



Kanmantoo Copper Mine Flora and Fauna Survey - New SEB Areas

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Prepared by EBS Ecology for Hillgrove Resources

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Front cover photo: Mixed Mallee +/- *Allocasuarina verticillata* (Drooping She-oak) over exotic / native grassland.

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GLOSSARY AND ABBREVIATION OF TERMS

BDBSA	Biological Database of South Australia (managed by DEWNR)
DEWNR	Department of Environment, Water and Natural Resources
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EBS	Environmental and Biodiversity Services
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
NPW Act	<i>National Parks and Wildlife Act 1972</i>
NRM Act	<i>Natural Resources Management Act 2004</i>
NVC	Native Vegetation Council
Project site	area assessed by EBS Ecology
SEB	Significant Environmental Benefit
ssp.	sub-species
spp.	species (plural)

1 INTRODUCTION

EBS Ecology was commissioned by Hillgrove Resources to undertake a flora and fauna survey of the new SEB areas adjacent the Kanmantoo Copper Mine project site. This is to assist in satisfying some of the Avoidance, Mitigation and Management Measures set out in the Kanmantoo Copper Program for Environment Protection and Rehabilitation (PEPR) (Coffey 2009). The PEPR is the key operational document for the mining project and details information on environmental control measures and outcome-based performance criteria.

The new SEB area is approximately 109.5 ha of mostly open country, a large proportion of which has been cropped or grazed and contains very little native vegetation. There are a few isolated patches of *Lomandra effusa* (Scented Mat-rush) and a few areas where native grass populations still persist amidst exotic grasslands.

The aim of the project is to identify, protect and ultimately enhance any native vegetation remnants within the new areas of farming land allocated to SEB-offset establishment for the life of mine extension. Information from the flora and fauna survey including information on weed species and feral animal activity will be used to establish future control programs.

The objectives of the project were to:

- Survey for signs of any remnant native plant species and native vegetation communities
- Identify and map areas of on-farm native species plantings
- Compile an overall native vegetation species list
- Conduct a survey of native birds and other animals and map occurrences
- Map remnant native vegetation, assigning SEB offset ratios to any patches where possible
- Map areas of pest plants or individual pest plants where possible
- Map any rabbit warrens/ fox dens or areas of high rabbit/fox activity

2 BACKGROUND INFORMATION

The new SEB offset areas are adjacent to the Kanmantoo Mine. SEB offset areas associated with the Life of Mine (LOM) extension have been located as near as possible to the Mine Lease (ML) on suitable Hillgrove-owned land parcels. The Kanmantoo Copper Project is located approximately 44 kilometres east-southeast of Adelaide, South Australia. The new SEB project area is approximately 109.5 hectares and is comprised of five properties (Figure 1). The area has an average rainfall in the range of 400 to 450 millimetres and is within the Mount Lofty District Council area.

The adjacent Kanmantoo mine has experienced several periods of mining activity, from 1846 to 1874 and then again from 1971 to 1976 before low copper prices forced to mine to close. In 2003 Hillgrove Resources began an exploration program and in 2008 a mining lease for the Kanmantoo Copper Project was granted.

All properties within the new SEB areas have been managed under a mixed cropping / sheep grazing regime for over 100 years. Cropping has been confined to the flats which are characterized by deep alluvial soils. Grazing has been on crop stubble and the higher/rocky areas, which have skeletal topsoils over weathered parent rock. As a result, there are only small remnant patches of native vegetation remaining in the new SEB areas which have persisted, including native grasslands and a Mallee community.

For detailed background information refer to documents; *Kanmantoo Copper Project MARP* (Coffey 2009) and *Kanmantoo Copper Project Mining Lease Proposal, Main Report* (Hillgrove Resources 2007).

SEB Offset

The primary management objectives of the offset area will be the protection and enhancement (and control of threatening processes such as weed invasion and grazing) of the Mixed Mallee and the *Lomandra effusa* Tussock Grassland vegetation communities, and habitat for dependant fauna species such as the Diamond Firetail (*Stagonopleura guttata*) and Brushtail Possum (*Trichosurus vulpecula*). The management measures will include the prevention of impacts from stock grazing, overgrazing by native species, weed invasion and revegetation, with Hillgrove proposing to meet its SEB obligations by:

- Providing for the ongoing protection and management of remnant native vegetation within the Mine Lease Area (MLA).
- Excluding stock from the offset area.
- Upon project onset, commencing rehabilitation of areas dominated by introduced pasture
- Revegetation
- Managing weeds in areas of remnant native vegetation in the MLA
- Supporting community initiatives occurring offsite through donation of plants, equipment and funding (if necessary).

It is intended that an SEB offset will be created on the assigned areas through the following means:

- Removing agricultural activity from allocated areas
- Installing rabbit-proof fencing and controlling rabbits/hares/foxes within fenced areas
- Carrying out ongoing weed control programs to remove introduced plant species
- Carrying out erosion mitigation works within assigned areas where possible
- Planting local plant species derived from local provenance seed within designated vegetation areas to create areas of high-value vegetation
- Following up planting programs with infill plantings where required
- Progressively providing nesting boxes, perches and/or refuges for local fauna within revegetated patches as they become increasingly capable of supporting local fauna populations.
- Involving local community groups and local contractors in all work where possible (to create both regional interest and regional employment)
- Protecting SEB-offset patches through appropriate Heritage Agreements

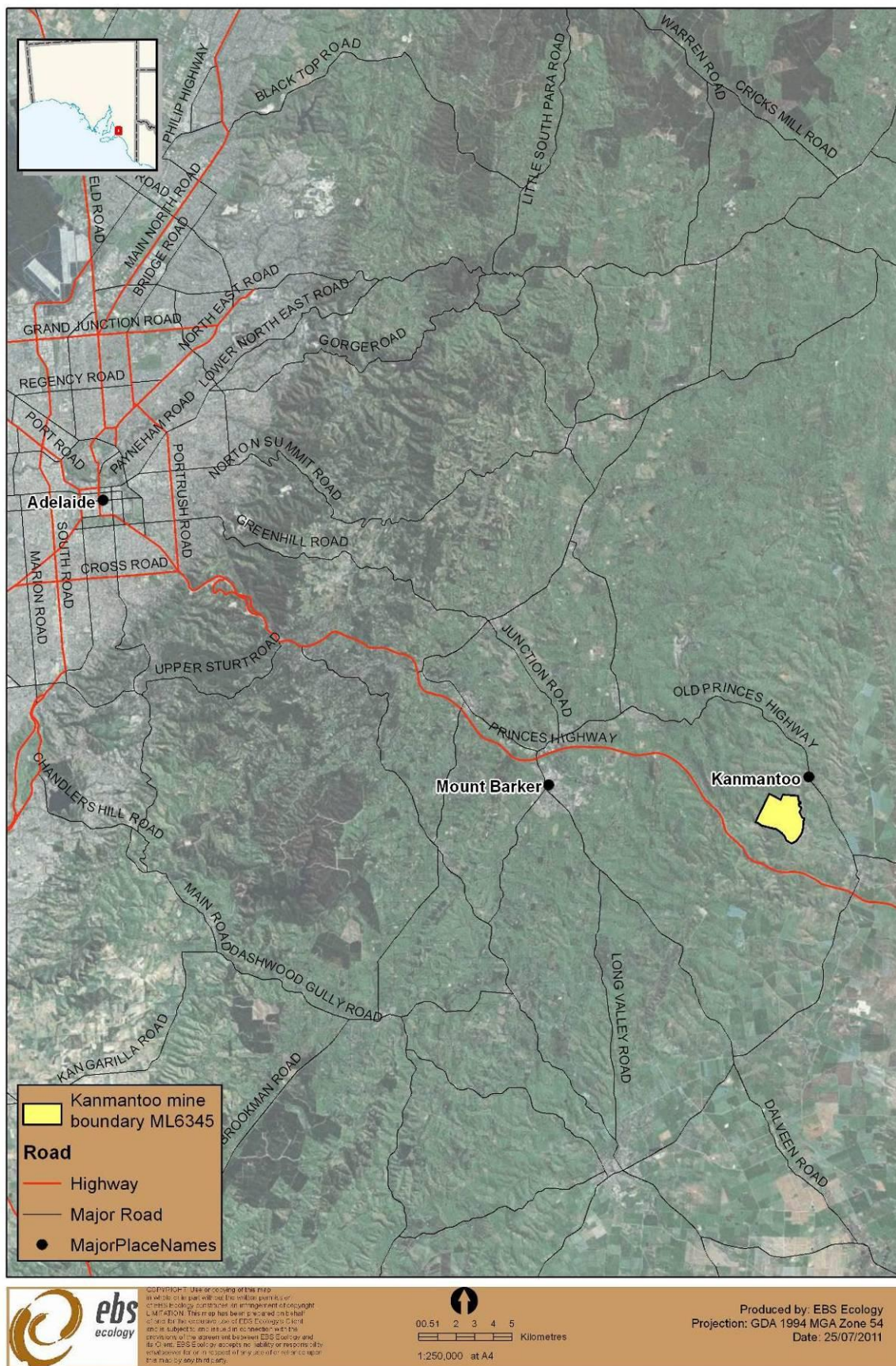


Figure 1. Location of project area.

3 METHODS

3.1 Field survey

3.1.1 Weather conditions during the survey

Weather conditions for the two components of the survey ranged from warm to cool. Wind speeds were generally low to fresh during the bird survey (Table1).

Table 1. Mount Barker Weather Station daily weather observations, spring 2014..

Date	Min temp.	Max temp.	Rain	Time	Temp.	Rel. humid.	Wind direction	Wind speed	Activity
	°C	°C	mm		°C	%		km/h	
23/10/2014	11.6	25.6	0	9am	12.7	97	SE	7	Flora and fauna survey
				3pm	25.0	53	SSE	7	
27/10/2014	10.6	17.3	9.4	9am	14.9	72	WSW	30	Flora and fauna survey
				3pm	15.3	71	SW	11	
06/11/2014	5.2	27.0	0	9am	16.9	48	WNW	7	Bird survey and spotlighting
				3pm	26.5	26	SW	4	

Source: Bureau of Meteorology. www.bom.gov.au

3.1.2 Vegetation associations and condition

Vegetation associations within the new SEB areas were mapped and described. Within each association the dominant species, structural form, presence of understorey species, and condition was recorded (Table 2). Observations were also made on the quality of the habitat for fauna species within the project area (e.g. presence of hollows, fallen logs, leaf litter, wetlands, dense shrubby refuge etc).

The survey methodology utilised was the BushRAT (Bushland Rapid Assessment Technique) assessment. This method, which was recently developed by DEWNR, is a rapid assessment technique derived from the Nature Conservation Society of South Australia's 'Bushland Condition Monitoring' methodology, for assessment of native vegetation offsets under the Native Vegetation Act. It is intended that the technique will be employed for most assessments undertaken under the Native Vegetation Act, which will likely include clearance via clearance application, clearance via regulation, potential SEB offset areas, Heritage Agreement assessments and compliance assessments. The vegetation associations are identified within each 'application area' and then assessed against the corresponding 'benchmark' vegetation community identified as part of the BCM Manuals.

Each BushRat assessment identified is termed a 'vegetation association', within which a representative 100 x 100m quadrat is surveyed. A single datasheet is completed per site which a number of standard indicators are scored. Three 'components' of the biodiversity value of the sites are measured and scored: vegetation condition, conservation value and landscape context. Vegetation condition is the main component for which field data is gathered.

Each identified vegetation association is related to a 'Benchmark' Vegetation Community. The 'Benchmark' vegetation communities describe 'intact' vegetation and so can help us determine how much a vegetation association has changed from its historic structure and composition.

Two associations did not require a BushRat assessment, one being the Planted Windbreak / Amenity Planting association and the Plantation associations. The Planted Windbreak / Amenity Plantings will remain intact and may not require any management activities other than weed control. The Plantation association will require a BushRat assessment at a later date as there may be some vegetation removal required before any revegetation or other management activities take place.

Table 2. SEB ratios used to rate condition of vegetation associations.

