Bayside Native Vegetation Works Program - Stage 2



Ecology Australia

Project: 11-038

Prepared for:

Bayside City Council

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1 Introduction

1.1 Background

In 2008 Ecology Australia was commissioned to prepare Stage 1 of the Native Vegetation Works Program for 14 reserves (seven foreshore and seven inland) in the Bayside municipality (Ecology Australia 2008a). Stage 1 identified the Ecological Vegetation Classes (EVCs) and Habitat Zones present within each site, along with the key weed species and other management issues that threaten the biodiversity of the reserve.

In 2011, Ecology Australia was commissioned by Bayside City Council to prepare Stage 2 of the Bayside Native Vegetation Works Program. The aim of Stage 2 is to provide a readily usable works-manual which clearly sets-out the management strategies for each reserve including a timeframe for the works to be undertaken. Specifically, this report encompasses the following:

- a summary of each management issue identified across the reserve system;
- prioritisation of the key management issues for the Management Unit(s) within each reserve;
- a timeframe (over 10 years) for specific management actions to take place;
- a prioritised list of weed species encountered within each reserve;
- a ten-year monitoring methodology; and
- identification of suitable locations for permanent monitoring plots and photo points to be established.

2 Study Area

Following Stage 1 (Ecology Australia 2008a), the study area is located in the City of Bayside, approximately 12 - 21 km south east of Melbourne's CBD (Figure 1). The 14 reserves within the municipality include seven foreshore reserves and seven inland reserves. The foreshore reserves are located between the suburbs of Brighton and Beaumaris, while the inland reserves are located within the area bounded by Bay Road to the north, Beach Road to the south, Bluff Road to the east and Charman Road to the west. The 14 reserves (Figure 1) are:

Foreshore reserves

- Beaumaris Foreshore north
- Black Rock south
- Brighton Dunes
- Picnic Point
- Red Bluff
- Ricketts Point Hinterland
- Sandringham Foreshore south

Inland reserves

- Balcombe Park
- Bay Road Heathland Sanctuary
- Cheltenham Park Flora and Fauna Reserve
- Donald McDonald Reserve
- George Street Reserves
- Gramatan Avenue Heathland Sanctuary
- Long Hollow Heathland

The study area is located within the Gippsland Plain bioregion and is part of the Port Phillip Catchment Management Authority (CMA) region.

The reserves are all located within the Sandbelt region of south-eastern Melbourne which in a geomorphic context is part of the Brighton Coastal Plain. This is a broad coastal plain or low plateau 30 to 40 m above sea level, which extends from Brighton to Springvale. The plain is underlain by Tertiary sedimentary rocks of the Brighton group (previously known as the "Sandringham Sands"), and is comprised of the Black Rock Formation and overlaying Red Bluff Formation. These units outcrop in coastal cliffs from south of Brighton to Beaumaris (Ecology Australia 2008a).





Figure 1 Aerial image showing the location of the 14 reserves (study sites) within Bayside City Council.



3 Methods

3.1 Field Surveys

In 2008 (Stage 1), the vegetation condition was assessed following the Vegetation Quality Assessment Manual (DSE 2004) and weed species and major management issues occurring in each reserve were identified (Ecology Australia 2008a). The results of the condition assessments (expressed as a percentage score of the benchmark pre-European condition) and the weed lists have been reproduced, and in some cases added to, in this current report.

Field assessments for Stage 2 were undertaken on 20 December 2011, and 20 and 22 March 2012. All sites were visited by two botanists accompanied by Jo Hurse of Citywide (Bushland & Nursery Team Leader) who coordinates and undertakes the management of each of the reserves. During the assessments, the reserves were traversed on foot while discussing the management, social and political issues relevant to each reserve, to map the Management Units – zones with similar management priorities – and record weed species not previously identified during the 2008 assessment (Ecology Australia 2008a). Suitable locations for the permanent quadrats were also identified.

3.2 Conservation Status

The conservation status of plant and animal species was determined by reference to the Department of Sustainability and Environments (DSEs) advisory list (DSE 2005, 2007, 2009), listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The conservation status of Ecological Vegetation Classes was determined by reference to DSEs Ecological Vegetation Class benchmarks webpage (DSE 2012a).

3.3 Terminology and Taxonomy

Plant taxonomy and the use of common names follow *A Census of the Vascular Plants of Victoria* (Walsh and Stajsic 2007) and the *Flora Information System* database (DSE 2012b).

Where an asterisk (*) precedes a plant name it is used to signify non-indigenous taxa, those species which have been introduced to Victoria or Australia. A hash sign (#) is used to denote plants that are native to Victoria, but are invasive and occurring outside of their natural range within the study area. Within the study area, this applies to Coast Tea-tree (*Leptospermum laevigatum*) and Coast Wattle (*Acacia longifolia* subsp. *sophorae*) when occurring in all inland reserves as these species are only indigenous to the coast. Sallow Wattle (*Acacia longifolia* subsp. *longifolia*) is considered to be naturalised beyond its natural range across the entire study area as it is indigenous in Victoria to East Gippsland.

4 Management Issues

Bayside City Council and its residents have been unusually well informed, responsive and active in environmental management over decades. Most of the Reserve management issues dealt with in this report are very well known and well canvassed and understood by Council, Council staff, management contractors, Friends groups and others involved in policy formulation, planning and implementation of management actions. These management issues are spelled out in the Bayside City Council (2002) Bushland Strategy, (pp. 9-14), viz.:

- Ecological relationships
- Fire ecology
- Fire prevention
- Significant vegetation
- Biological impact of weeds
- Hybridisation
- Indigenous fauna
- Feral animals
- Domestic animals
- Hydrology
- Pollution
- Run-off
- Partnerships
- Detrimental uses and conflict of use.

For the most part these require no further discussion to provide background to the present Environmental Management Plan, however this document does elaborate on and bring additional information to some issues, notably the most important – weed invasion in reserves (Table 1). This document also outline additional issues, some a minor risk and some of much greater significance, in the City's 14 reserves network. These have been identified by observation made during the field work, in discussions with managers (particularly Jo Hurse, Citywide), and in the wider context in the literature and by communications and discussions with formal and informal professional networks.



Threat Category	Threat	Key Impacts
 Feral mammal grazers/browsers European Rabbit (a) Black Rat, Brown Rat and House Mouse (b) 	 grazing/browsing of plants especially at vulnerable seedling stage (ab) mechanical damage to vegetation (a) disturbance to soil/soil erosion (a) dispersal of seeds in faeces and externally on fur (ab) 	 vegetation degradatio loss and/or reduction degradation of faunal soil erosion promotion of weed in
 Feral predators Red Fox cats Domestic dogs Black Rat Brown Rat 	 predation of fauna disturbance to fauna 	loss/reduction of faun
 Black Rat, Blown Rat Weed invasion and other undesirable plants exotic plant species indigenous ecologically out-of-balance plant species non-local provenances of indigenous species non-local plant species used for revegetation genetic pollution of in-situ indigenous species by exotic species <i>Cassytha</i> (Dodder-laurel) infestation of indigenous host plants) 	 competition with indigenous flora for light, water and nutrients, pollinators and seed dispersers changed ecosystem function 	 destruction of indiger loss or decline of plar reduced visual amenir reduced recreational a increased management users increased fuel load, h
Fire (planned and unplanned)	 fire frequency: -too frequent -too infrequent/absence of fire fire intensity 	 too frequent fires dest deplete soil-stored/ca absence of fire will no will become senescen stored seed-banks fires of excessive inte destroy soil-stored or all fires have the pote weeds and promote ex- species (e.g. <i>Olearia</i>) all fires have the pote killing animals or mo recover will vary account
Climate change	 increased temperature reduced precipitation reduced recharge of groundwater 	 loss or decline of pop unable to cope with o increased intensity of change in the weed fl unknown consequence
 Exotic plant pathogens Cinnamon Root-rot Fungus (<i>Phytophthora cinnamomi</i>) Myrtle Rust (<i>Uredo rangelii</i>) 	death or decline of susceptible plant species	 changed floristic com changed structure of v loss or decline in plar loss or decline in faur reduced landscape and
Beach 'nourishment' (with sand) and beach-raking (for litter removal)	 damage to vegetation and rare plant populations disturbance to shorebirds and waterbirds 	 mechanical destruction Grassland potential loss of popul subsp. <i>pontica</i>) Potential facilitation of Disturbance to birds f

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on including structural/floristic changes of plant populations l habitats
nvasion
na populations
nous vegetation and fauna habitats
int and animal species
ity
amenity
ent costs to retain amenity values for reserve
hence fire risk
stroy some fire-sensitive species (kill plants and
anopy-stored seed-banks)
not allow persistence of plant species, which
nt and fail to recruit from soil-stored or canopy-
ensity can kill standing crop of vegetation and r canopy-stored seed banks
ential to be a major stimulus for recruitment of
excessive recruitment of some indigenous
ramulosa, Solanum laciniatum).
ential to adversely impact fauna populations by odifying habitats; the capacity of populations to pording to species and context
pulations of species of plants and animals
or unable to compete in a changing climate
lora (additional species may be favoured) with
ces.
nposition of vegetation
vegetation
nt populations
na populations of habitat-dependent species menity
on and disturbance to the rare Coast Dune
ulations of the rare Saltwort (Salsola tragus
of weed invasion
feeding, roosting or loafing on the shore

Threat Category	Threat	Key Impacts
 Possum browsing of trees (elevated population numbers) Common Brushtail Possum Common Ringtail Possum 	damage to indigenous trees, particularly eucalypts, by defoliation	 death of trees reduced performance and function of trees (e.g. reproductive capacity) reduced visual amenity altered ecosystem function
Exotic birds • Blackbird (a) • Indian Myna (b) • Common Starling (c)	 competition for resources with native birds aggressive behaviour towards native birds (b) 	 dispersal of weed seeds (major problem) co-opting scarce nest-hollow resources by aggressive behaviour (bc) vectors of avian disease destruction of moss-beds (a) physical damage to soils and small plant (a) promotion of weed seed germination by soil disturbance (a)
User-related impacts	 unrestricted access of people to environmentally sensitive areas/sites 	 damage to soils (compaction, exacerbated erosion) damage to vegetation (trampling, mechanical destruction) elevated disturbance to soils and vegetation creating sites for weed invasion destruction/damage to fauna habitats wider dispersal of litter (discarded hard rubbish) increased risk of unplanned fires disturbance to fauna, including nesting birds hydrological impacts: channelization of water along depressed, eroded and compacted tracks
 Exotic invertebrates snails and slugs (gastropods) (a) European Honeybee (b) European Wasp (c) Aphids, scale and other sap-sucking insects (on aerial parts or roots) (d) Portuguese Millipede (e) 	 disruption of ecosystem function (pollinators, nutrient cycling, competition etc) damage to vegetation and fauna habitats damage to plant species/populations damage to fauna species/populations impaired user amenity risks to human health 	 predation of seedlings of indigenous plants preventing or lowering recruitment (a) transmission of diseases (e.g. viruses and bacteria) (ad) damage to and death of plants, particularly orchids and smaller herbs (ae) lowered performance, reproductivity and/ or death of plants (ade) co-option of nesting hollows utilised by birds and mammals (bc) disruption damage to pollinator-plant mutualism and lowered reproductivity competing for the same resources (nectar, pollen)(bc) competition with bird pollinators (b) predation (as a top carnivore) of a vast array of indigenous insects in larval and adult stages (c) critical health risks to people susceptible to bee and wasp sting allergies impaired amenity for users of reserves because of the perception of European Wasp risks
Domestic dogs	 unrestrained dogs off leads failure of dog owners to remove faeces 	 disturbance by dogs to wildlife, particularly birds on beaches and in the littoral zone eutrophication of soils by dog faeces exacerbating weed invasion seriously compromised user-amenity of reserves occasioned by treading on dog faeces negative visual impacts and smell of dog faeces negative health impacts (occupational health and safety issues) if management workers inadvertently encounter faeces

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4.1 Hybridisation

The issue of hybridisation was canvassed in Bayside's Bushland Strategy (Bayside City Council 2002) but the dimensions of the problem are much larger than they were previously perceived to be, as determined by Ecology Australia's recent investigations (Carr unpubl. data) and field inspections.

Hybridisation between indigenous and introduced species may give rise to serious issues of genetic integrity in indigenous species, as well as 'genetic pollution' of indigenous species with exotic gene-pools of the same species. Such hybrids recorded during field work were:

• Common Correa (Correa reflexa var. reflexa) x *Correa species (cultivated)

Correa reflexa var. *reflexa* is a widespread indigenous species in heathlands and heathy woodlands. It is an important species because it is a nectar source for honeyeaters, and it is a showy and a conspicuous wildflower (admired by many people).

Cultivated *Correa* species and garden hybrids in adjoining or nearby gardens are hybridising with the in situ *C. reflexa* and species involved include – by inference from their form and colour – *C. pulchella* (SA), *C. calycina* (SA), *C. reflexa* forms (some at least with red and yellow-green flowers) and perhaps others. It appears that all natural populations of *Correa* in the Reserves have been severely compromised, now embracing an array of hybrids. This is a difficult issue to manage because parents occur off-site. Pending further investigations of a difficult issue, the immediate strategy is to avoid propagating hybrids for revegetation, and to remove hybrids when detected.

• Sallow Wattle/Coast Wattle (**Acacia longifolia* subsp. *longifolia*/subsp. *sophorae*) x Spike Wattle (*A. oxycedrus*) and *A. longifolia s.l.* x **A. floribunda* (White Sallow).

Hybridisation in *Acacia* is complicated locally as the indigenous *A. longifolia* subsp. *sophorae* of the coast is a very serious weed inland, while *A. oxycedrus* is indigenous in heathland and woodland; the other two are introduced garden escapees. All four of these entities can hybridise, creating genetic pollution problems for in situ indigenous species/subspecies.

• Silky Tea-tree (*Leptospermum myrsinoides*) x Coast Tea-tree (*L. laevigatum*) evident in many inland Reserves.

Leptospermum myrsinoides of heathlands and heathy woodlands is largely non-coastal at Bayside and where it comes into contact with invading *L. laevigatum*, hybrids often arise.

The serious conservation implications of invasion by plant hybridisation are outlined by Vila et al. (2000).

4.1.1 Genetic provenance and hybridisation of plant materials

Some species utilised in landscaping occur naturally in the area where they are used in landscaping (i.e. naturally indigenous species) but the gene-pool is exotic, that is of non-local provenance. This may give rise to 'genetic pollution' of the in situ indigenous population with unknown or unforeseeable deleterious consequence. An example of this is the Spiny-headed Mat-rush (*Lomandra longifolia*) used in landscaping on the coast; the particular form occurs in New South Wales and is quite distinct from the local population which occurs in close proximity (as a natural population or planted local-provenance population).

4.2 Dodder-laurel (Cassytha spp.)

Three species of *Cassytha* occur naturally in Bayside: large Dodder-laurel (*Cassytha melantha*), Downy Dodder-laurel (*C. pubescens*) and Slender Dodder-laurel (*C. glabella*). *Cassytha* are common aerial hemiparasites infecting a very wide range of woody host plants (trees, shrubs and herbs) with twining stems and organs (haustoria) penetrating the host's tissues (leaves and stems). While naturally abundant in diverse habitats, they can destroy the host plants, including large trees; this applies to *C. melantha* (trees) and *C. pubescens* (shrubs). *Cassytha melantha* is destroying Coast Banksia (*Banksia integrifolia*) trees, for example in Dr. Jim Willis Reserve; *C. pubescens* is probably destroying a range of shrubs in heathlands. It is clear that some plant populations can be eliminated by Dodder-laurel.

Cassytha dominance is a difficult issue to deal with. If infected host plants of value show signs of being destroyed by *Cassytha* then it should be physically removed. This can be very difficult and complicated and for some plants is not practicable unless hosts respond by reshooting (e.g. eucalypts) when branches (infected with *Cassytha*) are cut back. There may be options involving the use of herbicides with differential action on the host (non-lethal) and parasites (lethal). Further research is required but an interim strategy is to identify problem *Cassytha* infections on hosts before they become intractable and ultimately lethal to hosts.

4.3 Plant diseases

Plant diseases are a serious or potentially serious concern for vegetation and plant species, and for fauna that may be adversely affected by resultant changes in their habitat quality. Two pathogens are particularly relevant to Bayside: Cinnamon Root-rot Fungus (*Phytophthora cinnamomi*) and Myrtle Rust (*Uredo rangelii*). Cinnamon Root-rot Fungus is a very well-known pathogen and its devastating impacts are recognised in its listing as a threatening process under the *Flora and Fauna Guarantee Act 1988* and the *Environmental Protection and Biodiversity Conservation Act 1999*. A recent and detailed review by Cahill et al. (2008) outlines all relevant aspects of its biology, ecology, distribution and impacts. The authors outline management of the disease in reserves, which is reliant on hygiene, the use of chemicals and restriction of access, but those measures have been only partially successful; they conclude that 'our ability to control the disease is limited.'

In the context of Bayside reserves Cinnamon Root-rot fungus is consider to be intractable because it is likely to be widespread because of its prevalence in the horticultural trade and gardens, and that the reserves are in an urban context with little or no feasibility of cross-fence management.

Myrtle Rust, an exotic species from Brazil, is of recent advent in Australia and it is likely to be devastating to a huge slice of the Australian flora- members of the plant family Myrtaceae. It appeared in Victoria in the last year and a suite of a hundred or more records exist, many in south-eastern Melbourne suburbs (Appendix 1). This is likely to be an intractable issue for Bayside but if any potential infestations are detected the Department of Primary Industries must be notified. Protocols and procedures are given in Appendix 1.

4.4 Selection of plant species for revegetation

The underlying principal of revegetation (or vegetation restoration) is that all plant species utilised should occur (or have occurred) in the relevant vegetation type (Ecological Vegetation Class) in question. The corollary is that plant species should be used to mimic the structural attributes of the vegetation model, i.e.

distribution, density, aggregations of plants, etc. Revegetation should thus, as far as practicable, conform with the floristic (species composition) and structural vegetation models being reconstructed (unless there are specific and enunciated reasons to diverge, e.g. creation of particular fauna habitats or enhanced visual amenity. For the most part this is a simple and straightforward procedure whereby remnant vegetation examples and historical information on plant distributions (herbarium collections and plant species lists etc.) are combined to construct the model; extrapolations based on the regional distribution and ecology of the species in question are also routinely employed (as done in this report).

Difficulties may arise when:

- I. Apparently natural plant populations are not in fact natural—such species do not 'belong' and have been introduced. Examples include Purple Coral-pea (Hardenbergia violacea) in Gramatan Avenue Reserve-it is a garden escapee, not an indigenous species.
- II. Species that have been historically recorded in the original local flora but their correct habitats no longer exist, e.g. Kangaroo Apple (Solanum aviculare) has been twice collected locally (Australian Virtual Herbarium; AVH data) but appropriate habitat does not now exist in the reserve system.
- III. Species considered to be indigenous on the basis of their regional occurrence in similar environments but which have not been recorded. Moonah (Melaleuca lanceolata) is the most conspicuous example locally where it has been widely planted in the coastal reserves. It has not been recorded along the coast in this part of Port Phillip Bay (Willis 1948, AVH records). This similarly applies to the widely planted Coast Pomaderris (Pomaderris paniculosa subsp. oraria).
- IV. Species that have been utilised overzealously in local plantings, that is the extent and dominant structural role does not, or is unlikely to conform with their natural structural role in vegetation.
- V. Species that 'belong' but may become weedy-see Prioritised Management Action tables for each site (Section 5).
- VI. Taxonomic discrimination: an issue when the incorrect (formal or informal) subspecies, variety or variant is utilised. This notably applies to Sweet Bursaria (Bursaria spinosa subsp. spinosa) as it is now known. The entity formerly known as B. spinosa var. macrophylla (Large-leaf Sweet Bursaria) (Willis 1972) has unfortunately been sunk as a formal entity despite a suite of differences separating it from subsp. *spinosa*. The spiny variant has been widely planted but the large-leaved version is a better plant in many respects: it has large leaves and attractive foliage; it is not spiny, and forms a more attractive single or few-stemmed tree with an attractive fissured bark (rather than the ferociously spiny, multi-stemmed small-leaved version).

Analysis of the list of plant species recorded for the Bayside area has allowed us to refine the list of plant species suitable for revegetation. This has been based on: historical records; collections in the National Herbarium of Victoria; personal communication with botanists (notably Valentino Stajsic, National Herbarium of Victoria); and Ecology Australia's in-house knowledge of the biology and ecology of the flora.

The removal of plant species already used in revegetation that are deemed 'out of place' is not advocated as they now often form very important dominants of revegetation. Rather, it is advocated that their use in revegetation, which attempts restoration of a former community, be curtailed. This

contrasts with the use of plants for public amenity landscaping; such species may be highly appropriate and perform valuable roles.

Genetic considerations, that is, non-local provenances and 'genetic pollution' are discussed in Section 4.1. Table 2 lists plant species or taxa excluded from the revegetation lists given in Appendix 2 with the reasons for omission.

Species/Taxon	Common name	Comments
Acacia pycnantha	Golden Wattle	Considered introduced and naturalised except in Dr. Jim Willis Reserve
Acacia verticillata subsp. ovoidea	Ovoid Prickly-moses	Not recorded locally.
Allocasuarina littoralis	Black Sheoak	Not considered to belong in the existing reserve system.
Bursaria spinosa 'var. macrophylla'	Sweet Bursaria	Considered to be the local entity (mostly coastal).
Bursaria spinosa subsp. spinosa	Sweet Bursaria	Not considered to belong in the existing reserve system.
Cassinia aculeata	Common Cassinia	? requires checking
Cassinia longifolia	Shiny Cassinia	Not recorded locally.
Cymbonotus preissianus	Austral Bear's ear	Not considered to belong in the existing reserve system.
Daviesia ulicifolia subsp. ulicifolia	Gorse Bitter-pea	Not considered to belong in the existing reserve system; planted in Long Hollow Reserve.
Dianella laevis	Smooth Flax-lily	Not recorded locally.
Dianella tasmanica	Tasman Flax-lily	Not recorded locally.
Eucalyptus radiata subsp. radiata	Narrow-leaf Peppermint	Not considered to belong in the existing reserve system.
Gahnia trifìda	Coast Saw-sedge	Not considered to belong in the existing reserve system.
Gompholobium ecostatum	Dwarf Wedge-pea	Not recorded locally.
Gompholobium huegelii	Common Wedge-pea	Not recorded locally.
Goodenia blackiana	Black's Goodenia	Not recorded locally.
Hardenbergia violacea	Purple Coral-pea	Not recorded locally. Naturalised garden escapee in Gramatan Avenue Reserve.

Table 2 Plant species or taxa excluded from revegetation lists for Bayside City

Species/Taxon	Common name	Comments
Indigofera australis	Austral Indigo	Not recorded locally.
Kunzea ericoides/leptospermoides	Burgan	Natural distribution locally/regionally uncertain; can be very weedy-question unresolved.
Lepyrodia muelleri	Common Scale-rush	Not considered to belong in the existing reserve system.
Lobelia pratioides	Poison Lobelia	Not recorded locally.
Mentha australis	Fairy Spectacles	Not considered to belong in
		the existing reserve system.
Olearia glutinosa	Sticky Daisy-bush	Not recorded locally.
Ozothamnus turbinatus	Coast Everlasting	Not recorded locally.
Olearia phlogopappa	Dusty Daisy-bush	Not recorded locally.
Pimelia curviflora	Curved Rice-flower	Not recorded locally.
Poa sieberiana var. sieberiana	Grey Tussock-grass	Not considered to belong in
		the existing reserve system.
Pultenaea canaliculata	Coast Bush-pea	Not recorded locally.
Pultenaea paleacea	Chaffy Bush-pea	Not recorded locally.
Pultenaea sericea	Chaffy Bush-pea	Not recorded locally.
Pultenaea tenuifolia	Slender Bush-pea	Not recorded locally.
Rubus parvifolius	Small-leaf Bramble	Not considered to belong in
		the existing reserve system.
Senecio odoratus	Scented Groundsel	Not recorded locally.
Solanum aviculare	Kangaroo Apple	Not considered to belong in
		the existing reserve system.
Sphaerolobium vimineum	Leafless Globe-pea	Not recorded locally.
Tetragonia tetragonioides	New Zealand Spinach	Not considered to belong in
		the existing reserve system.

4.5 Ecological out-of-balance indigenous plants

Indigenous in situ plant species in excessive abundance can become serious management issues (Carr et al. 1992, Carr 1993), with the same kinds of impacts as exotic weeds - destruction of subordinate indigenous plants by competition for light, moisture and nutrients. This is a widespread and serious problem in the non-coastal reserves. While the issue relates to plant species that naturally 'belong' in the vegetation (heathland or woodland) it is confounded by indigenous species that doubtfully belong in a given situation, to those that are clearly out of place. Coast Tea-tree (*#Leptospermum laevigatum*) and Coast Wattle (*#Acacia longifolia* subsp. *sophorae*) are the best-known and most damaging weedy species locally (and in Victoria generally). These are large vigorous shrubs of the foredunes which form a dense canopy effectively out-competing the heathland flora. #Coast Tea-Tree is a major threat in all inland reserves.

The tendency of #Coast Tea-tree to invade heathland in south-eastern Australia has been documented by various authors (e.g. Burrell 1981, Molnar et al. 1989, Fletcher 1988, Ecology Australia 2008b). Molnar et al. (1989) note that in the last fifty years, #Coast Tea-tree has invaded a number of heathland reserves in Sandringham, severely reducing species diversity. This is also the case for the other inland reserves in the Bayside Municipality, as well as many inland vegetation types in Victoria generally.

#Coast Tea-tree is normally rare or absent from coastal heath communities (Burrell 1981) and should not be considered a part of the inland reserve system in Bayside. As #Coast Tea-tree is fire sensitive, a reduction in fire frequency has been suggested by many authors as a precursor to invasion by this species (Burrell 1981, McMahon et al. 1987, Molnar et al. 1989). Fire is an essential management tool for eliminating #Coast Tea-tree and stimulating or enhancing recruitment of heathland species. Fire has been used very effectively by Bayside City Council and in other regions where heathy vegetation is threatened by #Coast Tea-tree, e.g. by Parks Victoria at Wonthaggi Flora and Fauna Reserve and at 'The Pines' in Frankston. In other coastal heaths, e.g. in the Greater Otway National Park near Anglesea, fire is similarly employed to control #Coast Tea-tree and #Coast Wattle invasion (Katrina Lovett, Parks Victoria, pers. comm.).

The sensitivity of #Coast Tea-tree to fire and its lack of resprouting capacity is the key to fire-related control. #Coast Tea-tree is killed by fire and does not regenerate vegetatively by resprouting from rootstocks or lignotubers; recruitment is wholly from canopy-stored seed liberated from the persistent capsules (fruits). The age of first seed set in #Coast Tea-tree is about five years. Bennett (1994) notes that if burns can be timed such that the interval between consecutive fires is less than five years, then regeneration of #Coast Tea-tree after the second burn should be minimal (Bennett 1994).

At Bayside, active ecological management through controlled burning has been effective in restoring heathy vegetation, albeit with somewhat altered floristics. The technique is effective in transforming mono-specific stands of #Coast Tea-tree to heaths with considerable diversity, mostly from promoting regeneration of soil-stored seed. As also shown elsewhere, e.g. at Wonthaggi Flora and Fauna Reserve, and for the comparable White Kunzea (*Kunzea ambigua*) invasion at Wilsons Promontory National Park, the approach has a proven track record and should continue as an integral part of management of Bayside's inland reserves.

Other ecologically out-of-balance indigenous species are much less obvious and the mechanisms for their upsurge are not well understood, either in the local Bayside context or the wider context.

