonally wet sites, along creeklines, hilltops, pasture and disturbed land.

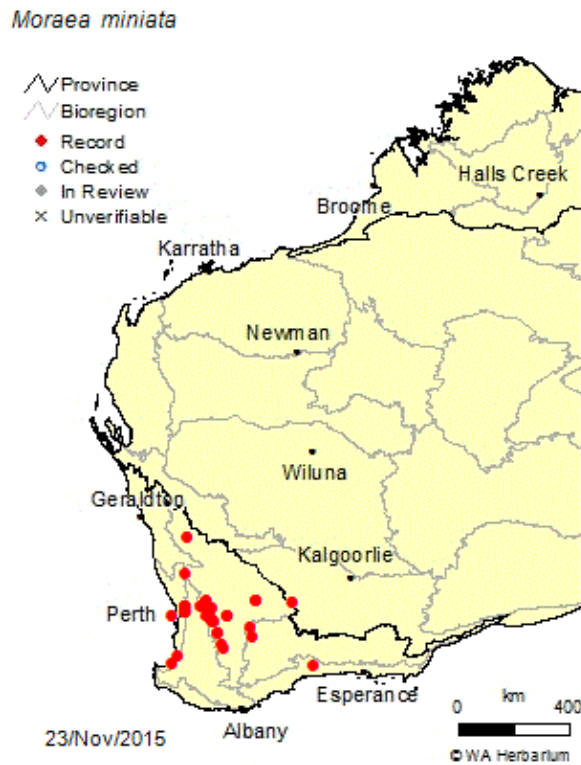


Figure 8: Cape tulip plant & corm images and distribution map. Florabase web site & EMRC NRM factsheets.

Method of management and control

Individuals and small numbers of plants can be dug out and the corms and fruit destroyed by incinerating. Care must be taken to remove all plant parts as manual removal without attending to all parts will spread the weed. Can be effectively and economically controlled with glyphosate treatment, repeated over several seasons. It is most effective when plant is about to flower during winter. Treatment must be done annually to reduce the populations. After fire is an important time to control cape tulip as fire can bring corms out of dormancy and stimulate flowering.

Castor Oil Plant (*Ricinus communis*)

Originates in North and South America, tropical Asia and Africa. Castor Oil is an extremely toxic plant with one of the most toxic substances in the plant world contained in the seeds. Seeds are scattered over several meters when released explosively from ripe fruits. Can intoxicate fauna. Originally introduced and cultivated in Australia for oil, which can be extracted from the seeds. The shrub grows up to 4m tall, it flourishes in a warm climate and is generally found growing in moist, disturbed environments and wastelands, such as: road and rail verges, rubbish tips, wasteland, and especially alongside water courses.

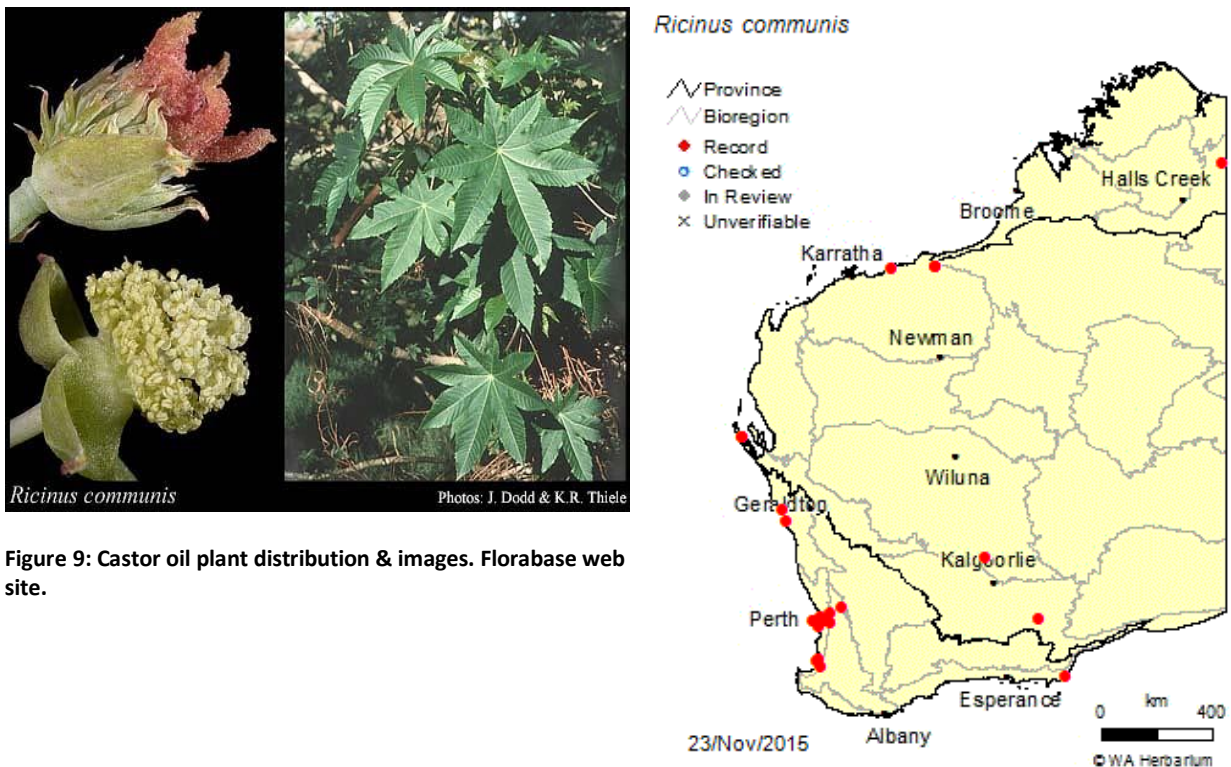


Figure 9: Castor oil plant distribution & images. Florabase web site.