Con- dition	SEB ratio	% total indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)
Very Poor	0:1	<10%	No overstorey stratum remaining.	Complete destruction of indigenous understorey* (by grazing &/or introduced plants).	Vegetation structure no longer intact (e.g. removal of one or more vegetation strata). Scope for regeneration, but not to a state approaching good condition without intensive management.	Where proposed clearance is considered to be minor and of limited biodiversity impact, e.g. lopping of overhanging limbs only or minor clearance of shrubs in areas otherwise considered as highly disturbed.
	1:1	10-19%	Scattered trees in poor health and/or representing an immature stand.	Almost complete destruction of indigenous understorey* (by grazing &/or introduced plants) - reduced to scattered clumps and individual plants.	Dominated by very aggressive weeds. Partial or extensive clearing (> 50% of area). Evidence of heavy grazing (tracks, browse lines, species changes, complete depletion of soil surface crust).	
	2:1	20-29%	Scattered trees either immature in good health, or mature in poor/moderate health. Alternatively, the dominant overstorey stratum is largely intact and an immature stand (or regrowth), and is generally in poor health.			Where proposed clearance is in areas dominated by introduced species, the area of native vegetation is largely reduced to scattered trees, indigenous understorey reduced to scattered clumps and individual plants.
Poor	3:1	30-39%	Dominant overstorey stratum is largely intact and a moderately healthy mature stand.	Heavy loss of native plant species (by grazing &/or introduced plants). The understorey* consists predominately of alien species, although a small number of natives persist.	Vegetation structure substantially altered (e.g. one or more vegetation strata depleted). Retains basic vegetation structure or the ability to regenerate it. Very obvious signs of long-term or severe disturbance. Weed dominated with some very aggressive weeds. Partial clearing (10 – 50% of area). Evidence of moderate grazing (tracks, browse lines, soil surface crust extensively broken).	
	4:1	40-49%	Dominant overstorey stratum is largely intact and is a healthy mature stand with high wildlife habitat value (e.g. hollows).			Where the proposed clearance is of mostly intact overstorey vegetation but there is still considerable weed infestation amongst the understorey flora
Moderate	5:1	50-59%	Dominant overstorey stratum is largely intact – any condition+	Moderate loss of native understorey diversity. Weed-free areas small. Substantial invasion of aliens resulting in significant competition, but native understorey* persists; for example, may be a low proportion of native species and a high native cover, or a high proportion of native species and low native cover.	Vegetation structure altered (e.g. one or more vegetation strata depleted). Most seed sources available to regenerate original structure. Obvious signs of disturbance (e.g. tracks, bare ground). Minor clearing (<10% of area). Considerable weed infestation with some aggressive weeds. Evidence of some grazing (tracks, soil surface crust patchy).	
	6:1	60-69%	Dominant overstorey stratum is largely intact – any condition+	Moderate but not severe weed infestation amongst the understorey flora.		Where the proposed clearance is of mostly intact overstorey vegetation with moderate but not severe weed infestation amongst the understorey flora. Clearance is not seriously at variance with the Principles.

Con- dition	SEB ratio	% total indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)
Good	7:1	70-79%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.	Vegetation structure intact (e.g. all strata intact). Disturbance minor, only affecting individual species. Only non-aggressive weeds present. Some litter build-up.	
	8:1	80-89%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.		Where the proposed clearance is of mostly intact overstorey and understorey vegetation, weed infestation is moderate to low, but the original vegetation is still dominant. Clearance is assessed by the Native Vegetation Council to be at variance with the Principles.
Excellent	9:1	> 89%	Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand.	Diverse vegetation with very little weed infestation. Understorey largely undisturbed, minimal loss of plant species diversity. Very little or no sign of alien vegetation in the understorey*; resembles probable pre-European condition.	All strata intact and botanical composition close to original. Little or no signs of disturbance. Little or no weed infestation. Soil surface crust intact. Substantial litter cover.	
	10:1		Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand, with high habitat value (e.g. hollows).			Where the proposed clearance is of diverse vegetation with very little weed infestation. Clearance is assessed by the Native Vegetation Council to be seriously at variance with the Principles.

*Or all strata if the upper and lower strata are difficult to distinguish

+ Ratio assessment will largely depend upon condition of understorey associated with an intact overstorey stratum.

Adapted from 'Guide to Roadside Vegetation Survey Methodology for South Australia', (Stokes *et al.* 1998) and 'Guidelines for a Native Vegetation Significant Environmental Benefit Policy', (DWLBC 2005).

3.1.3 Bird Survey

A roaming process was used to survey for birds within the project area. One surveyor undertook a roaming survey for one hour in the morning and afternoon over one day. Habitat usage by birds was also recorded whilst surveying these areas. The roaming process allowed for coverage of changing habitat across the site. Seven survey areas were assigned a waypoint to ensure an even spread across the project area.

3.1.4 Mammal and nocturnal fauna survey

A fauna specific survey was not undertaken during this assessment however opportunistic sightings of fauna species were recorded, to provide an indication of the habitat value of the site for native fauna. Rabbit warrens / fox dens and areas of high rabbit / fox activity were recorded.

Spotlighting was undertaken within wooded habitats in search of the Common Brushtail Possum. All five properties were surveyed over one night for up to two hours commencing approximately one hour after dusk. Any other species observed opportunistically were also recorded.

3.1.5 Active searching

Active searching of the project area was conducted for two hours during the day in order to detect any additional small mammals or reptiles.

3.2 Survey Limitations

At the time the survey was undertaken, not all plant species may have been visibly present. Some species such as native orchids and lilies are particularly hard to detect when not in flower. As a consequence, it is possible that species were not detected. It should be noted however, that the number of species missing from the species list is expected to be low and data collected is considered adequate to make a reasonable assessment of potential impacts of the proposed works on flora and fauna.

Although effort was taken to ensure all visibly present species were observed and recorded, it is likely that not all species present were observed in the two day survey period.

4 RESULTS

4.1 Field survey

The flora/fauna component of the survey was undertaken on the 23rd and 27th October 2014 by EBS staff Chris Harrison and Serina Lattanzio. The bird survey and spotlighting was undertaken on the 6th November 2014 by EBS staff Alison Derry and Travis How. The majority of the project area was traversed on foot to record all vegetation associations, condition, fauna species and habitat.

4.1.1 Flora species

A total of 96 (57 native and 39 exotic) flora species were recorded during the field survey. A summary of these flora species, and the vegetation associations in which they were recorded, is provided Appendix 1. Three flora species listed under the NPW Act were recorded during the field survey, the state rare *Eucalyptus fasciculosa* (Pink Gum), *Eucalyptus globata* ssp. *globata* (Port Lincoln Mallee), both of which were planted, and *Rytidosperma tenuius* (Short-awn Wallaby-grass).

4.1.2 Vegetation associations

Eight broad vegetation associations were observed during the field survey (Figure 2). Within the designated survey area, most of the vegetation was of poor condition. The majority of the survey area has been previously cleared or consisted of immature trees; however some areas had good ground cover of leaf litter, moss and rocks. There were two patches of planted vegetation present (some may be remnant but difficult to distinguish for some species). Vegetation condition ranged from very poor (SEB condition rating 0:1) to moderate (SEB 6:1) (Figure 3). Each vegetation association is further described below with representative photos. Appendix 1 details individual flora species recorded within each vegetation association.

Vegetation associations recorded within the project area:

1. Mixed Mallee +/- *Allocasuarina verticillata* (Drooping She-oak) over Exotic / Native Grassland
2. Exotic Grassland / Grazing Land
3. Plantation
4. Cropping Land
5. Planted Windbreak / Amenity Planting
6. Native Grassland
7. *Lomandra effusa* (Scented Mat-rush) Open Grassland
8. *Acacia pycnantha* (Golden Wattle) Tall Shrubland

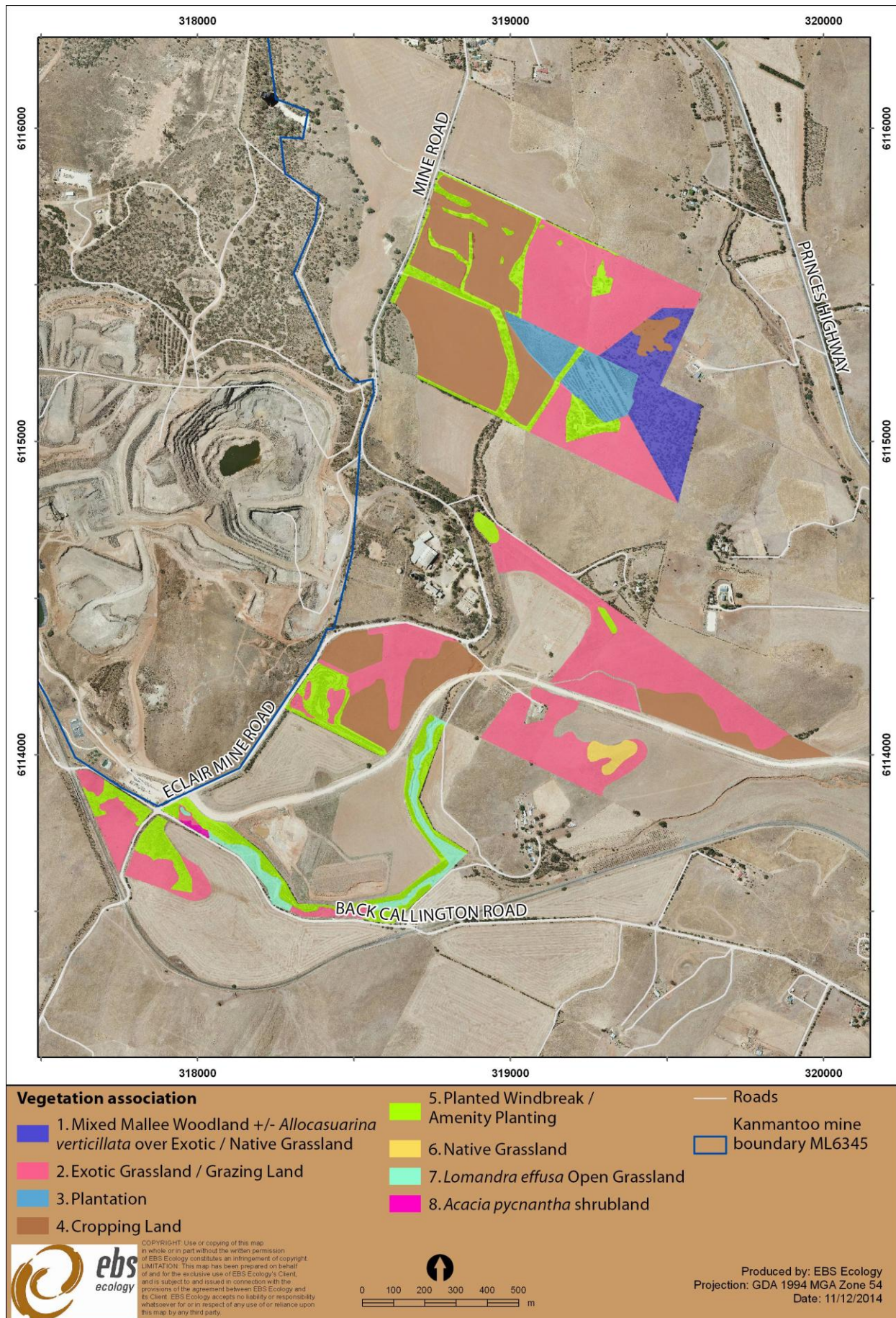


Figure 2. Vegetation associations observed within the new SEB areas.

