School of Science & Engineering

AIREYS INLET BUSHLAND RESERVE

FLORA AND FAUNA SURVEY AND VEGETATION QUALITY ASSESSMENT

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Aireys Inlet Bushland Reserve

Flora and Fauna Survey and Vegetation Quality Assessment

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CONTENTS

1. INTRODUCTION 1

1.1 Project background 1

1.2 Aims 1

1.3 Study area 1

2. METHODS 3

2.1 Database and literature review 3

2.2 Field survey 3

2.2.1 Flora 3

2.2.2 Vegetation quality assessment 3

2.2.3 Fauna 4

3. FLORA AND VEGETATION QUALITY 7

3.1 Ecological Vegetation Classes 7

3.1.1 Existing EVC mapping 7

3.1.2 EVCs observed in the study area 7

3.1.3 Significant EVCs 8

3.2 Flora 8

3.2.1 Existing database records 8

3.2.2 Flora recorded from the study area 8

3.2.3 Potential habitat for significant flora 9

3.3 Vegetation quality assessment 10

4. FAUNA 12

4.1.1 Existing database records 12

4.1.2 Fauna recorded from the study area 12

4.1.3 Potential habitat for significant fauna 14

5. DISCUSSION 15

5.1.1 Aireys Inlet Bushland Reserve values 15

REFERENCES 17

Appendix 1. Vascular Flora Recorded From the Study Area 18

Appendix 2. Vascular Flora Recorded at Aireys Inlet Bushland Reserve 22

Appendix 3. Completed Habitat Hectare field sheet for Aireys Inlet Bushland Reserve 25

Appendix 4. Fauna Recorded From the Study Area 27

Appendix 5. Fauna Recorded From Aireys Inlet Bushland Reserve 30

Tables

Table 1 Summary table of Habitat Hectare assessment for Aireys Inlet Bushland Reserve. 11

Figures

Figure 1-1 A mounded earth motorbike ramp which has been constructed within the reserve. 2
Figure 1-2 Section of reserve adjoining Boundary Road that has been recently slashed 2
Figure 2-1 Example of a harp trap set-up used to survey bats within Aireys Inlet Bushland Reserve. 5
Figure 3-1 Typical vegetation occurring at Aireys Inlet Bushland Reserve 7
Figure 3-2 Hyacinth-orchid *Dipodium* spp. 9
Figure 3-3 Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea) 9
Figure 4-1 Chocolate Wattled Bat *Chalinolobus morio* 13
Figure 4-2 Sulphur-crested Cockatoo *Cacatua galerita* 14

Maps

Map 1 Location of Aireys Inlet Bushland Reserve, Aireys Inlet, Victoria 32
Map 2 Trap site locations for field survey of Aireys Inlet Bushland Reserve 33
Map 3 Records of Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea) 34
Map 4 Location of large trees (>60 cm dbh) in Aireys Inlet Bushland Reserve 35

1. INTRODUCTION

1.1 Project background

In December 2005, the Centre for Environmental Management (CEM) was commissioned by the Department of Sustainability and Environment (DSE) to undertake a survey of the flora and fauna values of the Aireys Inlet Bushland Reserve (Crown Allotment 19J, Parish of Angahook), Aireys Inlet. The 2.3 ha Aireys Inlet Bushland Reserve is an area of remnant vegetation on the outer fringes of the Aireys Inlet township (Map 1).

1.2 Aims

The objective of this project was to conduct a flora and fauna survey of the Aireys Inlet Bushland Reserve. The aims of the project were to:

- Identify the occurrence of any species and communities that are significant at a state (listed on DSE Advisory list for Flora and Fauna or listed under the *Flora and Fauna Guarantee* Act (Vic)) or national level (listed under the *Environment Protection and Biodiversity Conservation Act* (Commonwealth)).
- Identify the ecological vegetation classes present.
- Assess the habitat quality of the reserve based on the completion of a Habitat Hectares assessment.

1.3 Study area

The 2.3 ha Aireys Inlet Bushland Reserve is a Crown land reserve located on the outskirts of the Victorian coastal town of Aireys Inlet (Map 1). The study area falls within the Otway Plain bioregion.

The reserve is bounded by Boundary Road to the south, Gilbert Street to the east and private land on the north and west sides (Map 1). The land surrounding the reserve has retained much of its native tree cover and is contiguous with the Great Otway National Park, which is north of the bushland reserve. Many of the private land parcels in the vicinity of the reserve contain dwellings but retain native tree cover.

The vegetation of the study area has previously been mapped as EVC 16 Lowland Forest and EVC 21 Shrubby Dry Forest and (DSE Interactive Maps – www.dse.vic.gov.au; Accessed January 2006).

The reserve includes a minor vehicle track and an informal walking track. At the time of survey, the vehicle track had recently been slashed. Both tracks show evidence of use by motorbike riders and an earthen motorbike ramp of considerable size has been constructed, including the excavation of earth, along the vehicle track (Figure 1-1). The road frontages adjoining the reserve have recently been slashed and it is apparent that this is an ongoing management action. This activity has encroached on those parts of the reserve that adjoin the road reserve (Figure 1-2).

Figure 1-1 A mounded earth motorbike ramp which has been constructed within the reserve.

Figure 1-2 Section of reserve adjoining Boundary Road that has been recently slashed

2. METHODS

2.1 Database and literature review

The Department of Sustainability and Environment's (DSE) Ecological Vegetation Class (EVC) mapping (www.dse.vic.gov.au - Biodiversity Interactive Map; Accessed January 2006) was reviewed to determine the EVCs likely to occur within the study area and their bioregional conservation status.

The Victorian Flora Information System (FIS) (DSE 2004a) was examined for flora records within one kilometre of the study area. Records were filtered to a locational accuracy of ≤2' longitude/latitude. Previous surveys of the site conducted by Steve McDougall (DSE South West) in 2004 were also used.

The Atlas of Victorian Wildlife (AVW) (DSE 2004b) was examined for fauna records within one kilometre of the study area. Records were filtered to a locational accuracy of ≤2' longitude/latitude.

The AVW and FIS databases contain the most complete accessible Victorian data on *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Flora and Fauna Guarantee Act 1988* (FFG Act) listed species, as well as threatened species within Victoria.

2.2 Field survey

A field survey of the flora and fauna of the Aireys Inlet Bushland Reserve was conducted during 19-21 December 2005.

2.2.1 Flora

A flora survey of the reserve was undertaken in conjunction with the Habitat Hectare assessment (see below).

Flora species were recorded during systematic traverses of the whole site (2.3 ha). The EVC(s) mapped for the site were validated using EVC descriptions for the region (CVRFASC 2000) along with observations made on-site.

Targeted searches for potential significant species were conducted during the systematic traverses of the site. Potential significant species were identified from FIS records and previous flora surveys of the site. Significant species included flora that are considered to be rare or threatened under Schedule 1 of the *Flora and Fauna Guarantee Act 1988* (Vic), on the Department of Sustainability and Environment's advisory list of rare or threatened species (DSE 2005) and/or species protected by the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).

Incidental observations of flora were recorded during all assessments undertaken within the reserve.

For the purposes of reporting, introduced flora have been identified throughout the report with an asterisk (*). The term 'weed' throughout this report refers to an introduced species.

Flora species identification predominantly followed Walsh and Entwistle (1994; 1996; 1999). Flora names follow those used in the Flora Information System (DSE 2004a).

2.2.2 Vegetation quality assessment

The quality of the vegetation at the site was assessed using the Habitat Hectare method as outlined in the Vegetation Quality Assessment Manual (DSE 2004c).

Due to the small size of the reserve, it was possible to achieve complete coverage of the site when undertaking the assessment.

Prior to undertaking the habitat hectare assessment an inspection of the site was conducted to identify any variation in habitat condition or vegetation composition. The purpose of this exercise was to determine the number of habitat zones within the reserve requiring separate Habitat Hectare assessments.

2.2.3 Fauna

A thorough survey of the study area was undertaken to identify vertebrate fauna that occupy or utilise the site including birds, mammals and herpetofauna. The fauna survey included the following techniques:

Terrestrial mammal trapping

A trap grid comprising five north-south transects was established to survey terrestrial small mammals occurring within the reserve (Map 2). Each transect comprised ten Elliott traps (33 cm x 10 cm x 9 cm) and one cage trap located 7-10 m apart. Traps were baited with a standard mixture of peanut butter, rolled oats and honey.

Traps were open between the afternoon of 19 December and the morning of 21 December. Traps were checked within one hour of sunrise on each day.

Spotlighting

Spotlight searches for nocturnal fauna were conducted on the nights of 19 December and 20 December. The existing track network was traversed giving an adequate coverage of the reserve. Between 45-60 minutes of spotlighting was conducted on each night. All fauna seen or heard was recorded.

Harp traps

Four harp traps were used to sample bats occurring within the reserve (Map 2). Harp traps were located on existing tracks which provided suitable flyways for bats (Figure 2-1). These traps were in operation on the nights of 19 and 20 December. Each trap was checked between 1-2 hours after sunset and within one hour of sunrise.

Any bats caught during the early night trap round were identified and released at the point of capture. Individuals caught during the dawn round were placed in calico bags and housed in a suitable location for the day before being identified and released at the point of capture on nightfall.

Figure 2-1 Example of a harp trap set-up used to survey bats within Aireys Inlet Bushland Reserve.

Diurnal bird surveys

A complete area search of the reserve was conducted on the mornings of 20 and 21 December. This encompassed a 40-minute search of the entire reserve, recording all birds seen or heard including those species in the areas surrounding the reserve.