The reasons for indigenous species causing problems as members of native vegetation communities because of their 'abnormal' structural dominance are undoubtedly complex, and different causes probably apply to different plant species based on differing intrinsic biological and ecological characteristics and changed conditions contingent on settlement, fragmentation and related anthropogenic factors. The problematic species in the Bayside reserves because of their over-abundance are enumerated, with comments in Table 3. Of particular note are the woody species that have long-lived, soil-stored seed-banks and are capable of massed post-fire germination (e.g. Olearia ramulosa, and Solanum laciniatum), see Table 3. Another problematic group is comprised of robust rhizomatous or tussock-forming perennial herbs (e.g. Lepidosperma concavum and Dianella brevicaulis). Management of these species is essential or highly desirable, depending on species or location, if vegetation quality (that is biodiversity – plant species and faunal habitat attirbuted) are not to decline further. This is not to say that such species cannot be tolerated and should be removed, rather they may need to be managed. Some people have objected to the removal of native plants – for example Large Kangaroo Apple (Solanum laciniatum) that recruits en masse after fire - claiming that Kangaroo Apple functions as a 'nurse crop' protecting and allowing survival of subordinate species. While the function of 'nurse crop' species is uncontestable in given locations such as continuously recruiting species of wet forests, the concept has no legitimacy in the Bayside context. Here, episodic recruitment following fire by a large suite of species that have evolved over millions of years to flourish under such conditions (massed recruitment on fire soil) are being dealt with. If Kangaroo Apple facilitates recruitment then it only applies to weed species such as Panic Veldtgrass (*Ehrharta erecta). The management of species listed in Table 3 in given contexts/situations is recommended.

Table 3Indigenous plant species causing problems of over-abundance
(structural dominance) in Bayside City Council reserves, June 2012.

Key:

- T Tree
- LS Large Shrub
- MS Medium Shrub
- PR Rhizomatous/stoloniferous perennial herbs
- V Vines

AP

PT Tifted (tussock-forming) perennial herbs

Aerial hemiparasites

		Life	Recruitment	
Species Name	Common Name	form	Fire-induced episodic recruitment (seed)	Continuous recruitment (seed or vegetative)
Acacia mearnsii	Black Wattle	Т	✓	\checkmark
Solanum laciniatum	Large Kangaroo Apple	Ls	✓	✓
Olearia ramulosa	Twiggy Daisy-bush	Ms	\checkmark	
Pteridium esculentum	Common Bracken	Pr		\checkmark
Muehlenbeckia australis	Climbing Lignum	v	\checkmark	
Dianella brevicaulis	Small-flower Flax-lily	Pt	\checkmark	\checkmark
Lepidosperma concavum	Sand-hill Saw-sedge	Pr	\checkmark	\checkmark
Cassytha melantha	Coarse Dodder-laurel	Ар	\checkmark	
Cassytha pubescens	Downy Dodder-laurel	Ар	\checkmark	
Kunzea leptospermoides	Yarra Burgan	Ls	\checkmark	\checkmark
Acacia paradoxa	Hedge Wattle	Ls	\checkmark	\checkmark
Rhagodia candolleana subsp. candolleana	Seaberry Saltbush	Ms		\checkmark

4.6 Tree decline

Decline in health and death of trees is a very widespread problem in Australia caused by a complex of factors, some explained and others not. In the Bayside area and the region, decline and death and failure of recruitment by seed in Coast Banksia (*Banksia integrifolia* subsp. *integrifolia*) has been known for decades in this iconic coastal tree. Studies into the potential causes of the decline have been undertaken at the Yanakie Isthmus, Wilsons Promontory (Bennett and Attiwill 1996) and at four sites on the Mornington Peninsula (Price and Morgan 2003). The Wilsons Promontory study, which investigated the nutritional status of *Banksia* was inconclusive, attributing the lower calcium levels in declining trees and lower nutritional status of healthy trees in declining stands, to lower productivity and lower water use- a symptom rather than a cause (Bennett and Attiwill 1996). The authors suggested that long-term exclusion of fire may have created 'unhealthy' surface soil conditions.

The Mornington Peninsula study of long unburnt stands found that there was no shortage of seeds for recruitment (despite the top-heavy age structure of populations) and that vegetation facilitated seed survival by protection from grazing animals. Seedling transplants exhibited extremely high mortality due to browsing and summer desiccation. Stand replacement was considered unlikely under current circumstances. Bruce and Morgan (2003) concluded that developing fire and/or grazing management regimes will be necessary to conserve the structural integrity of these coastal ecosystems. To what extent this applies to the Bayside situation is unclear but assisted recruitment (planting of high-quality tubestock) must be continued. Paradoxically the planted tubestock, rather than naturally recruited seedlings appears to have a higher survival rate (Jo Hurse pers. comm.).

Among other pests or pathogens, *Banksia integrifolia* may also be prone to attacks of wood-boring beetle larvae particularly the handsome buprestid *Cyrioides imperialis* (Hawkeswood 2007) and the much more damaging Banksia Longicorn Beetle (*Paraplites australis*) (Fearn 1989). The role of these insects (both may occur locally) is unknown, either alone or in combination with other deleterious factors.

It is outside the scope of this Management Plan to review the pathology and pests of *B. integrifolia* but it is possible, even probable that *B. integrifolia* may be being attacked by Cinnamon Root-rot Fungus (*Phytophthora cinnamomi*), though it is considered within the *Banksia* genus to be moderately to highly resistant to this devastating plant pathogen (McCredie et al. 1985).

Another factor in the tree decline—but not *Banksia* is predation of foliage by browsing Brushtail Possums and Ringtail Possums. Possum browsing has caused the death and severe decline of trees, particularly Eucalypts, in many locations in Greater Melbourne and rural Victoria. As Ecology Australia studies show (e.g. Ecology Australia 2012a), the problem has had little exposure and of course has contentious political dimensions in its management. No conclusive evidence of excessive possum browsing was observed in the reserve system at Bayside, but that the issue is present and significant is axiomatic. Given the political and social dimensions, and the formal response of the Department of Sustainability to the issue, it remains only partially tractable from a management viewpoint. Placing guards on trunks to prevent possums climbing into the canopy seems the only solution but this is not possible where trees have contiguous interconnecting canopies. Proper protocols must be observed when implementing such management.

4.7 Tree quards

Use of tree guards in revegetation in many instances is of dubious merit and their use should not be routine. They may be indicated where there is a risk of

- trampling by people
- rabbit grazing.

The downsides of tree guarding are: they are another often unnecessary expense; the negative visual impacts of plastic strewn around the landscape; the risk that such plastic will join the litter stream, particularly where it enters the stormwater drainage system and ends up in the sea where it can be a major hazard to marine biota. Ecology Australia are unaware of documentation supporting the use of tree guards to protect young plants from the vagaries of climate while plants become established; plants have been recruiting and establishing naturally for millennia.

The notion that a microclimate within a tree guard helps establishment is just that, a notion. All tubestock used in revegetation should be healthy, young, vigorous, well-hardened ex-nursery stock of high quality, not etiolated (excessively lanky) or overgrown, hence root-bound and potentially moribund. Tubestock must also be planted into an appropriately prepared site, at the correct time of year, and receive adequate moisture, ideally by natural precipitation (or artificial irrigation). Wherever tree guards are deemed appropriate they should be removed at the earliest time; too often plants are seen bursting out of tree guards, only to become structurally damaged when they are released (e.g. by wind) and often very tender and vulnerable to desiccation and sunburn because of the humid shaded microclimate from which they are liberated.

4.8 Beach nourishment and cleaning

Importation of sand—beach nourishment—to augment beaches as well as the use of raking machines to remove hard rubbish is routinely practiced on Bayside beaches. While beach nourishment is a somewhat contentious environmental management intervention, we (Ecology Australia) do not consider its merits or demerits, except for potentially negative impacts on vegetation at the top of the beach. The rare Coastal Dune Grassland dominated by Hairy Spinifex (Spinifex sericeus) is being damaged by machinery driving over the top of it, and it is sometimes raked by the beach-raking equipment. Similarly the rare Coast Saltwort (Salsola tragus subsp. pontica), which grows on sand at the top of beaches is also vulnerable. Such damage must be avoided.

There are numerous disturbance factors operating on beaches or adjacent to beaches to disturb birds which feed, roost or 'loaf' on beaches or promontories. Locally these birds include cormorants (three species), terns (two species), Australian Pelicans and Chestnut Teal (authors pers. obs.). Disturbance factors include people, dogs, and boats or watercraft of various kinds. Use of the machinery and equipment in beach raking or nourishment is yet another disturbance factor, even though most birds are probably somewhat habituated to disturbances locally; the use of such machinery should be minimised wherever possible.

4.9 Herbicides and weed control

There are various options available for weed control, as follows:

Techniques which do not utilise chemicals:

- 1. Physical removal digging or pulling the plant up, ensuring no vegetative propagules remain in or on the soil (e.g. roots, stems, bulbs, corms, tubers, proliferous leaves) to perpetuate the plant or the population.
- 2. Ringbarking- for wood species with no capacity to sprout from stems, lignotubers or roots below the bark removal zone.
- 3. Cutting woody plants off at the base-species that do not have basal buds or lignotubers from which to regenerate.
- 4. Fire-for fire-sensitive species killed by burning vegetation or use of flame-throwers etc.
- 5. Solarisation-cooking the plants, and typically the surface area of soils, under a covering of clear plastic fully exposed to the hot sun for as long as it takes to develop lethal temperatures under the plastic.
- 6. Biological control-whereby an organism (invertebrates, fungus etc., or browsing/grazing mammals such as goats) is introduced or liberated to kill or lower the biomass reproductivity of the target weed species.

Techniques which utilise chemicals:

- 7. Stems (woody or herbaceous) cut and painted with concentrated systemic herbicide.
- 8. Bark of wood plants 'frilled' and concentrated systemic herbicide applied.
- 9. Herbicide applied to foliage and/or stems using a spray, wick applicator or similar equipment.
- 10. Herbicide (granular) applied to roots.
- 11. Biocides such as sea salt or petroleum products applied to leaves, stems or roots of plants.

Techniques 1-6 above are categorised as control options (without the use of chemicals), while techniques 7-11 utilize chemicals, typically a complex formulated chemical compound, often with the use of adjuvants (spreaders) to aid uptake and effectiveness, and with dyes to signify their use in a given location.

The use of herbicides is potentially complex as there are many different herbicides of different chemical composition, mechanisms of action in the target plants, means of application, concentrations, optimal timing and/or physiological activity of the targeted plants, adjuvants etc. (Parsons and Cuthbertson 2001, Muyt 2001). Some are formulated for specific weed species; others are intended for a wide spectrum of species. Some are registered for use on particular species and some, though widely used for off-label species, are not registered (on-label and off-label). Weed control operators using chemicals must be licensed, competent and abreast of developments in the industry at all times. Operators must apply the right herbicides to the right species (to effect requisite control), at the right time of year/physiological state of target weeds, at the correct concentrations, using the correct mode of application, as well as monitor and record the results of their actions. All requisite occupational health and safety obligations and protocols relevant to their certification must be applied.



Without the use of some herbicides, effective control or elimination of a suite of weeds in the reserve system will remain a vain and unachievable objective.

4.10 Fire

The use of fire (fuel reduction or ecological burning) in Bayside has long been recognised as an important management tool to revitalise senescent vegetation and simulate its recovery from the soil-stored seedbanks. This has typically been utilised to kill standing crops of #Coast Tea-tree or has capitalised on an unplanned fire; the result can be astonishing recovery of the former vegetation before the highly invasive #Coast Tea-tree ostensibly destroyed it. Fire is a normal disturbance event in the Sand Heathland, Heathy Woodland and Damp Sands Herb-rich Woodland EVCs and the vegetation has a long geological history of fire (tens of thousands or millions of years). The component plant species have evolved evolutionary strategies to cope with fire – either by in situ survival and post-fire resprouting of plants; recovery from long-lived soil-stored or canopy-stored seed banks; or seed dispersal to the burnt site after fire by wind. In the long term absence of fire on sites where the vegetation is not destroyed by weedy invaders such as #Coast Tea-tree or #Coast Wattle, vegetation ultimately senesces and species are progressively lost – as live plants or from the seed-banks. While soil-stored seed-banks are remarkably long-lived, they are ultimately degraded, depleted and lost. See Section 4.5 for further discussion of #Coast Tea-tree management using fire.

Ecological burning is endorsed by Bayside City Council in the Ecological Burn and Post Burn Management Policy, and is recognised in the Bayside Bushland Strategy (Bayside City Council 2002, pp. 9, 10) as an important management tool: indeed we (Ecology Australia) believe that fire is a crucial option in the management mix of Sand Heathland, Heathy Woodland and Damp Sands Herb-rich Woodland EVCs. While it is acknowledged that there are significant practical, logistic, social and political constraints militating against the use of fire – despite it being a part of the Bushland Strategy – its use must be continued if irreparable degradation of vegetation and faunal habitats is not to occur. It seems appropriate to tease these issues out in a public forum – the facts and constraints – chaired by an informed, conciliatory and firm chairperson.

The recommended burning regime for the inland reserve systems is detailed in Section 5 Prioritised Management Actions for Sites, and is summarised here:

Short term (1 - 3 years)

- Balcombe Park mosaic burn the long unburnt areas of Management Unit 3 adjoining recently burnt areas
- Donald McDonald mosaic burn the long unburnt areas of Management Unit 2

Short to medium term (3 - 4 years)

• Long Hollow – mosaic burn the long unburnt areas of Management Unit 2

Medium term (4 - 7 years)

- George Street mosaic burn the long unburnt areas of Management Unit 2
- Bay Road mosaic burn up to 50% of Management Units 1 and 2
- Donald McDonald mosaic burn the long unburnt areas of Management Unit 3

Medium to long term (7 - 8 years)

• Gramattan Avenue - mosaic burn the long unburnt areas of Management Unit 1

Long term (8 - 10 years)

- Cheltenham Park mosaic burn the long unburnt areas of Management Unit 1
- Donald McDonald mosaic burn the long unburnt areas of Management Unit 4

4.11 Fencing

Installing fences to exclude pedestrians and dogs will greatly benefit the remnant vegetation by protecting the sensitive components, including the indigenous vascular plants (above and below ground parts) and the soil crust (composed of bryophytes (mosses and lichens), lichens and algae), from a variety of associated threats. The most pertinent threats to the vegetation as a result of unrestricted access include (see Ecology Australia 2009 for more details):

- trampling of vegetation which can damage or kill plants, compact the soil, reduce regeneration, and inhibit plant growth;
- weed invasion due to nutrient enrichment (e.g. via dog faeces), trampling and dispersal of seeds by pedestrians/dogs; and
- collection of plant material, particularly of reproductive material (flowers and fruits).

Perhaps the most vulnerable stage for vegetation to succumb to these threats is soon after fire when little above-ground vegetation cover remains, exposing the fragile regenerating seedlings, resprouts from rootstocks and soil crusts. Fences should be installed immediately after disturbances such as fire to inhibit access during the most vulnerable stages of vegetation recovery. The fences should wherever possible be made from sustainable resources (e.g. fast-growing plantation pine timber rather than slowgrowing Cypress-pine (Callitris glaucophylla)), and their site location and installation should involve minimal to no soil and vegetation disturbance. Fencing contractors should be well made aware of the issues and threats that they pose to the regenerating vegetation prior to fence installation and make all attempts to minimise their impacts during the installation process.

The current Council policy requires fences to be installed for a minimum of 3.5 years after fire. However, given the rarity of remnant vegetation within the municipality and the pressures threatening its extent and quality (weed invasion, user related pressures, etc.), it is extremely important to protect the remaining areas from serious threats. For this reason it is recommended that fences remain in place permanently to exclude pedestrian and dog traffic from areas away from designated walking tracks. This is a costeffective method of helping to maintain biodiversity and reducing ongoing management costs (such as more intense weed management) in the long term. As there can be significant public pressure to remove the fences, signage explaining why the fences are required is desirable. Although it is not advisable to remove fences, if public pressures warrants further consideration of the matter, then an ecological assessment of the vegetation should be undertaken to determine if removing the fences will adversely effect the vegetation (such as the post-fire investigation conducted for George Street Reserve by Ecology Australia (2009)). It should not be considered acceptable to remove fences if the quality and/or extent of remnant vegetation is likely to decline.

In addition to fencing recently burnt and/or disturbed areas, fences should be installed in areas where informal tracks or track widening is problematic.

Prioritised Management Actions for Sites 5

Habitat Zones within each study area have been grouped into Management Units based on comparable vegetation condition and unifying management requirements. For each site, the reasoning for Management Unit divisions is provided, along with a map illustrating the extent of each Management Unit, and a table of the prioritised management actions.

The list of weed species provided in Stage 1 of the Bayside Native Vegetation Works Program (Ecology Australia 2008a) has been updated to include additional weed species identified during the brief 2012 site visits, changes to site-specific priority, and the management aim of elimination or control. All changes to the weeds tables are shown in blue text. The aim for the more ubiquitous weed species that cannot reasonably be eliminated is to reduce their distribution and cover (i.e. control), while those species known to be particularly invasive, and/or those with currently small and tractable populations, should be eliminated where possible (i.e. elimination).

The Management Unit and Habitat Zone quality variations (i.e. habitat score categories of 10% increments) are illustrated for each site. The quality variations are depicted in the maps to correspond with the colour categories used in Stage 1 (Ecology Australia 2008a), whereby:

Red	0-9% of pre-European condition
Orange	10-19% of pre-European condition
Pale Orange	20-29% of pre-European condition
Yellow	30-39% of pre-European condition
Light Green	40-49% of pre-European condition
Medium Green	50-59% of pre-European condition
Dark Green	60-69% of pre-European condition

Based on this colour scheme, land managers can see which areas within a Management Unit are of higher quality and hence should be prioritised for initial management activities over lower-quality areas.

A Risk Assessment has been undertake for each of the major management issues to justify the reasoning behind the management priority level for the inland and foreshore reserves. The Risk Assessment process is illustrated in Figure 2 and explained in Appendix 3. Table 4 indicates which management issues were identified in each reserve, and are considered in the site-specific prioritised management actions tables.

Fire, as detailed in the site-specific prioritised management actions tables, is prioritised across the applicable Management Units in the seven inland reserves in the following order:

- 1. Balcombe Park Management Unit 3
- 2. Donald McDonald Reserve Management Unit 2
- 3. Long Hollow Heathland Management Unit 2
- 4. Bay Road Heathland Sanctuary Management Units 1 and 2
- 5. George Street Reserves Management Unit 2
- 6. Donald McDonald Reserve Management Unit 3
- 7. Gramatan Avenue Heathland Sanctuary Management Unit 1
- Cheltenham Park Flora and Fauna Reserve Management Unit 1 8.
- 9. Donald McDonald Reserve Management Unit 4









Table 4 Identified occurrence of management issues within each of the 14 reserves.

Key: (RA)

RA) Risk Assessment undertaken for this management issue

	Inland Reserves			Foreshore Reserves											
Management issue	Balcombe	Bay Rd	Cheltenham	Donald Mc	George St	Gramatan	Long Hollow	Beaumaris	Black Rock	Brighton	Picnic Pt	Red Bluff	Ricketts Pt	Sandringham	
Weeds (Priority 1-4) (RA)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	Additional species are likely to occur
Hybridisation (RA)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	~		~	~	\checkmark	\checkmark		~	This issue or additional hybrids may occur for each reserve
Over-abundant indigenous plants (RA)	\checkmark	~	✓	~	~	~	~		✓	✓	~			~	This issue or additional species requiring management may occur for each reserve
Invasion of Coastal Dune Grassland by indigenous shrubs (BA)															
Inclusion of fire as a management strategy (RA)	<u> </u>	<u> </u>		✓	✓				l ·		v			v	
Dettice (DA)	·														May occur in additional reserves, but no evidence observed 2008 during field
							~	~	· ✓	✓	~	~		~	surveys Issue is likely present on-site, but no
Foxes (RA)	×	×	×	x	×	×	×	×	×	×	x	×	×	×	management is currently recommended due to tractability of problem
															Issue is likely present on-site, but no
															management is currently recommended
Cats (RA)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	due to tractability of problem
Rodents (rats and mice) (RA)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	management is currently recommended due to tractability of problem
Exotic birds (Common Mynas, Blackbirds, Feral Pigeons) (RA)	×	×	×	×	×	×	×	×	×	×	×	×	x	×	Issue is likely present on-site, but no management is currently recommended due to tractability of problem
Damage to vegetation by machinery used for beach 'nourishment' and sand raking (RA)									~	~	~	~		~	
Informal tracks through vegetation (RA)									√	√	\checkmark	\checkmark	\checkmark	\checkmark	May occur in additional reserves
Unrestrained dogs (RA)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
Planted non-indigenous native plant species potentially seen as indigenous	~	~	~	~	~	~	~				~	~		~	This issue or additional species requiring management may occur for each reserve
Robust shrubs (planted?) outcompeting herbaceous indigenous diversity												\checkmark		\checkmark	May occur in additional reserves
Spiny/large shrubs growing (planted?) next to footpaths											~	\checkmark		~	Likely to occur in additional reserves
Loss of rare Coast Saltwort (Salsoa tragus ssp.															Likely to occur in additional foreshore
pontica) individuals														\checkmark	reserves
Investigate taxonomy of Platylobium obtusangulum						\checkmark									
Experimental slashing of robust tufted/rhizomatous graminoids to increase diversity					\checkmark										
Construct a soak (wetland)	\checkmark														
Revegetation of bare areas and supplementary	1	1	1	1	1	1	1		<u> </u>	1	1	1	1		
Erosion at storm-water drain outlets	·	, v	, v	v	v	,	v	▼ √		·	v	v	v	v	Likely to occur in additional reserves
Sea-cliff erosion (natural and human-influenced)								· ~	✓	✓	\checkmark	\checkmark	\checkmark	\checkmark	
Litter/hard rubbish								~	~	~	~	~	~	~	Primarily a coastal issue where litter will impact sea birds and marine life
Dog faeces	\checkmark			\checkmark	\checkmark			\checkmark	✓	✓	\checkmark	\checkmark		\checkmark	Minor issue in other reserves
Leaking septic tank											\checkmark				
Weeds on private property						\checkmark									
Private land use encroaching into reserves													\checkmark		
Dumping of garden waste													\checkmark		Likely to occur in additional reserves
Tree/vegetation vandalism								\checkmark	~	~	\checkmark	\checkmark	\checkmark	\checkmark	May also occur in inland reserves but is less of an issue there
Pruning along tracks impacting significant species													\checkmark		Likely to occur in additional reserves
Expand study area			\checkmark						✓			\checkmark			Could apply to additional reserves
Set up quadrats	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	

5.1 Site: Balcombe Park (Beaumaris)

Three Management Units (MUs) were identified onsite and are separated on the basis of variations in the management requirements across the site (Figure 3). Management Unit 1 (MU1) comprises vegetation that has been burnt in the past decade which has killed the exotic Coast Tea-tree (*#Leptospermum laevigatum*) canopy and stimulated the germination of many species resulting in regeneration of the heathland vegetation. This area is of highest conservation value in the reserve.

While some #Coast Tea-tree remains in Management Unit 2, a large amount has been manually removed. In place of the #Coast Tea-tree, a variety of indigenous, questionably indigenous and Victorian/Australian native species that are not indigenous to the local area have been planted. Management Unit 3 contains vegetation dominated by #Coast Tea-tree and Coast Wattle (#*Acacia longifolia* subsp. *sophorae*) over varying degrees of indigenous understorey. Management works in this Unit should be focused in area containing populations of significant species (e.g. orchids) or pockets of diverse indigenous understorey with high indigenous cover, then expanding out into the lower-quality areas of the Management Unit.

Table 5 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 6), along with an updated list of prioritised weeds requiring control or elimination (Table 7). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 8.

Table 6Location details of permanent monitoring quadrats at Balcombe Park,
Beaumaris (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

Table 5	Constituent Ecological Vegetation Classes and Habitat Zones within each
	Management Unit, Balcombe Park, Beaumaris.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Sand Heathland (6) .	1, 3, 5, 8	22%, 46%, 33%, ♦	Fire history, heathland vegetation structure
2	Damp Sands Herb-rich Woodland (3)	2, 7	23%, 27%	Management history of plantings
3	Damp Sands Herb-rich Woodland (3)	2, 4, 6	23%, 26%, 31%	Coast Tea-tree domination

• As very little vegetation was present in Habitat Zone 8 during the 2008 assessment (undertaken just weeks after the zone was burnt), it was assumed the HZ8 would form part of the Damp Sands Herb-rich Woodland EVC based on the EVC mapping by DSE. However, in the brief 2012 site visit the vegetation appeared to have more affinities with Sand Heathland EVC.

• A Vegetation Quality Assessment was not completed for HZ8 in 2008 (too recently burnt). It was estimated during the 2012 site visit that the quality is likely to be between 30-39% of pre-European condition.



Table 7	Summary of the weed species recorded in the Habitat Zones identified at
	Balcombe Park, Beaumaris - updated from Ecology Australia (2008a).

K	ley:	
S	H	Sand Heathland
D	SHW	Damp Sands Herb-rich Woodland
С	ont/Elim	Management objective of Control or Eliminate
	С	Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated
	Е	Eliminate, where possible: species known to be particularly invasive and/or those with currently small
		and tractable populations should be eradicated
C	aLP	Catchment and Land Protection Act 1994
	R	Regionally Restricted under the Catchment and Land Protection Act 1994
	С	Regionally Controlled under the Catchment and Land Protection Act 1994
W	/ONS / W	Weed of National Significance
\checkmark	·	Present (species may occur in additional HZs)
•		A species list and Vegetation Quality Assessment were not completed for HZ 8 in 2008 as it had been
		burnt too recently
+		Some adult planted specimens may be retained however elimination of any offspring is recommended

[†] Some adult planted specimens may be retained, however elimination of any offspring is recommended

- a Eliminate from Management Unit 1, Control in Management Units 2 and 3
- Blue text Additions or edits to the weeds table presented in Ecology Australia (2008a)

Habitat Zone							1	2	3	4	5	6	7	8 ♦
Ecological Vegetation Class name (initials) Habitat Score						HS 22%	MHSQ 23%	HS 46%	MHSQ 26%	HS 33%	MHSQ 31%	MHSQ 27%	MHSQ c. 30-39%	
riority	Cont/Elim	CaLP	NONS		Spacios Nomo	Common Nomo								
1	E	<u> </u>	-	*	Acacia longifolia subsp.	Sallow Wattle		√		√	√	√		
1	Е			#	Acacia longifolia subsp. sophorae	Coast Wattle	~	~		~	~		~	
1	Е			*	Acetosa sagittata	Rambling Dock		\checkmark						
1	Е	R		*	Allium triquetrum	Angled Onion		\checkmark						
1	Е	R	W	*	Asparagus asparagoides	Bridal Creeper	\checkmark	\checkmark		\checkmark				
1	Е			*	Coprosma repens	Mirror Bush		\checkmark						
1	Е			*	Dipogon lignosus	Common Dipogon		\checkmark						
1	Е			#	Leptospermum laevigatum	Coast Tea-tree	~	\checkmark	\checkmark	\checkmark	~	~	\checkmark	
1	Е			*	Oxalis incarnata	Pale Wood-sorrel	\checkmark		\checkmark				\checkmark	
1	Е	R		*	Oxalis pes-caprae	Soursob	\checkmark	\checkmark			\checkmark	\checkmark		
1	Е			*	Pennisetum clandestinum	Kikuyu		\checkmark					\checkmark	
1	Е			*	Pittosporum undulatum	Sweet Pittosporum		\checkmark			\checkmark			
1	Е	С		*	Salpichroa origanifolia	Pampas Lily-of-the- Valley		~		~	~	1	~	
1	Е			*	Tradescantia fluminensis	Wandering Jew		\checkmark						
2	С			*	Anthoxanthum odoratum	Sweet Vernal-grass				\checkmark				
2	Е			*	Callitris verrucosa	Scrub Cypress-pine	\checkmark		\checkmark					
2	Е			*	Chlorophytum comosum	Spider Plant		\checkmark						
2	а			*	Ehrharta erecta var. erecta	Panic Veldt-grass	~	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	~	
2	С			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark							
2	Е			*	Eucalyptus botryoides	Southern Mahogony							\checkmark	
2	Е			*	Eucalyptus conferruminata	Bald Island Marlock	~		~		~		~	

Hab	oitat 7	Zone					
Thuc	itut 2	20110					-
Eco	logic	al Ve	eget	atic	on Class name (initials)		5
Hab	itat S	Score	2				22
iority	ont/Elim	aLP	SNO				
Pr	Ŭ	Ű	3		Species Name	Common Name	
2	E			*	Passiflora caerulea	Passion-fruit	
2	C			*	Setaria parviflora	Slender Pigeon-grass	
3	E			*	Acanthus mollis	Bear's Breach	
3	E			*	Alstroemeria psittacina	Alstromeria	
3	C			*	Arctotheca calendula	Cape Weed	v
3	C			*	Briza maxima	Large Quaking-grass	
3	E			*	Cupressus macrocarpa	Monterey Cypress	v
3†	Е			*	Eucalyptus globulus subsp. globulus	Southern Blue-gum	
3	С			*	Fumaria spp.	Fumitory	
3	С			*	Hypochoeris radicata	Flatweed	v
3	С			*	Lagurus ovatus	Hare's-tail Grass	-
3	С			*	Lolium spp.	Rye-grass	
3	С			*	Poa annua	Annual Meadow-	
4	С			*	Cerastium glomeratum	Common Mouse-ear Chickweed	
4†	Е			*	Corymbia	Red-flowering Gum/	
					ficifolia/calophylla	Bloodwood	
4	С				Dianella tasmanica (probably exotic	Tasman Flax-lily	v
					provenance)		
4	С			*	Eleusine tristachya	American Crows-foot Grass	
4†	Е			*	Eucalvptus burdettiana	Burdetts Mallee	
4†	Е				Eucalyptus camaldulensis	River Red-gum	
<i>1</i> ÷	E	-		*	Eucalyptus taraticornis	Ginnsland Red gum	-
4	C			*	Geranium molle var. molle	Dove's Foot	
4	С			*	Malva spp.	Mallow	
4	C			*	Polygonum arenastrum	Wireweed	
4	С			*	Romulea rosea var. australis	Onion Grass	
4	C	-		*	Solanum nigrum	Black Nightshade	-
1		-		*	Souchus oloracous	Common Sow thistle	-
4	C	-		*	Stallaria modia	Chielawood	-
4		-		*	Trifolium spp (oppuals)	Clover	-
4				1.	<i>Trijottum</i> spp. (annuals)	Ciovei	1







Figure 3 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Balcombe Park, Beaumaris. EVC 3: Damp Sands Herb-rich Woodland, EVC 6: Sand Heathland.