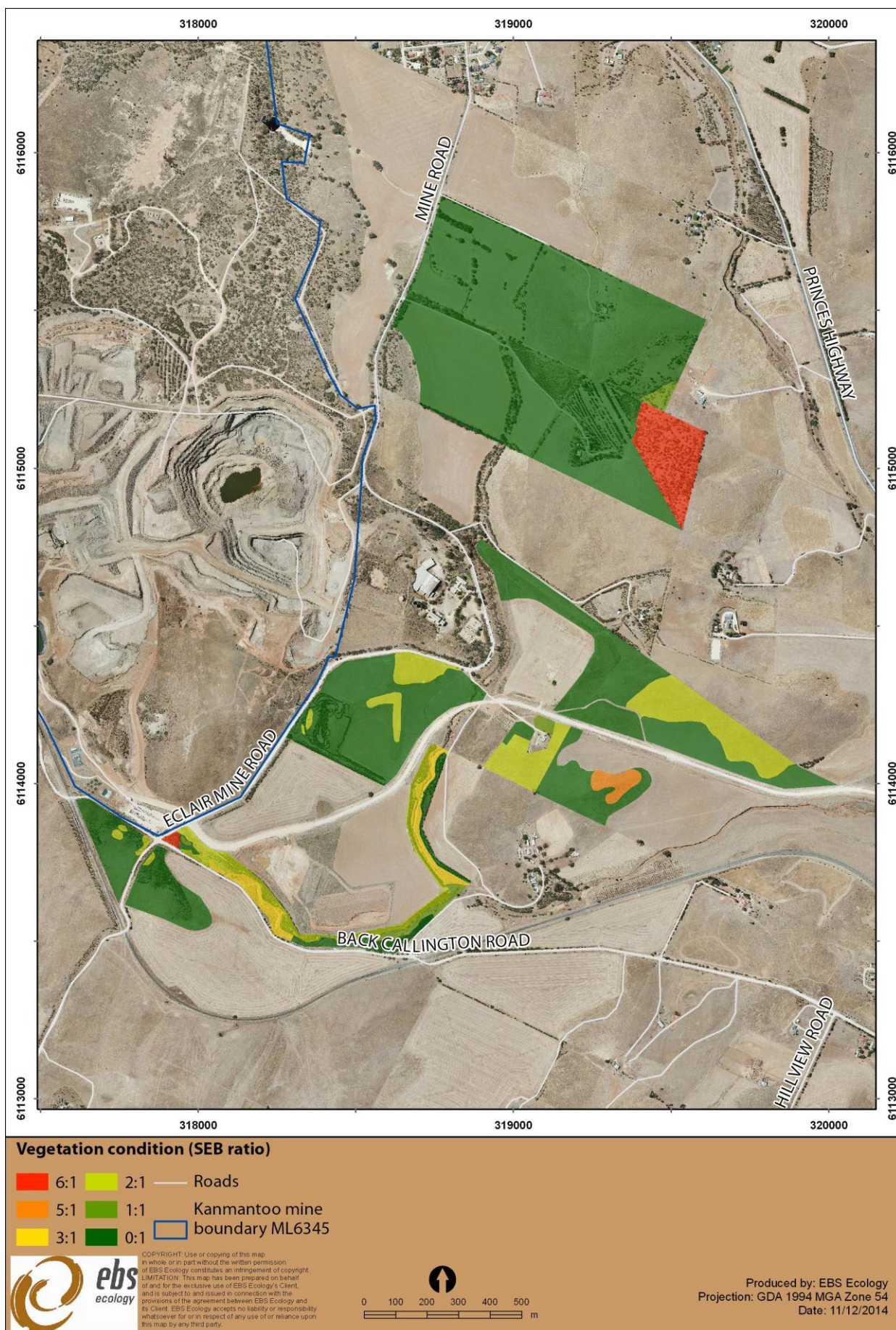


Figure 3. Vegetation condition observed within the new SEB areas.

Association 1: Mixed Mallee +/- *Allocasuarina verticillata* (Drooping She-oak) over Exotic / Native Grassland

Vegetation Association 1 was located within the 141 Mine Road and Mulewa properties with the association located on the western end of each of the properties. Association 1 was dominated by a mix of upper and midstorey species including *Eucalyptus leucoxylon* ssp. (South Australian Blue Gum), *Eucalyptus socialis* (Red Mallee), *Allocasuarina verticillata* (Drooping She-oak), *Acacia argyrophylla* (Silver Mulga-bush), *Callitris gracilis* (Southern Cypress Pine), *Senna* sp. (Senna) and *Santalum acuminatum* (Quandong). Native species in the understorey was predominantly dominated by *Rytidosperma caespitosum* (Common Wallaby-grass), *Enchylaena tomentosa* var. *tomentosa* (Ruby Saltbush) and *Austrostipa scabra* ssp. (Rough Spear-grass). Dominant weed species in the understorey consisted of *Echium plantagineum* (Salvation Jane) and *Avena barbata* (Bearded Oat).

The 141 Mine Road property was in poor condition, with the understorey dominated by exotic species. The condition improved at the rocky outcrop (SE corner) where there was good native grass cover. This area appeared to be direct seeded with self seeding regeneration from the direct seeding and adjacent properties, with the possibility of the presence of remnant vegetation.

The understorey on the Mulewa property was in good condition with native grass cover, plentiful cover of leaf litter, moss and a rocky outcrop. The vegetation appeared to be remnant with some planted local and exotic species such as *Eucalyptus cladocalyx* ssp. (Sugar Gum).

The condition of Vegetation Association 1 was considered very poor (0:1) to moderate (6:1). Refer to Figures 4 and 5 for a representative photo.



Figure 4. Mixed Mallee +/- *Allocasuarina verticillata* (Drooping She-oak) over Exotic/Native Grassland: 141 Mine Rd.



Figure 5. Mixed Mallee +/- *Allocasuarina verticillata* (Drooping She-oak) over Exotic/Native Grassland: Mulewa.

BushRat Assessment

A number of key management activities, such as feral animal management, weed management and understorey revegetation, would need to be implemented to manage the areas as a suitable offset.

Following the BushRat assessment the remnant scored for Association 1:

- Unit Biodiversity Score = 68
- Total Biodiversity Score = 3889.6

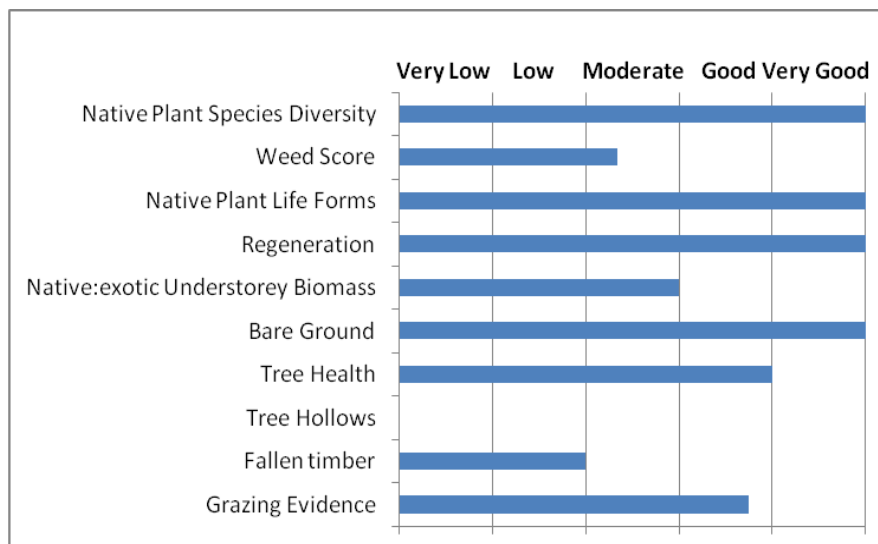


Figure 6. BushRat assessment Association 1 against benchmark community.

Association 2: Exotic Grassland / Grazing Land

This association has been highly modified and was dominated by exotic herbs and grasses including *Avena barbata* (Bearded Oat), *Echium plantagineum* (Salvation Jane), *Trifolium angustifolium* (Narrow-leaf Clover) and *Gomphocarpus cancellatus* (Broad-leaf Cotton-bush). This association was located on all five properties. Much of this association was used as grazing land. In areas where there was no stock present, grazing pressure from stock was evident.

Scattered native species including *Austrostipa scabra* ssp. (Rough Spear-grass), *Enneapogon nigricans* (Black-head Grass) and *Convolvulus remotus* (Grassy Bindweed) were located within association two.

The condition of Vegetation Association 2 was considered very poor (0:1). Refer to Figure 7 for a representative photo.



Figure 7. Exotic Grassland / Grazing Land.

BushRat Assessment

A number of key management activities, such as feral animal management, weed management and understorey revegetation, would need to be implemented to manage the areas as a suitable offset.

Following the BushRat assessment the remnant scored for Association 2:

- Unit Biodiversity Score = 38
- Total Biodiversity Score = 4089.18

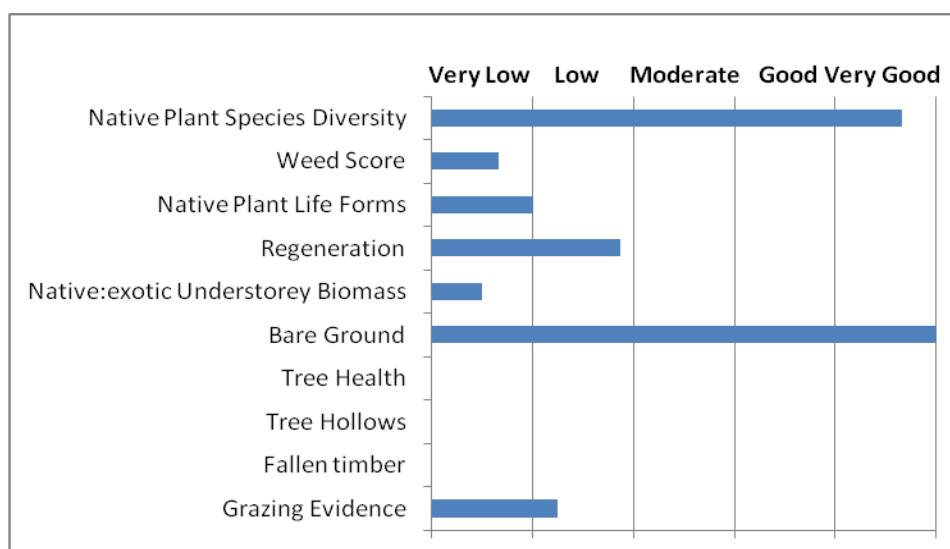


Figure 8. BushRat assessment Association 2 against benchmark community.

Association 3: Plantation

Association 3 is located on the Mulewa property only. There were three different plantations: *Pinus radiata* (Radiata Pine), *Callitris gracilis* (Southern Cypress Pine) and *Melaleuca uncinata* (Broombush) all within close vicinity of each other located in mid section of the property. The understorey mainly consisted of exotic grasses and herbs.

The condition of vegetation association one was considered very poor (0:1). Refer to Figure 8, 9 and 10 for a representative photo. No BushRat assessment was undertaken for this association.



Figure 9. *Pinus radiata* plantation.



Figure 10. *Callitris gracilis* plantation.



Figure 11. *Melaleuca uncinata* plantation.

Association 4: Cropping Land

Association 4 is located on the 141 Mine Road, Ferguson and Mulewa properties. The cropping land was predominantly wheat with exotic species such as *Avena barbata* (Bearded Oat) and *Hordeum vulgare* (Barley) scattered around the edges. This association was considered to be in very poor condition (0:1). Refer to Figure 11 for a representative photo.



Figure 12. Cropping land.

BushRat Assessment

A number of key management activities, such as feral animal management, weed management and understorey revegetation, would need to be implemented to manage the areas as a suitable offset.

Following the BushRat assessment the remnant scored for Association 4:

- Unit Biodiversity Score = 36
- Total Biodiversity Score = 2541

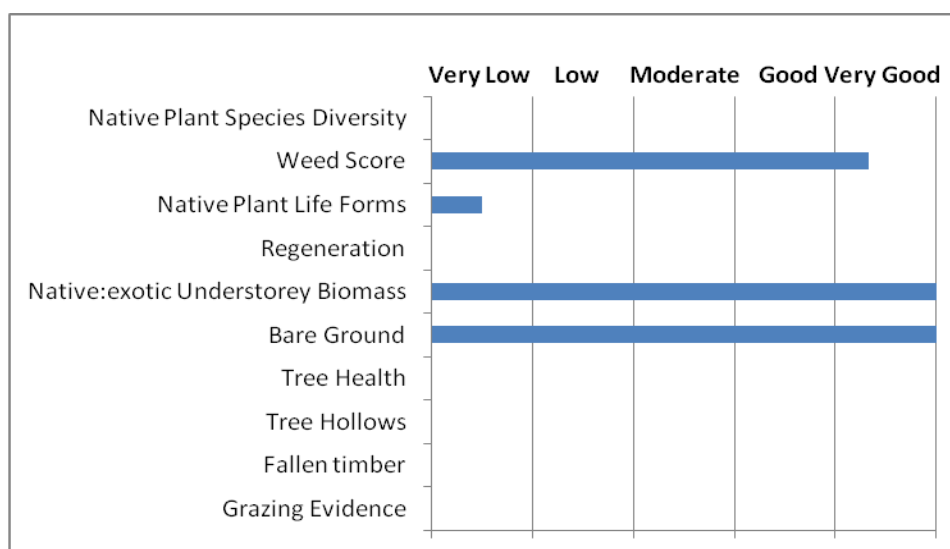


Figure 13. BushRat assessment Association 4 against benchmark community.

Association 5: Planted Windbreak / Amenity Planting

Vegetation Association 5 was located on all five properties. It was evident that the majority of the plantings were undertaken by direct seeding in either rows (windbreak) or large areas. There was a mix of local and non-local species including *Eucalyptus leucoxylon* ssp. (South Australian Blue Gum), *Eucalyptus cladocalyx* ssp. (Sugar Gum), *Callistemon* sp. (Bottlebrush), *Acacia victoriae* ssp. (Elegant Wattle), *Corymbia maculata* (Spotted Gum) and *Myoporum platycarpum* ssp. (False Sandlewood). The amenity plantings were located within vicinity of the dwellings and included *Ficus carica* (Edible Fig), *Agave americana* (Century Plant), *Olea europaea* ssp. *europaea* (Olive) and *Opuntia* spp. (Prickly Pear). Much of the understorey was an exotic grassland / herbland with some native grasses. This association was considered to be in very poor condition (0:1). Refer to Figure 12 and 13 for a representative photo. No BushRat assessment was undertaken for this association.