Method of management and control

Can be difficult to control, as seeds can lay dormant for years before germinating. Hand pull seedlings and small plants, ensuring roots are removed, use PPE ensuring you don't come into contact with the plant especially the sap and seeds. Cut and paint using neat glyphosate or apply Basal Barking method to lower 50cm of the tree trunk. Foliar spray seedlings and small plants using 1% glyphosate. Optimum treatment is in spring and early summer. Note that disturbance triggers mass seed germination.

Coastal Tea Tree / Victorian Tea Tree (*Leptospermum laevigatum*)

A shrub growing to 6m tall which originates from south-eastern Australia. Garden escape which is now a major bushland weed. In the past was used for dune stabilization and windbreaks. Reproduces by seed dispersed by wind, vehicles, soil movement, water, garden refuse. Adult plants are killed by fire, seed is released from woody fruits and germinates prolifically in post fire conditions. Seeds also released prolifically when plants are damaged or stressed, including herbicide application or mechanical damage. Unfortunately, it is still sold in nurseries.

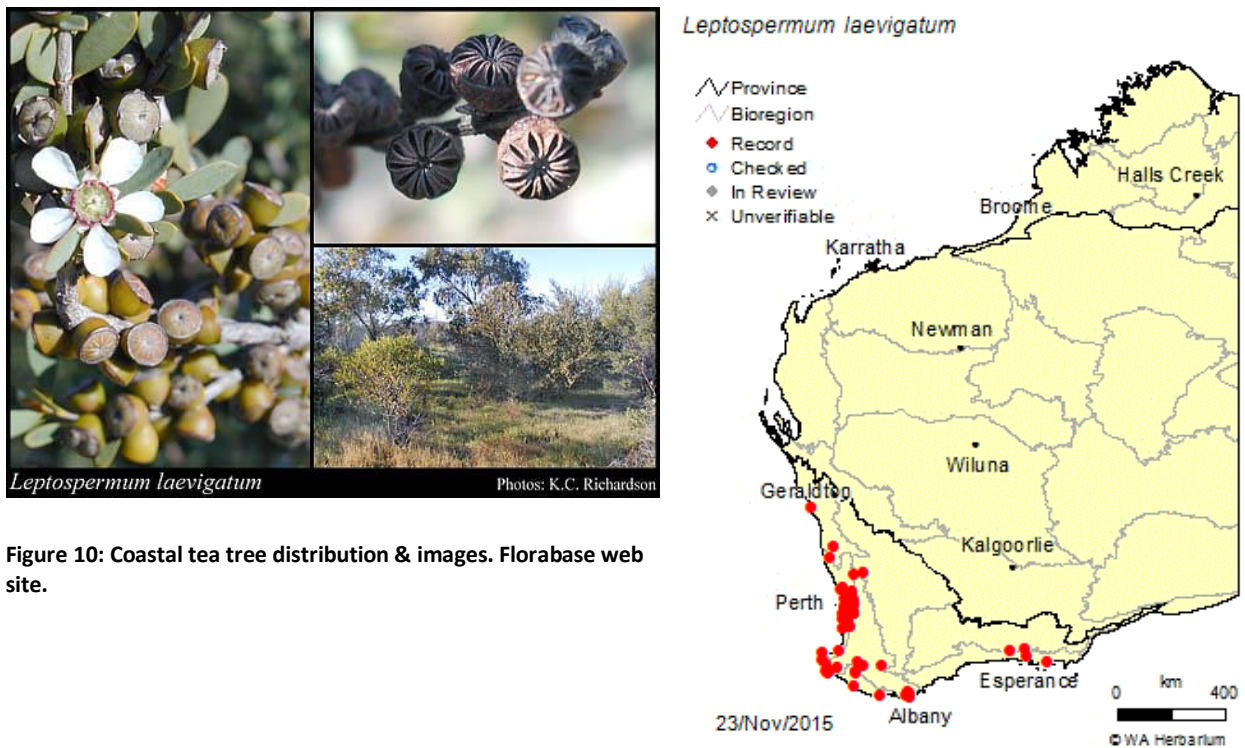


Figure 10: Coastal tea tree distribution & images. Florabase web site.

Method of management and control

Hand pull seedlings and fell mature plants Then burn when dry. Resprouting has been recorded in some areas. Where resprouting occurs, apply 250 ml Access® in 15 L of diesel to bottom 50 cm of trunk (basal bark method). Cut and paint method using glyphosate can also be used for mature plants. Optimum treatment is from July to October.

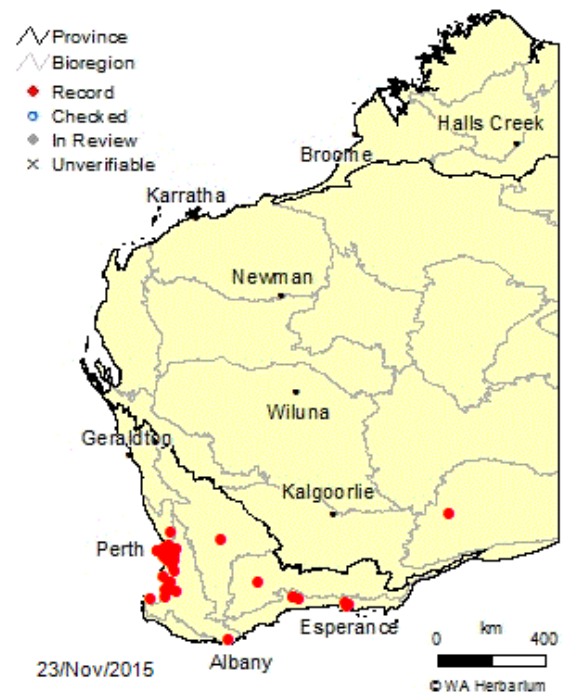
Cottonbush (*Gomphocarpus fruticosus*)

Cottonbush is a declared category P1, P2 plant by the Agriculture Protection Board in Western Australia, it must be prevented from spreading or being introduced into an area and eradicated from existing areas. Grows to 1.5m tall & originates in South Africa and the Mediterranean. Also known as the Swan Plant, it is a garden escapee that has spread into disturbed, moist sites, such as: water courses, storm water drains and bushland. It is poisonous, producing a milky sap which causes skin irritations and potentially death if eaten.