Systematic herpetofauna searching

A systematic search of potential reptile and amphibian habitats was undertaken within the reserve on 19 and 20 December. Potential habitats included leaf litter, woody debris, decorticating bark, hollows and basking sites. There were no water bodies or surface water present in the reserve at the time of survey. All fauna seen was recorded.

Opportunistic sightings

Opportunistic sightings of all fauna observed while surveying within the reserve were recorded. Observations of tracks, scratchings, burrows and scats were also recorded.

The location of any threatened species observed was noted. Threatened species included fauna that are considered to be threatened under Schedule 1 of the *Flora and Fauna Guarantee Act 1988* (Victoria), on the Department of Sustainability and Environment's advisory list of threatened species (DSE 2003) and/or species protected by the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).

Fauna names follow those used in the Atlas of Victorian Wildlife (DSE 2004b).

Limitations

The survey was conducted in early summer, when many plant species had finished flowering and fruiting. Readily observable material of some annuals or geophytes (e.g. orchids, lilies, forbs) would not have been present. Therefore, while sufficient data was collected to describe the vegetation and habitat present, the survey did not constitute an exhaustive species search. However, when combined with previous flora information from the site, a detailed account of the flora species present is presented.

The fauna survey also had several limitations that should be considered when interpreting results. The results of the fauna survey represent only a brief snapshot

of the fauna likely to be present at the site. The small amount of time spent, and area investigated, during the fauna survey may not have been adequate to detect rare, cryptic, migratory or wide-ranging species. The results, while not exhaustive, do provide a representative account of the fauna present at the site.

3. FLORA AND VEGETATION QUALITY

3.1 Ecological Vegetation Classes

3.1.1 Existing EVC mapping

Existing ecological vegetation classes (EVC) mapping showed the reserve to predominantly support EVC 16 Lowland Forest (Biodiversity Interactive Map - www.dse.vic.gov.au; Accessed January 2006). There is also a small area of EVC 21 Shrubby Dry Forest mapped for the southwest corner of the reserve.

EVC 16 Lowland Forest is listed as depleted in the Otway Plain bioregion. EVC 21 Shrubby Dry Forest is listed as being of Least Concern in the Otway Plain bioregion (DSE Interactive Maps – www.dse.vic.gov.au; Accessed January 2006).

3.1.2 EVCs observed in the study area

The present vegetation survey of the Aireys Inlet Bushland Reserve supported an earlier assessment of this site (Steve McDougall, DSE South West) as being a vegetation community that represents a transition of EVC 21 Shrubby Dry Forest into EVC 16 Lowland Forest (Figure 3-1). Identification of vegetation communities was aided by descriptions in CVRFASC (2000).

Figure 3-1 Typical vegetation occurring at Aireys Inlet Bushland Reserve

Key elements of both EVCs are present across the site. The overstorey vegetation is an open forest up to 20 m in height and dominated by Messmate *Eucalyptus obliqua*, with Narrow-leaf Peppermint *Eucalyptus radiata* and Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea) prominent. A dense tall and medium shrub layer of Prickly Moses *Acacia verticillata,* Varnish Wattle *Acacia verniciflua* and Prickly Teatree *Leptospermum continentale* is present. A dense ground stratum dominated by large and medium tufted graminoids including Thatch Saw-sedge *Gahnia radula*, Common Rapier-sedge *Lepidosperma filiforme* and Wattle Mat-rush *Lomandra filiformis* occurs, which is a characteristic feature of EVC 21 Shrubby Dry Forest. Other common species in the ground stratum include Trailing Goodenia *Goodenia lanata*, Common Flat-pea *Platylobium obtusangulum* and grasses including Kangaroo Grass *Themeda triandra*, *Austrodanthonia* sp. and *Austrostipa* sp. Appendix 2 lists the flora species recorded from this site.

At the time of survey, the reserve was relatively free of weeds. A single *Boneseed *Chrysanthemoides monilifera* was observed in the slashed area along Gilbert Street.

The vegetation of the reserve more closely resembled the benchmark description for EVC 21 Shrubby Dry Forest and therefore, for the purposes of the Habitat Hectare assessment, the entire reserve has been treated as this EVC.

3.1.3 Significant EVCs

The Shrubby Dry Forest EVC observed within the study area, or any of its components, are not listed as a threatened ecological community under the EPBC Act or the FFG Act.

3.2 Flora

3.2.1 Existing database records

There were no existing records of flora in the FIS for the Aireys Inlet Bushland Reserve. Within one kilometre of the reserve, the FIS contains existing records of 164 flora species (Appendix 1). This includes 129 indigenous species, two non-indigenous native species and 33 introduced species (Appendix 1).

EPBC Act listed flora

One flora species listed as vulnerable under the EPBC Act, Spiral Sun-orchid *Thelymitra matthewsii*, has been recorded within one kilometre of the reserve. This species is also listed under the FFG Act and is listed as vulnerable in Victoria.

FFG Act listed flora

The Spiral Sun-orchid *Thelymitra matthewsii* is the only flora species listed under the FFG Act that has been recorded within one kilometre of the reserve (see above).

Victorian rare or threatened flora (DSE 2005)

Existing FIS records from within one kilometre of the Aireys Inlet Bushland Reserve contain two species included on the Advisory List of Rare or Threatened Plants in Victoria (DSE 2005) — Spiral Sun-Orchid *Thelymitra matthewsii*, which is considered to be vulnerable in Victoria and Wine-lipped Spider-orchid *Caladenia oenochila*, which is considered to be vulnerable in Victoria.

3.2.2 Flora recorded from the study area

A total of 58 flora species were confirmed as present during the field survey of the reserve — 56 indigenous species and two introduced species (Appendix 2). A further 37 indigenous species had previously been recorded within the reserve (from the list compiled by Steve McDougall (DSE South West) in 2004).

Figure 3-2 Hyacinth-orchid *Dipodium* spp.

Significant flora

Only one significant flora species was recorded during the survey. The Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea) is listed as vulnerable in Victoria (DSE 2005) and was found throughout the reserve (Figure 3-3). The location of Otway Grey-gum individuals found in the reserve is shown on Map 3.

Figure 3-3 Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea)

3.2.3 Potential habitat for significant flora

The Aireys Inlet Bushland Reserve provides potentially suitable habitat for the Spiral Sun-orchid *Thelymitra matthewsii*. This species favours open forests and woodlands in well-drained sand and clay loams. It is a post-disturbance coloniser that is usually found in open areas around old quarries and gravel pits, on road verges, disused tracks and animal trails (Bishop 2000). The species has not been recorded within the reserve.

The Aireys Inlet Bushland Reserve also provides potentially suitable habitat for the Wine-lipped Spider-orchid *Caladenia oenochila*. This species occurs near the coast in mixed eucalypt forests with a dense shrubby or grassy understorey (Bishop 2000). The species has not been recorded within the reserve.

3.3 Vegetation quality assessment

As described in section 3.1.2, the vegetation community present on the reserve is a transition community between EVC 21 Shrubby Dry Forest and EVC 16 Lowland Forest. For the purposes of the vegetation quality assessment using the Habitat Hectare method, it was determined that the vegetation community present most closely resembled the benchmark description for EVC 21 Shrubby Dry Forest. Therefore, this is the benchmark the reserve was assessed against. The completed Habitat Hectare field sheet for the Aireys Inlet Bushland Reserve is presented in Appendix 3.

The Shrubby Dry Forest within the reserve supports high quality native vegetation with a high diversity of species and lifeforms, most of which are not substantially modified. The reserve supports a healthy cover of canopy trees, with many large trees (>60 cm dbh, n = 39 large trees) present (Map 4). Understorey lifeforms are mostly (12 of 13) present and unmodified. Only Bryophytes/Lichens and Soil crust could be considered as substantially modified. There is evidence of adequate recruitment for most (>70%) native woody species present. The reserve is relatively free of weeds. Both organic litter cover and logs are at levels consistent with the EVC benchmark (Appendix 3).

In a landscape context, the reserve is contiguous with a large patch of native vegetation that is significantly disturbed according to the Regional Forest Agreement Old Growth definition (DSE 2004c). The amount and configuration of native vegetation within proximity of the reserve (i.e. neighbourhood) varies with distance. Within the immediate proximity of the reserve (100 m radius) the proportion of native vegetation cover is high, approximately 80%. Within 1 km radius native vegetation cover drops to 40%, mostly attributable to clearings associated with Aireys Inlet township and farming land to the west. At a landscape scale (5 km radius) native vegetation cover is approximately 80%. Neighbourhood native vegetation is significantly disturbed according to the Regional Forest Agreement Old Growth definition (Appendix 3).

Vegetation quality of the site was assessed as having a habitat score of 0.86. Therefore, the amount of habitat hectares comprising the reserve totals 2.01 habitat hectares (Habitat score x Reserve area).

The conservation significance of the reserve is medium as determined from Victoria's Native Vegetation Management Framework (NRE 2002). It is important to recognise that the conservation significance of this site could be considered 'High' if other significant attributes are identified as outlined in Appendix 3, Table 5 of the Framework (NRE 2002). Possible attributes beyond the scope of this study include:

- sites identified as being of state significance for relictual, endemic, edge of range or other species values;
- areas identified as providing refuges for rare species;
- priority areas for the establishment of habitat for a threatened species.

Table 1 Summary table of Habitat Hectare assessment for Aireys Inlet Bushland Reserve.