Figure 14. Planted windbreak on the Mulewa property.



Figure 15. Amenity planting on the Mulewa property.

Association 6: Native Grassland

Vegetation Association 6 was located on the Ferguson (3) property in a small patch towards the eastern end of the property. This patch was recently grazed with sheep present on the site. The association contained a mix of native species. Dominant species includes *Enneapogon nigricans* (Black-head Grass), *Rytidosperma caespitosum* (Common Wallaby-grass) and *Vittadinia gracilis* (Woolly New Holland Daisy). Dominant exotic species included *Avena barbata* (Bearded Oat) and *Echium plantagineum* (Salvation Jane).

This association was considered to be in moderate condition (0:5). Refer to Figure 14 for a representative photo.



Figure 16. Native Grassland.

BushRat Assessment

A number of key management activities, such as feral animal management, weed management and understorey revegetation, would need to be implemented to manage the areas as a suitable offset.

Following the BushRat assessment the score for Association 6:

- Unit Biodiversity Score = 42
- Total Biodiversity Score = 42

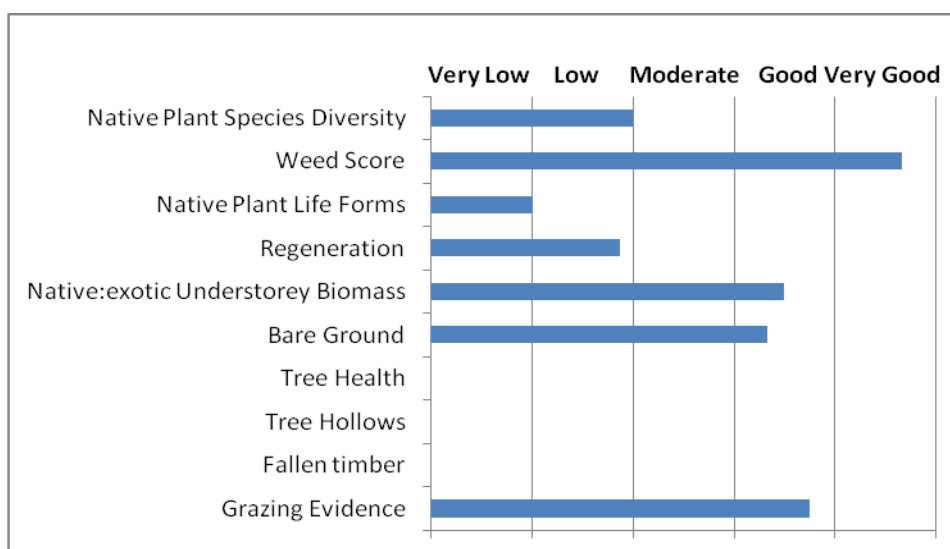


Figure 17. BushRat assessment Association 6 against benchmark community.

Association 7: *Lomandra effusa* (Scented Mat-rush) Open Grassland

There were two large and one small *Lomandra effusa* open grassland patches located within the Lot 25 property. Dominant species within the area include *Lomandra effusa* (Scented Mat-rush), *Aristida contorta* (Curly Wire-grass), *Austrostipa blackii* (Crested Spear-grass) and *Rytidosperma setaceum* (Small-flower Wallaby-grass). Dominant exotic species include *Avena barbata* (Bearded Oat), *Cynara cardunculus* ssp. *flavescens* (Artichoke Thistle) (located in the drainage line) and *Echium plantagineum* (Salvation Jane).

The vegetation condition varied within the patches and ranged from very poor (1:1) to poor (3:1). Refer to Figure 15 for a representative photo.



Figure 18. *Lomandra effusa* (Scented Mat-rush) Open Grassland.

BushRat Assessment

A number of key management activities, such as feral animal management, weed management and understorey revegetation, would need to be implemented to manage the areas as a suitable offset.

Following the BushRat assessment the remnant scored for Association 7:

- Unit Biodiversity Score = 45
- Total Biodiversity Score = 328.5

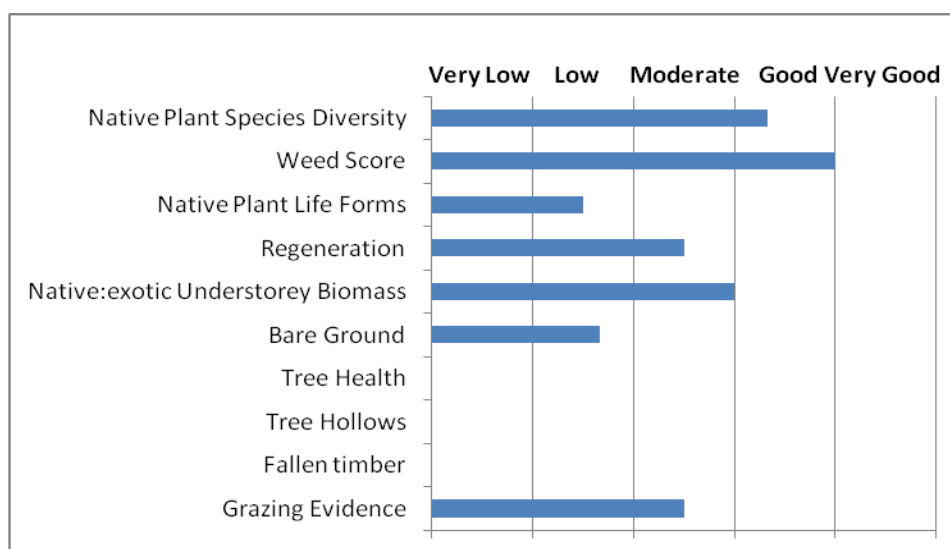


Figure 19. BushRat assessment Association 7 against benchmark community.

Association 8: *Acacia pycnantha* Tall Shrubland

The *Acacia pycnantha* (Golden Wattle) Tall Shrubland association was located on the Carmen property. This association was a small remnant stand located on the fence line. The dominant species within the understorey was *Enchylaena tomentosa* (Ruby Saltbush), *Lomandra effusa* (Scented Mat-rush), *Euphorbia terracina* (False Caper) and *Avena barbata* (Bearded Oat).

This association was considered to be in very poor condition (2:1). Refer to Figure 16 for a representative photo.



Figure 20. *Acacia pycnantha* (Golden Wattle) Tall Shrubland.

BushRat Assessment

A number of key management activities, such as feral animal management, weed management and understorey revegetation, would need to be implemented to manage the areas as a suitable offset.

Following the BushRat assessment the remnant scored for Association 8:

- Unit Biodiversity Score = 49
- Total Biodiversity Score = 7.84

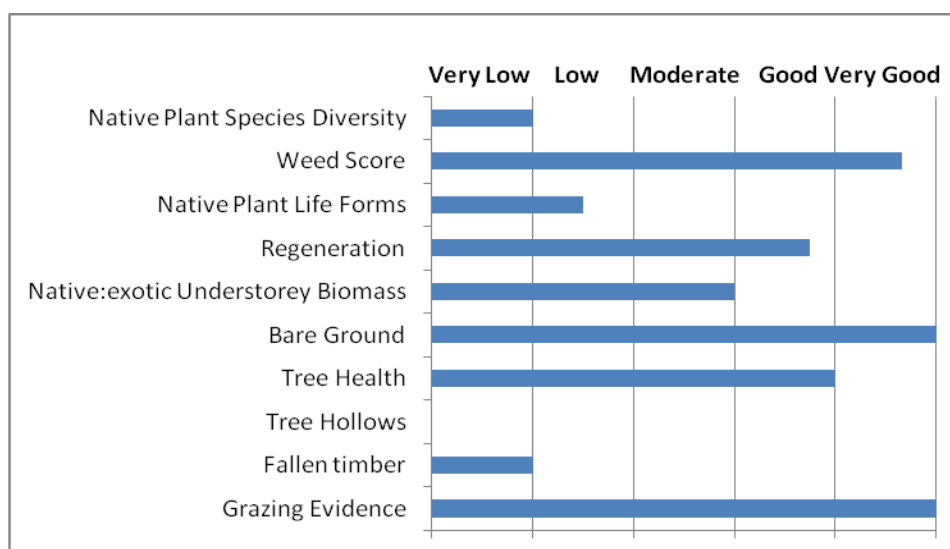


Figure 21. BushRat Assessment Association 8 against Benchmark community

4.1.3 Significant weed species

Thirty nine exotic species were observed within the project site. Eight of these species are classed as declared under the *Natural Resources Management Act 2004*, and a further 10 were considered environmental weeds (Table 3). Environmental weeds have the potential to cause significant environmental impacts, however their control is not legislated. Landholders are obliged to control declared weeds on their property, as they are known to cause significant economic, social and environmental impacts.

Table 3. Declared and environmental weeds.

Species Name	Common Name	Declared	Environmental
<i>Arctotheca calendula</i>	Cape Weed		✓
<i>Asphodelus fistulosus</i>	Onion Weed		✓
<i>Avena barbata</i>	Bearded Oat		✓
<i>Briza minor</i>	Lesser Quaking-grass		✓
<i>Echium plantagineum</i>	Salvation Jane	✓	
<i>Euphorbia terracina</i>	False Caper	✓	
<i>Galenia pubescens</i> var. <i>pubescens</i>	Coastal Galenia		✓
<i>Hypochaeris radicata</i>	Rough Cat's Ear		✓
<i>Lycium ferocissimum</i>	African Boxthorn	✓	
<i>Marrubium vulgare</i>	Horehound	✓	
<i>Olea europaea</i> ssp. <i>europaea</i>	Olive	✓	
<i>Opuntia</i> sp.	Prickly Pear	✓	
<i>Oxalis pes-caprae</i>	Soursob	✓	
<i>Pinus radiata</i>	Radiata Pine		✓
<i>Rosa canina</i>	Dog Rose	✓	
<i>Salvia verbenaca</i> var.	Wild Sage		✓
<i>Scabiosa atropurpurea</i>	Pincushion		✓
<i>Schinus molle</i>	Pepper-tree		✓

Status:

Declared: Declared plant under the *Natural Resources Management Act 2004*.

Environmental: Environmental weed (DTEI Environmental Weeds List).

4.2 Bird Survey

A total of 216 bird observations of 34 bird species (including three introduced species) were recorded at random locations throughout the project area (**Error! Reference source not found.**). The Meliphagidae Family was most represented with six bird species observed. These species were the Red Wattlebird (*Anthochaera carunculata*), Spiny-cheeked Honeyeater (*Acanthagenys rufogularis*), White-plumed Honeyeater (*Lichenostomus penicillatus*), Singing Honeyeater (*Lichenostomus virescens*), Brown-headed Honeyeater (*Melithreptus brevirostris*) and New Holland Honeyeater (*Phylidonyris novaehollandiae*). The Musk Lorikeet (*Glossopsitta concinna*) (39 individuals) and the Australian Magpie (*Gymnorhina tibicen*) (25 individuals) were the most abundant species present.

Three state threatened species were located within the new SEB area during the bird survey, the Rare Glossy Ibis (*Plegadis falcinellus*) and White-winged Chough (*Corcorax melanorhamphos*), and the Vulnerable Diamond Firetail (*Stagonopleura guttata*). Each species is further described below.

Glossy Ibis (*Plegadis falcinellus*)

Two individuals of the Glossy Ibis (*Plegadis falcinellus*) were located within the Ferguson (1) property within the vicinity of the Exotic Grassland / Grazing Land association, and amenity plantings in the adjacent property. The Glossy Ibis frequents swamps and lakes throughout much of the Australian mainland, but is most numerous in the north. It is a non-breeding visitor to Tasmania and the south-west of Western Australia. The Glossy Ibis requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains, mangroves and rice fields.

The Glossy Ibis is both migratory and nomadic. Its range expands inland after good rains, but its main breeding areas seem to be in the Murray-Darling Basin of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. Glossy Ibis often move north in autumn then return south to their main breeding areas in spring and summer. This species is likely to be an infrequent visitor to the SEB monitoring sites, based on the proximity of the site to floodplain areas near the Murray River at Murray Bridge.