Figure 11: Cottonbush distribution & images. Florabase web site.

Gomphocarpus fruticosus



Method of management and control

Wear protective clothing to avoid skin or eye contact with the milky sap. Place a bag over the entire bush and hand pull small plants, ensuring the complete root system is removed. Regrowth should be hand-pulled and disposed of before setting seed. Plants containing seed should be stacked and burnt on site. Larger plants can be sprayed with glyphosate; the cut-paint method is effective. Herbicides are best used late spring-early summer, before seed set.

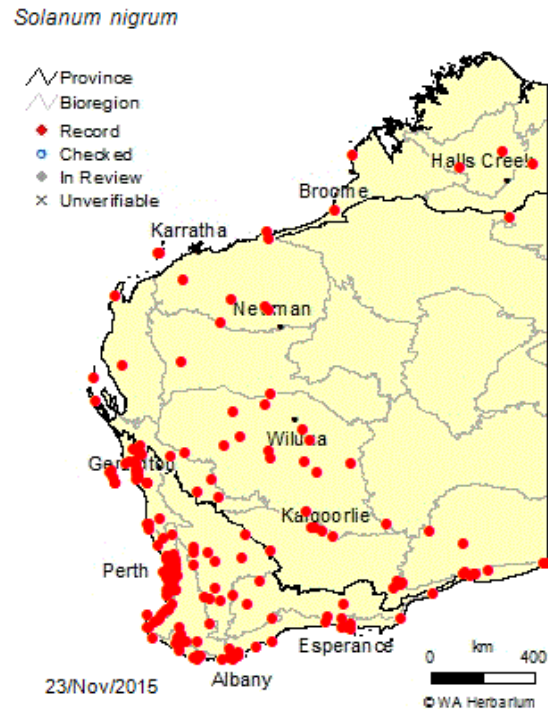
Blackberry Nightshade / Deadly Nightshade (*Solanum nigrum*)

Originates most likely from Europe. A common weed of wasteland, pastoral land and cropping. Readily spread by birds into bushland. Grows to 1m in height. Flowering occurs 5-9 weeks after germination and continues until the plant dies, produces prolific seed.



Solanum nigrum Photos: S.M. Armstrong, K.C. Richardson & J.F. Smith

Figure 12: Blackberry nightshade distribution & images.
Florabase web site.



Method of management and control

Prevent seed set for several years. Hand weed small infestations. In bushland situations, manually remove plants before flowering. For large infestations, Starane® applied when actively growing in summer, will provide reasonably selective control. Do not use in or near wetlands. Control infestations within 5 km of the target area to reduce dispersal of seed by birds. Amine can also be used for control of young plants in early summer. Herbicide treatment is from July to December.

Flaxleaf Broom (*Genista Linifolia*)

Originates from Europe and the Mediterranean. This is a Weed of National Significance (WoNS) and is a garden escapee that inhabits native bushland. Produces a large amount of long lived seed that explode from pods as they dry out and are resistant to fire. It is an erect shrub to 3m tall .