Table 8 Prioritised management actions for Balcombe Park, Beaumaris.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Management Unit	Management Actions for Balcombe Park	Outcome	Timeframe
Highest Priority			
1, 2	 Management of Priority 1 weeds (eliminate/control as in Table 7) If areas of woody weeds, particularly Coast Tea-tree (#Leptospermum laevigatum), are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seedbank Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3
1	Aim to eliminate Panic Veldt-grass (* <i>Ehrharta erecta</i> var. <i>ereta</i>) (Priority 2 weed) from Management Unit 1	Reduction in cover of Panic Veldt-grass	Year 1, ongoing; elimination achieved by Year 3
3	 Manage Priority 1 weeds (eliminate/control as in Table 7) where orchid populations and areas where a diverse indigenous understorey are known to exist All Coast Tea-tree (#<i>Leptospermum laevigatum</i>) should be removed. After the autumn break, spray smoke-water over areas where adult Coast Tea-tree have been manually removed (i.e. not killed by fire) to stimulate germination of indigenous species in the soil-stored seedbank Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved in areas with orchids or an indigenous understorey by Year 3
1	 Ecological thinning of over-abundant/highly competitive indigenous plant species Remove all Kangaroo Apple (<i>Solanum laciniatum</i>) from Management Unit 1 (particularly Habitat Zone 8), and only tolerate low levels elsewhere across the site Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where overabundant and killing indigenous vegetation Tolerate no more than 5% cover of Twiggy Daisy-bush (<i>Olearia ramulosa</i>) in any Habitat Zone polygon Dispose of removed plant material off-site to help reduce soil nutrient levels 	 No monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required

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Management Unit	Management Actions for Balcombe Park	Outcome	Timeframe
1, 2, 3	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	• No hybrid individuals or their exotic parents present	Year 1, ongoing
	• Hybrid Correa, involving Correa reflexa var. reflexa and other species		
	• Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X # <i>L</i> . <i>laevigatum</i>) hybrids (if present)		
	• Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus</i> X # <i>Acacia longifolia</i> s.l.) hybrids (if present)		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		
1	Maintain/erect fences around Management Unit 1 and areas of regenerating heath where woody weeds have been controlled, to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public 	Year 1, ongoing
1	Implement dog faeces management program	• Letter sent to all dog owners in the municipality	Year 1, ongoing
	Regular presence of staff enforcing dog owner compliance	• Reduction of dog faeces along tracks and in vegetation areas (based on observations	
	• Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal	by management staff/contractors)	
	• Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced		
1, 2, 3	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2)	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is 	After the autumn break Ongoing, as required.
	Replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance	less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	
	Avoid unnecessary use of tree guards		
1, 3	Establish permanent monitoring quadrats	 Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing
3	Mosaic burn the long unburnt areas of Management Unit 3 where it adjoins recently burnt areas, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt vegetation where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in the short term (1-3 years)



Management Unit	Management Actions for Balcombe Park	Outcome	Timeframe
Medium Priority			
1, 2	Management of Priority 2 weeds (eliminate/control as in Table 7)	• Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	• Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
		• No increase in cover of Priority 3 and 4 weeds	
3	Management of Priority 1 weeds (eliminate/control as in Table 7)	Reduction in cover of Priority 1 weeds	Medium to long term (3-10
	• If areas of woody weeds, particularly Coast Tea-tree (<i>#Leptospermum laevigatum</i>), are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seed-	• No increase in cover of Priority 2, 3 and 4 weeds	years depending on species and abundance) Ongoing
	 Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads Ensure cover of Priority 2, 3 and 4 weeds does not increase 		
1, 2, 3	 Tasman Flax-lily (<i>Dianella tasmanica</i>) is doubtfully indigenous to Balcombe Park and could be wrongly perceived in future as a bona fide indigenous species Adults can be retained, however all recruits should be eliminated 	No expansion of the Tasman Flax-lily population	Ongoing, as required
	• Do not plant more of this species		
1, 2, 3	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appednix 2) Infill plantings of Scented Paperbark (<i>Melaleuca squarrosa</i>) in Management Units 2 and 3 where Swamp Paperbark (<i>Melaleuca ericifolia</i>) occurs, with the aim of gradually replacing the Swamp Paperbark that is unlikely to have originally occurred in the park	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
	Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 and 2 according to EVC revegetation lists (Appendix 2)		
	Avoid unnecessary use of tree guards		
Lowest Priority			
1, 2	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 7)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required



Management Unit	Management Actions for Balcombe Park	Outcome	Timeframe
3	Management of Priority 2 weeds, as well as Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 7)	 Reduction of cover of Priority 2, 3 and 4 weeds Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Medium term (3-8 years) Ongoing
2, 3	Consider building a soak (wetland) in the depression to the west of the northern end of the oval, and revegetate with indigenous species of local provenance (Appendix 2)	• Self-sustaining wetland environment with a reliable supply of water, high cover of indigenous species and few weeds	Long term (5-10 years)
1, 2, 3	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



5.2 Site: Bay Road Heathland Sanctuary (Sandringham)

Four Management Units (MUs) were identified onsite and are separated on the basis of past management works, management constraints, and vegetation quality (Figure 4). The Sand Heathland of Management Unit 1 is long unburnt and of high conservation value with its high indigenous diversity and cover. Management efforts in MU1 will be focused on maintaining this high quality. #Coast Tea-tree management in Management Unit 2 has resulted in limited regeneration of heath species. In several areas monocultures of indigenous species (e.g. Twiggy Daisy-bush Olearia ramulosa, Black Wattle Acacia *mearnsii*) have recruited; these suppress the germination or survival of other indigenous species, resulting in reduced diversity. Management for this Unit will focus on enhancing the heathland regeneration. Management Units 3 and 4 will be maintained as garden beds for indigenous species, differing in that #Coast Tea-tree will be removed for MU3 and retained as a buffer in MU4.

Table 9 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 10), along with an updated list of prioritised weeds requiring control or elimination (Table 11). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 12.

Table 9	Constituent Ecological Vegetation Classes and Habitat Zones within each
	Management Unit, Bay Road Heathland Sanctuary, Sandringham.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of	Reason for MU division/grouping
			pre-European condition)	
1	Sand Heathland (6)	1, 2	62%, 62%	Highest conservation value, maintain high quality
2	Sand Heathland (6)	2, 4,	39%, 14%,	Assisted regeneration after
	Heathy Woodland (48)	5	35%	#Coast Tea-tree removal is required
3	Heathy Woodland (48)	6, 7	46%, 49%	Maintain as garden beds
4	Sand Heathland (6)	4	14%	#Coast Tea-tree is to be
	Heathy Woodland (48)	5	35%	retained as a buffer

Table 10 Location details of permanent monitoring quadrats at Bay Road Heathland Sanctuary, Sandringham (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

Table 11 Summary of the weed species recorded in the Habitat Zones identified at Bay Road Heathland Sanctuary, Sandringham - updated from Ecology Australia (2008a).

Key: SH			Sa	inc	l Heathland	HW Heathy Woodla	nd						
Cont C E	/Eliı Z	m	Management objective of Control or Eliminate Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be elimi Eliminate, where possible: species known to be particularly invasive and/or those with currently and tractable populations should be eradicated										elimir ently s
CaLI	5		C	ata	chment and Land Protection A	ct 1994							
R			R	eg	ionally Restricted under the Ca	atchment and Land Prote	ction	Act 1	994				
C	1		R	eg	ionally Controlled under the C	atchment and Land Prote	ection	Act	1994				
WON	NS /	W	W	lee	ed of National Significance								
/			Pr	es	ent (species may occur in addit	tional HZs)							
i			Sc	om	e adult planted specimens may	be retained, however eli	minat	ion o	f any	offsp	oring	is rec	omme
a			El	im	ninate from Management Unit	1, Control in Managemen	t Uni	ts 2, 3	3 and	4			
Blue	text		A	dd	itions or edits to the weeds tab	le presented in Ecology A	ustra	lia (2	008a)			
Hal	oitat	Zo	ne (ΉZ	Z)		1	2	3	4	5	6	7
Eco	ologi	cal	Veg	get	ation Class name (initials)		SH	SH	SH	SH	HW	HW	HW
Hal	oitat	Sc	ore				62%	62%	39%	14%	35%	46%	49%
Priority	Cont/Elim	CaLP	NONS		Species Name	Common Name							
1	E			*	Acacia longifolia subsp.	Sallow Wattle	\checkmark	√		√	\checkmark	✓	
					longifolia								
1	E			*	Acacia provincialis	Wirilda		\checkmark	\checkmark	\checkmark			
1	E			*	Agrostis capillaris	Brown-top Bent						\checkmark	
1	E	R	W	*	Asparagus asparagoides	Bridal Creeper	\checkmark				\checkmark		
1	E			*	Briza maxima	Large Quaking-grass	\checkmark		\checkmark		\checkmark		
1	E			*	Chamaecytisus palmensis	Tree Lucerne	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	
1†	Е			*	Eucalyptus botryoides	Southern Mahogany		\checkmark					
1	E			*	Gladiolus sp.	Gladiolus							
1	E			*	Ixia sp.	Ixia		\checkmark			\checkmark		
1	E			#	Leptospermum laevigatum	Coast Tea-tree	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	
1	E			*	Oxalis incarnata	Pale Wood-sorrel		\checkmark					
1	E	R		*	Oxalis pes-caprae	Soursob					\checkmark	\checkmark	
1	E			*	Pennisetum clandestinum	Kikuyu					\checkmark	\checkmark	\checkmark
1	E	С		*	Salpichroa origanifolia	Pampas Lily-of-the-Valley	\checkmark		\checkmark				
2	E			*	Cynodon dactylon var. dactylon	Couch					~	~	~
2	E			*	Dactylis glomerata	Cocksfoot					\checkmark		
2	C			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark		\checkmark		\checkmark		\checkmark
2	C			*	Ehrharta longiflora	Annual Veldt-grass	✓	✓	✓		\checkmark	\checkmark	
3	E			*	Acetosella vulgaris	Sheep Sorrel		 ✓ 					
3	C			*	Arctotheca calendula	Cape Weed	✓	✓	 ✓ 	✓	 ✓ 	✓	✓
3	C			*	Fumaria spp.	Fumitory			 ✓ 		✓		
3	C			*	Hypochoeris radicata	Flatweed	✓	✓	✓	✓		✓	
3	C			*	Poa annua	Annual Meadow-grass							✓
3	C			*	<i>Vulpia</i> spp.	Fescue	✓	<u> </u>		✓	✓		
4	C			1	Leontodon taraxacoides subsp.	Hairy Hawkbit			√				
	0			*	taraxacoides	Q . W 1 1							
4	C			*	Oxalis corniculata s.s.	Creeping Wood-sorrel			✓ ✓		✓ 		
4				*	Komulea rosea var. australis	Union Grass	✓	~	~	~	✓ 		
4				*	Solunum nigrum Stollaria modia	Chickweed	1				× ./	1	V V
4		\vdash		*	Trifolium amongo yor amorgo	Hara's foot Claver	V V		1	v V	v	v	v
4				1 L	111jouun arvense val. arvense	Tiale S-1001 Clovel	V		Ý	v V			

nated small

ended



Figure 4 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Bay Road Heathland Sanctuary, Sandringham. EVC 6: Sand Heathland, EVC 48= Heathy Woodland.

Table 12 Prioritised management actions for Bay Road Heathland Sanctuary, Sandringham.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Management Unit	Management Actions for Bay Road Heathland Sanctuary	Outcome
Highest Priority		
1, 2, 3	Management of Priority 1 weeds (eliminate/control as in Table 11)	Reduction in cover of Priority 1 weeds
	• If areas of woody weeds, particularly Coast Tea-tree (<i>#Leptospermum laevigatum</i>), are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seedbank	• No increase in cover of Priority 2, 3 and 4 weeds
	• Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads	
	Ensure cover of Priority 2, 3 and 4 weeds does not increase	
1	Aim to eliminate Panic Veldt-grass (* <i>Ehrharta erecta</i> var. <i>ereta</i>) (Priority 2 weed) from Management Unit 1	Reduction in cover of Panic Veldt-grass
4	Management of Priority 1 weeds (eliminate/control as in Table 11)	Reduction in cover of Priority 1 weeds
	• Coast Tea-tree (# <i>Leptospermum laevigatum</i>) is to be retained in Management Unit 4	• No increase in cover of Priority 2, 3 and 4 weeds
	• Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads	
	Ensure cover of Priority 2, 3 and 4 weeds does not increase	
1, 2, 3, 4	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	No hybrid individuals or their exotic parents present
	• Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X # <i>L.</i> <i>laevigatum</i>) hybrids	
	• Hybrid Correa involving Correa reflexa var. reflexa and other species	
	• Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus</i> X # <i>Acacia longifolia</i> s.l.) hybrids (if present)	
	Dispose of removed plant material off-site to help reduce soil nutrient levels	
1-4	Tasman Flax-lily (<i>Dianella tasmanica</i>) is doubtfully indigenous to Bay Road Heathland Sanctuary and could be wrongly perceived in future as a bona fide indigenous species	No expansion of the Tasman Flax-lily population
	• Adults can be retained, however all recruits should be eliminated	
	• Do not plant more of this species	

EcologyAutralia

Timeframe
Year 1, ongoing; elimination achieved by Year 3
Year 1, ongoing; elimination achieved by Year 3
Year 1, ongoing; elimination achieved by Year 3
Year 1, ongoing
Ongoing, as required

Management Unit	Management Actions for Bay Road Heathland Sanctuary	Outcome	Timeframe
1-4	 Ecological thinning of over-abundant/highly competitive indigenous plant species Tolerate no more than 5% cover of Twiggy Daisy-bush (<i>Olearia ramulosa</i>) in any Habitat Zone polygon 	 No monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required
	Remove all Kangaroo Apple (<i>Solanum laciniatum</i>) from Management Units 1 and 2, and only tolerate low levels elsewhere		
	• Retain a maximum of 20 Black Wattle (<i>Acacia mearnsii</i>) individuals in Management Units 1 and 2		
	• Slash/scorch Bracken (<i>Pteridium esculentum</i>) where it is supressing indigenous species (and hence the vegetation is likely to regenerate with indigenous species rather than exotic species, particularly exotic grasses), to reduce cover to no more than 10% in a Habitat Zone polygon		
	• Tolerate no more than 5% cover of Hedge Wattle (<i>Acacia paradoxa</i>) in any Habitat Zone polygon		
	• Destroy (i.e. remove haustoria – the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where over- abundant and killing indigenous vegetation		
	• Tolerate no more than 5% cover of Climbing Lignum (<i>Muehlenbeckia australis</i>) in any Habitat Zone polygon		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		
1, 2, 3, 4	Remove non-indigenous native species competing with indigenous species, and that could be wrongly perceived in future as a bona fide indigenous species	No/few non-indigenous native species present	Year 1, ongoing
	• Burgan (<i>Kunzea ericoides</i> spp. agg.)		
	• Seaberry Saltbush (<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>) – eliminate from Management Units 1 and 2, and tolerate low levels elsewhere		
	• Drooping She-oak (<i>Allocasuarina verticilata</i>) – larger adult individuals can be retained, recruits eliminated		
	• River Red-gum (<i>Eucalyptus camaldulensis</i>) - larger adult individuals can be retained, recruits eliminated		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		
1, 2	Maintain fences around Management Units 1 and 2 to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public 	Year 1, ongoing



Management Unit	Management Actions for Bay Road Heathland Sanctuary	Outcome	Timeframe
1, 2, 3, 4	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance Avoid unnecessary use of tree guards	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1, 2	Establish permanent monitoring quadrats	Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program	Set up: Year 1 Monitoring: ongoing
1, 2	Mosaic burn up to 50% of the long unburnt areas of Management Units 1 and 2, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt Sand Heathland where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in the medium term (4-7 years)
Medium Priority			
1-4	Management of Priority 2 weeds (eliminate/control as in Table 11)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	 Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Ongoing
1-4	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in Management Units 1 and 2 and higher quality areas of Management Units 3 and 4 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
Lowest Priority			
1-4	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 11)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required
1-4	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required

Sweet Bursaria (*Bursaria spinosa* subsp. *spinosa*) is considered to be in the wrong place by some volunteers at Bay Road Heathland Sanctuary; Ecology Australia are aware of no evidence to indicate it was an original member of the Sand Heathland vegetation. Monitoring can be undertaken to determine if it becoming weeding.



5.3 Site: Beaumaris Foreshore – north (Beaumaris)

One Management Unit (MU1) was identified onsite (Figure 5). Management Unit 1 comprises all Habitat Zones within the study area, as the management issues (primarily weeds) are uniform throughout.

Table 13 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 14), along with an updated list of prioritised weeds requiring control or elimination (Table 15). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 16.

Table 13	Constituent Ecological Vegetation Classes and Habitat Zones within the
	Management Unit, Beaumaris Foreshore - north, Beaumaris.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coastal Headland Scrub (161)	1, 2, 3, 4, 5, 6, 7, 8, 10, 11	40%, 47%, 16%, 35%, 33%, 35%, 50%, 37%, 33%, 28%	Comparable management issues.
	Spray-zone Coastal Shrubland (876)	9, 12	48%, 54%	

Table 14Location details of permanent monitoring quadrats at Beaumaris
Foreshore - north, Beaumaris (to be detailed when quadrats are
established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

Table 15Summary of the weeds recorded in the Habitat Zones identified at
Beaumaris Foreshore - north, Beaumaris - updated from Ecology
Australia (2008a).

Key:	
CHS	Coastal Headland Scrub
SZCS	Spray-zone Coastal Shrubland
Cont/Elim	Management objective of Control or Eliminate
С	Control: Reduce the distribution and cover of ubiquite
E	Eliminate, where possible: species known to be partic
	and tractable populations should be eradicated
CaLP	Catchment and Land Protection Act 1994
R	Regionally Restricted under the Catchment and Land
С	Regionally Controlled under the Catchment and Land
WONS / W	Weed of National Significance
\checkmark	Present (species may occur in additional HZs)
Ť	Some adult planted specimens may be retained, howe
Blue text	Additions or edits to the weeds table presented in Eco

Hab	oitat	Zo	ne				1	2	3	4	5	6	7	8	9	10	11	12
Eco	Ecological Vegetation Class name (initials)		\mathbf{S}	S	S	S	S	S	S	S	CS	S	S	CS				
							G	CE	SZ	CE	CE	SZ						
Hab	oitat	Sc	ore				40%	47%	16%	35%	33%	35%	50%	37%	48%	33%	28%	54%
	m																	
rity	E	<u>۔</u>	9															
1.0	ont	F	Ó															
<u> </u>	Ŭ	Ű	5		Species Name	Common Name												
1	E			*	Acacia longifolia s.l. x.A.	Hybrid Sallow Wattle								\checkmark				
			_		floribunda													
1	E			*	Acetosa sagittata	Rambling Dock					\checkmark						✓	
1	E	R		*	Allium triquetrum	Angled Onion		✓	✓	✓					✓		✓	✓
1	E			*	Araujia sericifera	White Bladder-flower	✓				✓							
1	E	R	W	*	Asparagus asparagoides	Bridal Creeper	✓			\checkmark								
1	E			*	Carpobrotus aequilaterus /	Angled Pigface /	√											
					C. edulis	Hottentot Fig												
1	E			*	Chasmanthe floribunda	A frican Cornflag							\checkmark					
1	E	C	W	*	Chrysanthemoides monilifera	Boneseed	✓						\checkmark	\checkmark	\checkmark			\checkmark
					subsp. monilifera													
1	E			*	Coprosma repens	Mirror Bush	✓		\checkmark				\checkmark	\checkmark				\checkmark
1	E			*	Delairea odorata	Cape Ivy	\checkmark			\checkmark	\checkmark		\checkmark	\checkmark		\checkmark	\checkmark	
1	E	С	W	*	Genista linifolia	Flax-leaf Broom								\checkmark		\checkmark		
1†	E			*	Hakea drupacea	Sweet Hakea	\checkmark			\checkmark	\checkmark			\checkmark			\checkmark	
1	E	С	W	*	Lycium ferocissimum	A frican Box-thorn	\checkmark		\checkmark		\checkmark		\checkmark	\checkmark				
1	E	C		*	Moraea flaccida	One-leaf Cape-tulip	\checkmark				\checkmark				\checkmark			
1	E	R		*	Oxalis pes-caprae	Soursob	\checkmark											
1	Е			*	Pennisetum clandestinum	Kikuyu	\checkmark		\checkmark	\checkmark	\checkmark						\checkmark	\checkmark
1	Е	C		*	Salpichroa origanifolia	Pampas Lily-of-the-	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	\checkmark	
						Valley												
1	Е			*	Zantedeschia aethiopica	White Arum-lily					\checkmark							
2	Е			*	Chlorophytum comosum	Spider Plant					\checkmark							
2	С	C		*	Cirsium vulgare	Spear Thistle		\checkmark										
2	Е			*	Crassula sarmentosa var.	Crassula					\checkmark		\checkmark					
					sarmentosa													
2	С			*	Cynodon dactylon var.	Couch	\checkmark		\checkmark	\checkmark		\checkmark						
					dactylon													
2	С			*	Dactylis glomerata	Cocksfoot					\checkmark							
2	С			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark		\checkmark	\checkmark	\checkmark							
2	С			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark											

tous species that cannot reasonably be eliminated cularly invasive and/or those with currently small

d Protection Act 1994 ad Protection Act 1994

ever elimination of any offspring is recommended ology Australia (2008a)

Table 15 continued

Hat	oitat	Zc	ne				1	2	3	4	5	6	7	8	9	10	11	12
Eco	Ecological Vegetation Class name (initials)			HS	HS	HS	HS	HS	HS	HS	HS	CCS	HS	HS	CCS			
							5	5	5	5	5	5	5	5	S	Ð	5	S
Hat	oitat	Sc	ore	_		1	40%	47%	16%	35%	33%	35%	50%	37%	48%	33%	28%	54%
Priority	Cont/Elim	CaLP	WONS		Species Name	Common Name												
2	C			*	Galenia pubescens var. pubescens	Galenia	~	~			~					~		
2	С			*	Oxalis purpurea	Large-flower Wood- sorrel	~											
2	С			*	Sporobolus africanus	Rat-tail Grass	\checkmark								\checkmark			\checkmark
2	С			*	Thinopyrum junceiforme	Sea Wheat-grass												\checkmark
3	Е			*	Acanthus mollis	Bear's Breach												\checkmark
3	С			*	Arctotheca calendula	Cape Weed	\checkmark			\checkmark								
3	С			*	Conyza spp.	Fleabane			\checkmark									
3	С			*	Fumaria spp.	Fumitory	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	\checkmark	
3	С			*	Hypochoeris radicata	Flatweed	\checkmark				\checkmark							
3	С			*	Plantago coronopus	Buck's-horn Plantain												\checkmark
3	C			*	Poa annua	Annual Meadow- grass		~										
3	С			*	Vulpia spp.	Fescue	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			
4	С			*	Cerastium glomeratum	Common Mouse-ear Chickweed	~						~	~				~
4†	Е			*	Corymbia ficifolia	Red-flowering Gum	\checkmark											
4	С			*	Geranium molle var. molle	Dove's Foot							\checkmark					
4	С			*	Romulea rosea var. australis	Onion Grass	\checkmark				\checkmark		\checkmark		\checkmark			\checkmark
4	E			*	Solanum nigrum	Black Nightshade	\checkmark				\checkmark	\checkmark	\checkmark	\checkmark				
4	С			*	Sonchus oleraceus	Common Sow-thistle	\checkmark	\checkmark				\checkmark	\checkmark		\checkmark		\checkmark	\checkmark
4	С			*	Stellaria media	Chickweed	\checkmark	\checkmark						\checkmark				
4	C			*	Vicia sativa s.l.	Common Vetch			\checkmark								\checkmark	





Figure 5 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Beaumaris Foreshore - north, Beaumaris. EVC 161: Coastal Headland Scrub, EVC 876: Spray-zone Coastal Shrubland.



Table 16 Prioritised management actions for Beaumaris Foreshore - north, Beaumaris.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff erosion is an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue. Beaumaris Foreshore - north presents a significant sea-cliff collapse risk, and as such management works should only occur in areas where it is safe to do so.

Management Unit	Management Actions for Beaumaris Foreshore - north	Outcome	Timeframe
Highest Priority			
1	 Management of Priority 1 weeds (eliminate/control as in Table 15) Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, liverworts) and fungi, unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals Management staff are trained and have suitable equipment to work on slopes Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3
1	 Improve the tree/vegetation vandalism program Develop an informative brochure summarising the impacts of tree vandalism, why it's an issue, and the consequences to vandals if they are identified If trees or other vegetation is vandalised: Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years Pursue/investigate all possible prosecutions in full Ensure publicity through local newspapers when trees are vandalised 	 Brochure distributed it to all residents (particularly new residents) with beach frontage Signage installed as soon as possible. Temporary signage may be necessary in the short term Reduction in occurrence of tree/vegetation vandalism 	Improve program: Year 1 Installation of signs: Asking for witnesses: 48 hrs after tree/vegetation vandalism occurs View obstructing signs: as soon as possible after tree/vegetation vandalism occurs, no later than 1 month after
1	Maintain fences (allowing access via gates) to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public 	Year 1, ongoing
1	Manage erosion at storm-water drain outlets	Erosion mitigated and rehabilitated, arresting its progression	Year 1



Management Unit	Management Actions for Beaumaris Foreshore - north	Outcome	Timeframe
1	Implement dog faeces management program	• Letter sent to all dog owners in the municipality	Year 1, ongoing
	Regular presence of staff enforcing compliance by owners	• Reduction of dog faeces along tracks and in vegetation areas (based on observations	
	• Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal	by management staff/contractors)	
	• Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced		
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90% determine and mitigate the cause of plant death before undertaking 	After the autumn break Ongoing, as required.
	Bursaria (<i>Bursaria spinosa</i> 'var. <i>macrophylla</i> ') to replace bird habitat lost through removal of *African Box-thorn	replacement plantings	
	Avoid unnecessary use of tree guards		
1	Establish permanent monitoring quadrats	 Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing
Medium Priority			
1	Management of Priority 2 weeds (eliminate/control as in Table 15)	• Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	• Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
	Management staff are trained and have suitable equipment to work on slopes	• No increase in cover of Priority 3 and 4 weeds	
1	 Follow-up revegetation/infill plantings where vegetation management has esulted in bare ground, utilising the robust species indicated in the EVC evegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality treas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards Sufficient weed control works prior to planting and adequate maintenance of plant death before undertaking replacement plantings Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken Sufficient meed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 		As required
1	Undertake regular litter collection	• Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
1	Maintain elimination of rabbits from the site	• No evidence of rabbits observed within the site	Ongoing



Management Unit	Management Actions for Beaumaris Foreshore - north	Outcome	Timeframe
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where	• Reduction in cover of targeted Priority 3 and 4 weeds	Long term (5-10 years)
	(eliminate/control as in Table 15)	Continued reduction in cover of Priority 1 and 2 weeds, as necessary	Ongoing, as required
		No increase in cover of weeds	
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 	As required
	revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	• 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	


5.4 Site: Black Rock – south (Black Rock)

One Management Unit (MU1) was identified onsite as the management issues (primarily weeds) are comparable across the study area (Figure 6). As the managed remnant vegetation extends beyond that included here in the study area, consideration should be given to expanding the site to encompass the wider area of adjoining vegetation.