Diamond Firetail (*Stagonopleura guttata*)

The methodology used as part of the fauna monitoring within the new SEB areas, is a replica of those used within the ML. This included targeted surveys on conservation rated species including the state vulnerable Diamond Firetail. Surveying for the Diamond Firetail involved a roaming process within a wooded habitat. The species preferred habitat type consists of *Eucalyptus odorata* (Peppermint Box) Woodland. Although there was no such habitat located within the Mulewa property a single Diamond Firetail was observed and heard calling from a power line which stretched across the *Melaleuca uncinata* plantation and the Planted Windbreak / Amenity Planting association. This was the only observation of Diamond Firetail recorded within both the ML and new SEB areas during the 2014 spring survey.

Diamond Firetails typically live in a wide range of eucalypt dominated vegetation communities usually consisting of a grassy understory, including woodland, forest and mallee. They are ground-feeders that predominantly eat ripe and half-ripe seeds of various grasses but are also known to feed on seeds of herbs, bushes and trees.

White-winged Chough (*Corcorax melanorhamphos*)

The *White-winged Chough* has a state listing of Rare, and is considered to be uncommon in the; eleven individuals were recorded within the new SEB project area on the Mulewa property within the Planted Windbreak association. White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building. They forage through the leaf litter; the diet includes termites, beetles, worms, insects, grain, and snails. White-winged Choughs build deep, cup-shaped nest of grasses held together with mud or sometimes manure in a tree fork. Breeding is communal with all members of the family helping to raise the young. It is not uncommon to observe White-winged Choughs around the Kanmantoo Mine Area, with 34 individuals and numerous nests also observed within the ML during the spring 2014 survey.

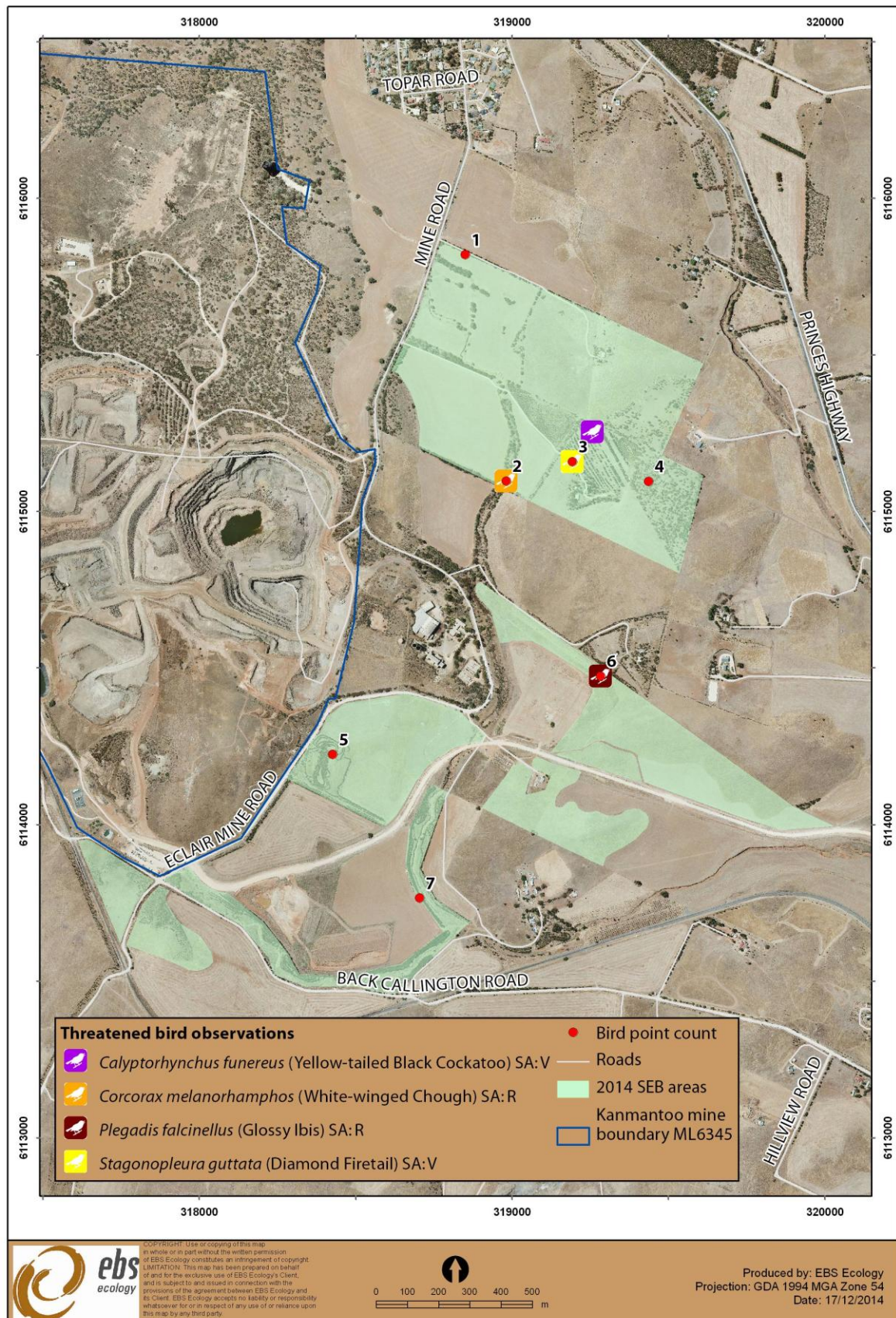


Figure 22. Location of bird surveys and threatened bird observations.

4.3 Mammal and nocturnal fauna survey

A total of six fauna species were observed within the new SEB areas during the flora assessment and include two bird species, three mammals and one reptile species (Table 4). One conservation significant species was detected during the field survey, the state vulnerable Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*).

Three mammal species were recorded during the spotlighting survey, the Western Grey Kangaroo (*Macropus fuliginosus*), the European Rabbit (*Oryctolagus cuniculus*) and the Common Brushtail Possum (*Trichosurus vulpecula*) (Table 4). The targeted state rare Common Brushtail Possum was observed during the survey, with nine observations (Figure 18).

Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*)

A flock of 15 Yellow-tailed Black Cockatoos were observed during the flora assessment, with all individuals being at flight when observed. The habitat over which they were flying was the *Pinus radiata* and *Callitris gracilis* plantations.

The species prefers mainly stringybark forests and woodlands with a heath understory and adjacent pines. They have also benefitted from large scale pine plantations, finding this a ready source of available food. As a result large flocks can often be found in and around these plantations. They have also been noted within areas of the Mount Lofty Ranges preferring broad vegetation groups consisting of grassy woodland, heath woodland and heath forest.

Common Brushtail Possum (*Trichosurus vulpecula*)

The Common Brushtail Possum was observed within eight different locations, some within close proximity of each other. The Brushtail Possum was located within the Mulewa, Ferguson (1 & 3), Lot 25 and the Carmen properties, mostly within or close to the Planted Windbreak / Amenity Planting association.

The Common Brushtail Possum (*Trichosurus vulpecula*) is listed as rare in South Australia due to suffering a significant decline in abundance and reduction in its range across the state, mainly brought about by loss of habitat and predation. They are commonly found at night in the canopies of eucalypt and she-oak woodlands, mainly feeding on the leaves, flowers and fruits. They often use tree hollows as preferred den sites which are generally around 10 cm in diameter (Ecological Associates 2006). Suitable feeding and possible nesting habitat in mature eucalypts would be available across the site in the scattered groups of eucalypts (Planted Windbreaks), however they have limited mobility across fragmented landscapes, and are vulnerable to fox and cat predation inhibiting their ability to relocate to other suitable areas (Ecological Associates 2006). It is unknown how far individuals will move to find necessary resources.

Table 4. Fauna species identified during the field survey and spotlighting.

Scientific Name	Common Name	Method	Conservation Status		Total number observed
			AUS	SA	
Birds					
<i>Calyptrorhynchus funereus</i>	Yellow-tailed Black Cockatoo	Observed (within the Pinus Radiata and Callitris gracilis plantation)		V	15
<i>Gymnorhina tibicen</i>	Australian Magpie	Observed (scattered throughout the project area)			5
Mammals					
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	observed, scats, spotlighting (scattered throughout the project area)			15
<i>Oryctolagus cuniculus</i> *	European Rabbit	warrens, scats, diggings, spotlighting (scattered throughout the project area)			8
<i>Ovis aries</i> *	Sheep	observed, scats			-
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	Spotlighting (scattered throughout the project area)		R	9
Reptiles					
<i>Tiliqua rugosa</i>	Sleepy Lizard	Observed (Mine Rd and Mulewa property)			3

* denotes exotic species

SA: South Australia (*National Parks and Wildlife Act 1972*). **Conservation Codes:** **V:** Vulnerable, **R:** Rare

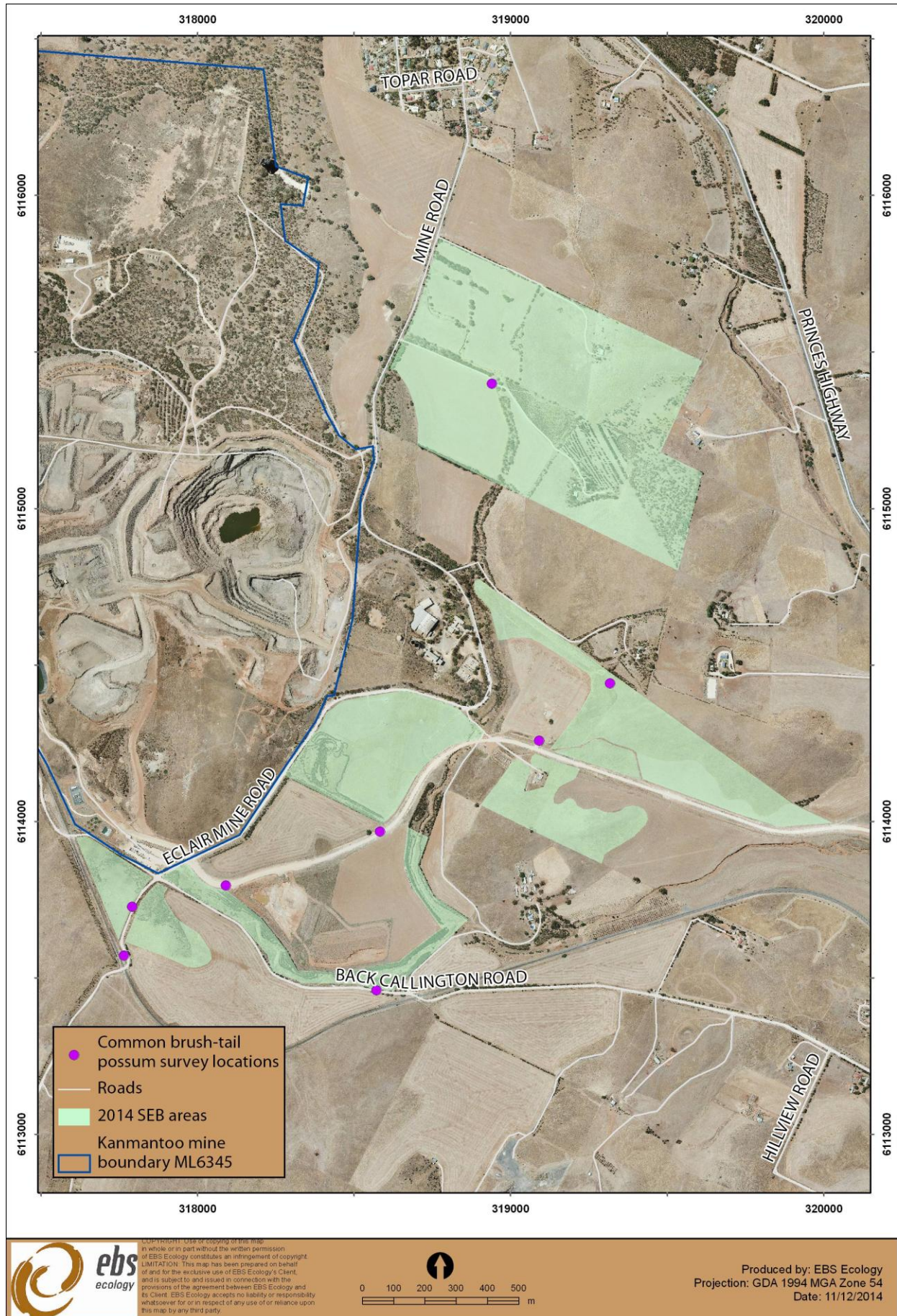


Figure 23. Common Brushtail Possum sightings within the new SEB area.

A total of 12 rabbit warrens were located across the five properties (Table 5, Figure 20). Some warrens have several entrances and had evidence of being active (scats and tracks) (Figure 19). It is possible that not all rabbit warrens were detected during the current survey. There were no evident signs of fox activity observed during the survey.