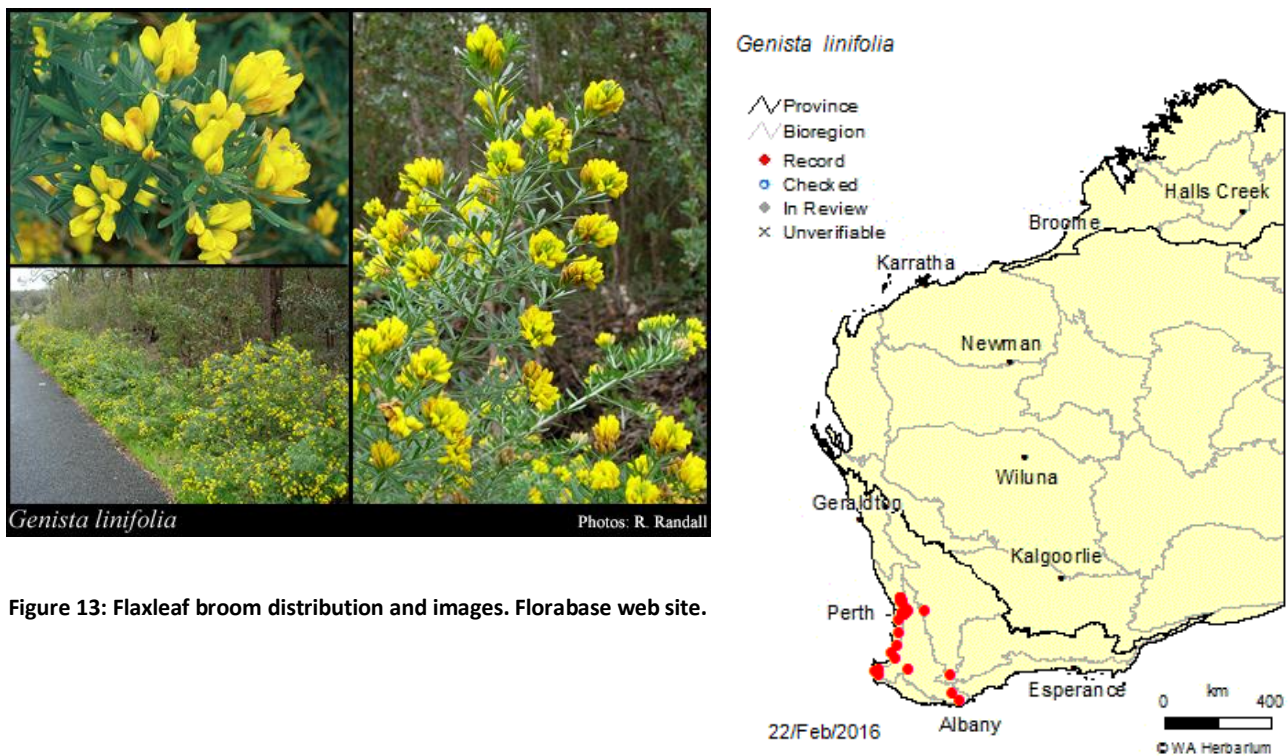


Figure 13: Flaxleaf broom distribution and images. Florabase web site.

Method of management and control

Due to the longevity of soil-stored seeds, control of larger infestations should be considered as a long term endeavour. Manual removal ensuring removal of all roots is an option where there are only isolated plants. Cut and paint method using Glyphosate can be successful for smaller infestations. Foliar spray with 1% glyphosate is also an option. Best time to treat is June to November.

Fleabane (*Conyza bonariensis*)

Erect annual, herb, 0.15-1.5 m high. Flowers are white between January to December and establishes within a variety of soils. Predominantly found in disturbed areas and along roadsides. Reproduction is by seed dispersal via wind and water run-off. Seedbank persistence is at least 3 years and likely resprouts after fire. Does not compete well under high plant density or cover and requires disturbance to establish and persist. Light stimulates germination. Soil type and burial depth has significant effects on seed persistence and emergence. Predominantly emerges from the soil surface or burial depths of 0.5 cm. Has small lightweight seed that allows it to readily be dispersed long distances. Some biotypes have herbicide-resistance in parts of the world, however no glyphosate-resistant *Conyza* populations are recorded in the southeast of Western Australia.

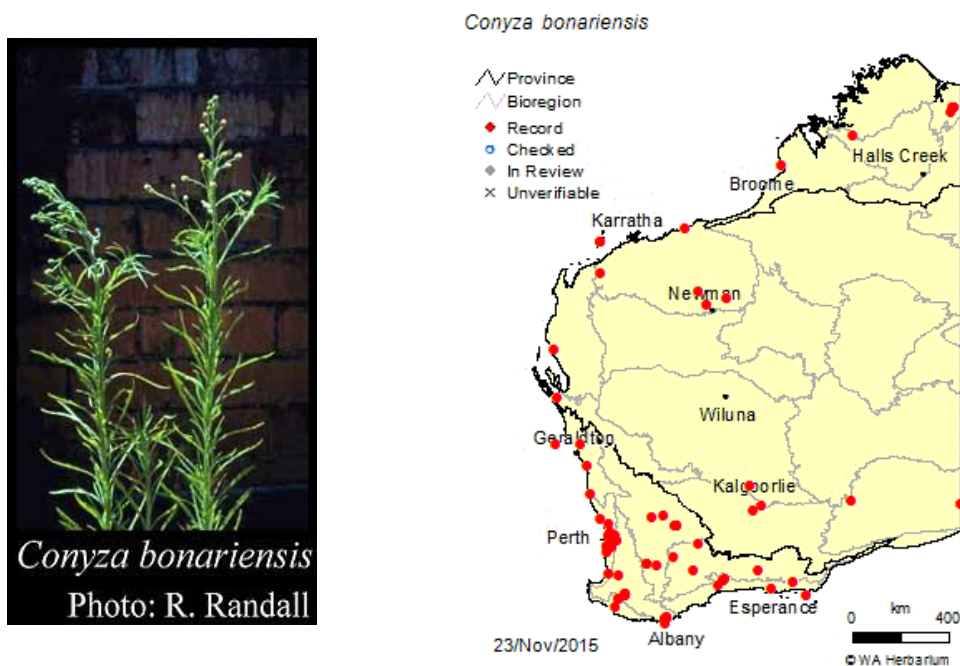


Figure 14: Fleabane distribution & images. Florabase web site.

Method of management and control

Best time for herbicide or manual removal is June to September. Hand remove small and/or isolated infestations prior to seeds setting. Resprouts from basal buds after top removal. Timing of application is key to the efficacy of any herbicide treatment. Most susceptible to glyphosate at the rosette stage and least susceptible at flowering. Apply glyphosate when plants are small (at rosette stage <10cm across) 25 ml/ 10L after stem elongation and before flowering and actively growing. Otherwise 50% glyphosate can be used to wipe the stems of plants. At later stages, it is difficult to control with any single herbicide treatment.

Flinders Range Wattle (*Acacia iteaphylla*)

Originates from the Flinders Ranges in South Australia. Commonly cultivated in nurseries and has now become a serious environmental weed. Produces high volumes of highly viable seed each year. Colonises along roadsides and bushland areas, displacing native species and reducing biodiversity. A shrub 2-5m tall with yellow flowers, seed pods are usually straight and 60 to 120mm long.