Table 17 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 18), along with an updated list of prioritised weeds requiring control or elimination (Table 19). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 20.

Table 17Constituent Ecological Vegetation Classes and Habitat Zones within the
Management Unit, Black Rock - south, Black Rock.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coastal Headland Scrub (161)	1, 2, 3	45%, 45%, 33%	Comparable management issues.
	Spray-zone Coastal Shrubland (876)	4	50%	
	Coastal Dune Grassland (879)	5	24%	

Table 18 Location details of permanent monitoring quadrats at Black Rock - south, Black Rock (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

Table 19 Summary of the weed species recorded in the Habitat Zones identified at Black Rock - south, Black Rock - updated from Ecology Australia (2008a).

Key:	
CHS	Coastal Headland Scrub SZCS Spray-zone Coastal Shrubland CDG Coastal Dune Grassland
Cont/Elim	Management objective of Control or Eliminate
С	Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated
Е	Eliminate, where possible: species known to be particularly invasive and/or those with currently small
	and tractable populations should be eradicated
CaLP	Catchment and Land Protection Act 1994: R = Regionally Restricted; C = Regionally Controlled
WONS / W	Weed of National Significance
\checkmark	Present (species may occur in additional HZs)
Ť	Some adult planted specimens may be retained, however elimination of any offspring is recommended
Blue text	Additions or edits to the weeds table presented in Ecology Australia (2008a)

Tab	ble	19) C(on	tinued						
Hat	itat	Zo	ne				1	2	3	4	5
Eco	logi	ical	Veg	get	ation Class name (initials)		CHS	CHS	CHS	SZCS	CDG
Hat	itat	Sco	ore		· · · · · · · · · · · · · · · · · · ·		45%	45%	33%	50%	24%
Priority	Cont/Elim	CaLP	WONS		Species Name	Common Name					
1	E		W	*	Asparagus aethiopicus	Emerald Fern	~	√			
1	Е	R	W	*	Asparagus asparagoides	Bridal Creeper	\checkmark	\checkmark		√	
1	E			*	Carpobrotus aequilaterus / C. edulis	Angled Pigface / Hottentot Fig	~			~	~
1	Е			*	Chasmanthe floribunda	African Cornflag		\checkmark	\checkmark		
1	E	C	W	*	Chrysanthemoides monilifera subsp. monilifera	Boneseed	~	✓	~	✓	
1	Е			*	Coprosma repens	Mirror Bush		\checkmark	\checkmark	✓	\checkmark
1	Е			*	Cotoneaster spp.	Cotoneaster		\checkmark			
1	E			*	Delairea odorata	Cape Ivy	\checkmark	\checkmark	\checkmark		\checkmark
1	E			*	Dipogon lignosus	Common Dipogon	\checkmark	\checkmark			
1	Е	C	W	*	Genista linifolia	Flax-leaf Broom		\checkmark			
1	Е			*	Ixia sp.	Ixia			\checkmark	\checkmark	
1	Е	C	W	*	Lycium ferocissimum	African Box-thorn	\checkmark	\checkmark	\checkmark		
1	Е	R		*	Oxalis pes-caprae	Soursob	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
1	Е			*	Pennisetum clandestinum	Kikuyu	\checkmark		\checkmark		
1	Е	C		*	Salpichroa origanifolia	Pampas Lily-of-the-Valley	\checkmark				
1	Е			*	Stenotaphrum secundatum	Buffalo Grass	\checkmark				
1	Е			*	Zantedeschia aethiopica	White Arum-lily	\checkmark				
2	С			*	Brassica fruticulosa	Twiggy Turnip	\checkmark				
2	С			*	Bromus catharticus	Prairie Grass	\checkmark				
2	Е			*	Chlorophytum comosum	Spider Plant	\checkmark				
2	С	C		*	Cirsium vulgare	Spear Thistle				✓	
2	С			*	Cynodon dactylon var. dactylon	Couch	\checkmark	✓		✓	
2	С			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark	\checkmark	\checkmark		\checkmark
2	С			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark	\checkmark	\checkmark	√	\checkmark
2	C			*	Galenia nubescens var nubescens	Galenia					\checkmark
2	C			*	Sporobolus africanus	Rat-tail Grass	\checkmark				
2	C		-	*	Thinopyrum junceiforme	Sea Wheat-grass	\checkmark			\checkmark	\checkmark
3	C			*	Arctotheca calendula	Cape Weed	\checkmark	√			
3	C		-	*	Convza honariensis	Flaxleaf Fleabane	\checkmark				
3	C			*	Fumaria spp	Fumitory	\checkmark				
3	C			*	Hypochoeris radicata	Flatweed	\checkmark				
3	C			*	Lagurus ovatus	Hare's-tail Grass	\checkmark	✓	✓	✓	
3	C			*	Lolium spp	Rye-grass				\checkmark	
4	C		-	*	Plantago coronopus	Buck's-horn Plantain		✓		√	
3	C		-	*	Setaria numila subsp. numila	Pale Pigeon-grass	\checkmark				
3	C			*	Vulnia spn	Fescue		√			
4	C			*	Cerastium glomeratum	Common Mouse-ear Chickweed			~		
4†	Е	\square		*	Eucalyptus sp.	Eucalypt	\checkmark				
4	C	Ħ		*	Malva spp.	Mallow	\checkmark				
4	C	Ħ		*	Medicago spp.	Medic				✓	
4	C	\square	-	*	Romulea rosea var australis	Onion Grass	\checkmark	✓			√
4	C	\square		*	Solanum nigrum	Black Nightshade	\checkmark	\checkmark			
4	C	\square		*	Sonchus oleraceus	Common Sow-thistle	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
4	C	H		*	Stellaria media	Chickweed	\checkmark		\checkmark		
-7				1	Sicilaria meata	CHICKWOOD	•		· ·		



Figure 6 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Black Rock - south, Black Rock. EVC 161: Coastal Headland Scrub, EVC 876: Spray-zone Coastal Shrubland, EVC 879: Coastal Dune Grassland.



Table 20 Prioritised management actions for Black Rock - south, Black Rock.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff erosion is an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue.

Management Unit	Management Actions for Black Rock - south	Outcome	Timeframe
Highest Priority			
1	Management of Priority 1 weeds (eliminate/control as in Table 19), particularly Cape Ivy (* <i>Delairea odorata</i>)	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3
	• Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, liverworts) and fungi, unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals		
	Management staff are trained and have suitable equipment to work on slopes		
	Ensure cover of Priority 2, 3 and 4 weeds does not increase		
1	 Ecological thinning of over-abundant/highly competitive indigenous plant species Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where over-abundant and killing indigenous vegetation 	 No monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required
1	If beach sand is imported to the site, ensure machinery operators do not destroy or compromise remnant vegetation or sea-bird roosting sites when spreading sand; this also applies to mechanical sand raker operations	 No loss or damage to indigenous vegetation or sea-bird roosts If indigenous vegetation is disturbed, undertake a Net Gain assessment and establish appropriate vegetation offsets that must be permanently protected and managed 	Identification of risks to machinery operators: prior to importing/spreading/raking beach sand
1	 Improve the tree/vegetation vandalism program Develop an informative brochure summarising the impacts of tree vandalism, why it's an issue, and the consequences to vandals if they are identified If trees or other vegetation is vandalised: Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years Pursue/investigate all possible prosecutions in full Ensure publicity through local newspapers when trees are vandalised 	 Brochure distributed it to all residents (particularly new residents) with beach frontage Signage installed as soon as possible. Temporary signage may be necessary in the short term Reduction in occurrence of tree/vegetation vandalism 	Improve program: Year 1 Installation of signs: Asking for witnesses: 48 hrs after tree/vegetation vandalism occurs View obstructing signs: as soon as possible after tree/vegetation vandalism occurs, no later than 1 month after



Management Unit	Management Actions for Black Rock - south	Outcome	Timeframe
1	Maintain/install fences to avoid/minimise the creation of informal tracks, track widening and damage to vegetation by pedestrians and off-leash dogs Close existing informal tracks using fencing and signage, and rehabilitate using indigenous species of local provenance as indicated in the EVC revegetation lists (Appendix 2)	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public Existing informal track closed and rehabilitated 	Year 1, ongoing
1	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals Dispose of removed plant material off-site to help reduce soil nutrient levels	No hybrid individuals or their exotic parents present	Year 1, ongoing
1	Remove indigenous and exotic shrubs (other than Coast Saltbush <i>Atriplex cinerea</i>) that are growing amongst and adversely competing with Hairy Spinifex (<i>Spinifex sericeus</i>) in the Coastal Dune Grassland vegetation	• No shrubs (other than Coast Saltbush) growing amongst Hairy Spinifex swards	Year 1, ongoing
1	Implement dog faeces management program	Letter sent to all dog owners in the municipality	Year 1, ongoing
	 Regular presence of staff enforcing compliance by owners Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced 	 Reduction of dog faeces along tracks and in vegetation areas (based on observations by management staff/contractors) 	
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet Bursaria (<i>Bursaria spinosa 'var. macrophylla'</i>) to replace bird habitat lost through removal of *African Box-thorn Avoid unnecessary use of tree guards	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1	Undertake regular litter collection	• Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
1	Establish permanent monitoring quadrats	Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program	Set up: Year 1 Monitoring: ongoing
Medium Priority			
1	 Management of Priority 2 weeds (eliminate/control as in Table 19) Ensure cover of Priority 3 and 4 weeds does not increase Management staff are trained and have suitable equipment to work on slopes 	 Reduction of cover of Priority 2 weeds Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Medium term (3-8 years) Ongoing



Management Unit	Management Actions for Black Rock - south	Outcome	Timeframe
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
N/A	Expand the management area to the north, beyond the study area illustrated in Figure 6	• Management area expanded to include as much remnant vegetation as is feasible to adequately manage	Year 4 (earlier if feasible)
1	Evaluate the possibility of eliminating rabbits from the site, as was achieved at Beaumaris Foreshore (Jo Hurse, Citywide, pers. comm.)	Rabbits eradicated (if considered feasible)	Medium term (3-8 years) Ongoing, as required
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 19)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



5.5 Site: Brighton Dunes (Brighton)

One Management Unit (MU1) was identified onsite comprising all Habitat Zones, grouped together on the basis of similar management issues, primarily focused on weeds (Figure 7). At the request of the Friends of Dr Jim Willis Reserve group, weed control works in this site exclude the use of herbicides. However, this lack of herbicide use is detrimental to the remnant vegetation onsite as many weed species are not being (and cannot be) adequately controlled (often resprouting after being cut back). It is recommended that this avoidance of herbicide use be reconsidered to ensure efficient and cost-effective weed control works can be undertaken. Alternatively, if the no-herbicide rule remains across the whole site, the intensity of management will need to be vastly increased.

Table 21 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 22), along with an updated list of prioritised weeds requiring control or elimination (Table 23). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 24.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coastal Dune Scrub (160)	1, 3, 4, 5, 7, 9	47%, 32%, 14%, 21%, 12%, 48%.	Comparable management issues.
	Coastal Dune Grassland (879)	2	18%.	
	Coastal Headland Scrub (161)	6, 8	14%, 32%.	

Table 21Constituent Ecological Vegetation Classes and Habitat Zones within the
Management Unit, Brighton Dunes, Brighton.

Table 22Location details of permanent monitoring quadrats at Brighton Dunes,
Brighton (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				
3				



Table 23Summary of the weed species recorded in the Habitat Zones identified at
Brighton Dunes, Brighton - updated from Ecology Australia (2008a).

Key:	
CDS	Coastal Dune Scrub
CDG	Coastal Dune Grassland
CHS	Coastal Headland Scrub
Cont/Elim	Management objective of Control or Eliminate
С	Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated
E	Eliminate, where possible: species known to be particularly invasive and/or those with currently small
	and tractable populations should be eradicated
CaLP	Catchment and Land Protection Act 1994
R	Regionally Restricted under the Catchment and Land Protection Act 1994
С	Regionally Controlled under the Catchment and Land Protection Act 1994
WONS / W	Weed of National Significance
\checkmark	Present (species may occur in additional HZs)
Ť	Some adult planted specimens may be retained, however elimination of any offspring is recommended
D1 ((

Blue text Additions or edits to the weeds table presented in Ecology Australia (2008a)

Hab	Habitat Zone		1	2	3	4	5	6	7	8	9				
Eco	Ecological Vegetation Class name (initials)		CDS	CDG	CDS	CDS	CDS	CHS	CDS	CHS	CDS				
Hab	itat	Sco	re				47%	18%	32%	14%	21%	14%	12%	32%	48%
Priority	Cont/Elim	CaLP	WONS		Species Name	Common Name									
1	E			*	Acetosa sagittata	Rambling Dock									
1	E			*	Aeonium haworthii	Pinwheel Aeonium									
1	Е			*	Agapanthus praecox subsp. orientalis	Agapanthus						~		~	
1	Е	R		*	Allium triquetrum	Angled Onion			\checkmark			\checkmark	\checkmark		
1	Е		W	*	Anredera cordifolia	Madeira Vine									
1	Е	R	W	*	Asparagus asparagoides	Bridal Creeper	\checkmark		\checkmark	\checkmark		\checkmark		\checkmark	\checkmark
1	E	C	W	*	Chrysanthemoides monilifera subsp. monilifera	Boneseed								\checkmark	
1	Е			*	Coprosma repens	Mirror Bush	\checkmark	\checkmark	\checkmark	\checkmark				\checkmark	\checkmark
1	E			*	<i>Cotoneaster glaucophyllus</i> var. <i>serotinus</i>	Large-leaf Cotoneaster						~		~	
1	E			*	Crassula multicava subsp. multicava	Shade Crassula			~						
1	Е			*	Delairea odorata	Cape Ivy	\checkmark		\checkmark						
1	Е			*	Freesia hybrid	Freesia			\checkmark					\checkmark	
1	Е			*	Gazania linearis/G. rigens	Gazania	\checkmark	\checkmark	\checkmark		\checkmark				
1†	Е			*	Hakea drupacea	Sweet Hakea	\checkmark		\checkmark						\checkmark
1	Е	C	W	*	Lycium ferocissimum	African Box-thorn	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
1	Е	C	W	*	Nassella trichotoma	Serrated Tussock						\checkmark			
1	Е	R		*	Oxalis pes-caprae	Soursob	\checkmark								
1	E			*	Paraserianthes lophantha subsp. lophantha	Cape Wattle	~								
1	Е			*	Pennisetum clandestinum	Kikuyu		\checkmark	\checkmark			\checkmark	\checkmark	\checkmark	
1	Е			*	Pittosporum crassifolium	Karo								\checkmark	
1	Е			*	Pittosporum undulatum	Sweet Pittosporum								\checkmark	
1	Е			*	Rhamnus alaternus	Italian Buckthorn								\checkmark	
1	Е	C		*	Salpichroa origanifolia	Pampas Lily-of-the- Valley	~		~	~	~	~			
1	Е			*	Stenotaphrum secundatum	Buffalo Grass			\checkmark						

Hał	oitat	Zot	ıe				1	2	3	4	5	6	7	8	9
Eco	logi	cal	Veg	eta	tion Class name (initials)		CDS	CDG	CDS	CDS	CDS	CHS	CDS	CHS	CDS
Hał	oitat	Sco	ore				47%	18%	32%	14%	21%	14%	12%	32%	48%
	<u> </u>						.,,,	1070	02/0	1.70		11/0	12/0	02/0	,
Priority	Cont/Eli	CaLP	WONS		Species Name	Common Name									
1	E			*	Vinca major	Blue Periwinkle			\checkmark						
2	C			*	Ammophila arenaria	Marram Grass	\checkmark	\checkmark	\checkmark		\checkmark				\checkmark
2	C			*	Bromus catharticus	Prairie Grass	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark			\checkmark
2	C			*	Bromus diandrus	Great Brome						\checkmark			\checkmark
2	C			*	Cynodon dactylon var. dactylon	Couch	~		√	~	~	√	\checkmark	\checkmark	
2	C			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark		\checkmark						
2	C			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark		\checkmark						
2	C			*	Galenia pubescens var. pubescens	Galenia	~	~	✓	~	~	~	~	~	~
2	C			*	Oxalis purpurea	Large-flower Wood- sorrel						~			
2	C			*	Rumex spp.	Dock						✓			
2	C			*	Sporobolus africanus	Rat-tail Grass			\checkmark						
2	E			*	Tamarix ramosissima	Tamarisk									\checkmark
3	C			*	Arctotheca calendula	Cape Weed			\checkmark					\checkmark	
3†	E			*	Eucalyptus cladocalyx	Sugar-gum			\checkmark						
3	C			*	Fumaria spp.	Fumitory			\checkmark						
3	C			*	Hypochoeris radicata	Flatweed	\checkmark		\checkmark		\checkmark				\checkmark
3	C			*	Lagurus ovatus	Hare's-tail Grass	\checkmark		\checkmark	\checkmark					\checkmark
3	C			*	Lolium perenne	Perennial Rye-grass			\checkmark				\checkmark		
3	C			*	Lolium rigidum	Wimmera Rye-grass			\checkmark						
4	C			*	Plantago coronopus	Buck's-horn Plantain									\checkmark
3	C			*	Poa annua	Annual Meadow-grass			\checkmark	\checkmark					
3	C			*	Vulpia spp.	Fescue						\checkmark			
4	C			*	Cakile maritima subsp. maritima	Sea Rocket	~	1		~					
4	C			*	Cardamine hirsuta	Common Bitter-cress			\checkmark	\checkmark					\checkmark
4	C			*	Cerastium glomeratum	Common Mouse-ear Chickweed	~		~				~		~
4	C			*	Medicago spp.	Medic								\checkmark	
4	C			*	Plantago lanceolata	Ribwort						✓	\checkmark	\checkmark	
4	C			*	Romulea rosea var. australis	Onion Grass	\checkmark		\checkmark			✓		\checkmark	
4	C			*	Sisymbrium sp.	Mustard									\checkmark
4	C			*	Sonchus oleraceus	Common Sow-thistle	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
4	C			*	Stellaria media	Chickweed	\checkmark	\checkmark	\checkmark		\checkmark				\checkmark
4	C			*	Trifolium spp. (annuals)	Clover		\checkmark							
4	C			*	Vicia sativa s.l.	Common Vetch	\checkmark		\checkmark						

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Figure 7 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Brighton Dunes, Brighton. EVC160: Coastal Dune Scrub, EVC161: Coastal Headland Scrub, EVC 879: Coastal Dune Grassland.



Table 24Prioritised management actions for Brighton Dunes, Brighton.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff/headland erosion may be an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue.

Management Unit	Management Actions for Brighton Dunes	Outcome	Timeframe
Highest Priority			
1	Management of Priority 1 weeds (eliminate/control as in Table 23)	Reduction in cover of Priority 1 weeds	Year 1, ongoing
	 Ensure African Box-thorn (*<i>Lycium ferocissimum</i>) are killed Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, liverworts) and fungi, unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to 	• No increase in cover of Priority 2, 3 and 4 weeds	Elimination achieved by Year 3 in Habitat Zones 1, 3, 8 and 9, and by Year 5 in Habitat Zones 2, 4, 5, 6 and 7
	other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals		
	Management staff are trained and have suitable equipment to work on slopes		
	Ensure cover of Priority 2, 3 and 4 weeds does not increase		
	Weed management objectives cannot be achieved at Brighton Dunes without herbicide use for some species		
1	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals	No hybrid individuals or their exotic parents present	Year 1, ongoing
	Dispose of removed plant material off-site to help reduce soil nutrient levels		
1	Ecological thinning of over-abundant/highly competitive indigenous plant species	• Insignificant death of indigenous plants as a result of Dodder-laurel parasitism	Ongoing, as required
	• Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where over- abundant and killing indigenous vegetation		
1	If beach sand is imported to the site, ensure machinery operators do not	No loss or damage to indigenous vegetation or sea-bird roosts	Identification of risks to
	destroy or compromise remnant vegetation or sea-bird roosting sites when spreading sand; this also applies to mechanical sand raker operations	• If indigenous vegetation is disturbed, undertake a Net Gain assessment and establish appropriate vegetation offsets that must be permanently protected and managed	machinery operators: prior to importing/spreading/raking beach sand
1	Maintain/install fences to avoid/minimise the creation of informal tracks,	No existing tracks widened or additional informal tracks created	Year 1, ongoing
	track widening and damage to vegetation by pedestrians and off-leash dogs, particularly through the Coastal Dune Scrub and in areas to the south of the	• No trampling of vegetation by dogs or the general public	
	site	• Existing informal track closed and rehabilitated	
	Close existing informal tracks using fencing and signage, and rehabilitate using indigenous species of local provenance as indicated in the EVC revegetation lists (Appendix 2)		



Management Unit	Management Actions for Brighton Dunes	Outcome	Timeframe
1	Remove indigenous and exotic shrubs (other than Coast Saltbush <i>Atriplex cinerea</i>) that are growing amongst and adversely competing with Hairy Spinifex (<i>Spinifex sericeus</i>) in the Coastal Dune Grassland vegetation	• No shrubs (other than Coast Saltbush) growing amongst Hairy Spinifex swards	Year 1, ongoing
1	Improve the tree/vegetation vandalism program	• Brochure distributed it to all residents (particularly new residents) with beach	Improve program: Year 1
	• Develop an informative brochure summarising the impacts of tree	frontage	Installation of signs:
	vandalism, why it's an issue, and the consequences to vandals if they are identified	• Signage installed as soon as possible. Temporary signage may be necessary in the short term	Asking for witnesses: 48 hrs after tree/vegetation vandalism
	• If trees or other vegetation is vandalised:	Reduction in occurrence of tree/vegetation vandalism	occurs
	 Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward 		View obstructing signs: as soon as possible after
	 Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years 		tree/vegetation vandalism occurs, no later than 1 month after
	 Pursue/investigate all possible prosecutions in full 		
	 Ensure publicity through local newspapers when trees are vandalised 		
1	Implement dog faeces management program	• Letter sent to all dog owners in the municipality	Year 1, ongoing
	Regular presence of staff enforcing compliance by owners	• Reduction of dog faeces along tracks and in vegetation areas (based on observations	
	• Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal	by management staff/contractors)	
	• Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced		
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2)	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is 	After the autumn break Ongoing, as required.
	Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet Bursaria (<i>Bursaria spinosa 'var. macrophylla'</i>) to replace bird habitat lost through removal of *African Box-thorn	less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	
	Avoid unnecessary use of tree guards		
1	Undertake regular litter collection	• Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
1	Establish permanent monitoring quadrats	• Three monitoring quadrats established and monitored as specified in Section 6	Set up: Year 1
		Monitoring Program	Monitoring: ongoing



Management Unit	Management Actions for Brighton Dunes	Outcome	Timeframe
Medium Priority			
1	Management of Priority 2 weeds (eliminate/control as in Table 23)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
	Management staff are trained and have suitable equipment to work on slopes	• No increase in cover of Priority 3 and 4 weeds	
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2)	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings: dead plants replaced as necessary. If survival rate is 	As required
	Avoid unnecessary use of tree guards	less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	
1	Evaluate the possibility of eliminating rabbits from the site, as was achieved	Rabbits eradicated (if considered feasible)	Medium term (3-8 years)
	at Beaumaris Foreshore (Jo Hurse, Citywide, pers. comm.)		Ongoing, as required
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where	• Reduction in cover of targeted Priority 3 and 4 weeds	Long term (5-10 years)
	they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 23)	• Continued reduction in cover of Priority 1 and 2 weeds, as necessary	Ongoing, as required
		No increase in cover of weeds	
1	Follow-up revegetation/infill plantings where vegetation management has	Sufficient weed control works prior to planting and adequate maintenance of	As required
	revegetation lists (Appendix 2)	• 90% survival rate for plantings: dead plants replaced as necessary. If survival rate is	
	Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2)	less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	
	Avoid unnecessary use of tree guards		



5.6 Site: Cheltenham Park Flora and Fauna Reserve (Cheltenham)

Two Management Units (MUs) were identified onsite and are separated on the basis of variations to the management requirements across the site (Figure 8). Management Unit 1 (MU1) comprises all the remnant patch vegetation within the study area and works will focus on improving the vegetation quality. Management Unit 2 is a small area of bare ground or exotic grasses that was not considered remnant in the 2008 assessment (Ecology Australia 2008a). This area will be revegetated with indigenous species around a hollow-bearing large old tree.

Table 25 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 26), along with an updated list of prioritised weeds requiring control or elimination (Table 27). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 28.

Table 25Constituent Ecological Vegetation Classes and Habitat Zones within each
Management Unit, Cheltenham Park Flora and Fauna Reserve,
Cheltenham.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Damp Sands Herb-rich Woodland (3)	1, 2, 3, 4, 5	39%, 42%, 33%, 16%, 35%	Herbicide can be used
2	Damp Sands Herb-rich Woodland (3)	N/A	N/A	Revegetation, herbicide can be used

Table 26 Location details of permanent monitoring quadrats at Cheltenham Park Flora and Fauna Reserve, Cheltenham (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

Table 27Summary of the weed species recorded at Cheltenham Park Flora and
Fauna Reserve, Cheltenham - updated from Ecology Australia (2008a).

Key:DSHWDamp Sands Herb-rich Woodland

Cont/Elim Management objective of Control or Eliminate

Cont/Emm	Management objective of Control of Emmate
С	Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated
E	Eliminate, where possible: species known to be particularly invasive and/or those with currently small
	and tractable populations should be eradicated
CaLP	Catchment and Land Protection Act 1994: R = Regionally Restricted; C = Regionally Controlled
WONS / W	Weed of National Significance
\checkmark	Present (species may occur in additional HZs)

Some adult planted specimens may be retained, however elimination of any offspring is recommended
 Additions or edits to the weeds table presented in Ecology Australia (2008a)

Tac	DIE	21	co	ntinuea		1	-	2	4	-
Hab	oitat	Zo	ne				2 DOUNT	3 DOLULY	4 DOLULY	5
Eco	logi	cal	Veg	etation Class name (initials)		DSHW 200/	DSHW	DSHW	DSHW	DSHW 250/
Hab	oitat	Sco	ore	1		39%	42%	33%	16%	35%
Priority	Cont/Elim	CaLP	WONS	Species Name	Common Name					
1	E		*	Acacia iteaphylla	Flinders Ranges Wattle	\checkmark				
1	Е		\$	Acacia longifolia subsp. sophorae	Coast Wattle		~			
1	E		*	Acacia prominens	Gosford Wattle	\checkmark				
1	Е		*	Acacia saligna	Golden Wreath Wattle	\checkmark		\checkmark		
1	Е	C	*	Cirsium vulgare	Spear Thistle					\checkmark
1†	Е		*	Eucalyptus botryoides	Southern Mahogany					\checkmark
1	Е		*	Freesia hybrid	Freesia	\checkmark		\checkmark		
1†	Е		*	Hakea drupacea	Sweet Hakea		\checkmark			
1	E		*	Kunzea ambigua	White Kunzea	\checkmark				
1	Е		#	Leptospermum laevigatum	Coast Tea-tree	\checkmark			\checkmark	
1	Е		*	Leptospermum petersonii	Lemon-scented Tea-tree	\checkmark				
1	E		3	⁴ Melaleuca armillaris subsp. armillaris	Giant Honey-myrtle	~				
1	Е	R	4	Oxalis pes-caprae	Soursob	\checkmark	\checkmark		\checkmark	\checkmark
1	E		3	⁴ Paraserianthes lophantha subsp. lophantha	Cape Wattle	~				
1	Е	C	4	Salpichroa origanifolia	Pampas Lily-of-the-Valley					\checkmark
2	Е		3	Anigozanthos flavidus	Tall Kangaroo Paw	\checkmark				
2	С		*	Ehrharta erecta var. erecta	Panic Veldt-grass		\checkmark		\checkmark	\checkmark
2	С		*	Ehrharta longiflora	Annual Veldt-grass	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
2	Е		*	Melaleuca nesophila	Showy Honey-myrtle	\checkmark				
2	С		3	Sporobolus africanus	Rat-tail Grass				\checkmark	
3	С		\$	Arctotheca calendula	Cape Weed					\checkmark
3†	Е		\$	Corymbia maculata	Spotted Gum		\checkmark		\checkmark	
3†	E		*	Eucalyptus globulus subsp.	Southern Blue-gum					~
3	С		\$	Fumaria spp.	Fumitory		\checkmark		\checkmark	
3	С		4	Hypochoeris radicata	Flatweed	\checkmark	\checkmark	\checkmark		\checkmark
3	С		4	Poa annua	Annual Meadow-grass					\checkmark
4†	Е		4	Callistemon rugulosus	Scarlet Bottlebrush	\checkmark				
4†	E		*	Corymbia ficifolia	Red-flowering Gum	\checkmark				
4†	E			<i>Eucalyptus camaldulensis</i> (exotic provenance)	River Red-gum		~	√		
4†	Е		*	Eucalyptus sp.	Eucalypt		\checkmark			
4†	E		*	Eucalyptus tricarpa	Red Ironbark		\checkmark			
4	E		*	Hardenbergia comptoniana	Native Wisteria	\checkmark				
4	Е		*	Kunzea baxteri	Crimson Kunzea	\checkmark				
4†	Е		*	Pinus pinea	Stone Pine				\checkmark	
4	С		*	Romulea rosea var. australis	Onion Grass	\checkmark	\checkmark	\checkmark		\checkmark
4	Е		*	Solanum nigrum	Black Nightshade				\checkmark	
4	С		*	Sonchus oleraceus	Common Sow-thistle			\checkmark		\checkmark
4	С		*	Stellaria media	Chickweed	\checkmark	\checkmark		\checkmark	\checkmark
4	С		*	Taraxacum officinale spp. agg.	Garden Dandelion				\checkmark	\checkmark





Table 28 Prioritised management actions for Cheltenham Park Flora and Fauna Reserve, Cheltenham.