Table 5. Rabbit warren locations.

Easting	Northing	Comments	Property
319519	6115413	Active	141 Mine Road
319428	6115361	Active	141 Mine Road
319374	6115261	Active	141 Mine Road
318940	6115398		Mulewa
319266	6114508	Active	Ferguson
319318	6114441		Ferguson
319091	6114258		Ferguson
318583	6113967		Ferguson
318572	6113460		Lot 25
318090	6113795		Lot 25
317765	6113571		Carmen's
317791	6113727		Carmen's



Figure 24. Rabbit warrens located on the 141 Mine Road property.

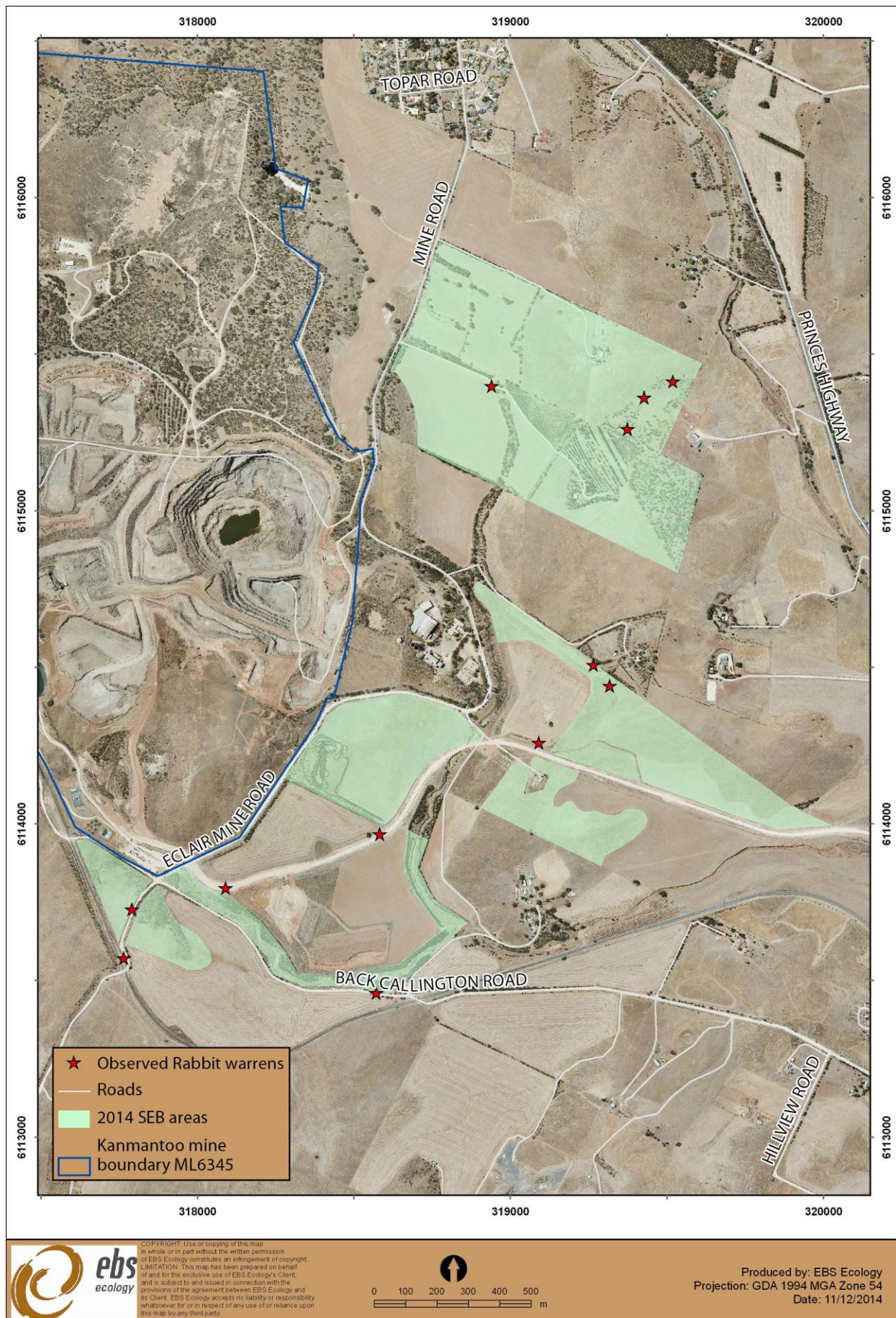


Figure 25. Rabbit warren locations within the new SEB area.

5 PROPERTY ASSESSMENT

141 Mine Road

The 141 Mine Road property encompasses several associations and included Mixed Mallee, Exotic Grassland (grazing), Cropping Land and a Planted Windbreak / Amenity Plantings associations (Figure 21). The overall condition of this property was very poor.

There were several active and large rabbit warrens with several entrances/exits observed within this property, the majority located toward the south eastern part of the property within the Mixed Mallee association. Refer to Table 5 and Figure 20 for warren locations.

Recommendations

- Remove exotic amenity plantings around the dwelling
- Retain planted windbreaks
- Undertake rabbit control, warren ripping
- Remove and control woody weeds such as Dog Rose and Boxthorn
- Enhance the vegetation within Association 1 in the south east of the property with typical mallee understorey species
- Erect bat and/or bird boxes within association 1
- Undertake revegetation of the exotic grassland and the cropping land
- Assess the erosion and undertake mitigation measures if required

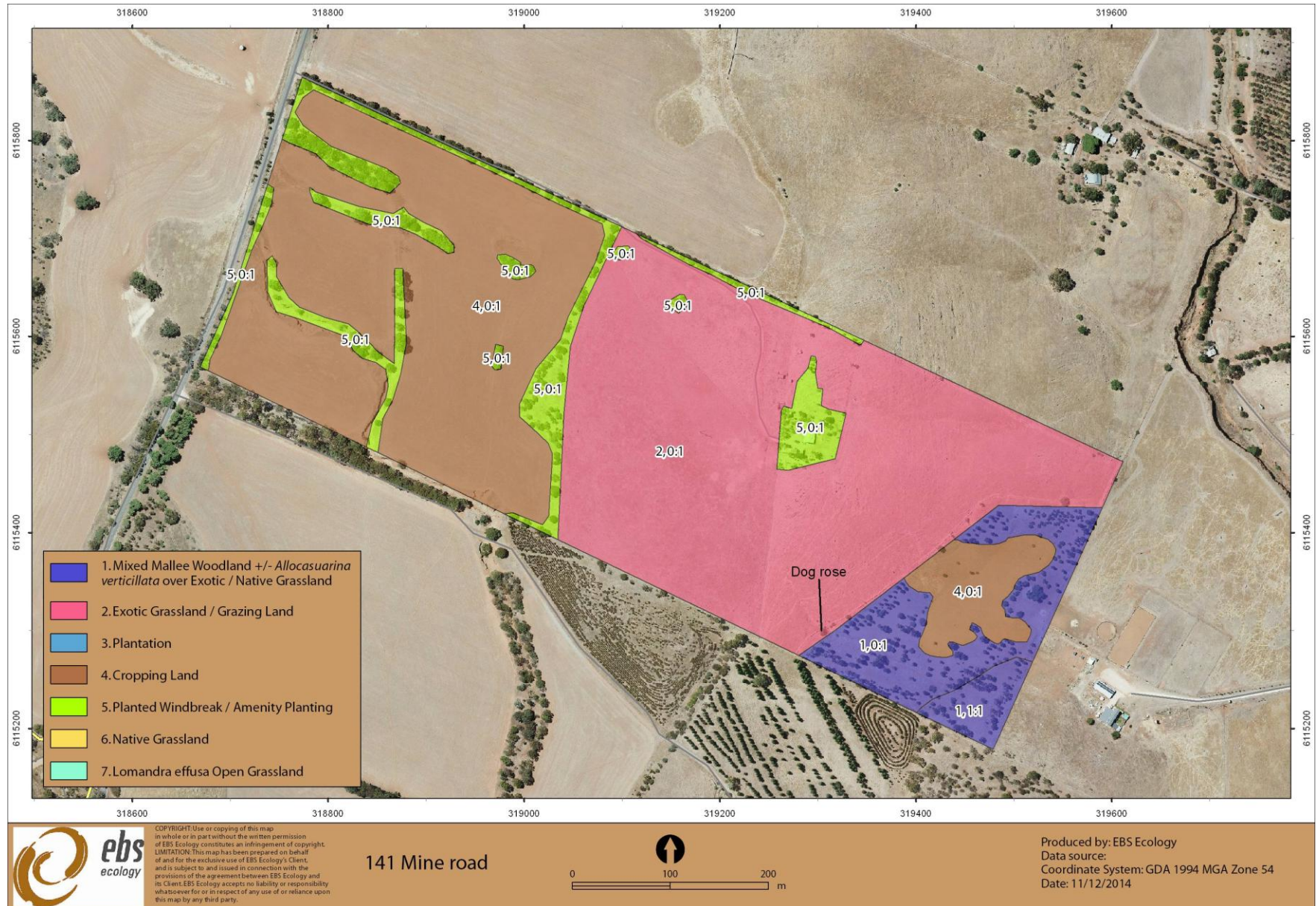


Figure 26. Current vegetation associations and condition of the 141 Mine Road property.

Mulewa

The associations located on the Mulewa property include Mixed Mallee, Exotic Grassland (grazing), Plantation, Cropping land and Planted Windbreak / Amenity Plantings (Figure 22). The majority of the property was in very poor condition. The Mixed Mallee located in the north eastern section of the property was in moderate condition and contained a good mix of native species.

There were three different sections on the property with a plantation association, two of which contained *Melaleuca uncinata* (Broom Bush) and one which contained *Pinus radiata* (Radiata Pine) and *Callitris gracilis* (Southern Cypress Pine). There were very few understorey species located in the plantation association. It is recommended that the Broom Bush and the Southern Cypress Pines are to be thinned out allowing the understorey to regenerate. It is also recommended that the Radiata Pines are removed and replanted with species similar to the adjacent mixed mallee association because the seeds are spread by Cockatoos and are invasive to other natural stratus.

Recommendations

- Remove exotic amenity plantings around the dwelling
- Retain planted windbreaks
- Undertake rabbit control, warren ripping where required
- Undertake weed control where required
- Retain the vegetation within Association 1 in the north east of the property, undertake weed control where necessary.
- Erect bat and/or bird boxes within association 1
- The vegetation within Association 1 may be used as a seed source for revegetation purposes
- Remove the Radiata Pine in the plantation association
- Thin out the Broom Bush and the Southern Cypress Pine to allow natural regeneration of the understorey or undertake revegetation
- Undertake revegetation of the exotic grassland and the cropping land
- Assess the erosion and undertake mitigation measures if required

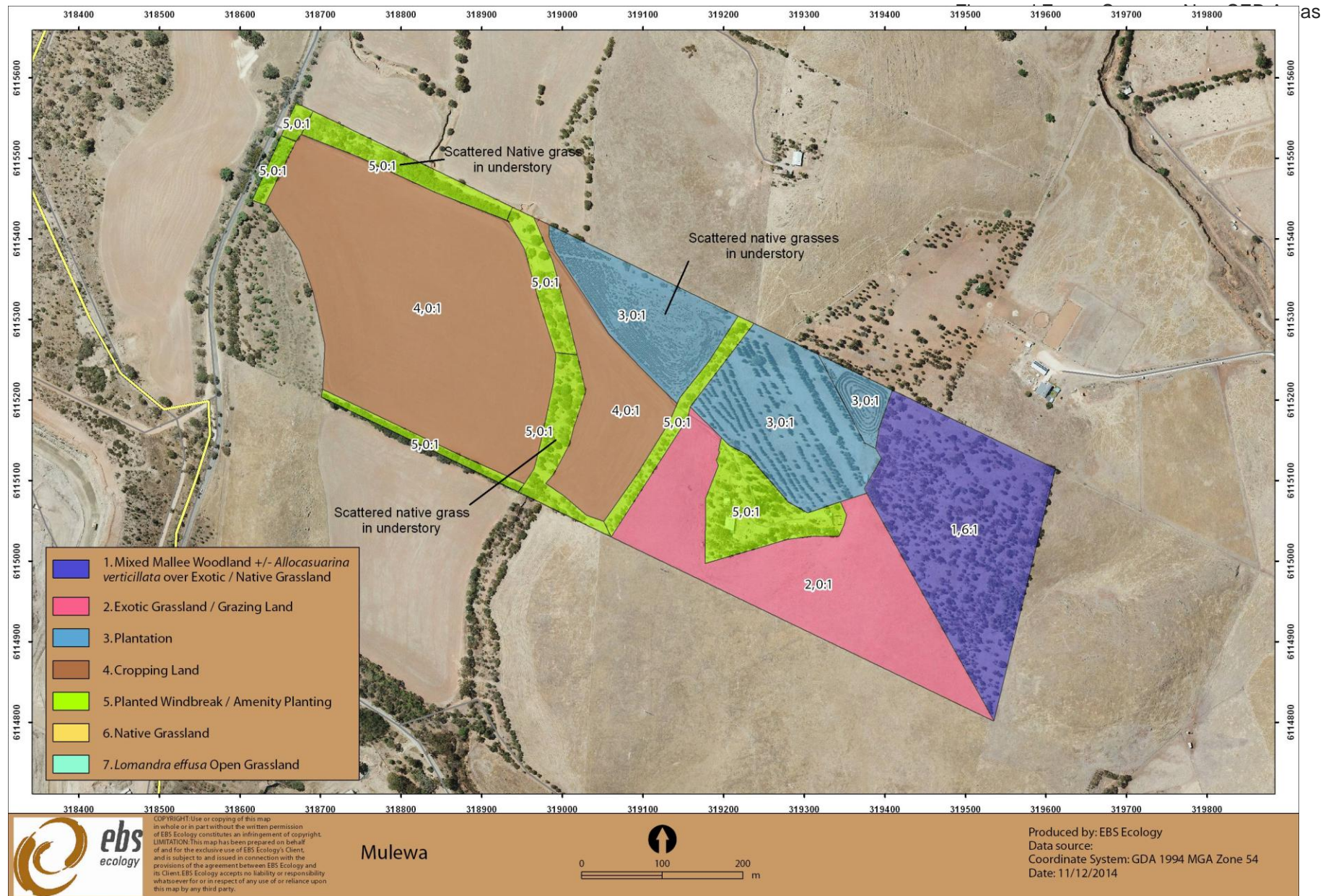


Figure 27. Current vegetation associations of the Mulewa property.