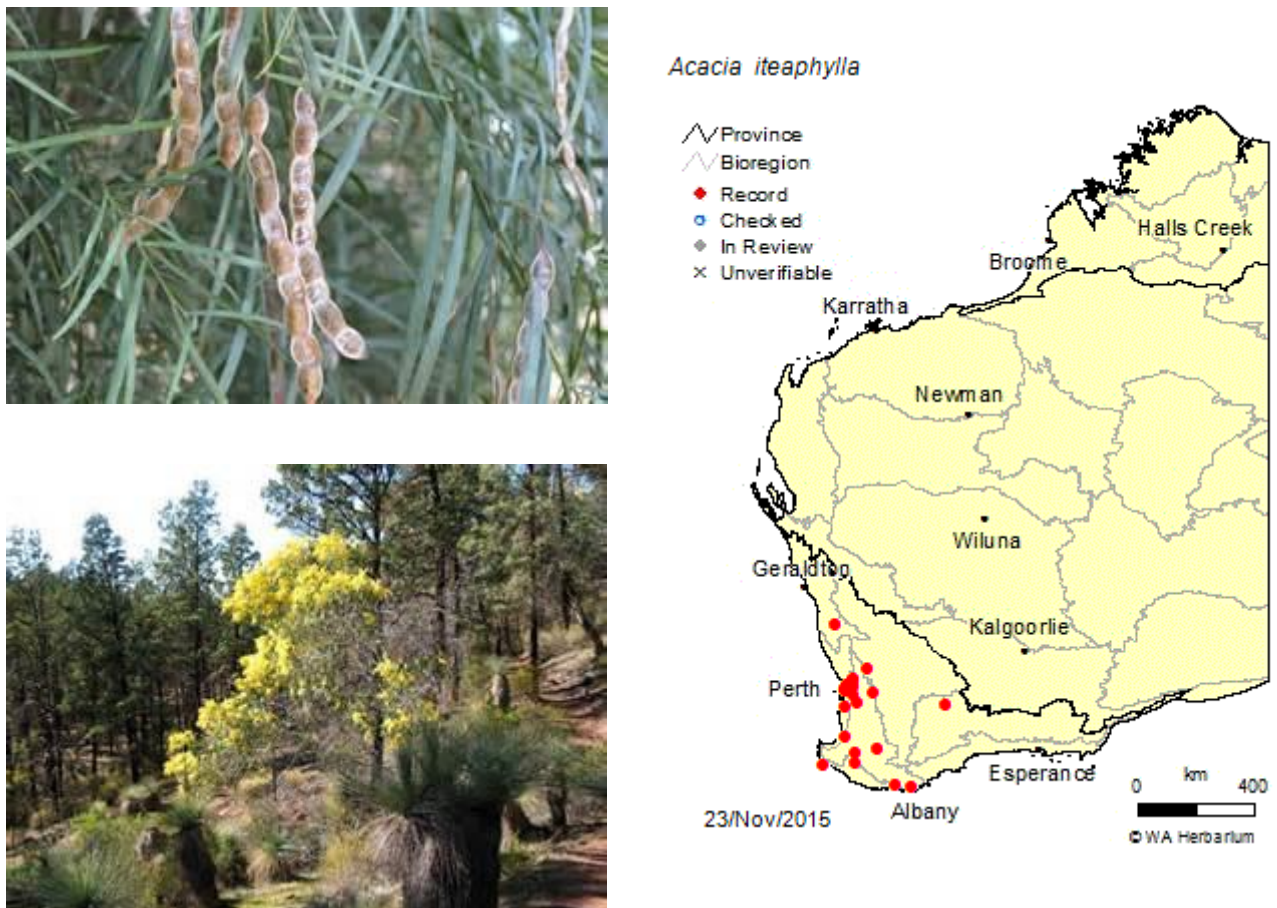


Figure 15: Flinders Range Wattle images & distribution. Florabase web site.

Method of management and control

Optimum treatment is March to July, while flowering before fruiting starts and by hand pulling seedlings and felling mature plants using the cut and paint method using glyphosate. Can use the foliar spray method but if glyphosate is not successful a contractor may be engaged to apply a broadleaf selective spray.

Paterson’s Curse (*Echium plantagineum*)

Paterson’s Curse is a declared agricultural weed by the Department of Agriculture and Food in Western Australia and is a priority weed species for the Shire of Kalamunda and the Shire of Mundaring. Originally introduced as a garden plant and considered a useful fodder species in times of drought. Widespread in agricultural areas, roadsides and vacant land. Displaces native annuals and is a threat to understorey species of many bushland reserves.



Echium plantagineum

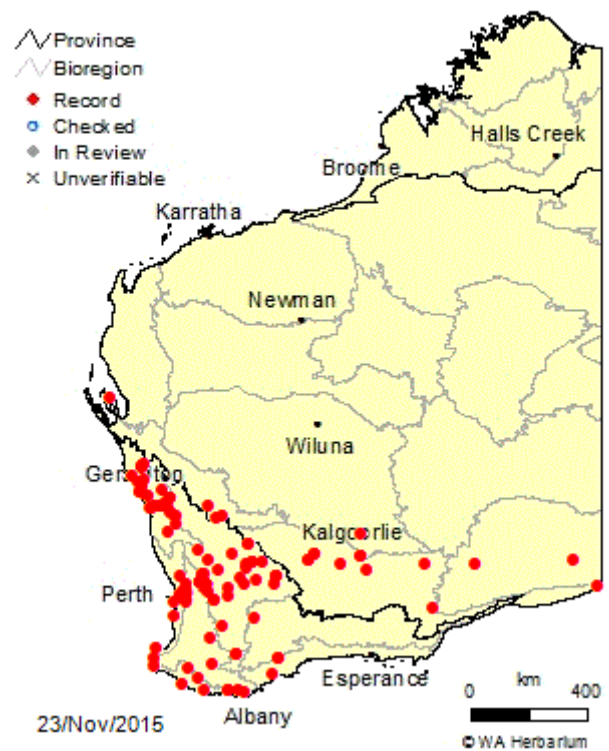


Figure 16: Paterson's Curse image & distribution. Florabase web site.