Site Name			**Aireys Inlet bushland Reserve**
EVC Name			**Shrubby Dry Forest***
EVC Number			**EVC 21**
		Max Score	
Site Condition	Large Old Trees	10	10
	Canopy Cover	5	5
	Lack of Weeds	15	15
	Understorey	25	20
	Recruitment	10	10
	Organic Litter	5	5
	Logs	5	5
Landscape context	Patch Size	10	8
	Neighbourhood	10	4
	Distance to Core	5	4
Habitat score		**100**	**86**
Habitat score/100		1	0.86
Reserve area			**2.34 ha**
Habitat Hectares			**2.01**
Bioregion			Otway Plain
EVC conservation status			Least concern
Conservation significance			Medium
No. of large trees in reserve			39

4. FAUNA

4.1.1 Existing database records

There were no existing fauna records for the Aireys Inlet Bushland Reserve contained within the AVW (DSE 2004b). The AVW contained records of 97 fauna species occurring within one kilometre of the Aireys Inlet Bushland Reserve. This includes 67 birds (63 native species and four introduced species), 22 mammals (19 native species and three introduced species), five reptiles and three frogs (Appendix 4).

EPBC Act listed fauna

One fauna species listed as endangered under the EPBC Act, the Southern Brown Bandicoot *Isoodon obesulus obesulus*, has been recorded within one kilometre of the reserve. This species is listed as near threatened in Victoria (DSE 2003).

FFG Act listed fauna

Four species listed under the FFG Act have been recorded within one kilometre of the Aireys Inlet Bushland Reserve; Lewin's Rail *Rallus pectoralis* (also listed as vulnerable in Victoria), Hooded Plover *Thilornis rubricollis* (also listed as vulnerable in Victoria), Rufous Bristlebird *Dasyornis broadbenti* (also listed as near threatened in Victoria) and Swamp Antechinus *Antechinus minimus* (also listed as near threatened in Victoria).

Victorian threatened fauna (DSE 2003)

A total of eight species included on the Advisory list of Threatened Vertebrate Fauna in Victoria (DSE 2003) have been recorded within one kilometre of the reserve. These are:

- Lewin's Rail *Rallus pectoralis* (listed as vulnerable in Victoria)
- Latham's Snipe *Gallinago hardwickii* (near threatened)
- Hooded Plover *Thilornis rubricollis* (vulnerable)
- Pacific Gull *Larus pacificus* (near threatened)
- Rufous Bristlebird *Dasyornis broadbenti* (near threatened)
- Swamp Antechinus *Antechinus minimus* (near threatened)
- White-footed Dunnart *Sminthopsis leucopus* (vulnerable)
- Southern Brown Bandicoot *Isoodon obesulus obesulus* (near threatened)

4.1.2 Fauna recorded from the study area

A total of 42 vertebrate fauna species were recorded at Aireys Inlet Bushland Reserve during the field survey (Appendix 5). This included 30 bird species (including one introduced species), nine mammals (including one introduced species) and three reptiles.

Terrestrial small mammal trapping resulted in no captures and there were no other small mammal observations during the field survey. However, the reserve contained high quality native vegetation (see section above) with a complex understorey relatively free of weeds that should provide suitable habitat for a range of small mammals.

Four bat species were recorded during the field survey (Appendix 5). Three species were captured in harp traps including Little Forest Bat *Vespadelus vulturnus* (one female, one male), Chocolate Wattled Bat *Chalinolobus morio* (one male, one female) (Figure 4-1) and Lesser Long-eared Bat *Nyctophilus geoffroyi* (one male).

The White-striped Freetail Bat *Tadarida australis* was heard flying above the canopy at night during spotlighting.

Figure 4-1 Chocolate Wattled Bat *Chalinolobus morio*

Two mammal species (in addition to White-striped Freetail Bat) were observed while spotlighting. The Common Ringtail Possum *Pseudocheirus peregrinus* (at least six individuals) was the only aboreal mammal species recorded during the field survey. A single Swamp Wallaby *Wallabia bicolor* was also observed while spotlighting.

Other mammal species recorded by indirect means included Eastern Grey Kangaroo *Macropus giganteus* (scats), Short-beaked Echidna *Tachyglossus aculeatus* (diggings) and the introduced Red Fox *Canis vulpes* (scats).

Thirty bird species were observed within the reserve during the field survey (Appendix 5). Commonly observed species included White-eared Honeyeater *Lichenostomus leucotis* (breeding), Sacred Kingfisher *Todiramphus sanctus* (breeding), Sulphur-crested Cockatoo *Cacatua galerita* (Figure 4-2), Spotted Pardalote *Pardalotus punctatus*, Superb Fairy-wren *Malurus cyaneus* and White-throated Treecreeper *Corombates leucophaeus*.

Reptile species recorded during the field survey included two skinks, Blotched Blue-tongued Lizard *Tiliqua nigrolutea* and an unidentified *Lampropholis* sp. A single snake, the Common Copperhead *Austrelaps superbus*, was observed basking along the mown track.

Figure 4-2 Sulphur-crested Cockatoo *Cacatua galerita*

Significant fauna

None of the fauna species recorded during the survey (Appendix 5) are listed as threatened in Australia or Victoria. Two bird species, the Painted Button-quail and Brown-headed Honeyeater are woodland-dependent species included in the Victorian temperate-woodland bird community which is listed as threatened in Victoria under the *Flora and Fauna Guarantee Act.*

4.1.3 Potential habitat for significant fauna

The Aireys Inlet Bushland Reserve provides potentially suitable habitat for a number of significant species including the EPBC Act listed Southern Brown Bandicoot *Isoodon obesulus obesulus*, the FFG Act listed Swamp Antechinus *Antechinus minimus* and Rufous Bristlebird *Dasyornis broadbenti*, and the White-footed Dunnart *Sminthopsis leucopus*, which is considered vulnerable in Victoria (DSE 2003). The habitat preferences of these species include forest and woodland habitats with diverse natural understoreys similar to that observed within the reserve.

Several of the significant species recorded from the vicinity of the Aireys Inlet Bushland Reserve are coastal or aquatic species that would not occur within the reserve. These include Lewin's Rail *Rallus pectoralis*, Latham's Snipe *Gallinago hardwickii*, Hooded Plover *Thinornis rubricollis* and Pacific Gull *Larus pacificus*.

5. DISCUSSION

5.1.1 Aireys Inlet Bushland Reserve values

The Aireys Inlet Bushland Reserve supports diverse and high quality habitat. The vegetation present is a transition community between EVC 21 Shrubby Dry Forest and EVC 16 Lowland Forest. EVC 21 Shrubby Dry forest has a conservation status of Least Concern in the Otway Plain and EVC 16 Lowland forest has a bioregional EVC status of Depleted (DSE Interactive Maps – www.dse.vic.gov.au; Accessed January 2006). The reserve supports vegetation of high quality that is relatively free of weeds and therefore provides an excellent example of an intact remnant of this vegetation association in the Otway Plain bioregion.

It is important to note that in conducting the vegetation quality assessment using the Habitat Hectare method, a decision was made to use the benchmark for EVC 21 Shrubby Dry Forest in the absence of a benchmark specific to the transition community. Following an inspection of the site, the benchmark description for EVC 21 Shrubby Dry Forest was determined to most closely align with the majority of habitat present within the reserve.

The reserve attained a high habitat score (0.86) using the Habitat Hectares vegetation quality assessment (DSE 2004c). The habitat rated very highly for the site condition component of the assessment indicating that high quality habitat is present at the site level (i.e. within Aireys Inlet Bushland Reserve). This includes representative cover of large trees, tree canopy, understorey life forms, organic litter and logs, evidence of species recruitment amongst woody species and a lack of weeds. In a landscape context, the reserve is part of a large patch that is significantly disturbed (see DSE (2004c) for definition). The amount of native vegetation surrounding the reserve is variable, but is as high as 80% (range = 40%–80% within 5 km radius).

The reserve may provide important habitat for significant flora species. The Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea), listed as vulnerable in Victoria, is present throughout the reserve (Map 3). This taxon is restricted to small areas within the Otway region and its occurrence within the reserve provides some protection for this local population. The reserve provides potentially suitable habitat for other significant flora species recorded within the vicinity of the reserve including Spiral Sun-orchid *Thelymitra matthewsii* (listed as vulnerable under the EPBC Act) and Wine-lipped Spider-orchid *Caladenia oenochila* (listed as vulnerable in Victoria) which occur in open forest environments. The Aireys Inlet area in general is known to provide habitat for a rich and diverse community of orchid species (Steve McDougall DSE South West).

The fauna recorded from the reserve is typical of that occurring in forest and woodland habitats in the Otway region. Most major fauna groups were represented including birds, mammals and reptiles. The lack of small mammal captures was surprising but may be an artefact of limited survey effort or the timing of the field survey. The habitat available would be expected to provide potentially suitable habitat for small mammals recorded previously in the vicinity of the reserve (Appendix 3) including the Southern Brown Bandicoot *Isoodon obesulus obesulus* (listed as endangered under the EPBC Act), Swamp Antechinus *Antechinus minimus* (listed under the FFG Act), Agile Antechinus *Antechinus agilis* and Bush Rat *Rattus fuscipes.*

A key feature of the reserve was the relatively high number of large old trees with hollows which are located throughout the reserve (Map 4). These trees are predominantly Messmate *Eucalyptus obliqua*, but also include Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea). These trees provide an important hollow resource for hollow-dependent fauna including Sacred Kingfisher

Todiramphus sanctus (observed utilising hollow for breeding in reserve), White-throated Treecreeper *Corombates leucophaeus*, Australian Owlet-nightjar *Aegotheles cristatus*, Little Forest Bat *Vespadelus vulturnus*, Lesser Long-eared Bat *Nyctophilus geoffroyi* and Common Ringtail Possum *Pseudocheirus peregrinus*.

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Appendix 1. Vascular Flora Recorded From the Study Area

Existing database records

The table below is a list of vascular flora species records contained in the FIS database (DSE 2004a) from sites within one kilometre of the Aireys Inlet Bushland Reserve.