Ferguson

The associations located on the Ferguson properties include an Exotic Grassland (grazing), Cropping Land, Planted Windbreak / Amenity Planting and a Native Grassland (Figures 23, 24 and 25). The majority of the property was in very poor condition except for the Native Grassland which was considered to be in good condition.

The Ferguson property has been split into three different sections. Ferguson one was predominantly an exotic grassland with a small section of cropping land. There were also three areas which had evidence of revegetation of approximately two years of age. There was a stockpile site which was heavily infested with weeds. There were scattered native grasses such as Spear Grass and Wallaby Grass within the property.

Ferguson two was predominantly cropping land and an exotic grassland. Within the exotic grassland there were several patches of native grasses such as Spear Grass and Wallaby Grass. There was also a small patch of scattered *Lomandra effusa* (Scented Mat-rush). The Ferguson two sections also contained an amenity planting undertaken by direct seeding.

Ferguson three was predominantly encompassed by an exotic grassland / grazing land with scattered *Maireana brevifolia* (Short-leaf Bluebush). There was a small patch of native grassland on the property towards the eastern side.

Recommendations

- Remove exotic amenity plantings around the dwelling
- Retain the Planted Windbreaks / Amenity Plantings (revegetation)
- Undertake rabbit control, warren ripping where required
- Undertake weed control where required
- Undertake revegetation of the exotic grassland and the cropping lands within all three sections
- Undertake weed control within the Native Grassland Association
- Undertake regular weed control on the stockpiles within section1

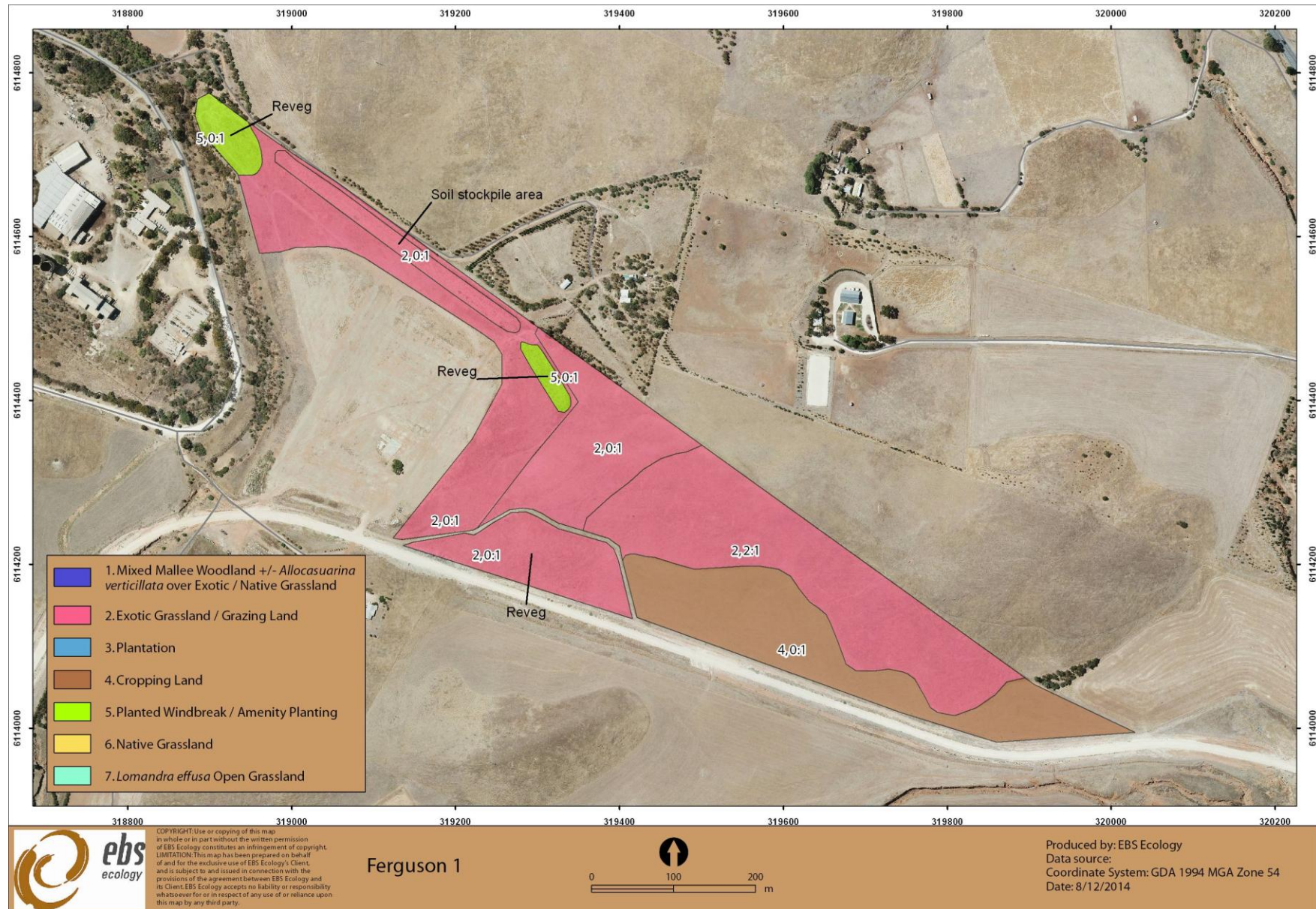


Figure 28. Current vegetation associations and condition of the Ferguson 1 property.

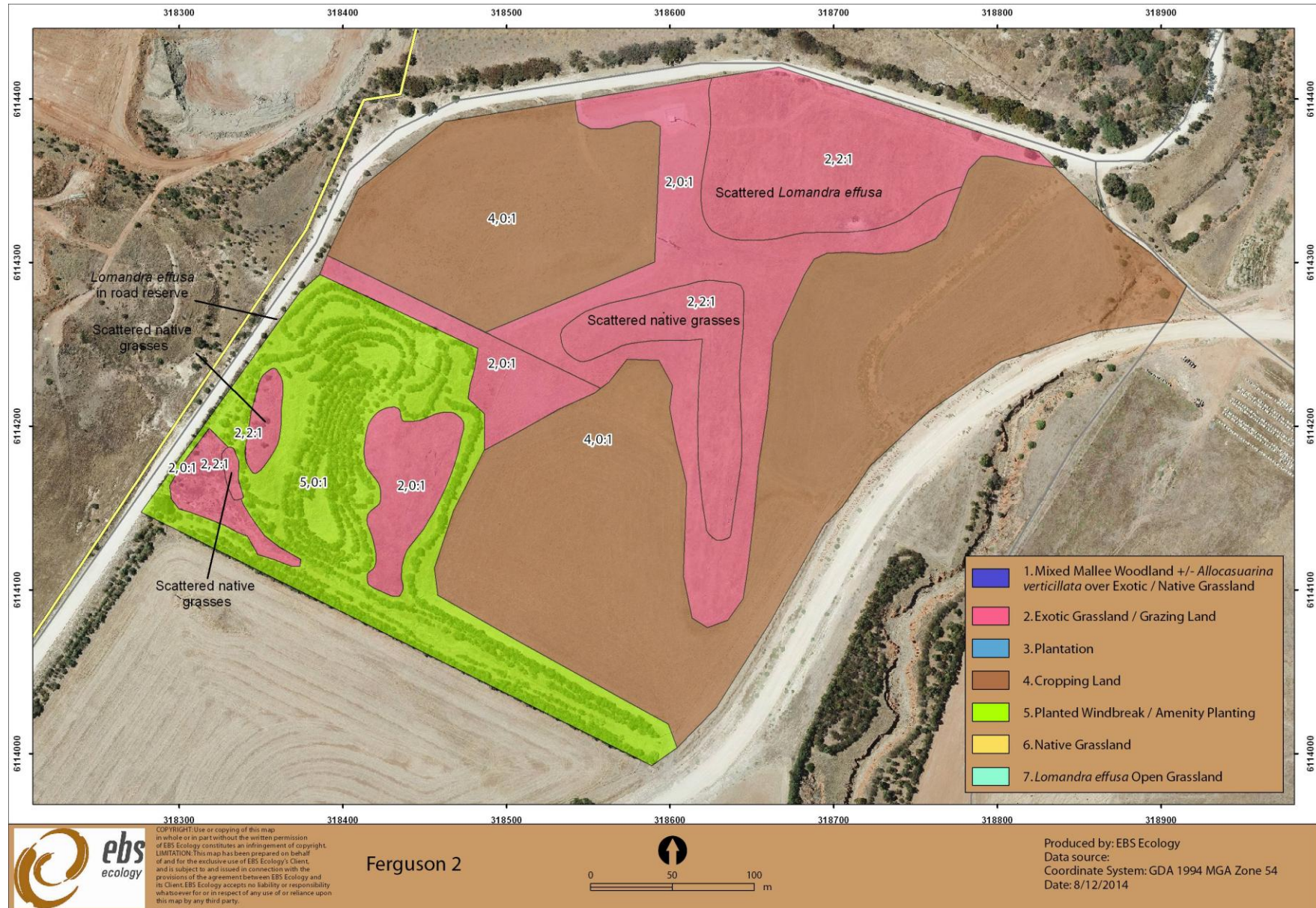


Figure 29. Current vegetation associations and condition of the Ferguson 2 property.