Method of management and control

Plants are best treated when young. Spot spray in late autumn/winter when most seed has germinated for the year with chlorsulfuron and a wetting agent, this will also help prevent further germination. Glyphosate or metsulfuron methyl applied at early flowering will control existing plants. Grubbing and cutting are suitable for young plants as long as 20 to 40 mm of taproot is removed. Slashing or mowing can cause out of season flowering and seed production. Manual removal best performed in May to October. Flowering and seeding plants should be destroyed (e.g. burning) as seeds will continue to mature even after being cut or pulled.

Stinkwort (*Dittrichia graveolens*)

Introduced from Northern Africa and is a shrub 0.1 to 0.5m tall. Adapted to temperate Mediterranean climates with winter-dominant rainfall. Tends to colonise within open areas and is strongly aromatic. Produces prolific seed that secretes a sticky exudate that causes seed to cling to clothing, animal fur and machinery. Declared plant in Victoria.

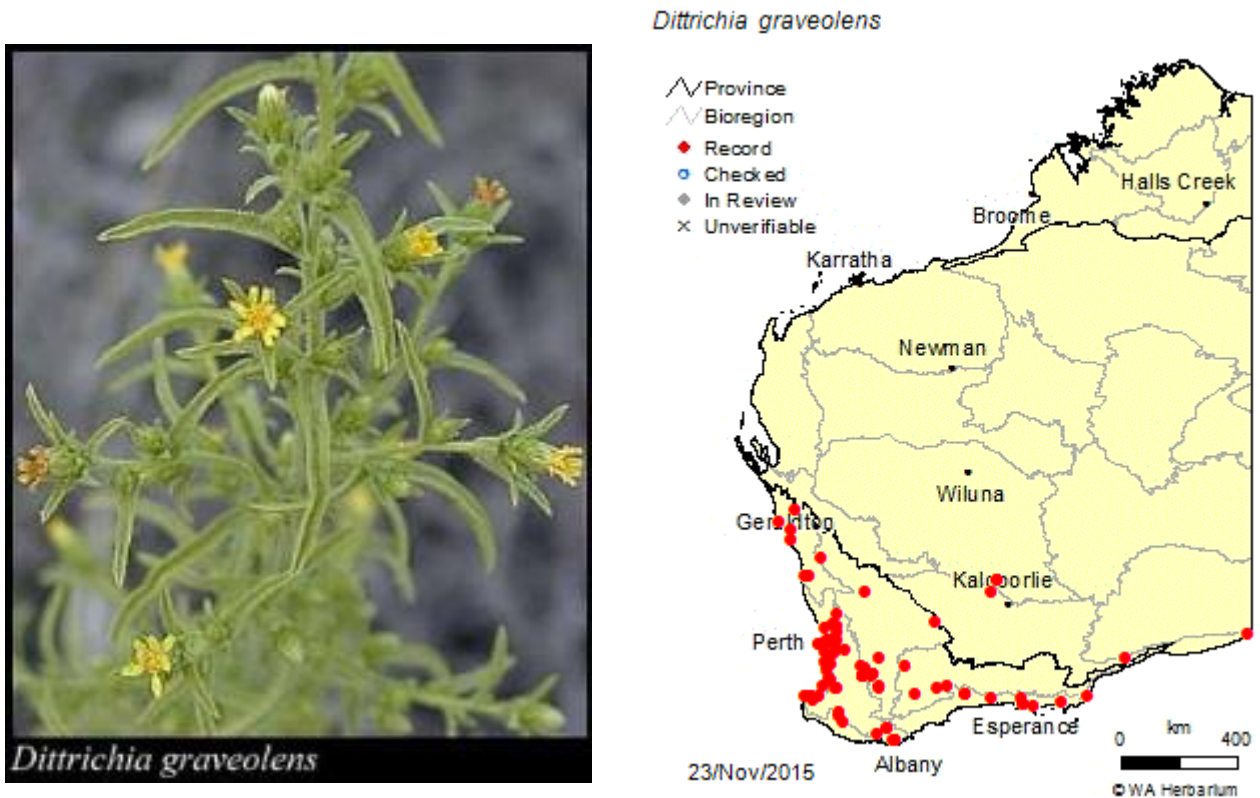


Figure 17: Stinkwort image & distribution. Florabase web site.

Method of management and control

Hand remove isolated plants from October to December before flowering which occurs January to April. Slash close to ground otherwise plants can resprout. Any treatment should be applied twice, early and then late summer. Apply glyphosate at 1% when plants are small in November/December, or up to flowering. Clean equipment, clothing and shoes, etc. to prevent spread of seed.

Sydney Golden Wattle (*Acacia longifolia*)

Garden escape introduced from Eastern Australia. Dense stands can significantly increase nitrogen in soil. There can be several hundred seeds per square meter of soil in the seed bank. Has been planted widely outside its natural range. Grows to up to 8m tall and flowers June to October.