Key to codes:

* = introduced species

= non-indigenous native species (usually planted)

Conservation status:

EPBC Environment Protection and Biodiversity Conservation Act 1999

E = endangered V = Vulnerable

FFG Flora and Fauna Guarantee Act 1988

L = listed as threatened under the Act

Advisory List of Rare or Threatened Plants in Victoria (DSE 2005)

c = critically endangered e = endangered v = vulnerable n = near threatened

Family		Species name	Common name
Ferns and fern allies			
Dennstaedtiaceae		*Pteridium esculentum*	Austral Bracken
Monocotyledons			
Anthericaceae		*Chamaescilla corymbosa* var. *corymbosa*	Blue Stars
		Arthropodium strictum s.l.	Chocolate Lily
		Thysanotus patersonii	Twining Fringe-lily
Cyperaceae		*Baumea tetragona*	Square Twig-sedge
		Carex appressa	Tall Sedge
		Isolepis fluitans	Floating Club-sedge
		Isolepis inundata	Swamp Club-sedge
		Eleocharis sphacelata	Tall Spike-sedge
		Gahnia radula	Thatch Saw-sedge
		Lepidosperma concavum	Sandhill Sword-sedge
		Lepidosperma filiforme	Common Rapier-sedge
		Lepidosperma semiteres	Wire Rapier-sedge
		Gahnia filum	Chaffy Saw-sedge
Iridaceae	*	*Romulea rosea*	Onion Grass
	*	*Sisyrinchium* spp.	Sisyrinchium
Juncaceae	*	*Juncus bulbosus*	Bulbous Rush
		Juncus holoschoenus	Joint-leaf Rush
		Juncus pauciflorus	Loose-flower Rush
		Juncus planifolius	Broad-leaf Rush
		Juncus procerus	Tall Rush
		Juncus pallidus	Pale Rush
Juncaginaceae		*Triglochin procera* s.l.	Water Ribbons
		Triglochin striata	Streaked Arrowgrass
Orchidaceae		*Acianthus caudatus*	Mayfly Orchid
		Diuris orientis	Wallflower Orchid
		Corunastylis morrisii	Bearded Midge-orchid
		Pterostylis longifolia s.l.	Tall Greenhood
		Pterostylis nutans	Nodding Greenhood
		Thelymitra antennifera	Rabbit Ears
	VvL	*Thelymitra matthewsii*	Spiral Sun-orchid
		Thelymitra rubra	Salmon Sun-orchid
		Pterostylis sanguinea	Banded Greenhood
		Pterostylis parviflora s.s.	Tiny Greenhood
		Pterostylis sp. aff. *revoluta*	Large Autumn Greenhood
		Caladenia parva	Small Spider-orchid

Family		Species name	Common name
		Pterostylis concinna	Trim Greenhood
	v	*Caladenia oenochila*	Wine-lipped Spider-orchid
Phormiaceae		*Dianella revoluta* var. *revoluta* s.l.	Black-anther Flax-lily
Poaceae		*Lachnagrostis filiformis*	Common Blown-grass
		Amphibromus archeri	Pointed Swamp Wallaby-grass
		Amphibromus recurvatus	Dark Swamp Wallaby-grass
	*	*Avena strigosa*	Bristle Oat
		Austrodanthonia caespitosa	Common Wallaby-grass
	*	*Holcus lanatus*	Yorkshire Fog
		Austrodanthonia setacea	Bristly Wallaby-grass
		Deyeuxia quadriseta	Reed Bent-grass
		Poa clelandii	Noah's Ark
		Austrostipa mollis	Supple Spear-grass
		Austrostipa pubinodis	Tall Spear-grass
		Themeda triandra	Kangaroo Grass
		Joycea lepidopoda	Scaly-foot Wallaby-grass
		Poa sieberiana var. sieberiana	Grey Tussock-grass
	*	*Vulpia* spp.	Fescue
	*	*Bromus catharticus*	Prairie Grass
	*	*Cynosurus echinatus*	Rough Dog's-tail
	*	*Lolium perenne*	Perennial Rye-grass
		Microlaena stipoides var. stipoides	Weeping Grass
	*	*Pennisetum clandestinum*	Kikuyu
	*	*Poa annua*	Annual Meadow-grass
		Poa labillardierei	Common Tussock-grass
Xanthorrhoeaceae		*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush
		Xanthorrhoea australis	Austral Grass-tree
		Lomandra nana	Dwarf Mat-rush
		Lomandra micrantha subsp. *micrantha*	Small-flower Mat-rush
Dicotyledons			
Apiaceae		*Centella cordifolia*	Centella
		Lilaeopsis polyantha	Australian Lilaeopsis
		Xanthosia pusilla spp. agg.	Heath Xanthosia
	*	*Conium maculatum*	Hemlock
Asteraceae	*	*Vellereophyton dealbatum*	White Cudweed
		Brachyscome uliginosa	Small Swamp-daisy
		Argentipallium obtusifolium	Blunt Everlasting
		Helichrysum scorpioides	Button Everlasting
	*	*Hypochoeris radicata*	Cat's Ear
	*	*Chrysanthemoides monilifera* subsp. *monilifera*	African Boneseed
	*	*Arctotheca calendula*	Cape Weed
	*	*Cirsium vulgare*	Spear Thistle
		Senecio spp.	Groundsel
Brunoniaceae		*Brunonia australis*	Blue Pincushion
Caryophyllaceae	*	*Cerastium glomeratum* s.l.	Common Mouse-ear Chickweed
Casuarinaceae		*Allocasuarina misera*	Slender Sheoak
Convolvulaceae		*Dichondra repens*	Kidney-weed
Dilleniaceae		*Hibbertia riparia*	Erect Guinea-flower
		Hibbertia sericea vars. *densiflora/sericea*	Silky Guinea-flower
Droseraceae		*Drosera whittakeri* subsp. *aberrans*	Scented Sundew
Epacridaceae		*Acrotriche serrulata*	Honey-pots
		Astroloma humifusum	Cranberry Heath
		Epacris impressa	Common Heath
		Leucopogon virgatus	Common Beard-heath
		Monotoca scoparia	Prickly Broom-heath
Fabaceae	*	*Lotus subbiflorus*	Hairy Bird's-foot Trefoil
		Daviesia brevifolia	Leafless Bitter-pea
		Dillwynia glaberrima	Smooth Parrot-pea
		Dillwynia sericea	Showy Parrot-pea
		Gompholobium ecostatum	Dwarf Wedge-pea
		Hovea heterophylla	Common Hovea
		Kennedia prostrata	Running Postman
		Platylobium obtusangulum	Common Flat-pea

Family		Species name	Common name
		Pultenaea humilis	Dwarf Bush-pea
	*	*Lotus corniculatus*	Bird's-foot Trefoil
	*	*Medicago polymorpha*	Burr Medic
	*	*Trifolium repens* var. *repens*	White Clover
	*	*Trifolium subterraneum*	Subterranean Clover
Gentianaceae	*	*Centaurium erythraea*	Common Centaury
	*	*Erodium cicutarium*	Common Heron's-bill
		Geranium potentilloides	Cinquefoil Cranesbill
		Geranium solanderi s.l.	Austral Cranesbill
Goodeniaceae		*Goodenia geniculata*	Bent Goodenia
		Goodenia lanata	Trailing Goodenia
Haloragaceae		*Myriophyllum amphibium*	Broad Water-milfoil
		Myriophyllum simulans	Amphibious Water-milfoil
		Gonocarpus tetragynus	Common Raspwort
Malvaceae		*Malva* spp.	Mallow
Menyanthaceae		*Villarsia reniformis*	Running Marsh-flower
Mimosaceae		*Acacia myrtifolia*	Myrtle Wattle
		Acacia suaveolens	Sweet Wattle
		Acacia melanoxylon	Blackwood
		Acacia verticillata	Prickly Moses
		Acacia pycnantha	Golden Wattle
Myoporaceae	#	*Myoporum insulare*	Common Boobialla
Myrtaceae		*Leptospermum continentale*	Prickly Tea-tree
		Melaleuca squarrosa	Scented Paperbark
		Eucalyptus obliqua	Messmate Stringybark
		Leptospermum myrsinoides	Heath Tea-tree
		Eucalyptus viminalis subsp. *viminalis*	Manna Gum
		Eucalyptus ovata	Swamp Gum
Oxalidaceae		*Oxalis exilis*	Shady Wood-sorrel
	*	*Oxalis pes-caprae*	Soursob
Pittosporaceae		*Bursaria spinosa* subsp. *spinosa*	Sweet Bursaria
	#	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae	*	*Plantago coronopus*	Buck's-horn Plantain
	*	*Plantago lanceolata*	Ribwort
Polygonaceae	*	*Acetosella vulgaris*	Sheep Sorrel
		Rumex brownii	Slender Dock
Portulacaceae		*Neopaxia australasica*	White Purslane
Primulaceae	*	*Anagallis arvensis*	Pimpernel
Proteaceae		*Banksia marginata*	Silver Banksia
		Hakea ulicina	Furze Hakea
		Isopogon ceratophyllus	Horny Cone-bush
		Lomatia ilicifolia	Holly Lomatia
		Persoonia juniperina	Prickly Geebung
Rhamnaceae		*Cryptandra tomentosa*	Prickly Cryptandra
		Spyridium parvifolium	Dusty Miller
Rosaceae		*Acaena novae-zelandiae*	Bidgee-widgee
	*	*Rubus fruticosus* spp. agg.	Blackberry
		Rubus parvifolius	Small-leaf Bramble
Rubiaceae		*Opercularia varia*	Variable Stinkweed
Scrophulariaceae		*Gratiola peruviana*	Austral Brooklime
Solanaceae	*	*Lycium ferocissimum*	African Box-thorn
Stackhousiaceae		*Stackhousia monogyna*	Creamy Stackhousia
Thymelaeaceae		*Pimelea humilis*	Common Rice-flower
		Pimelea octophylla	Woolly Rice-flower
Tremandraceae		*Tetratheca ciliata*	Pink-bells

Family		Species name	Common name
Urticaceae	*	*Urtica urens*	Small Nettle
Violaceae		*Viola hederacea* sensu Willis (1972)	Ivy-leaf Violet

Appendix 2. Vascular Flora Recorded at Aireys Inlet Bushland Reserve

Field survey records

The table below lists the flora species recorded at the Aireys Inlet Bushland Reserve during the survey conducted by the CEM (December 2005) and Steve McDougall and others (October-November 2004).