Management Unit	Management Actions for Cheltenham Park Flora and Fauna Reserve	Outcome
Highest Priority		
1, 2	Management of Priority 1 weeds (eliminate/control as in Table 27)	Reduction in cover of Priority 1 weeds
	• If areas of woody weeds are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seed-bank	• No increase in cover of Priority 2, 3 and 4 weeds
	• Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads	
	Ensure cover of Priority 2, 3 and 4 weeds does not increase	
1, 2	Ecological thinning of over-abundant/highly competitive indigenous plant species	No monocultures or near-monocultures of robust indigenous species
	 Remove all Kangaroo Apple (<i>Solanum laciniatum</i>) from Habitat Zone 4, and only tolerate low levels elsewhere 	
	• Retain a maximum of 10 Black Wattle (<i>Acacia mearnsii</i>) individuals in Habitat Zone 3	
	Dispose of removed plant material off-site to help reduce soil nutrient levels	
1, 2	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	No hybrid individuals or their exotic parents present
	• Hybrid Correa involving <i>Correa reflexa</i> var. <i>reflexa</i> and other species (if present)	
	• Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X #L. <i>laevigatum</i>) hybrids (if present)	
	• Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus X #Acacia longifolia</i> s.l.) hybrids (if present)	
	Dispose of removed plant material off-site to help reduce soil nutrient levels	
1	Remove non-indigenous native species competing with indigenous species, and that could be wrongly perceived in future as a bona fide indigenous species	 No/few non-indigenous native species present
	• Coast Banksia (Banksia integrifolia subsp. integrifolia)	
	• Seaberry Saltbush (Rhagodia candolleana subsp. candolleana)	
	Dispose of removed plant material off-site to help reduce soil nutrient levels	

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Timeframe
Year 1, ongoing; elimination achieved by Year 3.
Year 1, ongoing as required
Year 1, ongoing
(For all inland sites, not just where I've noted them)
Year 1, ongoing

Management Unit	Management Actions for Cheltenham Park Flora and Fauna Reserve	Outcome	Timeframe
1	Maintain fences around Management Unit 1 to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	No existing tracks widened or additional informal tracks createdNo trampling of vegetation by dogs or the general public	Year 1, ongoing
1, 2	 Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance Revegetate Management Unit 2 using species indicated for Damps Sands Herb-rich Woodland revegetation in Appendix 2 Avoid unnecessary use of tree guards 	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1	Establish permanent monitoring quadrats	 Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing
1	Mosaic burn the long unburnt areas of Management Unit 1, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt vegetation where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in the long term (8-10 years)
Medium Priority			
1, 2	Management of Priority 2 weeds (eliminate/control as in Table 27)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	Eliminate recruits of Priority 3 and 4 weeds that have been planted (as indicated with † in Table 27); adult planted specimens may be retained for non-problematic species	 Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Ongoing
1, 2	 Ensure cover of Priority 3 and 4 weeds does not increase Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards 	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
Lowest Priority			
1, 2	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 27)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required



Management Unit	Management Actions for Cheltenham Park Flora and Fauna Reserve	Outcome	Timeframe
1, 2	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
N/A	Expand management area to include areas of remnant vegetation, or potentially remnant vegetation if Coast Tea Tree (<i>#Leptospermum</i> <i>laevigatum</i>) was removed, that are adjoining the current study area boundary (illustrated in Figure 8)	Gradual expansion of management area	When management capacity can adequately manage additional land



5.7 Site: Donald McDonald Reserve (Beaumaris)

Five Management Units (MUs) were identified onsite (Figure 9). Management Unit 1 comprises good quality diverse indigenous vegetation regenerating after fires that have killed the exotic #Coast Tea-tree canopy. Management works for this Unit are to focus on improving the quality of the vegetation. The #Coast Tea-tree canopy will gradually be manually removed from Management Unit 2 and followed by plantings of indigenous species as necessary, again with works focusing on improving the vegetation condition. Management Unit 3 was burnt in 1997/8 and contains, among a diversity of indigenous species, a variety of exotic woody species (primarily Australian eucalypts that are not indigenous to the region) that have been planted and/or naturalised – works for this Unit will focus on improving the indigenous vegetation and thinning the exotic planted/naturalised species. The quality of the vegetation in Management Unit 4 is very low, and as such management works for the medium-term are to focus on containment of weeds. Finally, Management Unit 5 is a small area where the #Coast Tea-tree is to be retained and the understorey is treated as a garden bed.

Table 29 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 30), along with an updated list of prioritised weeds requiring control or elimination (Table 31). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 32.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Sand Heathland (6)	1, 3, 4, 5, 10	51%, 35%, 36%, 61%, 40%	Regenerating after fire
2	Damp Sands Herb-rich Woodland (3) Sand Heathland (6)	2, 6, 7 3, 4, 11	21%, 29%, 8%, 35%, 36%, 14%,	#Coast Tea-tree to be managed, followed by plantings as necessary
3	Sand Heathland (6)	8, 9, 11	43%, 22%, 14%	Improve indigenous vegetation, thin exotic planted species
4	Damp Sands Herb-rich Woodland (3)	6, 7	29%, 8%	Containment of weeds
5	Damp Sands Herb-rich Woodland (3)	7	8%	Retain #Coast Tea-tree, maintain as garden bed

Table 29Constituent Ecological Vegetation Classes and Habitat Zones within each
Management Unit, Donald McDonald Reserve, Beaumaris.

Table 30Location details of permanent monitoring quadrats at Donald McDonald
Reserve, Beaumaris (to be detailed when quadrats are established).

Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
	Ecological Vegetation Class	Ecological Vegetation Class Habitat Zone Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Imag	Ecological Vegetation Class Habitat Zone Datum/Grid Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class Image: Cological Vegetation Class

	Т	abl	le 3	31	Summary of the v	weed species rec	ord	ed ir	the	Hab	itat 2	Zone	es io	dent	ified	at		Ţ	abl	e 3	1 c	ont	tinued		
					Donald McDonald	d Reserve, Beaur	nari	s - u	pdat	ed f	rom	Ecology Australia Habitat Zone						1							
					(2008a).	·			-									I	Ecolo	ogic	al Ve	geta	ation Class name (initials)		
	K	ey:			. ,															-		-			
	S	Н			Sand Heathland																				$\overline{\mathbf{v}}$
	D	SH	W		Damp Sands Herb-rich	Woodland												I	Habit	tat S	score	;			51%
	С	ont/	/Eliı	m	Management objective	of Control or Elimina	te												>						
		C			Control: Reduce the dis	tribution and cover of	ubiq	uitou	s spec	ies th	at can	not re	easor	nably	be eli	minat	ed		÷	E	⊿ ¥				
		E			Eliminate, where possib	ble: species known to	be pa	rticul	arly 11	ivasiv	ve and	/or th	lose v	with c	curren	tly sn	nall		÷:		22		с • N	C N	
	C	. T D			and tractable population	is should be eradicate	d															•	Species Name	Common Name	
	C		•		Catchment and Land Pl	rolection Act 1994	nd I.	and D	notoot	ion 1	at 100	1						1		E			Pennisetum clandestinum	Kikuyu	
		K C			Regionally Controlled u	under the Catchment a	na La and I	ina P and F	roieci Protoc	tion A	Cl 195 1 _{ct} 10	4 01							_		0 11		D 1 1 1	DI 11	
	W		JS /	W	Weed of National Signi	ificance	inu L	unu 1	roiec	11011 2	101 19	94								E (CW	*	Rubus anglocandicans	Blackberry	
	~		107	**	Present (species may or	cur in additional HZs)											1		E		*	Salpichroa origanifolia	Pampas Lily-of-the-	1
	†				Some adult planted spec	cimens may be retained	ed ho	weve	r elim	inatio	on of a	nv o	ffspri	ing is	recor	nmen	ded		_	_	_			Valley	
	a				Eliminate from Manage	ment Unit 1. Control	in Ma	anage	ment	Units	2.3.	4 and	15				ava	1		E	_	*	Tradescantia fluminensis	Wandering Jew	
	B	lue	text	÷	Additions or edits to the	weeds table presente	d in I	Ecolo	ov Ai	istrali	_, , , a (20()8a)						2	2	C		*	Bromus catharticus	Prairie Grass	
Hab	itat 2	Zon	e	-			1	2	3	4	5	6	7	8	9	10	11	I 2	2	E		*	Chlorophytum comosum	Spider Plant	
Fcol	ngic	al V	• Jege	tatic	on Class name (initials)		-	>	5				>					2	2	C		*	Cynodon dactylon var.	Couch	
LUOI	0510	ui v	050	iuin	on class nume (initials)			AH				A	A			EA							dactylon		
							SH	DS	SH	SH	SH	DS	DS	SH	SH	DS	SH	2	2 8	a		*	Ehrharta erecta var.	Panic Veldt-grass	✓
Hab	itat S	Scor	re				51%	21%	35%	36%	61%	29%	8%	43%	22%	40%	14%						erecta		
	я																	1 2	2	C		*	Ehrharta longiflora	Annual Veldt-grass	\checkmark
2		5																2	2	C		*	Lolium perenne	Perennial Rye-grass	
ē	2	32	Ŝ															3	3	E		*	Aloe maculata	Common Soap Aloe	
Ŀ	ا <u>ق</u>		Š	Sn	ecies Name	Common Name												3	3	C		*	Arctotheca calendula	Cape Weed	
1	E		*	• Ac	cacia decurrens	Farly Black-wattle	\checkmark			\checkmark	\checkmark							3	3	C		*	Cynosurus echinatus	Rough Dog's-tail	
1	E	-	*	Ac	cacia iteanhvlla	Flinders Ranges	\checkmark									\checkmark		3	3	C		*	Fumaria spp.	Fumitory	\checkmark
	-				uera meaphyma	Wattle												3	3	C		*	Hypochoeris radicata	Flatweed	\checkmark
1	E		*	Ac	racia longifolia s l	Coast/Sallow Wattle			\checkmark	\checkmark	\checkmark		\checkmark		\checkmark		\checkmark	3	3	C		*	Lolium spp.	Rye-grass	✓
•	-			110	acta tongijotta s.r.	Coust Sunow watche												3	3	C		*	Plantago coronopus	Buck's-horn Plantain	ı √
i	F	+	*	: 40	cacia longifolia subsp	Sallow Wattle	\checkmark						-		\checkmark								0 1		
	-				ngifolia	Sullow Wattle												3	3	C		*	Poa annua	Annual Meadow-	\checkmark
1	F	-	±	4	racia longifolia subsp	Coast Wattle		\checkmark					-		\checkmark	\checkmark								grass	
	L		"		nhorae	coust wattle		·										4	1	C	-	*	Cardamine hirsuta	Bitter Cress	1
1	F	-	*	: 40	phorue cacia saliana	Golden Wreath	\checkmark											4	1	C		*	Cerastium glomeratum	Common Mouse-ear	
1					uciu sulignu	Wattle																		Chickweed	
1	F	+	*	: 10	entosa sagittata	Rambling Dock							1				1	4	1†	E	-	H	Eucalvptus	River Red-gum	-
1	E	D	*	AC : 11		Angled Onion		.(•				v		.	-			camaldulensis (exotic		
1	E	K D V	V *			Angled Onion		v															nrovenance)		
1	E	K V C V	N *	AS	paragus asparagoiaes	Bridal Creeper	V	V	V	V	V	V	V	V		V	 ✓ 		1 +	F	-	*	Fucalization sp	Fucalynt	-
1	E		~ [*]		irysantnemolaes	Boneseed							V				×		1		-	*	Garanium molle var	Dove's Foot	+
				mc	onilijera subsp.														•				mollo	Dove 3 1 001	
	-	_		ma	onilifera														1 ÷	E	-	*	mone Gravillag robusta	Sillar Oak	
1	E	_	*	Ca	oprosma repens	Mirror Bush	✓								 ✓ 				+ 1		-	*	Lastusa serviola	Driekly Lettuce	
1	E	_	*	De	elairea odorata	Cape Ivy		✓					 ✓ ✓ 		✓		 ✓ 		+ 1		-	*	Laciaca serriota	Common	
	E	_	*	Di	pogon lignosus	Common Dipogon	 ✓ 						 ✓ ✓ 			✓	 ✓ ✓ 	-	•				Lepiaium ajricanum	Donnoroza	
1 †	E		*	Eu	ıcalyptus botryoides	Southern	✓			✓	 ✓ 		√	✓	\checkmark		✓		1	0	-	*	14.1	Peppercress	
		_		_		Mahogany													+		-	*	Maiva spp.		-
1	E	_	*	Ke	ennedia rubicunda	Dusky Coral-pea			\checkmark										+ '			-	Romulea rosea Var.	Union Grass	V
1	E		#	$ Le_j $	ptospermum	Coast Tea-tree	\checkmark	✓	✓	✓	\checkmark	✓	\checkmark		\checkmark	\checkmark	✓		. +	-	_	-	australis	D1 1 1 1 1 1	
				la	evigatum													4	+	E	_	*	Solanum nigrum	Black Nightshade	
1	E		*	• Me	elaleuca armillaris	Giant Honey-myrtle	 ✓ 											4	+	C		*	Sonchus oleraceus	Common Sow-thistle	;
				su	bsp. armillaris														_	_	_		6 . 11 1:		
1	E		*	· Ox	xalis incarnata	Pale Wood-sorrel							\checkmark				\checkmark	4	1	C	_	*	Stellaria media	Chickweed	√
1	E	R	*	O_{X}	xalis pes-caprae	Soursob	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	4	1	C		*	Trifolium spp. (annuals)	Clover	\checkmark

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Figure 9 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Donald McDonald Reserve, Beaumaris. EVC 3: Damp Sands Herb-rich Woodland, EVC 6: Sand Heathland.

Table 32 Prioritised management actions for Donald McDonald Reserve, Beaumaris.

Management Unit	Management Actions for Donald McDonald Reserve	Outcome	Timeframe		
Highest Priority					
1, 2, 3	 Management of Priority 1 weeds (eliminate/control as in Table 31) If areas of woody weeds, particularly Coast Tea-tree (#Leptospermum laevigatum), are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seedbank Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3.		
1	Aim to eliminate Panic Veldt-grass (* <i>Ehrharta erecta</i> var. <i>ereta</i>) (Priority 2 weed) from Management Unit 1	Reduction in cover of Panic Veldt-grass	Year 1, ongoing		
1	 Ecological thinning of over-abundant/highly competitive indigenous plant species Remove all Kangaroo Apple (<i>Solanum laciniatum</i>) from Management Unit 1, and only tolerate low levels elsewhere Tolerate no more than 5% cover of Twiggy Daisy-bush (<i>Olearia ramulosa</i>) in any Habitat Zone polygon Tolerate no more than 5% cover of Climbing Lignum (<i>Muehlenbeckia australis</i>) in any Habitat Zone polygon Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where overabundant and killing indigenous vegetation Tolerate no more than 20% cover of Black Wattle (<i>Acacia mearnsii</i>) in any Habitat Zone polygon, where it is likely to be supressing other indigenous species Dispose of removed plant material off-site to help reduce soil nutrient levels 	 Not monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required		
1, 2, 3, 4, 5	 Remove non-indigenous native species competing with indigenous species, and that could be wrongly perceived in future as a bona fide indigenous species Burgan (<i>Kunzea ericoides</i> spp. agg.) Smooth Flax-lily (<i>Dianella laevis</i>) Dispose of removed plant material off-site to help reduce soil nutrient levels 	 No/few non-indigenous native species present 	Year 1, ongoing		



Management Unit	Management Actions for Donald McDonald Reserve	Outcome	Timeframe
1, 2, 3, 4, 5	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	No hybrid individuals or their exotic parents present	Year 1, ongoing
	• Hybrid Correa involving Correa reflexa var. reflexa and other species		
	• Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X # <i>L</i> . <i>laevigatum</i>) hybrids (if present)		
	• Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus</i> X # <i>Acacia longifolia</i> s.l.) hybrids (if present)		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		
1, 2, 3	Maintain/erect fences around the higher quality areas of Management Units	No existing tracks widened or additional informal tracks created	Year 1, ongoing
	1, 2 and 3 to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	• No trampling of vegetation by dogs or the general public	
1, 2, 3, 4, 5	Implement dog faeces management program	• Letter sent to all dog owners in the municipality	Year 1, ongoing
	Regular presence of staff enforcing compliance by owners	• Reduction of dog faeces along tracks and in vegetation areas (based on observations	
	• Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal	by management starr/contractors)	
	• Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced		
1, 2, 3, 4, 5	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2)	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is 	After the autumn break Ongoing, as required.
	Replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance	less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	
	Avoid unnecessary use of tree guards		
1, 2, 4	Establish permanent monitoring quadrats	• Four monitoring quadrats established and monitored as specified in Section 6	Set up: Year 1
		Monitoring Program	Monitoring: ongoing
2, 3, 4	Mosaic burn the long unburnt areas of Management Unit 2, 3 and 4, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt vegetation where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in Management Unit 2 in the short term (1-3 years), Management Unit 3 in the medium term (4-7 years) and Management Unit 4 in the long term (8-10 years)



Management Unit	Management Actions for Donald McDonald Reserve	Outcome	Timeframe
Medium Priority			
1, 2, 3	Management of Priority 2 weeds (eliminate/control as in Table 31)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
		• No increase in cover of Priority 3 and 4 weeds	
4, 5	Management of Priority 1 weeds (eliminate/control as in Table 31)	Reduction in cover of Priority 1 weeds	Year 1, ongoing; elimination
	• Coast Tea-tree (# <i>Leptospermum laevigatum</i>) can be retained in Management Unit 5	• No increase in cover of Priority 2, 3 and 4 weeds	achieved by Year 3.
	• If areas of woody weeds, particularly Coast Tea-tree, are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seed-bank		
	• Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads		
	Ensure cover of Priority 2, 3 and 4 weeds does not increase		
1, 2, 3, 4, 5	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1, 2 and 3 according to EVC revegetation lists (Appendix 2)	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
	Avoid unnecessary use of tree guards		
Lowest Priority			
1, 2, 3	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids)	• Reduction in cover of targeted Priority 3 and 4 weeds	Long term (5-10 years)
	(eliminate/control as in Table 31)	• Continued reduction in cover of Priority 1 and 2 weeds, as necessary	Ongoing, as required
		No increase in cover of weeds	
4, 5	Management of Priority 2 weeds, and Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or	• Reduction in cover of Priority 2 weeds and targeted Priority 3 and 4 weeds	Long term (5-10 years)
	populations (e.g. orchids) (eliminate/control as in Table 31)	 Continued reduction in cover of Priority 1 weeds, as necessary 	Ongoing, as required
		No increase in cover of weeds	
1, 2, 3, 4, 5	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 	As required
	Avoid unnecessary use of tree guards	• 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	



5.8 Site: George Street Reserve (Sandringham)

Three Management Units (MUs) were identified onsite and separated on the basis of variations to the management requirements across the site (Figure 10). Management Unit 1 (MU1) comprises Sand Heathland vegetation where the #Coast Tea-tree canopy has been removed, primarily by fire. The #Coast Tea-tree canopy remains Management Unit 2 at present, but will gradually be removed over time. In contrast, the #Coast Tea-tree will be retained as a buffer in Management Unit 3.

Table 33 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 34), along with an updated list of prioritised weeds requiring control or elimination (Table 35). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 36.

Table 33 Constituent Ecological Vegetation Classes and Habitat Zones within each Management Unit, George Street Reserve, Sandringham.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Sand Heathland (6)	1, 2, 3, 4, 5, 6	54%, 35%, 56%, 30%, 28%, 32%	Fire history, heathland vegetation structure
2	Sand Heathland (6)	2	35%	#Coast Tea-tree to be removed
3	Sand Heathland (6)	2	35%	#Coast Tea-tree to be retained as buffer

Table 34	Location details of permanent monitoring quadrats at George Street
	Reserve, Sandringham (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

				Ge (2	eorge Street Reserve, Sandi 008a).	Iringham - updated f	rom	Eco	ology	/ Aus	stral	ia
Key SH	:		S	and	d Heathland							
Cor	nt/El	im	Ň	/lar	agement objective of Control or Eli	liminate						
	C		C	lon	trol: Reduce the distribution and co	over of ubiquitous species t	that o	canno	t reas	onably	y be e	lir
	E		E	lin	inate, where possible: species know	wn to be particularly invas	ive a	nd/or	those	e with	curre	nt
			a	nd	tractable populations should be erac	dicated						
CaL	Р		(Cat	chment and Land Protection Act 19	994: R = Regionally Restri	cted;	C =	Regio	nally	Conti	ol
wO	NS	/ V	۷ ۱ ח	Ne	ed of National Significance	1117.)						
v Rhu	e ter	vt	P A	res	itions or edits to the weeds table pro-	al FIZS) resented in Ecology Austra	lia ('	20089	6			
Hal	hitat	170	ne	luu	itions of carts to the weeds table pre	esented in Leology Austra	1	20000	3	Δ	5	
Fee				ae	ation Class name (initials)		и СП	2 SH	сн СН	ч СН	SH	s
Hal	hitat	ICa.		ge		5	311	35%	56%	30%	28%	2
114	Jilai					J	9470	3370	3070	3070	20/0	5.
riority	ont/Elim	aLP	VONS									
	U D	0	5		Species Name Co	ommon Name						-
1	E			*	Acacia longifolia subsp. Sal	llow Wattle		~	✓	✓	\checkmark	
1	T				longifolia	(W/ ()]						-
1	E			#	Acacia longifolia subsp. Coa	bast Wattle		~	~	~		
1	-			-	sophorae							-
1	E			ŕ	Acacia longifolia subsp. Coa	bast Wattle X White		~				
	-				sophorae X A. floribunda Sal	llow Wattle hybrid						
1	E	R	W	*	Asparagus asparagoides Brie	idal Creeper		✓ 				
1	E			*	Carpobrotus aequilaterus / An	ngled Pigface /		~	~			
	-				C. edulis Ho	ottentot Fig						-
1	E	0		*	Chamaecytisus palmensis Tre	ee Lucerne	✓	✓				
1	E	C	W	*	Chrysanthemoides monilifera Bon	oneseed		~				
1	F			*	subsp. monilifera	· D 1						-
1	E			* 	Coprosma repens Min	irror Bush		✓				
1	E			#	Leptospermum laevigatum Coa	bast Tea-tree	✓ ✓	✓	✓		\checkmark	-
1	E	K		*	Oxalis pes-caprae Sou	oursob	~	✓				
1	E	0		۰ ب	Pennisetum clandestinum Kik	kuyu		✓ ✓				-
1	E	C	***	* *	Salpichroa origanifolia Par	mpas Lily-of-the-Valley		✓ 				
1	E	C	W	۰ ب	Ulex europaeus Goi	orse		V (-
2	C			۰ ب	Brassica fruticulosa Iw	viggy Turnip		V (
2	E			۳ ب	Briza maxima Lar	rge Quaking-grass		V (1	-
2	C			۰ ب	<i>Ehrharta erecta</i> var. <i>erecta</i> Par	nic Veldt-grass		V (✓	V (-
2	C			↑ ↓	<i>Ehrharta longiflora</i> An	nnual Veldt-grass	_	V (✓	✓	V	<u> </u>
3	C			۰ ب	Arctotheca calendula Caj	ipe weed	✓	✓ 				-
3	C			* *	Fumaria spp. Fu	imitory		✓ 				-
3	C			* *	Hypochoeris radicata Fla	atweed	✓	✓ 	✓ ✓	✓		
3	C	\square		*	Louum spp. Ryd	/e-grass	_	v	√			-
5	C	\square		*	<i>vuipia</i> spp. Fes	escue	v					-
4	C			*	Heiminthotheca echioides Ox-	k-tongue	_	v				-
4	C			*	<i>Komulea rosea</i> var. <i>australis</i> On	110n Grass	✓					-
4	C			*	Solanum nigrum Bla	ack Nightshade	_	V				-
4	C	\square		*	Sonchus oleraceus Col	ommon Sow-thistle	v	V	✓			Ľ
4	C			*	Stellaria media Chi	пскweed	v	V	v	v	v	-
4	C			*	<i>Irijolium</i> spp. (annuals) Clo	over	✓	\checkmark	\checkmark	\checkmark		1

Table 35 Summary of the weed species recorded in the Habitat Zones identified at

ated small



Figure 10 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at George Street Reserve, Sandringham. EVC 6: Sand Heathland.



Table 36 Prioritised management actions for George Street Reserve, Sandringham.