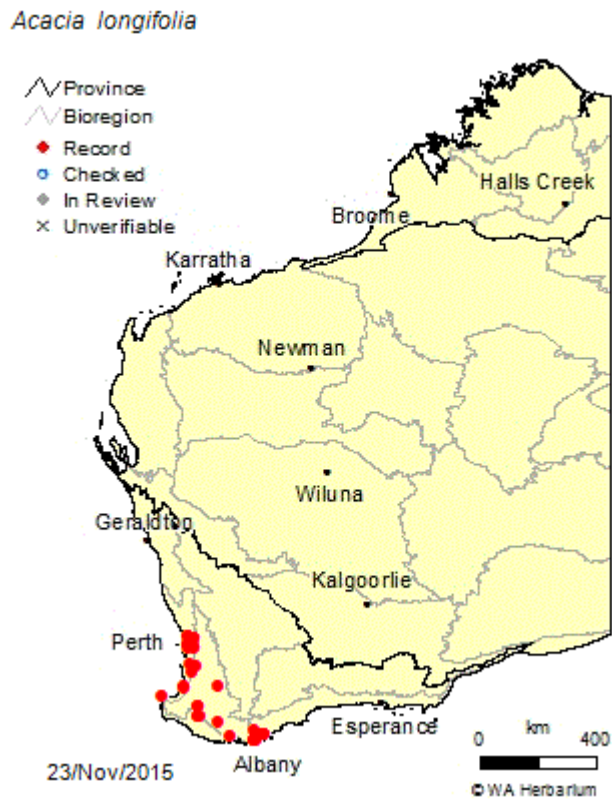


Figure 18: Sydney Golden Wattle image & distribution. Florabase web site.

Method of management and control

Hand pull seedlings, paint with glyphosate if stems break at ground level as they reshoot. For mature plants, apply 250 ml Access® in 15 L of diesel to basal 50 cm of trunk. Older plants can be ringbarked or felled and won't need chemical treatment as they don't reshoot. Monitor site for recruitment from seedbank.

Tagasaste / Tree Lucerne (*Chamaecytisus palmensis*)

A priority weed species for the Shire of Mundaring. Originates from Europe & Northern Africa. Shrub/tree to 6m tall which germinates readily after soil disturbance, forming dense infestations that can smother native vegetation and prevent regeneration. Introduced as a hedge plant and as a supplementary fodder tree for farm stock and for land rehabilitation. The species has adapted well to Australian conditions and is now found on farms, disturbed bushland, roadsides, creeks and sometimes invades native bushland. It has naturalised in almost all areas where it has been planted.



Chamaecytisus palmensis

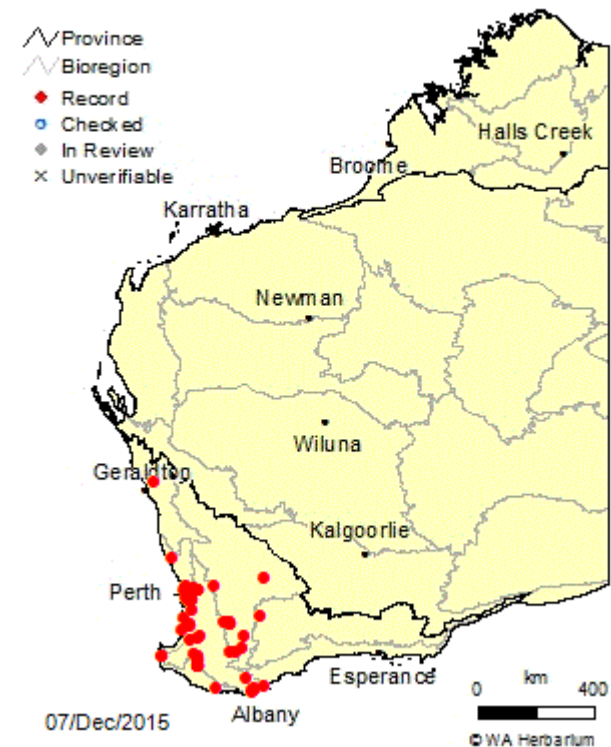


Figure 19: Tagasate image & distribution. Florabase web site.

Method of management and control

Seedlings and small plants may be removed by hand-pulling. Larger bushes and trees need to be cut down with secateurs or saws or burnt and the stumps treated with herbicides. Regrowth and seedlings need to be treated or grazed. Grazing can provide effective control by ring barking the tree. Stands can be slashed to stimulate seed germination for follow up control. Plants can be treated using basal bark method. Optimum treatment is March to September.

Wild/Common Oat (Avena sp)

Have been described as one of the most serious weeds found in cereal crops around the world. Many species of the Avena genus including the bearded, common & wild oat. (*Avena barbata*, *sativa* & *fatua*). An annual grass to 1m tall which germinates in cool & wet conditions then dies & dries in dry/hot weather becoming a fire hazard especially if left to invade & overtake areas. Able to out compete native grasses. Originates from Europe & the mediteranean region & Asia.