Key to codes:

* = introduced species

a = Flora species recorded by CEM December 2005

b = Flora species recorded by Steve McDougall (DSE South West), Evelyn Jones, Margaret MacDonald October-November 2004

Conservation status:

EPBC Environment Protection and Biodiversity Conservation Act 1999

E = endangered V = Vulnerable

FFG Flora and Fauna Guarantee Act 1988

L = listed as threatened under the Act

Advisory List of Rare or Threatened Plants in Victoria (DSE 2005)

c = critically endangered e = endangered v = vulnerable n = near threatened

Family	Species name	Common name	Source
Ferns and fern allies			
Dennstaedtiaceae	*Pteridium esculentum*	Austral Bracken	a, b
Lindsaeaceae	*Lindsaea linearis*	Screw Fern	a, b
Monocotyledons			
Anthericaceae	*Thysanotus patersonii*	Twining Fringe-lily	a, b
	Thysanotus juncifolius	Branching Fringe-lily	b
	Thysanotus tuberosus	Common fringe-lily	a
	Laxmannia orientalis	Wire-lily	b
Centrolepidaceae	*Centrolepis* spp.	Centrolepis	b
Colchicaceae	*Burchardia umbellata*	Milkmaids	a, b
Cyperaceae	*Gahnia radula*	Thatch Saw-sedge	a, b
	Lepidosperma filiforme	Common Rapier-sedge	a, b
Iridaceae	*Patersonia occidentalis*	Long Purple-flag	b
Orchidaceae	*Acianthus* spp.	Mosquito or Mayfly Orchid	a
	Pterostylis melagramma.	Tall Greenhood	b
	Dipodium spp.	Hyacinth-orchid	a
	Thelymitra pauciflora	Salmon Sun-orchid	b
	Thelymitra ixioides	Spotted Sun-orchid	b
	Thelymitra juncifolia	Rush-leaf Sun-orchid	b
	Thelymitra sp. aff. *pauciflora* (Peppertop)	Peppertop Sun-orchid	b
	Thelymitra flexuosa	Twisted Sun-orchid	b
	Pterostylis sanguinea	Banded Greenhood	b
	Caladenia transitoria	Eastern Bronzehood	b
	Corybas unguiculatus	Small Pelican-orchid	b
	Leptoceras menziesii	Hare orchid	b
Phormiaceae	*Dianella revoluta* var. *revoluta* s.l.	Black-anther Flax-lily	a
	Dianella admixta	Black anther Flax-lily	b
	Dianella brevicaulis	Coast Flax-lily	b
Poaceae	*Deyeuxia minor*	Small Bent-grass	a, b
	Tetrahena distichophylla	Hairy Rice-grass	b
	Austrostipa spp.	Spear-grass	a

Family		Species name	Common name	Source
		Austrostipa spp.	Spear-grass	a
		Austrodanthonia spp.	Wallaby-grass	a
		Austrodanthonia spp.	Wallaby-grass	a
		Themeda triandra	Kangaroo Grass	a, b
	*	*Aira* spp.	Hair Grass	a
		Microlaena stipoides var. stipoides	Weeping Grass	a
Xanthorrhoeaceae		*Xanthorrhoea minor* ssp. *lutea*	Small Grass-tree	a, b
		Lomandra filiformis var. *coriaceae*	Wattle Mat-rush	a, b
		Lomandra filiformis var. *filiforme*	Wattle Mat-rush	b
Dicotyledons				
Apiaceae		*Hydrocotyle* spp.	Pennywort	b
Asteraceae		*Brachyscome uliginosa*	Small Swamp-daisy	b
		Brachyscome multifida	Cut-leaf Daisy	a, b
		Helichrysum scorpioides	Button Everlasting	a, b
	*	*Chrysanthemoides monilifera* subsp. *monilifera*	African Boneseed	a
		Microseris sp. 3	Yam Daisy	b
Boraginaceae		*Cynoglossum sauveolens*	Sweet Hound's-tongue	b
Campanulaceae		*Wahlenbergia* spp.	Bluebell	a
		Wahlenbergia stricta subsp. *stricta*	Tall Bluebell	b
Clusiaceae		*Hypericum gramineum*	Small St John's Wort	a
Dilleniaceae		*Hibbertia riparia*	Erect Guinea-flower	a, b
		Hibbertia sericea vars. *densiflora/sericea*	Silky Guinea-flower	a, b
		Drosera peltata subsp. *auriculata*	Tall Sundew	b
Epacridaceae		*Acrotriche serrulata*	Honey-pots	a, b
		Astroloma humifusum	Cranberry Heath	a, b
		Epacris impressa	Common Heath	a, b
Euphorbiaceae		*Poranthera microphylla*	Small Poranthera	b
Fabaceae		*Bossiaea prostrata*	Creeping Bossiaea	a, b
		Dillwynia cinerascens	Grey Parrot-pea	b
		Sphaerolobium minus	Eastern Globe-pea	b
		Gompholobium ecostatum	Dwarf Wedge-pea	a, b
		Platylobium obtusangulum	Common Flat-pea	a, b
		Pultenaea daphnoides	Large-leaf Bush-pea	a
Goodeniaceae		*Goodenia geniculata*	Bent Goodenia	a, b
		Goodenia lanata	Trailing Goodenia	a, b
Lauraceae		*Cassytha glabella*	Slender Dodder-laurel	a, b
		Cassytha melantha	Coarse Dodder-laurel	a, b
		Cassytha pubescens s.s	Downy Dodder-laurel	a, b
Mimosaceae		*Acacia verniciflua*	Varnish Wattle	a, b
		Acacia pradoxa	Hedge Wattle	a, b
		Acacia longifolia subsp. *sophorae*	Coast Wattle	a
		Acacia verticillata	Prickly Moses	a, b
		Acacia pycnantha	Golden Wattle	a, b
Myrtaceae		*Leptospermum continentale*	Prickly Tea-tree	a, b
		Eucalyptus obliqua	Messmate Stringybark	a, b
		Leptospermum myrsinoides	Heath Tea-tree	b
		Eucalyptus radiata	Narrow-leaf Peppermint	a, b
	v	*Eucalyptus* sp. aff. *cypellocarpa (Anglesea)*	Otway Grey-gum	a, b
		Eucalyptus tricarpa	Red Ironbark	a, b
Pittosporaceae		*Billardiera scandens* var. *scandens*	Common Apple-berry	a, b
Plantaginaceae		*Plantago varia*	Variable Plaintain	b
Polygalaceae		*Comesperma volubile*	Love creeper	b
Proteaceae		*Banksia marginata*	Silver Banksia	a, b
		Isopogon ceratophyllus	Horny Cone-bush	a, b
		Persoonia juniperina	Prickly Geebung	a, b

Family	Species name	Common name	Source
Rhamnaceae	*Pomaderris ferruginea*	Rusty Pomaderris	a
	Spyridium parvifolium	Dusty Miller	a
Rosaceae	*Aceana agnipila*	Hairy Sheep's Burr	b
Rubiaceae	*Opercularia varia*	Variable Stinkweed	a
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell	b
Stackhousiaceae	*Stackhousia monogyna*	Creamy Stackhousia	b
Stylidiaceae	*Stylidium armeria*	Common Triggerplant	b
Thymelaeaceae	*Pimelea humilis*	Common Rice-flower	a, b
	Pimelea octophylla	Woolly Rice-flower	b
	Pimelea linifolia subsp. *linifolia*	Slender Rice-flower	a, b
Violaceae	*Viola hederacea* sensu Willis (1972)	Ivy-leaf Violet	b
	Viola cleistogamoides	Hidden Violet	b

Appendix 3. Completed Habitat Hectare field sheet for Aireys Inlet Bushland Reserve

Vegetation Quality Field Assessment Sheet

Version 1.3 - October 2004

Department of Sustainability and Environment

Site Name/No. AIREYS INLET BUSHLAND RES. Location AIREYS INLET Date 19 DEC 2005

Assessor(s) M.GIBSON & G.PALMER Map Name/No. GDA 94 AMG 247679 / 5740351

Tenure CROWN LAND EVC EVC 21 SHRUBBY DRY FOREST Bioregion OTWAY PLAIN

'Site Condition Score'

Large Trees — Score: 10

Category & Description	% Canopy Health*		
	> 70%	30-70%	< 30%
None present	0	0	0
> 0 to 20% of the benchmark number of large trees/ha	3	2	1
> 20% to 40% of the benchmark number of large trees/ha	4	3	2
> 40% to 70% of the benchmark number of large trees/ha	6	5	4
> 70% to 100% of the benchmark number of large trees/ha	8	7	6
≥ the benchmark number of large trees/ha	(10)	9	8

Large trees are defined by diameter at breast height (dbh) - see EVC benchmark.

* Estimate proportion of an expected healthy canopy cover that is present (i.e. not missing due to tree death or decline, or mistletoe infestation).