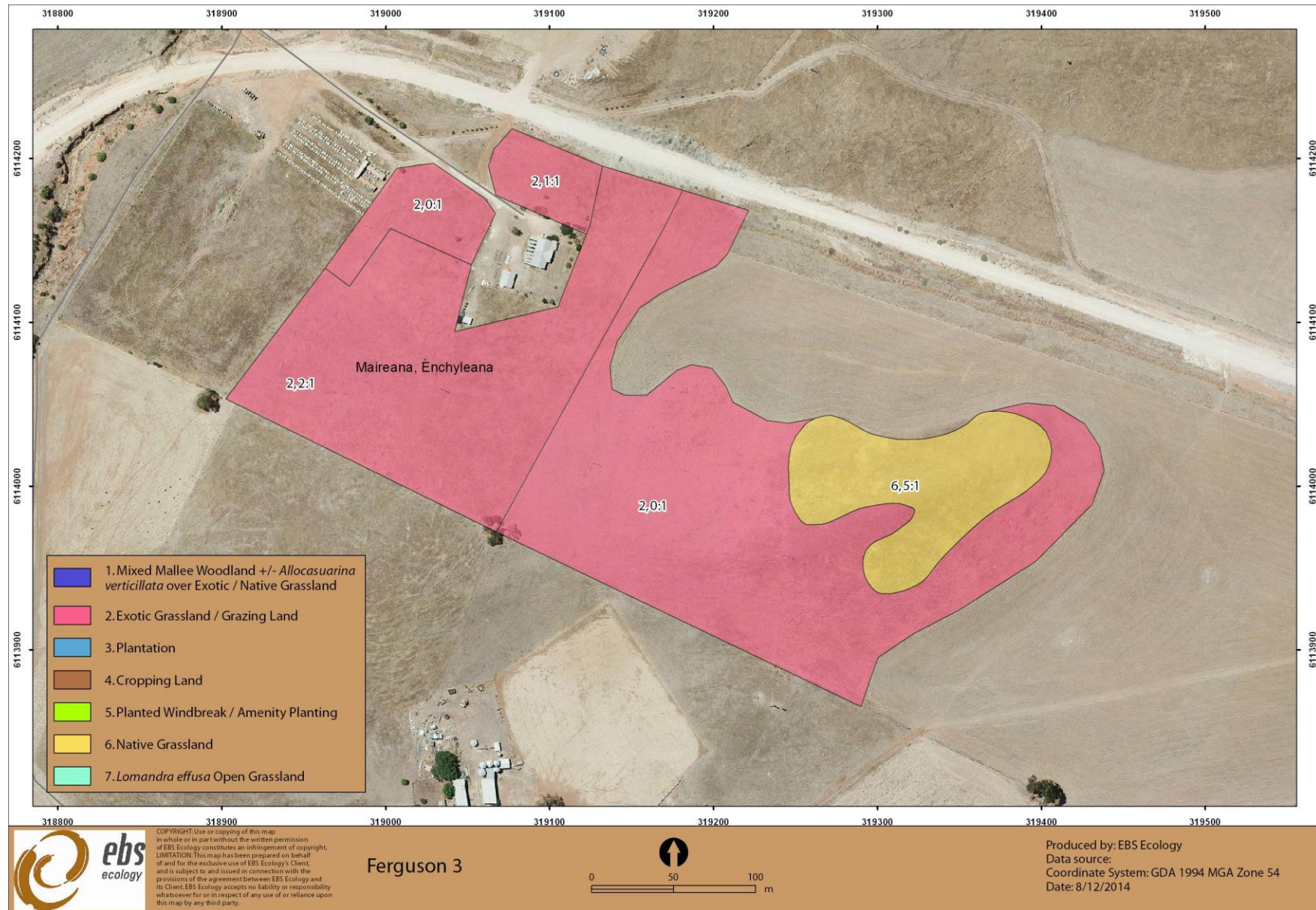


Figure 30. Current vegetation associations and condition of the Ferguson 3 property.

Lot 25

Lot 25 contained several vegetation associations including Exotic Grassland, Planted Windbreak / Amenity Planting, *Lomandra effusa* (Scented Mat-rush) Open Grassland and *Acacia pycnantha* (Golden Wattle) Tall Shrubland (Figure 26). The condition of the vegetation was predominantly very poor with one patch toward the south western end of the property which was of moderate condition.

Several patches of the *Lomandra effusa* Open Grassland was located within this property. This association was located within the mid section of the property and along the roadside. There was a drainage line that ran through the property, toward the north eastern end it was infested with *Cynara cardunculus* ssp. *flavescens* (Artichoke Thistle).

The understorey within the Planted Windbreak consisted of moss and leaf litter, providing habitat for small reptiles and invertebrates. The patch of vegetation in the north-west corner had a mix of overstorey and understorey species, including a good leaf litter cover and moss.

There was a small patch of remnant *Acacia pycnantha* (Golden Wattle) Tall Shrubland. This association was isolated and the understorey was predominantly exotic with some native species persisting.

Recommendations

- Retain the Planted Windbreaks / Amenity Plantings (revegetation)
- Undertake rabbit control, warren ripping where required
- Undertake weed control where required, in particular where *Lomandra effusa* is present
- Eradicate the Artichoke Thistle along the drainage line



Figure 31. Current vegetation associations and condition of Lot 25.

Carmens

The Carmen property was a mix of an Exotic Grassland and Amenity Plantings, the vegetation condition was very poor (Figure 27). There were several native grass and *Acacia pycnantha* patches located within the property. Two Rabbit warrens were located within close proximity to the roadside.

Recommendations

- Retain the Amenity Plantings
- Undertake rabbit control / warren ripping where required
- Undertake weed control where required
- Undertake revegetation of the exotic grassland



Figure 32. Current vegetation associations and condition of the Carmen's property.

6 REFERENCES

Coffey Natural Systems (2009) *Mining and Rehabilitation Program, Main Report - Kanmantoo Copper Project*. Coffey Natural Systems Pty Ltd, Adelaide.

Ecological Associates (2006) *Distribution and status of Brushtail Possums on the Lower Eyre Peninsula following the January 2005 bushfire*. Prepared for the Department for Environment and Heritage.

Pizzey, G. and Knight, F. (1997) *Field Guide to the Birds of Australia*. Angus and Robertson, Sydney.

7 APPENDICES

Appendix 1. Species list for each vegetation association

Species Name	Common Name	Conservation Status		Association							
		AUS	SA	1	2	3	4	5	6	7	8
<i>Acacia argyrophylla</i>	Silver Mulga-bush			✓							
<i>Acacia cyclops</i>	Western Coastal Wattle			✓							
<i>Acacia melanoxylon</i>	Blackwood			✓							
<i>Acacia paradoxa</i>	Kangaroo Thorn			✓							
<i>Acacia pycnantha</i>	Golden Wattle				✓					✓	✓
* <i>Agave sp.</i>	Century Plant							✓			
* <i>Aira sp.</i>	Hair-grass			✓							
<i>Allocasuarina verticillata</i>	Drooping Sheoak			✓	✓						
* <i>Arctotheca calendula</i>	Cape Weed				✓					✓	
<i>Aristida contorta</i>	Curly Wire-grass				✓				✓	✓	
* <i>Asphodelus fistulosus</i>	Onion Weed				✓						
<i>Atriplex semibaccata</i>	Berry Saltbush									✓	
<i>Austrostipa blackii</i>	Crested Spear-grass				✓			✓		✓	
<i>Austrostipa elegantissima</i>	Feather Spear-grass				✓					✓	
<i>Austrostipa scabra ssp.</i>	Rough Spear-grass			✓	✓				✓		
* <i>Avena barbata</i>	Bearded Oat			✓	✓	✓	✓	✓	✓	✓	✓
* <i>Briza minor</i>	Lesser Quaking-grass			✓	✓						
* <i>Bromus diandrus</i>	Great Brome				✓				✓	✓	
<i>Bursaria spinosa ssp. spinosa</i>	Sweet Bursaria			✓							
<i>Callistemon sp.</i>	Bottlebrush										
<i>Callitris gracilis</i>	Southern Cypress Pine			✓		✓		✓			
<i>Chloris sp.</i>	Windmill Grass/Chloris				✓					✓	
<i>Convolvulus remotus</i>	Grassy Bindweed				✓				✓		
<i>Correa glabra var.</i>	Rock Correa			✓							
* <i>Corymbia maculata</i>	Spotted Gum							✓			
* <i>Cynara cardunculus ssp. flavescentis</i>	Artichoke Thistle				✓					✓	
<i>Dianella revoluta var.</i>	Black-anther Flax-lily							✓			
<i>Dodonaea viscosa ssp. spatulata</i>	Sticky Hop-bush			✓							
* <i>Echium plantagineum</i>	Salvation Jane			✓	✓	✓	✓	✓	✓	✓	✓
<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush			✓						✓	✓
<i>Enneapogon nigricans</i>	Black-head Grass			✓	✓				✓	✓	
<i>Eremophila longifolia</i>	Weeping Emubush			✓							
* <i>Erodium botrys</i>	Long Heron's-bill				✓						
<i>Eucalyptus cladocalyx ssp.</i>	Sugar Gum			✓				✓			
<i>Eucalyptus conglobata ssp. conglobata</i>	Port Lincoln Mallee		R*					✓			
<i>Eucalyptus fasciculosa</i>	Pink Gum		R					✓			
<i>Eucalyptus leucoxylon ssp.</i>	South Australian Blue Gum			✓				✓			
<i>Eucalyptus odorata</i>	Peppermint Box			✓				✓			
<i>Eucalyptus porosa</i>	Mallee Box							✓			
<i>Eucalyptus socialis ssp.</i>	Beaked Red Mallee			✓							
<i>Eucalyptus sp.</i>				✓			✓				
* <i>Euphorbia terracina</i>	False Caper				✓			✓		✓	✓
* <i>Ficus carica</i>	Edible Fig							✓			
* <i>Galenia pubescens var. pubescens</i>	Coastal Galenia			✓	✓					✓	
<i>Glycine sp.</i>	Glycine				✓						
* <i>Glycyrrhiza glabra</i>	Liquorice								✓		
* <i>Gomphocarpus cancellatus</i>	Broad-leaf Cotton-bush			✓	✓					✓	

Species Name	Common Name	Conservation Status		Association							
		AUS	SA	1	2	3	4	5	6	7	8
<i>Haloragis aspera</i>	Rough Raspwort				✓						
* <i>Hordeum vulgare</i>	Barley			✓	✓	✓	✓	✓		✓	
* <i>Hypochaeris glabra</i>	Smooth Cat's Ear			✓	✓					✓	
* <i>Hypochaeris radicata</i>	Rough Cat's Ear								✓		
<i>Juncus flavidus</i>	Yellow Rush				✓					✓	
* <i>Lolium sp.</i>	Ryegrass			✓						✓	
<i>Lomandra effusa</i>	Scented Mat-rush				✓			✓		✓	✓
<i>Lomandra micrantha ssp.</i>	Small-flower Mat-rush				✓			✓		✓	
<i>Lomandra multiflora ssp. dura</i>	Hard Mat-rush			✓							
* <i>Lycium ferocissimum</i>	African Boxthorn				✓						
<i>Maireana brevifolia</i>	Short-leaf Bluebush				✓					✓	
<i>Maireana enchylaenoides</i>	Wingless Fissure-plant								✓	✓	
* <i>Malva sp.</i>	Mallow				✓						
* <i>Marrubium vulgare</i>	Horehound				✓						
<i>Melaleuca lanceolata</i>	Dryland Tea-tree			✓							
<i>Melaleuca uncinata</i>	Broombush					✓					
<i>Myoporum platycarpum ssp.</i>	False Sandalwood							✓			
* <i>Nicotiana glauca</i>	Tree Tobacco			✓						✓	
* <i>Olea europaea ssp. europaea</i>	Olive							✓			
* <i>Opuntia sp.</i>	Prickly Pear				✓	✓					
* <i>Oxalis pes-caprae</i>	Soursob				✓						
* <i>Pinus radiata</i>	Radiata Pine							✓			
<i>Pittosporum angustifolium</i>	Native Apricot			✓							
<i>Ptilotus parvifolius</i>	Small-leaf Mulla Mulla				✓						
<i>Ptilotus sp.</i>	Mulla Mulla				✓				✓	✓	
<i>Ptilotus spathulatus</i>	Pussy-tails			✓						✓	
<i>Rhagodia sp.</i>	Saltbush			✓							
<i>Rhodanthe floribunda</i>	White Everlasting				✓					✓	
* <i>Rosa canina</i>	Dog Rose			✓	✓						
<i>Rytidosperma caespitosum</i>	Common Wallaby-grass			✓	✓			✓	✓		
<i>Rytidosperma setaceum</i>	Small-flower Wallaby-grass			✓						✓	
<i>Rytidosperma tenuius</i>	Short-awn Wallaby-grass		R					✓			
<i>Salsola australis</i>	Buckbush				✓						
* <i>Salvia verbenaca var.</i>	Wild Sage							✓		✓	
<i>Santalum acuminatum</i>	Quandong			✓							
* <i>Scabiosa atropurpurea</i>	Pincushion				✓						
* <i>Schinus molle</i>	Pepper-tree			✓	✓	✓					
<i>Senecio sp.</i>	Groundsel							✓			
<i>Senna sp.</i>	Senna			✓							
* <i>Sisymbrium erysimoides</i>	Smooth Mustard				✓						
* <i>Sisymbrium sp.</i>	Wild Mustard				✓				✓		
* <i>Trifolium arvense var. arvense</i>	Hare's-foot Clover			✓	✓	✓				✓	
* <i>Trifolium repens</i>	White Clover			✓	✓						
* <i>Trifolium sp.</i>	Clover			✓	✓			✓	✓		
* <i>Triticum aestivum</i>	Wheat				✓						
<i>Vittadinia cuneata var.</i>	Fuzzy New Holland Daisy				✓						
<i>Vittadinia gracilis</i>	Woolly New Holland Daisy				✓				✓		
* <i>Vulpia myuros f.</i>	Fescue							✓			
<i>Wahlenbergia sp.</i>	Native Bluebell								✓		



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