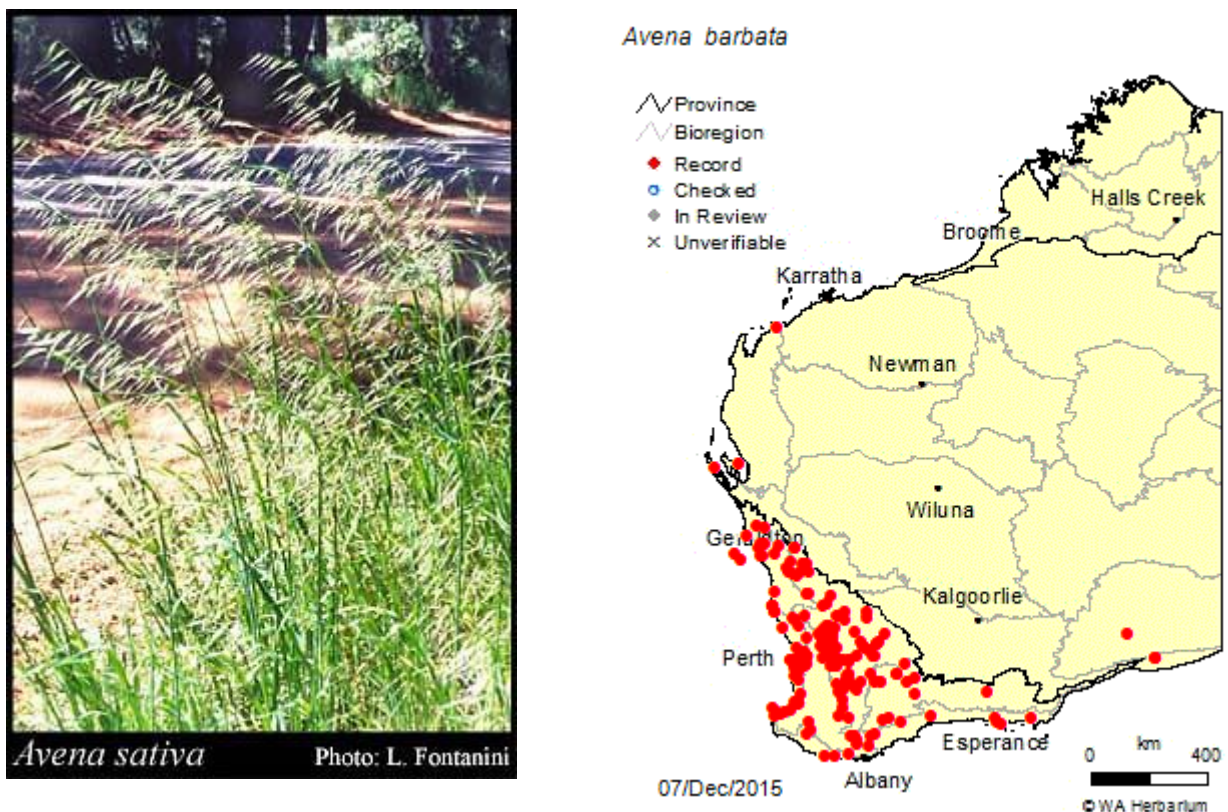


Figure 20: Wild Oat image & distribution. Florabase web site.

Method of management and control

Slash or graze infestations. It is not always necessary to remove the plant, because as an annual, it will die anyway at the onset of summer. Prohibiting new seed set will result in exhaustion of the seed store over time (3 - 5 years). This may be achieved by hand pulling, regular mowing, grazing or spraying with chemicals. Pay particular attention in spring when plants may produce seed quickly.

A grass selective herbicide and wetting agent can be used effectively for blanket and spot spraying. Follow-up will need to continue for the next two years. In areas with native grasses reduce the herbicide dose.

Wild Mint (*Mentha* sp)

Plants of the wild mint family are often cultivated in gardens but frequently spread out of control and become weedy. They are evergreen herbs to 0.9m high that often have a strong scent. Some such as red deadnettle have an unpleasant smell when crushed. They are common invasive weeds in flowerbeds, gardens, roadsides, hedgerows, scrubs, forests and around waterways. They often form dense clumps or mats of ground cover, some will invade lawns. In south-western Western Australia, pennyroyal (*Mentha pulegium*) grows on winter-wet flats, along creeklines, and in swamps and is particularly abundant in poorly drained pastures along the south coast. Wild mint is a weed of all states of southern Australia.



Mentha

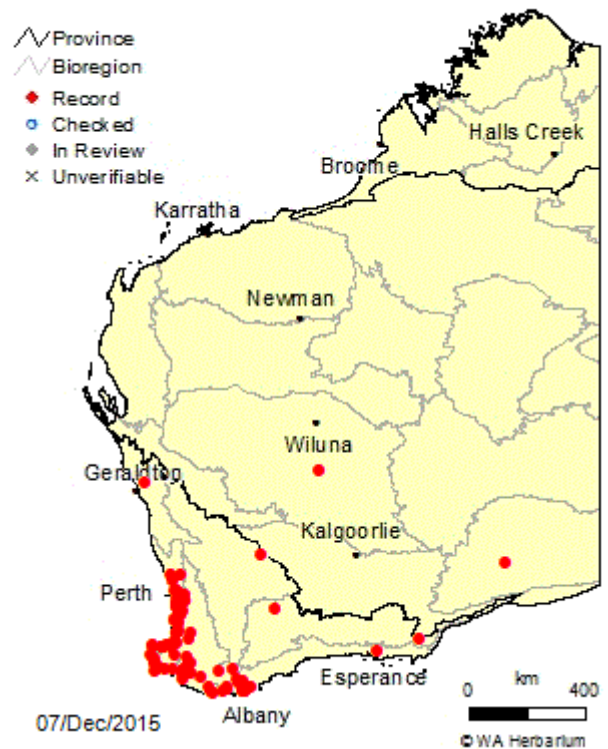


Figure 21: Wild Mint image & distribution map. Florabase web site.

Method of management and control

For best results apply spray in Spring and Autumn when weeds are growing using the foliar spray method. Control before flowering and seeding to prevent similar problems the following year. Non-selective chemicals like glyphosate have been proven to be successful but stronger than recommended dosages may be required. In areas amongst natural vegetation a selective spray may be successful, or manual removal for small areas can be successful but all the roots must be removed or the wild mint will re-grow from the remaining roots. Using high temperature steam may also be successful by utilising EMRCs steam weeder.

11. Records and Reporting

Detailed records will be kept of all weed monitoring and management activities undertaken within the Lot 82 and Lot 501 offsets area. Subsequent reports will be written each year and submitted on or before 1 July to the CEO of the Department of Environment Regulation.

12. References

Plants Out of Place

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Shire of Mundaring, 2013

Florabase Web Site

<http://florabase.dpaw.wa.gov.au/>

EMRC NRM Fact Sheets

<http://www.emrc.org.au/nrm-factsheets.html>