Tree Canopy Cover — Score: 5

Category & Description	% Canopy Health *		
	> 70%	30-70%	< 30%
< 10% of benchmark cover	0	0	0
< 50% or > 150% of benchmark cover	3	2	1
≥ 50% or ≤ 150% of benchmark cover	(5)	4	3

Tree canopy is defined as those canopy tree species reaching ≥ 80% of mature height - see EVC benchmark description.

* Estimate proportion of an expected healthy canopy cover that is present (i.e. not missing due to tree death or decline, or mistletoe infestation).

Lack of Weeds — Score: 15

Category & Description	'high threat' weeds*		
	None	≤ 50%	> 50%
> 50% cover of weeds	4	2	0
25 - 50% cover of weeds	7	6	4
5 - 25% cover of weeds	11	9	7
< 5% cover of weeds**	(15)	13	11

* proportion of weed cover due to 'high threat' weeds - see EVC benchmark for guide.

'High threat' weed species are defined as those introduced species (including non-indigenous 'natives') with the ability to out-compete and substantially reduce one or more indigenous life forms in the longer term assuming on-going current site characteristics and disturbance regime.

The EVC benchmark lists typical weed species for the EVC in the bioregion and provides an estimate of their 'invasiveness' and 'impact'. In general, those weed species considered to have a *high impact* are considered *high threat* regardless of their invasiveness.

** if total weed cover is negligible (<1%) and high threat weed species are present then score '13'.

Understorey Life forms

LF Code from EVC benchmark	# spp observed / Benchmark spp.	% cover observed / Benchmark % cover	Present (✓)	Modified (✓)
IT	1	5 / 5	✓	
T	– / 1	– / 5		
MS	5 / 5	30 / 25	✓	
SS	3 / 2	1 / 1	✓	
PS	1 / 1	1 / 1	✓	
MH	2 / 3	2 / 5	✓	
SH	1 / 2	1 / 1	✓	
LTG	1 / 2	15 / 10	✓	
MTG	7 / 4	12 / 10	✓	
GF	1 / 1	2 / 1	✓	
SC	2 / 3	2 / 5	✓	
BL	1	2 / 10	✓	✓
S/C	1	1 / 10	✓	✓
	1	1		
	1	1	12/13	2/12
	1	1		

Present

For life forms with benchmark cover of < 10%, considered 'present' if
- any specimens are observed.

For life forms with benchmark cover of ≥ 10%, considered 'present' if
- the life form occupies at least 10% of benchmark cover.

Modified (apply only where life form is 'present')

For life forms with benchmark cover of <10%, then considered substantially 'modified' if the life form has either:
- < 50% of the benchmark species diversity; or
- no reproductively-mature specimens are observed.

For life forms with benchmark cover of ≥ 10%, then considered substantially 'modified' if the life form has either:
- < 50% of benchmark cover; or
- < 50% of benchmark species diversity; or
- ≥ 50% of benchmark cover due largely to immature canopy specimens but the cover of reproductively-mature specimens is < 10% of the benchmark cover.

Understorey — Score: 20

Category & Description		
All strata and lifeforms effectively absent		0
Up to 50% of life forms present		5
≥ 50% to 90% of lifeforms present	• of those present, ≥ 50% substantially modified	10
	• of those present, < 50% substantially modified	15
≥ 90% of lifeforms present	• of those present, ≥ 50% substantially modified	15
	• of those present, < 50% substantially modified	(20)
	• of those present, none substantially modified	25

Victoria The Place To Be

AIBR01

Vegetation Quality Field Assessment Sheet

Version 1.3 October 2004

Recruitment — Score: 10

Category & Description			High diversity**	Low diversity**
No evidence of a recruitment 'cohort'+	within EVC not driven by episodic events		0	0
	within EVC driven by episodic events^	clear evidence of appropriate episodic event	0	0
		no clear evidence of appropriate episodic event	5	5
Evidence of at least one recruitment 'cohort' in at least one life-form	proportion of native woody species present that have adequate recruitment°	< 30%	3	1
		30 - 70%	6	3
		≥ 70%	(10)	5

+ 'cohort' refers to a group of woody plants established in a single episode (can include suppressed canopy species individuals).

^ refer to EVC benchmark for clarification.

° treat multiple eucalypt canopy species as one species.

* high diversity defined as ≥ 50% of benchmark woody species diversity.

Species Recruitment

Woody species recorded in habitat zone	Adequate Recruitment (✓)
Eucalypt canopy (combined species)	✓
Banksia marginata	✓
Leptospermum continentale	✓
Acacia verticillata	✓
Hibbertia spp.	✓
Platylobium obtusangulum	✓
Epacaris impressa	✓
Pultenea daphnoides	X
Acacia verniciflua	X
Acacia pycnantha	X
number of woody spp. in EVC benchmark (SS and taller)	11

Organic Litter — Score: 5

Category & Description	Dominated by native organic litter	Dominated by non-native organic litter
< 10% of benchmark cover	0	0
< 50% or > 150% of benchmark cover	3	2
≥ 50% or ≤ 150% of benchmark cover	(5)	4

Logs — Score: 5

Category & Description	Large logs present*	Large logs absent#
< 10% of benchmark length	0	0
< 50% of benchmark length	3	2
≥ 50% of benchmark length	(5)	4

Large logs defined as those with diameter ≥ 0.5 of benchmark large tree dbh.

* present if large log length is ≥ 25% of EVC benchmark log length.

absent if large log length is < 25% of EVC benchmark log length.

'Landscape Context Score'

Patch Size — Score: 8

Category & Description	
< 2 ha	1
Between 2 and 5 ha	2
Between 5 and 10 ha	4
Between 10 and 20 ha	6
≥ 20 ha, but 'significantly disturbed'*	(8)
≥ 20 ha, but not 'significantly disturbed'*	10

* 'significantly disturbed' defined as per RFA 'Old Growth' analyses eg. roading, coupes, grazing etc. – effectively most patches within fragmented landscapes.

Distance to Core Area — Score: 4

Distance	Core Area not significantly disturbed*	Core Area significantly disturbed*
> 5 km	0	0
1 to 5 km	2	1
< 1 km	4	3
contiguous	5	(4)

* defined as per RFA 'Old Growth' analyses.

Neighbourhood — Score: 4

Radius from site	% Native vegetation*	Weighting	
100 m	80	0.03	2.4
1 km	40	0.04	1.6
5 km	80	0.03	2.4
	subtract 2 if the neighbourhood is 'significantly disturbed'		-2
		Add Values and 'round-off'	4

* to nearest 20%.

Multiply % native vegetation x Weighting for each radius from the zone (eg. 40% x 0.03 = 1.2); then add values to obtain final Neighbourhood Value.

Final Habitat Score

	'Site Condition Score'							'Landscape Context Score'			
Component	Large Trees	Tree Canopy Cover	Lack of Weeds	Understorey	Recruitment	Organic Litter	Logs	Patch Size	Neighbourhood	Distance to Core Area	**Total** 100
Score	10	5	15	20	10	5	5	8	4	4	86

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Appendix 4. Fauna Recorded From the Study Area

Existing database records

The table below lists fauna species recorded in the Atlas of Victorian Wildlife (DSE 2004b) from sites within one kilometre of the Aireys Inlet Bushland Reserve.

Key to codes:

* = introduced species

Conservation status:

EPBC Environment Protection and Biodiversity Conservation Act 1999

E = endangered V = Vulnerable

FFG Flora and Fauna Guarantee Act 1988

L = listed as threatened under the Act

Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2003)

c = critically endangered e = endangered v = vulnerable n = near threatened

Family		Species name	Common name
Birds			
Anatidae		*Chenonetta jubata*	Australian Wood Duck
		Anas superciliosa	Pacific Black Duck
		Anas gracilis	Grey Teal
Sulidae		*Morus serrator*	Australasian Gannet
Phalacrocoracidae		*Phalacrocorax melanoleucos*	Little Pied Cormorant
Ardeidae		*Egretta novaehollandiae*	White-faced Heron
Falconidae		*Falco cenchroides*	Nankeen Kestrel
Rallidae	vL	*Rallus pectoralis*	Lewin's Rail
		Gallinula tenebrosa	Dusky Moorhen
		Porphyrio porphyrio	Purple Swamphen
Scolopacidae	n	*Gallinago hardwickii*	Latham's Snipe
Charadriidae		*Vanellus miles*	Masked Lapwing
	vL	*Thinornis rubricollis*	Hooded Plover
Laridae		*Larus novaehollandiae*	Silver Gull
	n	*Larus pacificus*	Pacific Gull
Columbidae		*Phaps chalcoptera*	Common Bronzewing
	*	*Streptopelia chinensis*	Spotted Turtle-Dove
Cacatuidae		*Calyptorhynchus funereus*	Yellow-tailed Black-Cockatoo
		Callocephalon fimbriatum	Gang-gang Cockatoo
		Cacatua galerita	Sulphur-crested Cockatoo
		Cacatua roseicapilla	Galah
Psittacidae		*Alisterus scapularis*	Australian King-Parrot
		Platycercus elegans	Crimson Rosella
Cuculidae		*Cacomantis flabelliformis*	Fan-tailed Cuckoo
Apodidae		*Hirundapus caudacutus*	White-throated Needletail
Halcyonidae		*Dacelo novaeguineae*	Laughing Kookaburra
Climacteridae		*Cormobates leucophaeus*	White-throated Treecreeper
Maluridae		*Malurus cyaneus*	Superb Fairy-wren
Pardalotidae		*Acanthiza lineata*	Striated Thornbill
		Acanthiza nana	Yellow Thornbill
		Acanthiza pusilla	Brown Thornbill