Management Unit	Management Actions for George Street Reserve	Outcome					
Highest Priority							
1, 2, 3	Management of Priority 1 weeds (eliminate/control as in Table 35)	Reduction in cover of Priority 1 weeds					
	• Coast Tea-tree (# <i>Leptospermum laevigatum</i>) can be retained in Management Unit 3	• No increase in cover of Priority 2, 3 and 4 weeds					
	• If areas of woody weeds, particularly Coast Tea-tree (<i>#Leptospermum laevigatum</i>), are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seedbank						
	• Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads						
	Ensure cover of Priority 2, 3 and 4 weeds does not increase						
1	Aim to eliminate Panic Veldt-grass (* <i>Ehrharta erecta</i> var. <i>ereta</i>) (Priority 2 weed) from Management Unit 1	Reduction in cover of Panic Veldt-grass					
1, 2, 3	Implement dog faeces management program	• Letter sent to all dog owners in the municipality					
	• Regular presence of staff enforcing compliance by owners	• Reduction of dog faeces along tracks and in vegetation areas (based on					
	• Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal	by management staff/contractors)					
	• Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced						
1, 2, 3	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	• No hybrid individuals or their exotic parents present					
	• Hybrid Correa involving Correa reflexa var. reflexa and other species						
	• Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X # <i>L.</i> <i>laevigatum</i>) hybrids (if present)						
	• Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus</i> X # <i>Acacia longifolia</i> s.l.) hybrids (if present)						
	Dispose of removed plant material off-site to help reduce soil nutrient levels						



	Timeframe
	Year 1, ongoing; elimination achieved by Year 3
	Year 1, ongoing
bservations	Year 1, ongoing
	Year 1, ongoing

Management Unit	Management Actions for George Street Reserve	Outcome	Timeframe
1, 2, 3	Remove non-indigenous native species competing with indigenous species, and that could be wrongly perceived in future as a bona fide indigenous species	No/few non-indigenous native species present	Year 1, ongoing
	• Black She-oak (<i>Allocasuarina littoralis</i>) – remove from management Unit 1, and maintain low abundances elsewhere		
	• Drooping She-oak (<i>Allocasuarina verticillata</i>) – remove from management Unit 1, and maintain low abundances elsewhere		
	• Coast Banksia (<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>), particularly while young to minimise the perceived visual-amenity change		
	• Smooth Flax-lily (<i>Dianella laevis</i>)		
	• Seaberry Saltbush (<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>)		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		
1, 2, 3	Ecological thinning of over-abundant/highly competitive indigenous plant species	 No monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required
	• Tolerate no more than 5% cover of Twiggy Daisy-bush (<i>Olearia ramulosa</i>) in any Habitat Zone polygon		
	• Remove all Kangaroo Apple (<i>Solanum laciniatum</i>) from Management Unit 1, and only tolerate low levels elsewhere		
	• Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where over- abundant and killing indigenous vegetation		
	• Thin Coast Manna-gum (<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>) to no more than 15% cover in Habitat Zone 4 by ringbarking younger trees and retaining dead trees as habitat		
	• Retain a maximum of 10 Lightwood (<i>Acacia implexa</i>) stems throughout the reserve		
	• Retain a maximum 2-3 individuals of each sex of Black She-oak (<i>Allocasuarina littoralis</i>) across the site		
	• Slash/scorch Bracken (<i>Pteridium esculentum</i>) where it is supressing indigenous species (and hence the vegetation is likely to regenerate with indigenous species rather than exotic species, particularly exotic grasses), to reduce cover to no more than 10% in a Habitat Zone polygon		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		



Management Unit	Management Actions for George Street Reserve	Outcome	Timeframe
1	Maintain fences around Management Unit 1 and areas of regenerating heath where woody weeds have been controlled, to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public 	Year 1, ongoing
1, 2, 3	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance Avoid unnecessary use of tree guards	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	
1, 2	Establish permanent monitoring quadrats	Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program	Set up: Year 1 Monitoring: ongoing
2	Mosaic burn the long unburnt areas of Management Unit 2, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt vegetation where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in the medium term (4-7 years)
Medium Priority			
1, 2, 3	 Management of Priority 2 weeds (eliminate/control as in Table 35) Ensure cover of Priority 3 and 4 weeds does not increase If present, ringbark exotic eucalypts (adults and recruits), retaining larger dead trees as habitat Trial experimental slashing of Sandhill Sword-sedge (<i>Lepidosperma concavum</i>) and Small-flower Flax-lily (<i>Dianella brevicaulis</i>) to decrease 	 Reduction of cover of Priority 2 weeds Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds Increased diversity and abundance of other indigenous species in areas currently dominated by Sandhill Sword-sedge and Small-flower Flax-lily 	Medium term (3-8 years) Ongoing Medium term (3-8 years)
	biomass/cover in areas where they are dominant and potentially smothering other indigenous species. Monitor the diversity and abundance of the regenerating heathland species	• If diversity does not adequately increase, modify or cease the trial	
1, 2, 3	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of the reserve according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
Lowest Priority			
1, 2, 3	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 35)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required



Management Unit	Management Actions for George Street Reserve	Outcome
1, 2, 3	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If sur less than c. 90%, determine and mitigate the cause of plant death befor replacement plantings



	Timeframe
e of	As required
vival rate is e undertaking	

5.9 Site: Gramatan Avenue Heathland Sanctuary (Beaumaris)

Two Management Units (MUs) were identified onsite and are separated on the basis of fire history, and hence vegetation management/regeneration issues (Figure 11). Management Unit 1 (MU1) has no recent fire history and as such contains quite tall and dense heathland vegetation. In contrast, Management Unit 1 comprises quite low heathland vegetation that is regenerating after a control burn in March 2011.

Table 37 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 38), along with an updated list of prioritised weeds requiring control or elimination (Table 39). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 40.

Table 37 Constituent Ecological Vegetation Classes and Habitat Zones within each Management Unit, Gramatan Avenue Heathland Sanctuary, Beaumaris.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Sand Heathland (6)	1, 2	58%, 45%	Long unburnt heathland vegetation
2	Sand Heathland (6)	1, 2	58%, 45%	Heathland vegetation regenerating from March 2011 burn

Table 38 Location details of permanent monitoring quadrats at Gramatan Avenue Heathland Sanctuary, Beaumaris (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				

Table 39 Summary of the weed species recorded in the Habitat Zones identified at Gramatan Avenue Heathland Sanctuary, Beaumaris - updated from Ecology Australia (2008a).

V	
Key:	
SH	Sand Heathland
Cont/Elim	Management objective of Control or Eliminate
С	Control: Reduce the distribution and cover of ubiquitous species that cannot
E	Eliminate, where possible: species known to be particularly invasive and/or t
	and tractable populations should be eradicated
CaLP	Catchment and Land Protection Act 1994
R	Regionally Restricted under the Catchment and Land Protection Act 1994
С	Regionally Controlled under the Catchment and Land Protection Act 1994
WONS / W	Weed of National Significance
\checkmark	Present (species may occur in additional HZs)
H	Species not recorded onsite yet, but was observed in adjoining properties and
	future
Blue text	Additions or edits to the weeds table presented in Ecology Australia (2008a)

Habitat Zone					1	2		
Eco	Ecological Vegetation Class name (initials)				SH	SH		
Ha	bitat	t Sc	ore	;			58%	45%
Priority	Cont/Elim	CaLP	WONS		Species Name	Common Name		
1	E			*	Acacia longifolia subsp. longifolia	Sallow Wattle	\checkmark	
1	Е			*	Anthoxanthum odoratum	Sweet Vernal-grass	\checkmark	\checkmark
1	Е			*	Bambusa sp.	Bamboo	\checkmark	
1	Е			*	Chamaecytisus palmensis	Tree Lucerne	9	f
1	Е			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark	\checkmark
1	Е			*	Ixia sp.	Ixia	\checkmark	
1	Е			#	Leptospermum laevigatum	Coast Tea-tree	\checkmark	
1	Е	R		*	Oxalis pes-caprae	Soursob	\checkmark	\checkmark
1	Е			*	Paraserianthes lophantha ssp. lopha	Cape Wattle	9	f
1	Е			*	Pittosporum undulatum	Sweet Pittosporum		\checkmark
2	Е			*	Agrostis capillaris	Brown-top Bent	\checkmark	\checkmark
2	С			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark	\checkmark
3	С			*	Arctotheca calendula	Cape Weed		\checkmark
3	С			*	Conyza sumatrensis	Tall Fleabane	\checkmark	
3	С			*	Fumaria spp.	Fumitory	\checkmark	\checkmark
3	С			*	Hypochoeris radicata	Flatweed	\checkmark	\checkmark
3	С			*	Lolium spp.	Rye-grass	\checkmark	
3	С			*	Vulpia spp.	Fescue		\checkmark
4	С			*	Cerastium glomeratum	Common Mouse-ear Chickweed	\checkmark	\checkmark
4	С			*	Romulea rosea var. australis	Onion Grass	\checkmark	
4	С			*	Sonchus oleraceus	Common Sow-thistle	\checkmark	
4	С			*	Stellaria media	Chickweed		\checkmark

ous species that cannot reasonably be eliminated ularly invasive and/or those with currently small

djoining properties and is expected to naturalise in



Figure 11 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Gramatan Avenue Heathland Sanctuary, Beaumaris. EVC 6: Sand Heathland.

Table 40 Prioritised management actions for Gramatan Avenue Heathland Sanctuary, Beaumaris.

Management Unit	Management Action Gramatan Avenue Heathland Sanctuary	Outcome	Timeframe
Highest Priority			
1, 2	 Management of Priority 1 weeds (eliminate/control as in Table 39) Remove the large Coast Tea-tree (#Leptospermum laevigatum) individual (and any other specimens) along the eastern boundary of the reserve as it provides a continuous seed source, requiring ongoing management of recruits. The Gramatan Avenue Management Plan specifies this tree for retention, however this should be over-ruled as the reserve is too small to support exotic trees that are too competitive Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3
1, 2	Maintain fences around Management Units 1 and 2 to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public 	Year 1, ongoing
1, 2	Investigate the taxonomy of Common Flat-pea (<i>Platylobium obtusangulum</i>) as it may be an undescribed taxon	Rhizomatous Common Flat-pea (<i>Platylobium obtusangulum</i>) taxonomically identified or described if it's a new taxon	Year 1
1, 2	 Ecological thinning of over-abundant/highly competitive indigenous plant species Tolerate no more than 5% cover of Twiggy Daisy-bush (<i>Olearia ramulosa</i>) in any Habitat Zone polygon Destroy (i.e. remove haustoria - the parasite's attachment-point) 	 No monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required
	abundant and killing indigenous vegetation		
1, 2	Dispose of removed plant material off-site to help reduce soil nutrient levels Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	No hybrid individuals or their exotic parents present	Year 1, ongoing
	 Hybrid Correa involving <i>Correa reflexa</i> var. <i>reflexa</i> and other species Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X #<i>L. laevigatum</i>) hybrids (if present) Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus</i> X #<i>Acacia longifolia</i> s.l.) hybrids (if present) 		
	Dispose of removed plant material off-site to help reduce soil nutrient levels		



Management Unit	Management Action Gramatan Avenue Heathland Sanctuary	Outcome	Timeframe
1, 2	 Remove non-indigenous native species competing with indigenous species, and that could be wrongly perceived in future as a bona fide indigenous species Black She-oak (<i>Allocasuarina littoralis</i>) – the reserve is too small to support exotic trees as trees are too competitive Dispose of removed plant material off-site to help reduce soil nutrient levels 	 No/few non-indigenous native species present 	Year 1, ongoing
1, 2	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance Avoid unnecessary use of tree guards	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1, 2	Establish permanent monitoring quadrats	 Two monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing
1	Mosaic burn the long unburnt areas of Management Unit 1, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt vegetation where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in the medium- long term (7-8 years)
N/A	In consultation with adjoining property owners, investigate the possibility of having Bamboo (* <i>Bambusa</i> sp.), Cape Wattle (* <i>Paraserianthes lophantha</i> subsp. <i>lophantha</i>) and Tree Lucerne (* <i>Chamaecytisus palmensis</i>) removed from private property	 Bamboo, Cape Wattle and Tree Lucerne removed from adjoining properties, hence minimising the seed source or rhizomatous potential for invasion 	Year 2, ongoing
Medium Priority			
1, 2	 Management of Priority 2 weeds (eliminate/control as in Table 39) Ensure cover of Priority 3 and 4 weeds does not increase 	 Reduction of cover of Priority 2 weeds Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Medium term (3-8 years) Ongoing
1, 2	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of the reserve, as necessary, according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



Management Unit	Management Action Gramatan Avenue Heathland Sanctuary	Outcome	Timeframe
Lowest Priority			
1, 2	Management of Priority 3 and 4 weeds that are particularly invasive or where	 Reduction in cover of targeted Priority 3 and 4 weeds 	Medium term (3-8 years)
	they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 39)	• Continued reduction in cover of Priority 1 and 2 weeds, as necessary	Ongoing, as required
		• No increase in cover of weeds	
1, 2	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



5.10 Site: Long Hollow Heathland (Beaumaris)

Two Management Units (MUs) were identified onsite and are separated on the basis of the current #Coast Tea-tree distribution across the site (Figure 12). Management Unit 1 (MU1) comprises good quality remnant vegetation with very few #Coast Tea-tree adults as a result of previous fires and/or manual removal. Management Unit 2 on the other hand is dominated by #Coast Tea-tree adults that will gradually be removed over time.

Table 41 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 42), along with an updated list of prioritised weeds requiring control or elimination (Table 43). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 44.

Table 41 Constituent Ecological Vegetation Classes and Habitat Zones within each Management Unit, Long Hollow Heathland, Beaumaris.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Damp Sands Herb-rich Woodland (3)	1, 2, 3, 4, 5, 6, 7, 8, 9	50%, 18%, 28%, 15%, 41%, 16%, 46%, 38%, 41%	Good quality remnant vegetation with few #Coast Tea-tree adults.
2	Damp Sands Herb-rich Woodland (3)	1, 3, 4	50%, 28%, 15%	#Coast Tea-tree dominated

Table 42 Location details of permanent monitoring quadrats at Long Hollow Heathland, Beaumaris (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				
3				

Table 43 Summary of the weed species recorded in the Habitat Zones identified at Long Hollow Heathland, Beaumaris - updated from Ecology Australia (2008a).

	Kev:		
	DSHW	Damp Sands Herb-rich Woodland	
	Cont/Elim	Management objective of Control or Eliminate	
	С	Control: Reduce the distribution and cover of ubiqui	to
	E	Eliminate, where possible: species known to be parti	ic
		and tractable populations should be eradicated	
	CaLP	Catchment and Land Protection Act 1994	
	R	Regionally Restricted under the Catchment and Lan	d
	С	Regionally Controlled under the Catchment and Lan	10
	WONS / W	Weed of National Significance	
	\checkmark	Present (species may occur in additional HZs)	
	Ť	Some adult planted specimens may be retained, how	e
	Blue text	Additions or edits to the weeds table presented in Ec	0
oit	at Zone		Γ

Habitat Zone			1	2	3	4	5	6	7	8	9				
Ecological Vegetation Class name (initials)			MH	MH	MH	MH	MH	ΜH	ΜH	MH	MH				
			DS	DS	DS	DS	DS	DS	DS	DS	DS				
Habitat Score			50%	18%	28%	15%	41%	16%	46%	38%	41%				
Priority	Cont/Elim	CaLP	WONS		Species Name	Common Name									
1	E			*	Acacia longifolia subsp. longifolia	Sallow Wattle	~		~		~				
1	E			#	Acacia longifolia subsp. sophorae	Coast Wattle		~		~			\checkmark	~	
1	Е			*	Acacia saligna	Golden Wreath Wattle					\checkmark				
1	Е	R		*	Allium triquetrum	Angled Onion		\checkmark							
1	Е		W	*	Asparagus aethiopicus	Emerald fern				\checkmark					
1	Е	R	W	*	Asparagus asparagoides	Bridal Creeper	\checkmark	\checkmark	\checkmark						\checkmark
1	E			*	Carpobrotus aequilaterus / C edulis	Angled Pigface / Hottentot Fig									\checkmark
1	Е			*	Dietes grandiflora	Dietes		\checkmark							
1	E			*	Dipogon lignosus	Common Dipogon				\checkmark					
1†	E			*	Eucalyptus botryoides	Southern Mahogany				\checkmark					
1	Е			#	Leptospermum laevigatum	Coast Tea-tree	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark
1	E			*	Melaleuca armillaris subsp. armillaris	Giant Honey-myrtle				~		~			
1	Е			*	Oxalis incarnata	Pale Wood-sorrel		\checkmark							
1	Е	R		*	Oxalis pes-caprae	Soursob	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark		\checkmark
1	Е			*	Pennisetum clandestinum	Kikuyu				\checkmark		\checkmark			
1	Е			*	Pittosporum undulatum	Sweet Pittosporum		\checkmark		\checkmark					
1	E	С		*	Salpichroa origanifolia	Pampas Lily-of-the- Valley				~		~			
1	Е			*	Tradescantia fluminensis	Wandering Jew				\checkmark					
2	С			*	Cynodon dactylon var.	Couch	\checkmark				\checkmark				
					dactylon										
2	С			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
2	С			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark		\checkmark						
2	E			*	Pandorea pandorana	Wonga Vine		\checkmark							
2	Е			*	Passiflora cinnabarina	Red Passion-flower	\checkmark								
2	E			*	Passiflora caerulea	Blue Passion-fruit		\checkmark		\checkmark					

ous species that cannot reasonably be eliminated cularly invasive and/or those with currently small

Protection Act 1994 d Protection Act 1994

ever elimination of any offspring is recommended ology Australia (2008a)

Tal	ole	43 (con	tinued										
Hal	Habitat Zone					1	2	3	4	5	6	7	8	9
Ecc	Ecological Vegetation Class name (initials)					DSHW	DSHW	DSHW						
Hal	Habitat Score					50%	18%	28%	15%	41%	16%	46%	38%	41%
Priority	Cont/Elim	CaLP	MONS	Species Name	Common Name									
3	E		*	Acanthus mollis	Bear's Breach				\checkmark					
3	C		*	Arctotheca calendula	Cape Weed			\checkmark	\checkmark					
3	C		*	Fumaria spp.	Fumitory	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark				\checkmark
3	C		*	Hypochoeris radicata	Hypochoeris radicata Flatweed			\checkmark	\checkmark			\checkmark		\checkmark
3	C		*	Lagurus ovatus Hare's-tail Grass				\checkmark						\checkmark
3	C		*	Poa annua	Annual Meadow-grass				\checkmark					\checkmark
3	C		*	Setaria pumila subsp. pumila	Pale Pigeon-grass			~						
3	C		*	Vulpia spp.	Fescue							\checkmark		
4	C		*	Cerastium glomeratum	Common Mouse-ear Chickweed	~								
4†	E			<i>Eucalyptus camaldulensis</i> (exotic provenance)	River Red-gum	~								
4	C		*	Lepidium africanum	Common Peppercress									\checkmark
4	C		*	Romulea rosea var. australis	Onion Grass	~		~	~	~				~
4	C		*	Sonchus oleraceus	Common Sow-thistle	\checkmark		\checkmark		\checkmark		\checkmark		\checkmark
4	C		*	Stellaria media	Chickweed	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark
4	C		*	Trifolium arvense var. arvense	Hare's-foot Clover			~						~
4	C		*	Vicia sativa s.l.	Common Vetch	\checkmark				\checkmark				





Figure 12 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Long Hollow Heathland, Beaumaris. EVC 3: Damp Sands Herb-rich Woodland.


Table 44 Prioritised management actions for Long Hollow Heathland, Beaumaris.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Management Unit	Management Actions for Long Hollow Heathland	Outcome		
Highest Priority				
1, 2	Management of Priority 1 weeds (eliminate/control as in Table 43)	Reduction in cover of Priority 1 weeds		
	• If areas of woody weeds, particularly Coast Tea-tree (# <i>Leptospermum laevigatum</i>), are manually removed (i.e. not killed by fire) leaving bare ground, spray soil with smoke-water after the autumn break to stimulate germination of indigenous species in the soil-stored seedbank	• No increase in cover of Priority 2, 3 and 4 weeds		
	• Eliminate Coast Tea-tree from Management Unit 1, while gradually eliminating it from Management Unit 2 focusing in areas that adjoin Management Unit 1			
	• Dispose of removed plant material off-site to help deplete soil nutrient levels and minimise fire fuel loads			
	Ensure cover of Priority 2, 3 and 4 weeds does not increase			
1	Aim to eliminate Panic Veldt-grass (* <i>Ehrharta erecta</i> var. <i>ereta</i>) (Priority 2 weed) from Management Unit 1	Reduction in cover of Panic Veldt-grass		
1, 2	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including:	No hybrid individuals or their exotic parents present		
	• Hybrid Correa involving <i>Correa reflexa</i> var. <i>reflexa</i> and other species (if present)			
	• Heath Tea-tree X Coast Tea-tree (<i>Leptospermum myrsinoides</i> X # <i>L.</i> <i>laevigatum</i>) hybrids (if present)			
	• Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus X #Acacia longifolia</i> s.l.) hybrids (if present)			
	Dispose of removed plant material off-site to help reduce soil nutrient levels			
1, 2	Remove non-indigenous native species competing with indigenous species, and that could be wrongly perceived in future as a bona fide indigenous species	No/few non-indigenous native species present		
	• Seaberry Saltbush (<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>)			
	Dispose of removed plant material off-site to help reduce soil nutrient levels			
1, 2	Maintain fences around higher quality areas of Management Unit 1 and areas of regenerating heath where woody weeds have been controlled, to avoid/minimise the creation of informal tracks, track widening and damage by pedestrians and off-leash dogs	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public 		

EcologyAutralia

Timeframe
Year 1, ongoing; elimination achieved by Year 3
Year 1, ongoing
Year 1, ongoing (For all inland sites, not just where I've noted them)
Year 1, ongoing
Year 1, ongoing

Management Unit	Management Actions for Long Hollow Heathland	Outcome	Timeframe
1, 2	 Ecological thinning of over-abundant/highly competitive indigenous plant species Tolerate no more than 5% cover of Twiggy Daisy-bush (<i>Olearia ramulosa</i>) in any Habitat Zone polygon Tolerate no more than 5% cover of Climbing Lignum (<i>Muehlenbeckia australis</i>) in any Habitat Zone polygon Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where overabundant and killing indigenous vegetation Slash/scorch Bracken (<i>Pteridium esculentum</i>) where it is supressing indigenous species (and hence the vegetation is likely to regenerate with indigenous species rather than exotic species, particularly exotic grasses), to reduce cover to no more than 10% in a Habitat Zone polygon 	 No monocultures or near-monocultures of robust indigenous species Insignificant death of indigenous plants as a result of Dodder-laurel parasitism 	Ongoing, as required
1, 2	 Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) If present, replace removed <i>Correa</i> hybrids with Common Correa (<i>Correa reflexa</i> var. <i>reflexa</i>) of indigenous provenance Avoid unnecessary use of tree guards 	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1, 2	Establish permanent monitoring quadrats	Three monitoring quadrats established and monitored as specified in Section 6 Monitoring Program	Set up: Year 1 Monitoring: ongoing
2	Mosaic burn the long unburnt areas of Management Unit 2, ensuring that thickets of robust species (e.g. Kangaroo Apple, Twiggy Daisy-bush, Black Wattle, Hedge Wattle, Bracken) are controlled if/as they arise	 Incremental burning of low diversity areas of long unburnt vegetation where fire is expected to increase diversity No monocultures or near-monocultures of robust indigenous species 	Commence in the short- medium term (3-4 years)
Medium Priority			
1, 2	 Management of Priority 2 weeds (eliminate/control as in Table 43) Ensure cover of Priority 3 and 4 weeds does not increase 	 Reduction of cover of Priority 2 weeds Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Medium term (3-8 years) Ongoing



Management Unit	Management Actions for Long Hollow Heathland	Outcome	Timeframe
1, 2	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
1, 2	Evaluate the possibility of eliminating rabbits from the site, as was achieved at Beaumaris Foreshore (Jo Hurse, Citywide, pers. comm.)	Rabbits eradicated (if considered feasible)	Medium term (3-8 years) Ongoing, as required
Lowest Priority			
1, 2	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 43)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required
1, 2	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



5.11 Site: Picnic Point (Sandringham)

One Management Unit (MU) was identified onsite as the management issues (primarily weeds) are similar across the study area (Figure 13).

Table 45 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. An updated list of prioritised weeds requiring control or elimination (Table 46) is provided, along with location details for the permanent monitoring quadrats (to be detailed when quadrats are established) (Table 47). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 48.

Table 45Constituent Ecological Vegetation Classes and Habitat Zones within the
Management Unit, Picnic Point, Sandringham.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coastal Dune Grassland (879)	1	53%	Comparable management issues
	Coastal Dune Scrub (160)	2, 9	38%, 44%	
	Coastal Headland Scrub (161)	3, 4, 5, 6, 7, 8	39%, 48%, 45%, 49%, 16%, 29%	

Table 46Summary of the weed species recorded in the Habitat Zones identified at
Picnic Point, Sandringham - updated from Ecology Australia (2008a).

Key: CDG Coastal Dune Grassland Coastal Dune Scrub CDS CHS Coastal Headland Scrub Cont/Elim Management objective of Control or Eliminate Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated С Е Eliminate, where possible: species known to be particularly invasive and/or those with currently small and tractable populations should be eradicated CaLP Catchment and Land Protection Act 1994 R Regionally Restricted under the Catchment and Land Protection Act 1994 С Regionally Controlled under the Catchment and Land Protection Act 1994 WONS / W Weed of National Significance Present (species may occur in additional HZs) Some adult planted specimens may be retained, however elimination of any offspring is recommended Additions or edits to the weeds table presented in Ecology Australia (2008a) Blue text

Hah	oitat	70	ne			
Fco	logi		Neo Veo	zet	ation Class name (initials)	
Hab	oitat	Sc	ore	,01	ution cluss nume (initials)	
riority	Cont/Elim	CaLP	NONS		Spacias Nama	Common Name
1	E	-	-	*	Acacia longifolia subsp	Sallow Wattle
1					Iongifolia	Sullow Wattle
1	Е		-	*	Acetosa sagittata	Rambling Dock
1	E		-	*	Acacia saligna	Golden Weath Wattle
1	E	R	-	*	Allium triquetrum	Angled Onion
1	E		W	*	Anredera cordifolia	Madeira Vine
1	E	R	W	*	Asparagus asparagoides	Bridal Creeper
1	Е			*	Berkheva rigida	African Thistle
1	E			*	Carpobrotus aequilaterus /	Angled Pigface /
					<i>C. edulis</i>	Hottentot Fig
1	Е			*	Chamaecytisus palmensis	Tree Lucerne
1	Е			*	Chasmanthe floribunda	African Cornflag
1	Е	C	W	*	Chrysanthemoides monilifera	Boneseed
					subsp. monilifera	
1	Е	C		*	Cirsium vulgare	Spear Thistle
1	Е			*	Coprosma repens	Mirror Bush
1	Е			*	Cotoneaster pannosus	Velvet Cotoneaster
1	Е			*	Dipogon lignosus	Common Dipogon
1	Е			*	Ehrharta calycina	Perennial Veldt-grass
1†	Е			*	Eucalyptus botryoides	Southern Mahogany
1	Е			*	Gazania linearis/G. rigens	Gazania
1	Е	С	W	*	Genista linifolia	Flax-leaf Broom
1	Е			*	Ixia sp.	Ixia
1	Е	С		*	Juncus acutus subsp. acutus	Sharp Rush
1	Е	С	W	*	Lycium ferocissimum	African Box-thorn
1	Е			*	Melaleuca armillaris ssp. armillaris	Giant Honey-myrtle
1	Е	R		*	Oxalis pes-caprae	Soursob
1	E			*	Paraserianthes lophantha	Cape Leeuwin Wattle
1	Е		<u> </u>	*	Pennisetum clandestinum	Kikuvu
1	E			*	Pittosporum undulatum	Sweet Pittosporum
1	E	C		*	Salpichroa origanifolia	Pampas Lily-of-the-
1	E			*	Stenotaphrum secundatum	Buffalo Grass
1	E			*	Tradescantia fluminensis	Wandering Jew
2	C			*	Brassica fruticulosa	Twiggy Turnip
2	C			*	Bromus catharticus	Prairie Grass
2	Е			*	Crassula sarmentosa var. sarmentosa	Crassula
2	С			*	Cynodon dactylon var.	Couch
2	F			*	Drosanthomum candons	Rodondo Creener
2 2	C		-	*	Ehrharta oracta vor oracta	Panic Valdt grass
4		<u> </u>	<u> </u>	Ľ.	Eninuriu ereciu val. ereciu	ranic velut-glass



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Table 46 continued

Habitat Zone		1	2	3	4	5	6	7	8	9					
Eco	Ecological Vegetation Class name (initials)				CDG	CDS	CHS	CHS	CHS	CHS	CHS	CHS	CDS		
Hab	Habitat Score			53%	38%	39%	48%	45%	49%	16%	26%	44%			
Priority	Cont/Elim	CaLP	WONS		Species Name	Common Name									
2	С			*	Galenia pubescens var.	Galenia	\checkmark		\checkmark			\checkmark	\checkmark		
					pubescens										
2	С			*	Holcus lanatus	Yorkshire Fog	\checkmark								
2	С			*	Lolium perenne	Perennial Rye-grass	\checkmark	\checkmark	\checkmark						
2	E			*	Ornithogalum	Pregnant Onion			\checkmark						
					longibracteatum										
2	С			*	Oxalis purpurea	Large-flower Wood- sorrel			\checkmark						
2	Е			*	Passiflora caerulea	Blue Passion-fruit			\checkmark						
2	E			*	Phoenix canariensis	Canary Island Date- palm								~	
2	С			*	Sporobolus africanus	Rat-tail Grass		\checkmark							
2	С			*	Thinopyrum junceiforme	Sea Wheat-grass	\checkmark								
3	С			*	Arctotheca calendula	Cape Weed		\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	
3	С			*	Avena fatua	Wild Oat					\checkmark				
3	С			*	Conyza spp.	Fleabane		\checkmark		\checkmark	\checkmark				
3	С			*	Fumaria spp.	Fumitory		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
3	С			*	Hypochoeris radicata	Flatweed	\checkmark	\checkmark		\checkmark					
3	С			*	Lagurus ovatus	Hare's-tail Grass	\checkmark		\checkmark						
3	С			*	Lolium spp.	Rye-grass			\checkmark		\checkmark				
3	С			*	Plantago coronopus	Buck's-horn Plantain			\checkmark	\checkmark					
3	С			*	Poa annua	Annual Meadow-grass			✓	\checkmark				\checkmark	
3	E			*	Schinus molle	Pepper Tree			\checkmark						
3	C			*	Vulpia spp.	Fescue	 ✓ ✓ 								
4	С			*	Cakile maritima subsp. maritima	Sea Rocket	✓		~						
4	С			*	Chenopodium murale	Sowbane					\checkmark				
4†	Е			*	Corymbia ficifolia	Red-flowering Gum		\checkmark							
4†	E				Eucalyptus camaldulensis	River Red-gum		\checkmark							
					(exotic provenance)										
4	С			*	Galium aparine	Cleavers		\checkmark							
4	C	\square		*	Hypochoeris glabra	Smooth Cat's-ear	√								
4	C			*	Malva spp.	Mallow			✓						
4	C			*	Medicago polymorpha	Burr Medic		✓							
4	C	\square		*	Medicago spp.	Medic	✓		✓ ✓						
4	C	\square		*	Romulea rosea var. australis	Onion Grass		✓ ✓	✓ ✓	✓				\checkmark	
4	0			*	Solanum nigrum	Black Nightshade		 ✓ 	 ✓ 					✓	
4	0	\square		*	Sonchus oleraceus	Common Sow-thistle	 ✓ 	✓	✓	 ✓ 	✓	✓	~	✓	
4		\square		*	Stellaria meala	Chickweed Cardan Dandalian	V (•	•	v		v		•	
4	C				agg.		×								
4	С			*	Trifolium arvense var. arvense	Hare's-foot Clover			~						
4	С			*	Trifolium spp. (annuals)	Clover				\checkmark					
4	С			*	Vicia sativa s.l.	Common Vetch			\checkmark		\checkmark				

Table 47Location details of permanent monitoring quadrats at Picnic Point,
Sandringham (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				
3				





Figure 13 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Picnic Point, Sandringham. EVC 160: Coastal Dune Scrub, EVC 161: Coastal Headland Scrub, EVC 879: Coastal Dune Grassland.