Family		Species name	Common name
		Acanthiza reguloides	Buff-rumped Thornbill
		Acanthiza chrysorrhoa	Yellow-rumped Thornbill
		Sericornis frontalis	White-browed Scrubwren
	nL	*Dasyornis broadbenti*	Rufous Bristlebird
		Pardalotus punctatus	Spotted Pardalote
Meliphagidae		*Melithreptus lunatus*	White-naped Honeyeater
		Acanthorhynchus tenuirostris	Eastern Spinebill
		Lichenostomus virescens	Singing Honeyeater
		Lichenostomus leucotis	White-eared Honeyeater
		Lichenostomus penicillatus	White-plumed Honeyeater
		Phylidonyris pyrrhoptera	Crescent Honeyeater
		Phylidonyris novaehollandiae	New Holland Honeyeater
		Anthochaera chrysoptera	Little Wattlebird
		Anthochaera carunculata	Red Wattlebird
Petroicidae		*Petroica multicolor*	Scarlet Robin
		Eopsaltria australis	Eastern Yellow Robin
Pachycephalidae		*Pachycephala pectoralis*	Golden Whistler
		Pachycephala olivacea	Olive Whistler
		Colluricincla harmonica	Grey Shrike-thrush
Dicruridae		*Rhipidura fuliginosa*	Grey Fantail
		Rhipidura leucophrys	Willie Wagtail
		Grallina cyanoleuca	Magpie-lark
Artamidae		*Strepera graculina*	Pied Currawong
		Strepera versicolor	Grey Currawong
		Gymnorhina tibicen	Australian Magpie
Corvidae		*Corvus coronoides*	Australian Raven
		Corvus mellori	Little Raven
Ptilonorhynchidae		*Ptilonorhynchus violaceus*	Satin Bowerbird
Passeridae		*Neochmia temporalis*	Red-browed Finch
	*	*Passer domesticus*	House Sparrow
Hirundinidae		*Hirundo neoxena*	Welcome Swallow
Sylviidae		*Megalurus gramineus*	Little Grassbird
Zosteropidae		*Zosterops lateralis*	Silvereye
Muscicapidae		*Zoothera lunulata*	Bassian Thrush
	*	*Turdus merula*	Common Blackbird
Sturnidae	*	*Sturnus vulgaris*	Common Starling
Mammals			
Dasyuridae		*Antechinus agilis*	Agile Antechinus
	nL	*Antechinus minimus*	Swamp Antechinus
	v	*Sminthopsis leucopus*	White-footed Dunnart
Peramelidae	nE	*Isoodon obesulus obesulus*	Southern Brown Bandicoot
		Perameles nasuta	Long-nosed Bandicoot
Pseudocheiridae		*Pseudocheirus peregrinus*	Common Ringtail Possum
Petauridae		*Petaurus breviceps*	Sugar Glider
Phascolarctidae		*Phascolarctos cinereus*	Koala
Macropodidae		*Wallabia bicolor*	Black Wallaby
		Macropus giganteus	Eastern Grey Kangaroo
Molossidae		*Tadarida australis*	White-striped Freetail Bat
Vespertilionidae		*Nyctophilus gouldi*	Gould's Long-eared Bat
		Nyctophilus geoffroyi	Lesser Long-eared Bat
		Chalinolobus gouldii	Gould's Wattled Bat
		Chalinolobus morio	Chocolate Wattled Bat
		Falsistrellus tasmaniensis	Eastern False Pipistrelle
		Vespadelus vulturnus	Little Forest Bat
Muridae		*Rattus fuscipes*	Bush Rat

Family		Species name	Common name
		Rattus lutreolus	Swamp Rat
	*	*Rattus rattus*	Black Rat
	*	*Mus musculus*	House Mouse
Leporidae	*	*Oryctolagus cuniculus*	European Rabbit
Reptiles			
Scincidae		*Lampropholis guichenoti*	Garden Skink
		Bassiana duperreyi	Eastern Three-lined Skink
Elapidae		*Drysdalia coronoides*	White-lipped Snake
		Notechis scutatus	Tiger Snake
		Pseudonaja textilis	Eastern Brown Snake
Amphibians			
Myobatrachidae		*Limnodynastes dumerilii*	Southern Bullfrog
		Crinia signifera	Common Froglet
Hylidae		*Litoria ewingii*	Southern Brown Tree Frog

Appendix 5. Fauna Recorded From Aireys Inlet Bushland Reserve

Field survey records

The table below lists the fauna species recorded from Aireys Inlet Bushland Reserve during field surveys 19-21 December 2005.

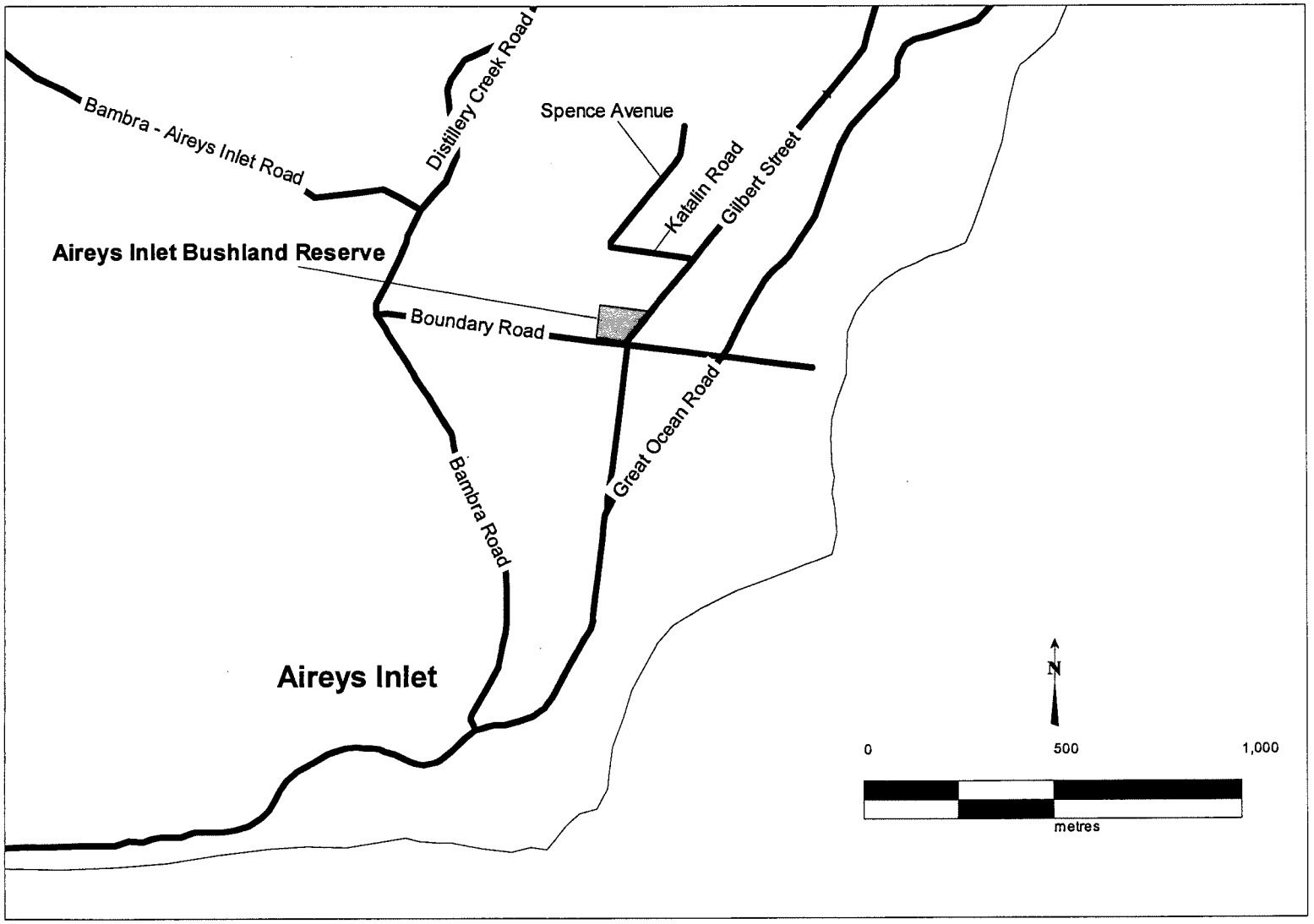
Key to codes:

* = introduced species

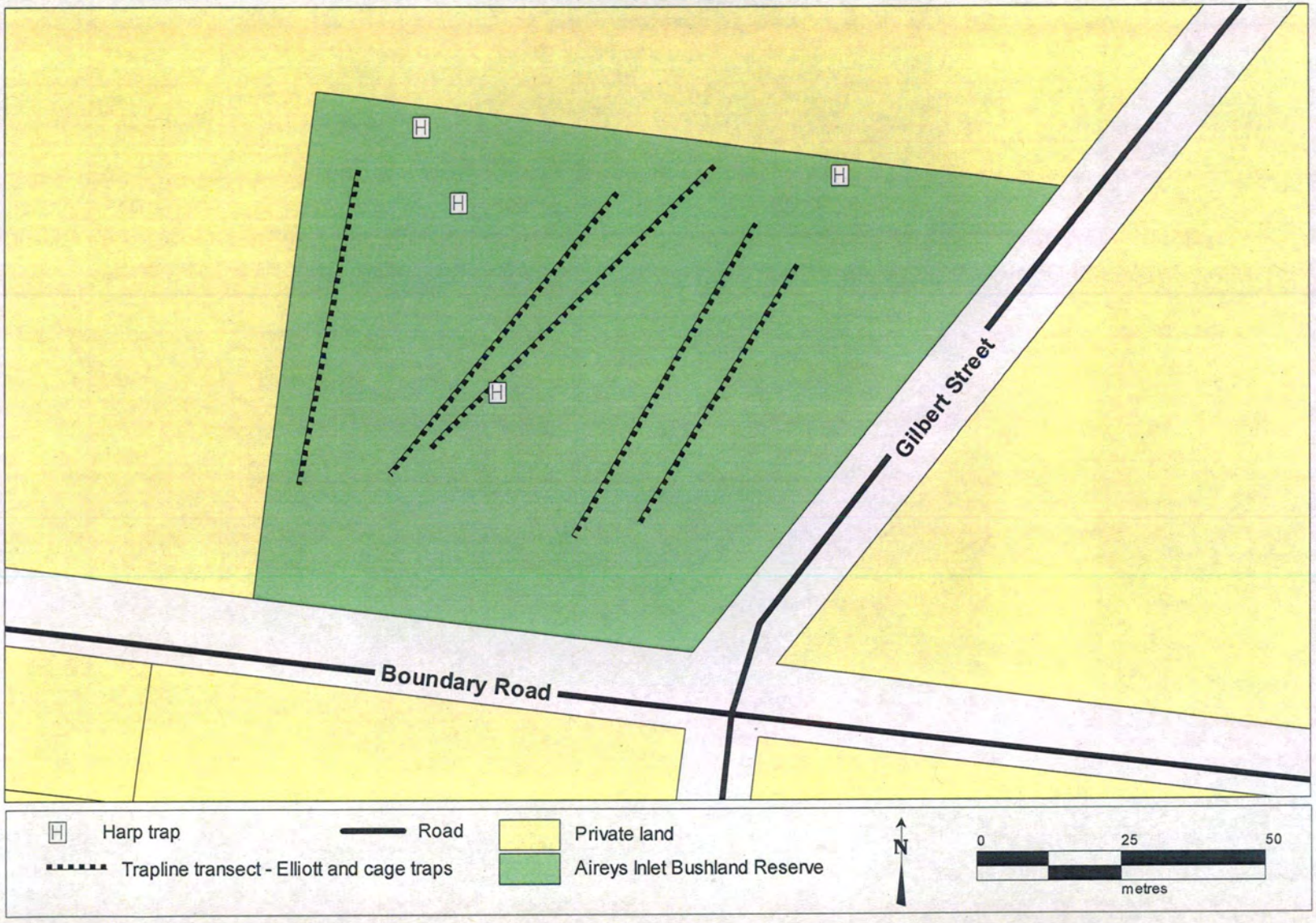
Family		Species name	Common name
Birds			
Turnicidae		*Turnix varia*	Painted Button-quail
Columbidae		*Phaps chalcoptera*	Common Bronzewing
Cacatuidae		*Calyptorhynchus funereus*	Yellow-tailed Black-Cockatoo
		Callocephalon fimbriatum	Gang-gang Cockatoo
		Cacatua galerita	Sulphur-crested Cockatoo
Psittacidae		*Glossopsitta concinna*	Musk Lorikeet
		Platycercus elegans	Crimson Rosella
		Neophema chrysostoma	Blue-winged Parrot
Aegothelidae		*Aegotheles cristatus*	Australian Owlet-nightjar
Halcyonidae		*Dacelo novaeguineae*	Laughing Kookaburra
		Todiramphus sanctus	Sacred Kingfisher
Climacteridae		*Cormobates leucophaeus*	White-throated Treecreeper
Maluridae		*Malurus cyaneus*	Superb Fairy-wren
Pardalotidae		*Pardalotus punctatus*	Spotted Pardalote
		Pardalotus striata	Striated Pardalote
		Acanthiza pusilla	Brown Thornbill
Meliphagidae		*Anthochaera carunculata*	Red Wattlebird
		Lichenostomus leucotis	White-eared Honeyeater
		Acanthorhynchus tenuirostris	Eastern Spinebill
		Melithreptus brevirostris	Brown-headed Honeyeater
Petroicidae		*Eopsaltria australis*	Eastern Yellow Robin
Pachycephalidae		*Pachycephala pectoralis*	Golden Whistler
		Pachycephala rufiventris	Rufous Whistler
		Colluricincla harmonica	Grey Shrike-thrush
Dicruridae		*Grallina cyanoleuca*	Magpie-lark
		Rhipidura fuliginosa	Grey Fantail
Artamidae		*Gymnorhina tibicen*	Australian Magpie
		Strepera graculina	Pied Currawong
Corvidae		*Corvus coronoides*	Australian Raven
Muscicapidae	*	*Turdus merula*	Common Blackbird
Mammals			
Tachyglossidae		*Tachyglossus aculeatus*	Short-beaked Echidna
Pseudocheiridae		*Pseudocheirus peregrinus*	Common Ringtail Possum
Macropodidae		*Wallabia bicolor*	Black Wallaby
		Macropus giganteus	Eastern Grey Kangaroo
Molossidae		*Tadarida australis*	White-striped Freetail Bat
Vespertilionidae		*Nyctophilus geoffroyi*	Lesser Long-eared Bat
		Chalinolobus morio	Chocolate Wattled Bat

Family		Species name	Common name
		Vespadelus vulturnus	Little Forest Bat
Canidae	*	*Canis vulpes*	Red Fox
Reptiles			
Scincidae		*Lampropholis* spp.	Skink
		Tiliqua nigrolutea	Blotched Blue-tongued Lizard
Elapidae		*Austrelaps superbus*	Common Copperhead

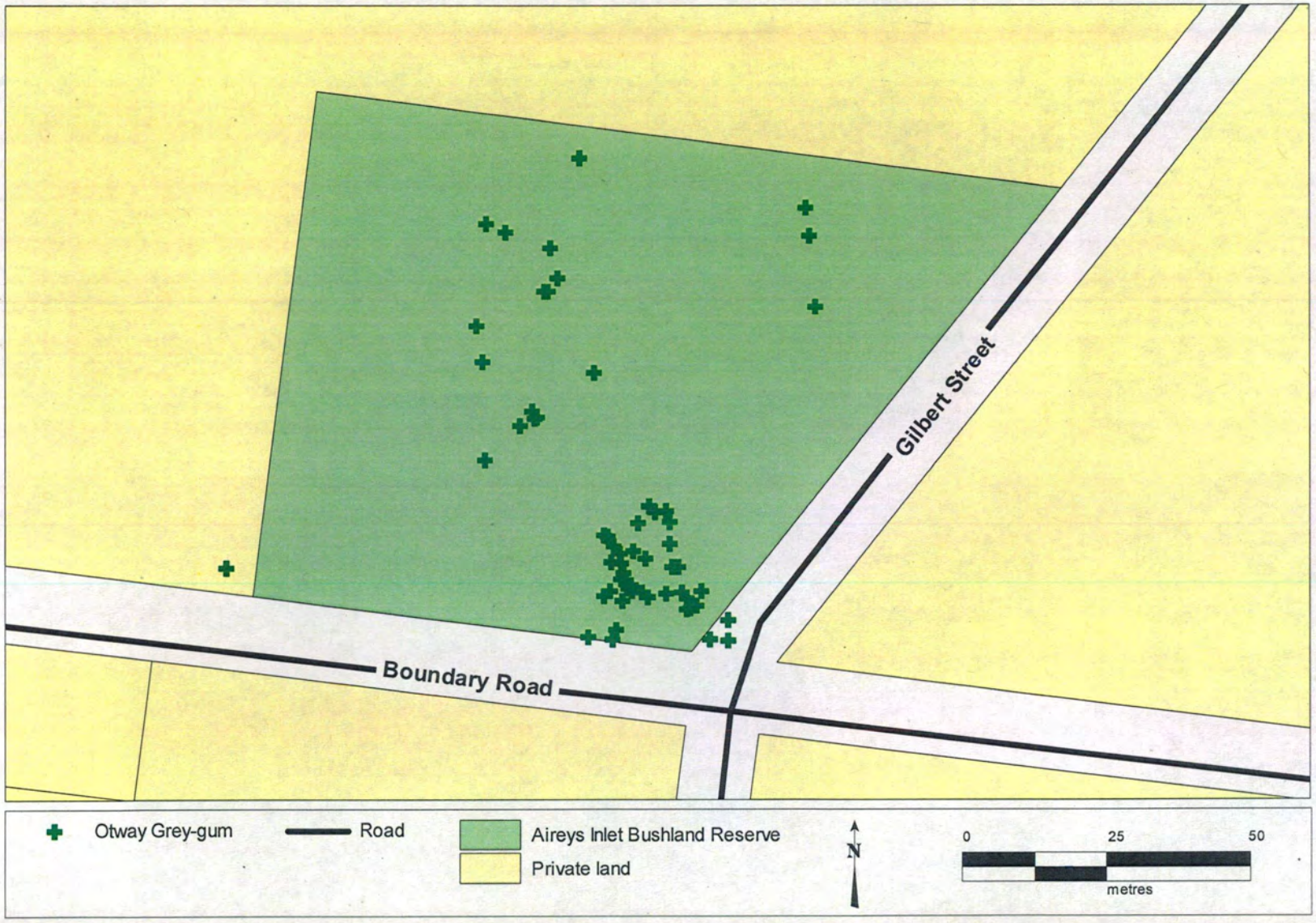
Map 1 Location of Aireys Inlet Bushland Reserve, Aireys Inlet, Victoria



Map 2 Trap site locations for field survey of Aireys Inlet Bushland Reserve



Map 3 Records of Otway Grey-gum *Eucalyptus* sp. aff. *cypellocarpa* (Anglesea)



Map 4 Location of large trees (>60 cm dbh) in Aireys Inlet Bushland Reserve