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Table 48 Prioritised management actions for Picnic Point, Sandringham.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff/headland erosion is an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue.

Management Unit	Management Actions for Picnic Point	Outcome	Timeframe
Highest Priority			
1	 Management of Priority 1 weeds (eliminate/control as in Table 46) Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, liverworts) and fungi, unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals Management staff are trained and have suitable equipment to work on slopes Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3
1	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals Dispose of removed plant material off-site to help reduce soil nutrient levels	• No hybrid individuals or their exotic parents present	Year 1, ongoing
1	 Ecological thinning of over-abundant/highly competitive indigenous plant species Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where over-abundant and killing indigenous vegetation 	• Insignificant death of indigenous plants as a result of Dodder-laurel parasitism	Ongoing, as required
1	Remove indigenous and exotic shrubs (other than Coast Saltbush <i>Atriplex cinerea</i>) that are growing amongst and adversely competing with Hairy Spinifex (<i>Spinifex sericeus</i>) in the Coastal Dune Grassland vegetation	No shrubs (other than Coast Saltbush) growing amongst Hairy Spinifex swards	Year 1, ongoing
1	If beach sand is imported to the site, ensure machinery operators do not destroy or compromise remnant vegetation or sea-bird roosting sites when spreading sand; this also applies to mechanical sand raker operations	 No loss or damage to indigenous vegetation or sea-bird roosts If indigenous vegetation is disturbed, undertake a Net Gain assessment and establish appropriate vegetation offsets that must be permanently protected and managed 	Identification of risks to machinery operators: prior to importing/spreading/raking beach sand
1	Maintain/install fences to avoid/minimise the creation of informal tracks, track widening and damage to vegetation by pedestrians and off-leash dogs Close existing informal tracks using fencing and signage, and rehabilitate using indigenous species of local provenance as indicated in the EVC revegetation lists (Appendix 2)	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public Existing informal track closed and rehabilitated 	Year 1, ongoing



Management Unit	Management Actions for Picnic Point	Outcome	Timeframe
1	 Improve the tree/vegetation vandalism program Develop an informative brochure summarising the impacts of tree vandalism, why it's an issue, and the consequences to vandals if they are identified If trees or other vegetation is vandalised: Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years Pursue/investigate all possible prosecutions in full Ensure publicity through local newspapers when trees are vandalised 	 Brochure distributed it to all residents (particularly new residents) with beach frontage Signage installed as soon as possible. Temporary signage may be necessary in the short term Reduction in occurrence of tree/vegetation vandalism 	Improve program: Year 1 Installation of signs: Asking for witnesses: 48 hrs after tree/vegetation vandalism occurs View obstructing signs: as soon as possible after tree/vegetation vandalism occurs, no later than 1 month after
1	 Implement dog faeces management program Regular presence of staff enforcing compliance by owners Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced 	 Letter sent to all dog owners in the municipality Reduction of dog faeces along tracks and in vegetation areas (based on observations by management staff/contractors) 	Year 1, ongoing
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet Bursaria (<i>Bursaria spinosa 'var. macrophylla'</i>) to replace bird habitat lost through removal of *African Box-thorn Avoid unnecessary use of tree guards	 Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1	Undertake regular litter collection	• Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
1	Establish permanent monitoring quadrats	Three monitoring quadrats established and monitored as specified in Section 6 Monitoring Program	Set up: Year 1 Monitoring: ongoing
1	Investigate if the septic tank near the Sandringham Anglers Club is functioning properly and, if necessary, rectify to avoid nutrient enrichment and waterlogging	• Septic tank functioning properly (i.e. not leaking)	Year 2, earlier if possible



Management Unit	Management Actions for Picnic Point	Outcome	Timeframe
Medium Priority			
1	Management of Priority 2 weeds (eliminate/control as in Table 46)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
	Management staff are trained and have suitable equipment to work on slopes	• No increase in cover of Priority 3 and 4 weeds	
1	Where spiny or (ultimately) excessively large shrubs have been planted next to tracks impairing user amenity and safety, as well having ongoing pruning/maintenance costs, they may need to be removed Replace removed shrubs with suitably-sized species (Appendix 2) planted in appropriate locations where they are unlikely to encroach on paths	 No impaired user amenity from overgrown shrubs No shrubs requiring excessive pruning or removal (i.e. removal of over ¼ of the projected canopy) Replacement plantings require no/minimal pruning when fully grown 	Medium term (3-8 years)
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
1	Evaluate the possibility of eliminating rabbits from the site, as was achieved at Beaumaris Foreshore (Jo Hurse, Citywide, pers. comm.)	Rabbits eradicated (if considered feasible)	Medium term (3-8 years) Ongoing, as required
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 46)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



5.12 Site: Red Bluff (Black Rock)

One Management Unit (MU1) was identified onsite as the management issues are uniform across the Red Bluff study area (Figure 14). The Management Unit extends beyond the original study area (Ecology Australia 2008a) to include adjoining remnant vegetation with similar management issues to those identified in the original study area. This additional area was included at the request of Jo Hurse, Bushland & Nursery Team Leader, Citywide as it is also managed by Citywide on behalf of Bayside City Council.

Table 49 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 50), along with an updated list of prioritised weeds requiring control or elimination (Table 51). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 52.

Table 49 Constituent Ecological Vegetation Classes and Habitat Zones within the Management Unit, Red Bluff, Black Rock.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coastal Headland Scrub (161)	1, 2	41%, 14%	Comparable management issues
	Spray-zone Coastal Shrubland (876)	3	26%	

Table 50 Location details of permanent monitoring quadrats at Red Bluff, Black Rock (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				
3				

Table 51 Summary of the weed species recorded in the Habitat Zones identified at Red Bluff, Black Rock - updated from Ecology Australia (2008a).

Hab Eco Hab	Ka Cl Ca Ca W ✓ Bl Initat Iogi	ey: HS ont C E aLH ON Zo cal	/Elin NS / text ne Veg ore	Coastal Headland Scrub SZCS Spray-zone Coastal Shrubland Im Management objective of Control or Eliminate Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be elin Eliminate, where possible: species known to be particularly invasive and/or those with current and tractable populations should be eradicated <i>Catchment and Land Protection Act 1994:</i> R = Regionally Restricted; C = Regionally Control / W Weed of National Significance Present (species may occur in additional HZs) Some adult planted specimens may be retained, however elimination of any offspring is record Additions or edits to the weeds table presented in Ecology Australia (2008a) Image: the specime of the spec			iminated tly small rolled nmended <u>3</u> SZCS 26%		
	В								
Priority	Cont/Eli	CaLP	NONS		Species Name	Common Name			
1	Е			*	Acacia provincialis	Wirilda			
1	Е	R	W	*	Asparagus asparagoides	Bridal Creeper	\checkmark		
1	Е			*	Carpobrotus aequilaterus / C. edulis	Angled Pigface / Hottentot Fig	\checkmark		\checkmark
1	Е			*	Chasmanthe floribunda	African Cornflag	\checkmark		
1	E	C	W	*	Chrysanthemoides monilifera subsp. monilifera	Boneseed	\checkmark		
1	Е			*	Coprosma repens	Mirror Bush	\checkmark	\checkmark	\checkmark
1	Е			*	Delairea odorata	Cape Ivy	\checkmark	\checkmark	
1	Е			*	Gazania linearis/G. rigens	Gazania			
1	Е	C	W	*	Lycium ferocissimum	African Box-thorn	\checkmark		
1†	E			*	Melaleuca armillaris ssp. armillaris	Giant Honey-myrtle			
1	E	C	W	*	Opuntia monacantha	Drooping Prickly-pear			
1	E	R		*	Oxalis pes-caprae	Soursob	\checkmark	\checkmark	
1	Е			*	Pennisetum clandestinum	Kikuyu	\checkmark	\checkmark	
1	E			*	Phoenix canariensis	Canary Island Date Palm			
1	E	C		*	Salpichroa origanifolia	Pampas Lily-of-the-Valley			
1	E			*	Stenotaphrum secundatum	Buffalo Grass			
2	С			*	Cynodon dactylon var. dactylon	Couch	\checkmark		
2	E			*	Drosanthemum candens	Rodondo Creeper	\checkmark		\checkmark
2	С			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark	\checkmark	\checkmark
2	С			*	Ehrharta longiflora	Annual Veldt-grass	\checkmark	\checkmark	
2	С			*	Galenia pubescens var. pubescens	Galenia	\checkmark		
2†	E			*	Hakea drupacea	Sweet Hakea	✓		
2	E			*	Lampranthus immelmaniae	Noon-flower	✓		
2	E			*	Melaleuca nesophila	Showy Honey-myrtle			
3	С			*	Arctotheca calendula	Cape Weed	✓		
3	E			*	Artemisia arborescens	Silver Wormwood	\checkmark		
3	С			*	Hypochoeris radicata	Flatweed	\checkmark		
3	С			*	Lagurus ovatus	Hare's-tail Grass	✓		
3	С			*	Lolium spp.	Rye-grass	√		
3	С			*	Plantago coronopus	Buck's-horn Plantain			\checkmark
4	С			*	Romulea rosea var. australis	Onion Grass	✓		
4	E			*	Solanum nigrum	Black Nightshade	✓		
4	С			*	Sonchus oleraceus	Common Sow-thistle	\checkmark		



Figure 14 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Red Bluff, Black Rock. EVC 161: Coastal Headland Scrub, EVC 876: Spray-zone Coastal Shrubland.



Table 52 Prioritised management actions for Red Bluff, Black Rock.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff erosion is an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue.

Management Unit	Management Actions for Red Bluff	Outcome	Timeframe
Highest Priority			
N/A	Expand the management area to the south, beyond the study area illustrated in Figure 14	Management area expanded to include as much remnant vegetation as is feasible to adequately manage	Year 1
1	 Management of Priority 1 weeds (eliminate/control as in Table 51) Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, fungi (notably Mallee Drumsticks <i>Battarrea stevenii</i> fungus), unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals Management staff are trained and have suitable equipment to work on slopes Ensure cover of Priority 2, 3 and 4 weeds does not increase 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3
1	Remove young Coast Tea-tree (<i>#Leptospermum laevigatum</i>) plants where they occur (planted?) over areas with significant ground layer herb diversity (e.g. Kidney-weed <i>Dichondra repens</i> , Australian Salt-grass <i>Distichlis</i> <i>distichophyllum</i> , Salt Couch <i>Sporobolus virginicus</i> , Hairy Spinifex <i>Spinifex</i> <i>sericeus</i> , Small-flower Flax-lily <i>Dianella brevicaulis</i>)	 Young shrubs are removed from areas where they will smother and kill many indigenous ground layer herbs (small grasses, graminoids and forbs) No future plantings of shrubs over areas with significant herb diversity 	Year 1
1	Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals Dispose of removed plant material off-site to help reduce soil nutrient levels	• No hybrid individuals or their exotic parents present	Year 1, ongoing (For all inland sites, not just where I've noted them)
1	Maintain/install fences to avoid/minimise the creation of informal tracks, track widening and damage to vegetation by pedestrians and off-leash dogs, particularly through areas with unstable cliffs/slopes Close existing informal tracks using fencing and signage, and rehabilitate using indigenous species of local provenance as indicated in the EVC revegetation lists (Appendix 2)	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public Existing informal track closed and rehabilitated 	Year 1, ongoing
1	If beach sand is imported to the site, ensure machinery operators do not destroy or compromise remnant vegetation or sea-bird roosting sites when spreading sand; this also applies to mechanical sand raker operations	 No loss or damage to indigenous vegetation or sea-bird roosts If indigenous vegetation is disturbed, undertake a Net Gain assessment and establish appropriate vegetation offsets that must be permanently protected and managed 	Identification of risks to machinery operators: prior to importing/spreading/raking beach sand



Management Unit	Management Actions for Red Bluff	Outcome	Timeframe
Management Unit 1	 Management Actions for Red Bluff Improve the tree/vegetation vandalism program Develop an informative brochure summarising the impacts of tree vandalism, why it's an issue, and the consequences to vandals if they are identified If trees or other vegetation is vandalised: Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years Pursue/investigate all possible prosecutions in full Ensure publicity through local newspapers when trees are 	 Outcome Brochure distributed it to all residents (particularly new residents) with beach frontage Signage installed as soon as possible. Temporary signage may be necessary in the short term Reduction in occurrence of tree/vegetation vandalism 	Timeframe Improve program: Year 1 Installation of signs: Asking for witnesses: 48 hrs after tree/vegetation vandalism occurs View obstructing signs: as soon as possible after tree/vegetation vandalism occurs, no later than 1 month after
1	 vandalised Implement dog faeces management program Regular presence of staff enforcing compliance by owners Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable for faeces to be left by dog owners (particularly for weed management staff working on their hands and knees), and how Council will enforce dog faeces removal Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the letter to dog owners; and ensure dispensers are adequately serviced 	 Letter sent to all dog owners in the municipality Reduction of dog faeces along tracks and in vegetation areas (based on observations by management staff/contractors) 	Year 1, ongoing
1	 Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet Bursaria (<i>Bursaria spinosa 'var. macrophylla'</i>) to replace bird habitat lost through removal of *African Box-thorn Avoid unnecessary use of tree guards Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 		After the autumn break Ongoing, as required.
1	Undertake regular litter collection	• Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
1	Establish permanent monitoring quadrats	 Three monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing



Management Unit	Management Actions for Red Bluff	Outcome	Timeframe
Medium Priority			
1	Management of Priority 2 weeds (eliminate/control as in Table 51)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Stage the removal of Rodondo Creeper (*Drosanthemum candens) and	Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
	Noon-flower (* <i>Lampranthus immelmaniae</i>) along the steep slopes adjoining the walking tracks. To maintain soil stability, replace immediately/prior to removal with Rounded Noon-flower (<i>Disphyma</i> <i>crassifolium</i> subsp. <i>crassifolium</i>) and Karkalla (<i>Carpobrotus rossii</i>). If necessary, install additional soil-stabilisation measures until Rounded Noon-flower and Karkalla are established	• No increase in cover of Priority 3 and 4 weeds	
	• Ensure cover of Priority 3 and 4 weeds does not increase		
	Management staff are trained and have suitable equipment to work on slopes		
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2)	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is 	As required
	Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2)	less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	
	Avoid unnecessary use of tree guards		
1	Evaluate the possibility of eliminating rabbits from the site, as was achieved at Beaumaris Foreshore (Jo Hurse, Citywide, pers. comm.)	Rabbits eradicated (if considered feasible)	Medium term (3-8 years) Ongoing, as required
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where	Reduction in cover of targeted Priority 3 and 4 weeds	Long term (5-10 years)
	they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 51)	• Continued reduction in cover of Priority 1 and 2 weeds, as necessary	Ongoing, as required
		• No increase in cover of weeds	
1	Where spiny or (ultimately) excessively large shrubs have been planted next	 No impaired user amenity from overgrown shrubs 	Medium term (3-8 years)
	to tracks impairing user amenity and safety, as well having ongoing pruning/maintenance costs, they may need to be removed	 No shrubs requiring excessive pruning or removal (i.e. removal of over ¹/₃ of the projected canopy) 	
	Replace removed shrubs with suitably-sized species planted in appropriate locations where they are unlikely to encroach on paths	Replacement plantings require no/minimal pruning when fully grown	
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



5.13 Site: Ricketts Point Hinterland (Beaumaris)

One Management Unit (MU1) was identified onsite as the management issues are similar across the Hinterland (Figure 15). A Native Vegetation Works Program has been prepared for the coastline of the Ricketts Point site as a separate document (Ecology Australia 2012b). Management Unit 1 identified here for the hinterland is comparable to Management Unit 1 identified in Ecology Australia (2012b) for the coastline, as they have similar values and management issues.

Table 53 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. An updated list of prioritised weeds requiring control or elimination (Table 54) is provided, along with location details for the permanent monitoring quadrats (to be detailed when quadrats are established) (Table 55). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 56.

Table 53Constituent Ecological Vegetation Classes and Habitat Zones within the
Management Unit, Ricketts Point Hinterland, Beaumaris.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coast Banksia Woodland (2)	1, 2	42%, 35%	Comparable management issues; analogous to MU1 for the Ricketts Point Coastline (Ecology
	Coastal Headland Scrub (161)	3, 4, 5	42%, 27%, 20%	Australia 2012b).

Table 54Summary of the weed species recorded in the Habitat Zones identified at
Ricketts Point Hinterland, Beaumaris - updated from Ecology Australia
(2008a).

CHS Coastal Headland Scrub Cont/Elim Management objective of Control or Eliminate Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated С Е Eliminate, where possible: species known to be particularly invasive and/or those with currently small and tractable populations should be eradicated CaLP Catchment and Land Protection Act 1994 Regionally Restricted under the Catchment and Land Protection Act 1994 R С Regionally Controlled under the Catchment and Land Protection Act 1994 WONS / W Weed of National Significance Present (species may occur in additional HZs) Some adult planted specimens may be retained, however elimination of any offspring is recommended Additions or edits to the weeds table presented in Ecology Australia (2008a) Blue text

Hał	oitat	Zo	ne				1	2	3	4	5
Eco	logi	cal	Veg	get	ation Class name (initials)		CBW	CBW	CHS	CHS	CHS
Hał	oitat	Sc	ore				42%	35%	42%	27%	20%
riority	Cont/Elim	aLP	NONS		Species Name	Common Name					
1	E		-	*	Acatosa sagittata	Rambling Dock	×			<u> </u>	
1	E			*	Agapanthus praecox subsp. orientalis	Agapanthus				↓	•
1	E	R		*	Allium triquetrum	Angled Onion	\checkmark				
1	Е		W	*	Anredera cordifolia	Madeira Vine			\checkmark	\checkmark	
1	Е	R	W	*	Asparagus asparagoides	Bridal Creeper			\checkmark	\checkmark	
1	Е			*	Chasmanthe floribunda	A frican Cornflag		\checkmark			
1	E	C	W	*	Chrysanthemoides monilifera subsp. monilifera	Boneseed	~			~	
1	E			*	Coprosma repens	Mirror Bush	\checkmark	\checkmark		\checkmark	
1	Е			*	Cortaderia selloana	Pampas-grass	\checkmark				
1	Е			*	Crassula multicava subsp. multicava	Shade Crassula				~	
1	E			*	Dipogon lignosus	Common Dipogon	\checkmark	\checkmark			\checkmark
1	Е			*	Hedera helix	English Ivy	\checkmark	\checkmark			\checkmark
1	Е	С	W	*	Lycium ferocissimum	African Box-thorn	\checkmark	\checkmark	\checkmark	\checkmark	
1	Е	С	W	*	Opuntia monocantha	Drooping Prickly-pear				\checkmark	
1	Е		W	*	Opuntia elata	Paraguay Prickly-pear				\checkmark	
1	Е			*	Opuntia schickendantzii	Lion's Tongue				\checkmark	
1	E			*	Oxalis incarnata	Pale Wood-sorrel				\checkmark	
1	E	R		*	Oxalis pes-caprae	Soursob	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
1	E			*	Paraserianthes lophantha subsp. lophantha	Cape Wattle				~	
1	Е			*	Pennisetum clandestinum	Kikuvu			\checkmark	\checkmark	\checkmark
1	Е			*	Pittosporum undulatum	Sweet Pittosporum		\checkmark		\checkmark	
1	E			*	Polygala myrtifolia var. myrtifolia	Myrtle-leaf Milkwort			~	~	
1	Е	C		*	Salpichroa origanifolia	Pampas Lily-of-the- Valley	~	~	~	~	
1	Е			*	Stenotaphrum secundatum	Buffalo Grass	\checkmark			\checkmark	
1	E			*	Tradescantia fluminensis	Wandering Jew		\checkmark	\checkmark	\checkmark	
1	E			*	Zantedeschia aethiopica	White Arum-lily		\checkmark			\checkmark
2	Е			*	Aeonium haworthii	Pinwheel Aeonium				\checkmark	
2	Е			*	Arundo donax	Giant Reed		\checkmark			
2	С			*	Brassica fruticulosa	Twiggy Turnip			\checkmark		
2	С			*	Bromus catharticus	Prairie Grass					\checkmark
2	Е			*	Chlorophytum comosum	Spider Plant				\checkmark	
2	E			*	Cymbalaria muralis subsp. muralis	Ivy-leaf Toadflax		~			
2	C			*	Cynodon dactylon var. dactylon	Couch	~	~	~	~	~
2	C			*	Ehrharta erecta var. erecta	Panic Veldt-grass	\checkmark	\checkmark	\checkmark	\checkmark	
2	C			*	Ehrharta longiflora	Annual Veldt-grass		\checkmark	\checkmark	\checkmark	
2	Е			*	Pandorea pandorana	Wonga Vine	1				\checkmark
2	C			*	Pintathorum miliacoum	Rice Millet	1			./	

Key: CBW

Coast Banksia Woodland

Table 54 continued

Hab	Habitat Zone				1	2	3	4	5		
Eco	Ecological Vegetation Class name (initials)			CBW	CBW	CHS	CHS	CHS			
Hab	oitat	Sco	ore				42%	35%	42%	27%	20%
riority	Cont/Elim	aLP	VONS		Succion Name	Common Nome					
	0	-	>	*	Species Name	Det teil Cross					
2	E			*	Sporobolus ajricanus	Kat-tall Grass				×	
2	E			*		Cape Honeysuckie					•
3 2	E			*	Acaninus motifis	Cono Wood				v	
3	C			*	Arctotneca calenaula	Cape weed	V		V	∨	
3	C			*	Conyza bonariensis			v			
3	C			~ ~	Conyza sumatrensis	Tall Fleabane		V		 ✓ 	
3	C			~ ~	Fumaria spp.	Fumitory		V	✓	√	
3	C			~ ~	Hypochoeris radicata	Flatweed				√	
3	C			* *	Lolium spp.	Rye-grass				✓ ✓	
3	C			* *	Poa annua	Annual Meadow-grass				 ✓ 	
3	С			ŕ	Setaria pumila ssp. parvijiora	Pale Pigeon-grass				~	
3	Е			*	Tropaeolum majus	Nasturtium		\checkmark		\checkmark	
3	С			*	Viola odorata	Common Violet		\checkmark			
3	С			*	Vulpia spp.	Fescue				\checkmark	
4	Е			*	Billbergia vittata	Billbergia				\checkmark	
4	С			*	Cardamine hirsuta	Common Bitter-cress		\checkmark			
4	С			*	Cerastium glomeratum	Common Mouse-ear		\checkmark		\checkmark	
						Chickweed					
4	Е			*	Convolvulus sabatius	Blue Convolvulus		\checkmark			
4	С			*	Erodium moschatum	Musky Heron's-bill				\checkmark	
4†	Е			*	Eucalyptus calophylla	Marri			\checkmark	\checkmark	
4	С			*	Galium aparine	Cleavers		\checkmark		\checkmark	
4†	Е			*	Hibiscus rosa-sinensis	Rose-of-China				\checkmark	
4	С			*	Malva spp.	Mallow	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
4	С			*	Medicago polymorpha	Burr Medic				\checkmark	
4	С			*	Modiola caroliniana	Red-flower Mallow	\checkmark				
4	Е			*	Pelargonium xhortorum	Zonal Pelargonium				\checkmark	
4	С			*	Plantago lanceolata	Ribwort				\checkmark	
4	С			*	Romulea rosea var. australis	Onion Grass			\checkmark	\checkmark	
4	E			*	Scilla peruviana	Cuban Lily	\checkmark				
4	С			*	Sonchus oleraceus	Common Sow-thistle	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
4	С			*	Stellaria media	Chickweed	\checkmark	\checkmark		\checkmark	
4	С			*	Urtica urens	Small Nettle				\checkmark	
4	С			*	Vicia sativa s.l.	Common Vetch			\checkmark		

Table 55Location details of permanent monitoring quadrats at Ricketts Point
Hinterland, Beaumaris (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				

Ecology Autralia



Figure 15 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Ricketts Point Hinterland, Beaumaris. EVC 2: Coast Banksia Woodland, EVC 161: Coastal Headland Scrub.



Table 56 Prioritised management actions for Ricketts Point Hinterland, Beaumaris.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff/headland erosion is an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue.

Management Unit	Management Actions for Ricketts Point Hinterland	Outcome	Timeframe
Highest Priority			
1	Management of Priority 1 weeds (eliminate/control as in Table 54)	Reduction in cover of Priority 1 weeds	Year 1, ongoing
	• Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, liverworts) and fungi, unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals	• No increase in cover of Priority 2, 3 and 4 weeds	Elimination achieved by Year 3 in Habitat Zones 1-3, and by Year 5 in Habitat Zones 4-5
	Management staff are trained and have suitable equipment to work on slopes		
	Ensure cover of Priority 2, 3 and 4 weeds does not increase		
1	 Improve the tree/vegetation vandalism program Develop an informative brochure summarising the impacts of tree vandalism, why it's an issue, and the consequences to vandals if they are identified If trees or other vegetation is vandalised: Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years Pursue/investigate all possible prosecutions in full Ensure publicity through local newspapers when trees are vandalised 	 Brochure distributed it to all residents (particularly new residents) with beach frontage Signage installed as soon as possible. Temporary signage may be necessary in the short term Reduction in occurrence of tree/vegetation vandalism 	Improve program: Year 1 Installation of signs: Asking for witnesses: 48 hrs after tree/vegetation vandalism occurs View obstructing signs: as soon as possible after tree/vegetation vandalism occurs, no later than 1 month after
1	 Develop an information brochure for adjoining and nearby residents addressing user related issues for the reserve, detailing: the values of the remnant vegetation the impacts of dumped garden waste the issue of private property encroachment into the reserve (i.e. clearing of native vegetation) why planted exotic species that are weedy will be removed from public land 	 Distribute brochure to residents adjoining or near the reserve Re-distributed brochure to appropriate residents, as necessary, if user related issues continue 	Brochure distributed to residents within Year 1 Brochure re-distributed as soon as possible (no later than one month later) after occurrence of user related issues
1	Investigate vegetation values before pruning for maintenance (e.g. fire tracks)	• Ensure no damage to rare or threatened plant species or threatened fauna habitat	Ongoing, as required



Management Unit	Management Actions for Ricketts Point Hinterland	Outcome	Timeframe
1	 Maintain/install fences to avoid/minimise the creation of informal tracks, track widening and damage to vegetation by pedestrians and off-leash dogs Close existing informal tracks using fencing and signage, and rehabilitate using indigenous species of local provenance as indicated in the EVC revegetation lists (Appendix 2) Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Infill planting of <i>Banksia integrifolia</i> to replace senescing and dead trees Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet Bursaria (<i>Bursaria spinosa 'var. macrophylla'</i>) to replace bird habitat lost through removal of *African Box-thorn Avoid unnecessary use of tree guards 	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public Existing informal track closed and rehabilitated Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	Year 1, ongoing After the autumn break Ongoing, as required
1	Establish permanent monitoring quadrats	 One monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing
Medium Priority			
1	Management of Priority 2 weeds (eliminate/control as in Table 54)	Reduction of cover of Priority 2 weeds	Medium term (3-8 years)
	• Ensure cover of Priority 3 and 4 weeds does not increase	Continued reduction in cover of Priority 1 weeds, as necessary	Ongoing
	Management staff are trained and have suitable equipment to work on slopes	• No increase in cover of Priority 3 and 4 weeds	
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required
1	Undertake regular litter collection	Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where they threaten significant plant species or populations (e.g. orchids) (eliminate/control as in Table 54)	 Reduction in cover of targeted Priority 3 and 4 weeds Continued reduction in cover of Priority 1 and 2 weeds, as necessary No increase in cover of weeds 	Long term (5-10 years) Ongoing, as required



Management Unit	Management Actions for Ricketts Point Hinterland	Outcome
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If sur less than c. 90%, determine and mitigate the cause of plant death before replacement plantings



	Timeframe
e of	As required
vival rate is e undertaking	

5.14 Site: Sandringham Foreshore – south (Sandringham)

One Management Unit (MU1) was identified onsite, grouping all the Habitat Zones based on uniform management issues across the study area (Figure 16).

Table 57 outlines which Ecological Vegetation Classes (EVCs) and Habitat Zones occur within each Management Unit. Location details for the permanent monitoring quadrats (to be detailed when quadrats are established) are provided (Table 58), along with an updated list of prioritised weeds requiring control or elimination (Table 59). Finally, a prioritised breakdown of management actions for each Management Unit is provided in Table 60.

Table 57	Constituent Ecological Vegetation Classes and Habitat Zones within each
	Management Unit, Sandringham Foreshore – south, Sandringham.

Management Unit (MU)	Ecological Vegetation Class (EVC number)	Habitat Zones	Respective Habitat Scores Present (% of pre-European condition)	Reason for MU division/grouping
1	Coastal Headland Scrub (161)	1, 2, 3, 4, 5, 6, 8, 9, 10	39%, 23%, 39%, 54%, 52%, 16%, 50%, 41%, 52%	Comparable management issues
	Coastal Dune Grassland (879)	7	41%	
	Spray-zone Coastal Shrubland (876)	11	60%	

Table 58 Location details of permanent monitoring quadrats at Sandringham Foreshore - south, Sandringham (to be detailed when quadrats are established).

Quadrat Number	Ecological Vegetation Class	Habitat Zone	Datum/Grid	Coordinates
1				
2				
3				

Table 59 Summary of the weed species recorded in the Habitat Zones identified at Sandringham Foreshore – south, Sandringham - updated from Ecology Australia (2008a)

					Australia (2000a).												
	Key:							4									
	Cont/Elim Management objective of Control or Eliminate							u									
	`	Control: Reduce the distribution and cover of ubiquitous species that cannot reasonably be eliminated															
	E Eliminate where possible: species known to be particularly invasive and/or those with currently small																
			L		and tractable populations	should be eradicated	purite	ulully	III v u	51 V C U	110/01	those	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	curre	intry 5	mun	
	(Cal	LP		Catchment and Land Prop	tection Act 1994											
			R		Regionally Restricted und	ler the Catchment and	Land	Prote	ection	Act I	994						
			С		Regionally Controlled und	der the Catchment and	l Lana	l Prot	ectior	ı Act	1994						
	1	W	ONS	5/	W Weed of National Signific	cance											
	,	\checkmark			Present (species may occu	r in additional HZs)											
	-	i			Some adult planted specin	nens may be retained,	howev	ver el	imina	tion c	of any	offsp	oring i	s reco	omme	nded	
]	Blı	ie te	ext	Additions or edits to the w	veeds table presented i	n Eco	logy /	Austra	alia (2	2008a)					
Hał	oitat	Zo	ne				1	2	3	4	5	6	7	8	9	10	11
Eco	logi	ical	Veg	get	ation Class name (initials)		CHS	CHS	CHS	CHS	CHS	CHS	CDG	CHS	CHS	CHS	SZCS
Hał	oitat	Sc	ore				39%	23%	39%	54%	52%	16%	41%	50%	41%	52%	60%
	<u> </u>																
ity			9														
.i	out	E	ð														
P	Ŭ	Ü	≥		Species Name	Common Name											
1	E			*	Acacia howittii	Sticky Wattle											
1	E			*	Acacia longifolia ssp.	Sallow Wattle											
					longifolia												
1	E			*	Acacia provincialis	Wirilda											
1	E			*	Acetosa sagittata	Rambling Dock	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark			
1	E			*	Agapanthus praecox subsp.	Agapanthus				\checkmark							
					orientalis												
1	E	R		*	Allium triquetrum	Angled Onion	\checkmark				\checkmark	\checkmark					
1	E		W	*	Anredera cordifolia	Madeira Vine											
1	E		W	*	Asparagus aethiopicus	Emerald fern	✓										
1	E	R	W	*	Asparagus asparagoides	Bridal Creeper	✓	\checkmark	✓	\checkmark	\checkmark	\checkmark		\checkmark			
1	E			*	Carpobrotus aequilaterus / C.	Angled Pigface /	✓		\checkmark						\checkmark	\checkmark	\checkmark
					edulis	Hottentot Fig											
1	E			*	Chasmanthe floribunda	African Cornflag	✓		✓			✓					
1	E	C	W	*	Chrysanthemoides monilifera	Boneseed	✓		\checkmark	\checkmark		\checkmark				\checkmark	
					subsp. monilifera												
1	E			*	Coprosma repens	Mirror Bush	✓		 ✓ 			 ✓ 				✓	✓
1	E			*	Delairea odorata	Cape Ivy			 ✓ 			✓					
1	E			*	Dipogon lignosus	Common Dipogon			~	✓							
1	E	_		*	Festuca arundinacea	Tall Fescue											
1	E	0		*	Freesia hybrid	Freesia	✓		✓								
1	E	C	W	*	Genista linifolia	Flax-leaf Broom					√						
1	E	0		*	Hakea laurina	Pincushion Hakea									✓ ✓		
1	E	C	W	*	Lycium ferocissimum	African Box-thorn	✓		✓ ✓			✓			✓		
1	E	-	-	*	Maiva dendromorpha	Gent Henry and			✓ ✓								
1	E			-	Metaleuca armitiaris subsp.	Gant Honey-myrtle			v		V						
1	Г	0	337	*	armillaris	Drooning Driell											
1	E	ľ	w	1	Opuntia monacantha	Diooping Prickley-	×										
1	Е	D	-	*	Oralis nos canvas	Sourcob											
1	E	K	-	*	Dannisotum alar doctinum	Vilava	V ./	•	× √	•	× √	V V	•	v	v	v	v
1	E	-	-	*	Pittosporum un dulatum	NIKUYU Sweet Dittognorum	V		v		v	v V		1			v
1	E E	C	-	*	1 mosporum unuululum Salnichroa origanifolia	Pampas Liby of the	• ./		./	v	./	• ./		• ./			
1	E	ľ		ľ		Valley			v		v	v		ř			
						valicy											

Tal	ole	59) C	on	Itinued												
Hat	oitat	Zo	ne				1	2	3	4	5	6	7	8	9	10	11
Eco	logi	cal	Veg	get	ation Class name (initials)		CHS	CHS	CHS	CHS	CHS	CHS	CDG	CHS	CHS	CHS	SZCS
Hat	oitat	Sco	ore				39%	23%	39%	54%	52%	16%	41%	50%	41%	52%	60%
•	lim																
riț	ΓE	4	SZ														
rio	O	aL	0														
P P	0	0	5		Species Name	Common Name				<u> </u>	<u> </u>		<u> </u>	<u> </u>			
1	E		_	Ť	Stenotaphrum secundatum	Buffalo Grass	√			<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u> </u>		<u> </u>
1	E		-	Ť	Tradescantia fluminensis	Wandering Jew	<u> </u>	<u> </u>	✓		<u> </u>	<u> </u>	<u> </u>	√	<u> </u>		
2	E		_	*	Aeonium haworthii	Pinwheel Aeonium			✓	✓		<u> </u>	<u> </u>	<u> </u>	<u> </u>		
2	C		<u> </u>	*	Anthoxanthum odoratum	Sweet Vernal-grass	√			<u> </u>			<u> </u>	<u> </u>			
2	С			*	Aster subulatus	Aster-weed				<u> </u>	<u> </u>		<u> </u>	<u> </u>			
2	E		<u> </u>	*	Chlorophytum comosum	Spider Plant	✓	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
2	E			*	Crassula multicava subsp.	Shade Crassula	✓										
					multicava		<u> </u>		<u> </u>	<u> </u>		<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
2	C			*	Cynodon dactylon var.	Couch	✓				\checkmark						
					dactylon												L
2	C			*	Dactylis glomerata	Cocksfoot	✓										<u> </u>
2	C			*	Ehrharta erecta var. erecta	Panic Veldt-grass	✓	✓	\checkmark	✓	✓	✓		✓	✓	\checkmark	<u> </u>
2	C			*	Ehrharta longiflora	Annual Veldt-grass	✓	\checkmark	\checkmark	✓	✓	\checkmark		✓	✓	\checkmark	
2†	E			*	Eucalyptus conferruminata	Bald Island Marlock	\checkmark				\checkmark						
2	C			*	Galenia pubescens var.	Galenia			 ✓ 			\checkmark			\checkmark		
					pubescens												
2	С			*	Juncus articulatus	Jointed Rush											\checkmark
2	E			*	Schinus molle	Pepper Tree											
2	C			*	Thinopyrum junceiforme	Sea Wheat-grass							\checkmark				
3	E			*	Aloe maculata	Common Soap Aloe	\checkmark		[
3	Е			*	Amaryllis belladonna	Belladonna Lily	\checkmark		\checkmark								
3	С			*	Arctotheca calendula	Cape Weed	\checkmark		\checkmark								
3	С			*	Atriplex prostrata	Hastate Orache											
3	С			*	Briza maxima	Large Quaking-grass	\checkmark		\checkmark								
3	С			*	Conyza bonariensis	Flaxleaf Fleabane	\checkmark										
3	С			*	Fumaria spp.	Fumitory	\checkmark					\checkmark					
3	С			*	Hypochoeris radicata	Flatweed	\checkmark	\checkmark	\checkmark								
3	С			*	Lagurus ovatus	Hare's-tail Grass	\checkmark										
3	С			*	Lolium spp.	Rye-grass	\checkmark								\checkmark		
3	Е			*	Phormium tenax	New Zealand Flax											
3	С			*	Plantago coronopus	Buck's-horn Plantain	\checkmark										
3	С			*	Vulpia spp.	Fescue					\checkmark						
4	Е			*	Brachychiton populneus	Kurrajong						\checkmark					
					subsp. populneus												
4	С			*	Cerastium glomeratum	Common Mouse-ear	\checkmark		✓		\checkmark			<u> </u>			
					ground and an	Chickweed											
4†	E			*	Corvmhia ficifolia	Red-flowering Gum	<u> </u>		\checkmark								
4	C			*	Geranium molle var molle	Dove's Foot	\checkmark										
4	C			*	Lenidium africanum	Common Pennercress			\checkmark					<u> </u>		<u> </u>	
	C			*	Malva spp	Mallow	1		1		<u> </u>					<u> </u>	
4	C		-	*	Petroselinum crisnum	Parsley	· ·										
т Л	C			*	Romulaa rosaa yar australis	Onion Grass	· ·	1	1		<u> </u>				1	<u> </u>	
	E		-	*	Solanum nigrum	Black Nightshade	· ·					1			-		
4	C	\square	-	*	Souchus alargaaus	Common Sourthistle	•					-			1	<u> </u>	
4		\vdash	-	*	Stallaria media	Chickweed	× ./	./	×	-					-	<u> </u>	
4	C		-	*	Trife live app (appuels)	Clavar	v	v			v	v		v			
4	E	\vdash	-	*	Vuana glaviaga	Dolm Liby	- v	<u> </u>			<u> </u>			<u> </u>			
4			1	1 * 1	Tucca gioriosa	railli Liiy	1	L	1	V 1	L	1	1	1	1	1 · · · ·	1





Figure 16 Management Units (hatching), Ecological Vegetation Classes (EVC number), Habitat Zones (shaded by quality categories) and suitable permanent monitoring quadrat locations at Sandringham Foreshore – south, Sandringham. EVC 161: Coastal Headland Scrub, EVC 876: Spray-zone Coastal Shrubland, EVC 879: Coastal Dune Grassland.





Table 60 Prioritised management actions for Sandringham Foreshore – south, Sandringham.

Management works should initially focus on areas/Habitat Zones of higher quality, then expanding to include the areas of lower quality.

Sea-cliff erosion is an issue that needs to be addressed, however it is not dealt with in this report as natural and human-influenced sea cliff erosion is a geotechnical and engineering issue.

Management Unit	Management Actions for Sandringham Foreshore - south	Outcome	Timeframe
Highest Priority			
1	 Management of Priority 1 weeds (eliminate/control as in Table 59) Killed woody weeds can be retained in situ to provide habitat and substrate for indigenous fauna and non-vascular flora (mosses, lichens, liverworts) and fungi, unless site-specific reasons dictate otherwise (e.g. smothering indigenous vegetation, impeding access to other weed species); the lower branches of killed weeds should be removed as they can provide harbour for pest animals Management staff are trained and have suitable equipment to work on slopes 	 Reduction in cover of Priority 1 weeds No increase in cover of Priority 2, 3 and 4 weeds 	Year 1, ongoing; elimination achieved by Year 3.
	Ensure cover of Priority 2, 3 and 4 weeds does not increase		
1	 Remove all hybrid plants that will potentially pollute indigenous species gene-pools, and all non-indigenous parents of the hybrid individuals, including: Spike Wattle X Coast/Sallow Wattle (<i>Acacia oxycedrus X #Acacia longifolia</i> s.1.) hybrids Coast Wattle X Sallow Wattle (<i>#Acacia longifolia</i> subsp. <i>sophorae X *A. longifolia</i> subsp. <i>longifolia</i>) hybrids Karkalla X Angled Pigface (<i>Carpobrotus rossii X *C. aequilaterus</i>) 	• No hybrid individuals or their exotic parents present	Year 1, ongoing
	hybrids		
1	Remove young Coast Tea-tree (<i>#Leptospermum laevigatum</i>) plants where they occur (planted?) over areas with significant ground layer herb diversity (e.g. Kidney-weed <i>Dichondra repens</i> , Australian Salt-grass <i>Distichlis</i> <i>distichophyllum</i> , Salt Couch <i>Sporobolus virginicus</i> , Small-flower Flax-lily <i>Dianella brevicaulis</i>)	 Young shrubs are removed from areas where they will smother and kill many indigenous ground layer herbs (small grasses, graminoids and forbs) No future plantings of shrubs over areas with significant herb diversity 	Year 1
1	Remove indigenous and exotic shrubs (other than Coast Saltbush <i>Atriplex cinerea</i>) that are growing amongst and adversely competing with Hairy Spinifex (<i>Spinifex sericeus</i>) in the Coastal Dune Grassland vegetation	No shrubs (other than Coast Saltbush) growing amongst Hairy Spinifex swards	Year 1, ongoing
1	If beach sand is imported to the site, ensure machinery operators do not destroy or compromise remnant vegetation or sea-bird roosting sites when spreading sand; this also applies to mechanical sand raker operations	 No loss or damage to indigenous vegetation or sea-bird roosts If indigenous vegetation is disturbed, undertake a Net Gain assessment and establish appropriate vegetation offsets that must be permanently protected and managed 	Identification of risks to machinery operators: prior to importing/spreading/raking beach sand



Management Unit	Management Actions for Sandringham Foreshore - south	Outcome	Timeframe
1	Ecological thinning of over-abundant/highly competitive indigenous plant species	• Insignificant death of indigenous plants as a result of Dodder-laurel parasitism	Ongoing, as required
	• Destroy (i.e. remove haustoria - the parasite's attachment-point) Dodder-laurel (<i>Cassytha melantha</i> and <i>C. pubescens</i>) where over- abundant and killing indigenous vegetation		
1	Improve the tree/vegetation vandalism program	Brochure distributed it to all residents (particularly new residents) with beach	Improve program: Year 1
	• Develop an informative brochure summarising the impacts of tree	frontage	Installation of signs:
	vandalism, why it's an issue, and the consequences to vandals if they are identified	• Signage installed as soon as possible. Temporary signage may be necessary in the short term	Asking for witnesses: 48 hrs after tree/vegetation vandalism
	• If trees or other vegetation is vandalised:	Reduction in occurrence of tree/vegetation vandalism	occurs
	 Immediately after vandalism occurs install signs oriented to passers-by asking for witnesses to come forward 		View obstructing signs: as soon as possible after
	 Install very large view-obstructing signs in place of removed trees/vegetation (larger than the signs currently used) and keep them in place for a minimum of 3 years 		tree/vegetation vandalism occurs, no later than 1 month after
	• Pursue/investigate all possible prosecutions in full		
	 Ensure publicity through local newspapers when trees are vandalised 		
1	Implement dog faeces management program	• Letter sent to all dog owners in the municipality	Year 1, ongoing
	• Regular presence of staff enforcing compliance by owners	• Reduction of dog faeces along tracks and in vegetation areas (based on observations	
	• Distribute a letter to dog owners explaining the impacts of dog faeces to native vegetation (e.g. nutrient enrichment), why it is undesirable	by management staff/contractors)	
	management staff working on their hands and knees), and how Council will enforce dog faeces removal		
	• Provide plastic bag dispensers and disposal bins at all main entrances to the reserve with signs summarising the information provided in the		
	letter to dog owners; and ensure dispensers are adequately serviced		
1	Protect Coast Saltwort (<i>Salsola tragus</i> subsp. <i>pontica</i>) individuals, classified as rare in Victoria by the Department of Sustainability and Environment (DSE 2005)	No human-caused death of Coast Saltwort individuals	Year 1
	• Young plants are located along the foreshore edge of the remnant vegetation making them vulnerable to trampling		
	• Plants are prickly and may be seen as undesirable by beach users		



Management Unit	Management Actions for Sandringham Foreshore - south	Outcome	Timeframe
1	Maintain/install fences to avoid/minimise the creation of informal tracks, track widening and damage to vegetation by pedestrians and off-leash dogs Close existing informal tracks using fencing and signage, and rehabilitate using indigenous species of local provenance as indicated in the EVC revegetation lists (Appendix 2)	 No existing tracks widened or additional informal tracks created No trampling of vegetation by dogs or the general public Existing informal track closed and rehabilitated 	Year 1, ongoing
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Infill plantings of Hedge Wattle (<i>Acacia paradoxa</i>) and/or groups of Sweet Bursaria (<i>Bursaria spinosa 'var. macrophylla'</i>) to replace bird habitat lost through removal of *African Box-thorn Revegetate the bare dunes at the base of the sea-cliffs with Hairy Spinifex (<i>Spinifex sericeus</i>) before they become dominated by Sea Wheat-grass (* <i>Thinopyrum junceiforme</i>) Avoid unnecessary use of tree guards	 Revegetation of bare dunes occurs promptly Sufficient weed-control works prior to planting, and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	After the autumn break Ongoing, as required.
1	Undertake regular litter collection	• Minimal litter enters the sea, and litter washed up on beaches is promptly removed	Ongoing, as required
1	Establish permanent monitoring quadrats	 Three monitoring quadrats established and monitored as specified in Section 6 Monitoring Program 	Set up: Year 1 Monitoring: ongoing
Medium Priority			
1	 Management of Priority 2 weeds (eliminate/control as in Table 59) Ensure cover of Priority 3 and 4 weeds does not increase Management staff are trained and have suitable equipment to work on slopes 	 Reduction of cover of Priority 2 weeds Continued reduction in cover of Priority 1 weeds, as necessary No increase in cover of Priority 3 and 4 weeds 	Medium term (3-8 years) Ongoing
1	Where spiny or (ultimately) excessively large shrubs have been planted next to tracks impairing user amenity and safety, as well having ongoing pruning/maintenance costs, they may need to be removed Replace removed shrubs with suitably-sized species planted in appropriate locations where they are unlikely to encroach on paths	 No impaired user amenity from overgrown shrubs No shrubs requiring excessive pruning or removal (i.e. removal of over ¼ of the projected canopy) Replacement plantings require no/minimal pruning when fully grown 	Medium term (3-8 years)
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC revegetation lists (Appendix 2) Supplementary plantings of smaller herbaceous species in higher-quality areas of Management Unit 1 according to EVC revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings 	As required



Management Unit	Management Actions for Sandringham Foreshore - south	Outcome	Timeframe
1	Evaluate the possibility of eliminating rabbits from the site, as was achieved	Rabbits eradicated (if considered feasible)	Medium term (3-8 years)
	at Beaumaris Foreshore (Jo Hurse, Citywide, pers. comm.)		Ongoing, as required
Lowest Priority			
1	Management of Priority 3 and 4 weeds that are particularly invasive or where	Reduction in cover of targeted Priority 3 and 4 weeds	Long term (5-10 years)
	they threaten significant plant species or populations (e.g. orchids)	Continued reduction in cover of Priority 1 and 2 weeds, as necessary	Ongoing, as required
	(chilinate/control as in Table 59)	• No increase in cover of weeds	
1	Follow-up revegetation/infill plantings where vegetation management has resulted in bare ground, utilising the robust species indicated in the EVC	 Sufficient weed control works prior to planting and adequate maintenance of plantings undertaken 	As required
	revegetation lists (Appendix 2) Avoid unnecessary use of tree guards	• 90% survival rate for plantings; dead plants replaced as necessary. If survival rate is less than c. 90%, determine and mitigate the cause of plant death before undertaking replacement plantings	



6 Monitoring Program

The monitoring program will enable vegetation changes over time to be documented and will entail three types of monitoring of the permanently marked quadrats:

- 1. Visual and photographic inspection (annually);
- 2. Collection of floristic data (every 3 years); and
- 3. Vegetation Quality Assessment (every 5 years.

The permanent monitoring quadrats (of c. 700 m2) will be set up in the general locations shown on the map for each site. The specific placement of quadrats will be determined on-site, and coordinates of each plot should be recorded in the 'Location details of permanent monitoring quadrats' table provided for each site (Tables 6, 10, 14, 18, 22, 26, 30, 34, 38, 42, 47, 50, 55 and 58). Plots will be circular with a diameter of 30 m, and will be centrally marked with a star picket.

The annual **visual and photographic inspections** will involve a basic assessment of the vegetation / habitat condition taking into account potential management issues and providing a context to photographs. Photo-point will be established at the centre-point (star-picket) of each plot, from which a 360 degree panorama photograph will be taken (starting and finishing facing north). Provided in Appendix 4 is a simple draft monitoring proforma that can be filled out at each monitoring event. The final design of the annual monitoring proforma will be completed as the sites are established.

The **collection of floristic data** will be undertaken every three years (starting in the first year), and will entail recording all indigenous and exotic vascular plant species (within the monitoring plot only), an assigning a visually-assessed cover/abundance value to each species; these values will follow the Domin-Krajina cover abundance scale (Mueller-Dombois and Ellenberg 1974):

Cover rating	Number of plants	Cover %
+	solitary, with insignificant cover	< 1
1	seldom, with insignificant cover	< 1
2	very scattered, with small cover	< 1
3	scattered	1 - 5
4	any number	5 - 10
5	any number	10 - 25
6	any number	25 - 33
7	any number	33 - 50
8	any number	50 - 75
9	any number	75 - < 100
10	any number	100

The **Habitat Hectare Assessment** will be undertaken in years 5 and 10, and will follow the Department of Sustainability and Environments Vegetation Quality Assessment Manual (DSE 2004). The assessment should take into account all vegetation occurring within the Habitat Zone in which the monitoring plot is located, noting that the Habitat Zone boundary may change over time.



Recommendations 7

The following recommendations are given, additional or supplementary to the numerous recommendations given or implicit in this EMP.

- 1. Convene a workshop to discuss the issue of herbicide use in the reserve system, particularly aimed at the non-professional managers. This forum/workshop would explore weed control options and outline why herbicide use in certain locations and contexts is required to achieve management objectives.
- 2. Convene a workshop to discuss the issue of ecological burning to improve the biodiversity of the bushland remnants. This could also incorporate the political issues associated with the removal of ecological out-of-balance species such as #Coast Tea-tree (Leptospermum laevigatum), which is primarily managed through the use of fire.
- 3. Evaluate the need to further investigate tree decline in the reserves, whether because of diseases or excessive possum browsing.
- Ensure all staff and contractors are familiar with and respond to the protocols developed by the 4 Department of Primary Industries if and when Myrtle Rust is detected.

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Appendix 1 Myrtle Rust information provided by the Department of Primary Industries (DPI 2012)

Myrtle rust

in the home garden

Myrtle rust (Uredo rangelii) is a serious fungal disease affecting the plant family Myrtaceae, which includes eucalypts and many other Australian native species.

After the first Australian detections in 2010, myrtle rust has recently been found in Victoria.

Myrtle rust is of serious concern because the fungus spreads very easily and because the Myrtaceae is a dominant plant group in both natural ecosystems and the plantation industry.

Myrtle rust poses no threat to human or animal health.

What does myrtle rust look like?

Myrtle rust attacks young, soft, actively growing leaves, shoot tips and young stems, as well as fruits and flower parts of susceptible plants.

The first signs of myrtle rust infection are tiny raised spots that are brown to grey, often with red-purple haloes. Up to 14 days after infection, the spots produce masses of distinctive yellow/ orange spores.



Myrtle rust spores on a Melaleuca paperbark



Myrtle rust spores on lophomyrtus Black Stallion.

March 2012

Which plants are affected?

All members of the Myrtaceae plant family are potential hosts of myrtle rust.

The family includes

- oum trees (Eucalyptus) bottlebrush (Callistemon, Melaleuca)
- tea tree (Leptospermum)
- lilly pilly (Syzygium, Acmena, Waterhousea)
- paperbark (Melaleuca)
- myrtle (Backhousia)
- guava (Psidium)
- midvim (Austromyrtus)
- rose apple (Syzygium) brush box (Lophostemon)
- . New Zealand Christmas bush (Metrosideros).

Which plants are not affected?

Plants which are not in the Myrtaceae family and therefore not hosts of myrtle rust include:

citrus	azaleas	camellias
stone fruit	pines	grevilleas
pome fruit	roses	wattles
vegetables	daisies	banksias
clovers	rhododendrons	ferns
crepe myrtle	orchids	lilies.

However, these and other non-Myrtaceae plants may show similar symptoms due to infection by other rusts.

How does it spread?

Rusts are highly transportable because they can produce large numbers of very small spores.

Myrtle rust can be dispersed by:

- movement of infected plant material (e.g. nursery stock, cut flowers, plant cuttings, germplasm)
- movement of contaminated equipment (e.g. secateurs, chainsaws)
- wind, water (wind-driven rain, irrigation) and gravity animals (e.g. insects including bees, birds, other
- wildlife, pets)
- humans (e.g. on clothing, shoes and jewellery) vehicles

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What do I do if I think I've found myrtle rust?

Report any suspected detection on a Myrtaceae plant species to DPI on 1800 084 881.

Alternatively, you can take electronic photos of the suspect material and email to plant.protection@dpi.vic.gov.au. together with a contact phone number and the plant's location

If you suspect you have found myrtle rust, do not touch the infected plant material or collect samples, as this could spread the disease.

Suspected rusts on non-Myrtaceae species should not be reported via this number or email address.

How can I treat plants for myrtle rust in my garden?

· Use an approved fungicide

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has issued permits for the use of certain fungicides to control myrtle rust in home gardens and to decontaminate infected myrtle rust host plant material before disposal.

The permits can be accessed via the DPI website at www.dpi.vic.gov.au/myrtlerust. Your local nursery or chemical supplier may also be able to assist.

Before using a fungicide, read the permit together with the product label to determine the applicable directions for use.

In severely infected areas, susceptible host plants should be removed, since re-infection after fungicide treatment is highly

Protection may be improved by treating a plant with fungicide after removing infected parts.

Remove infected plants

likely.

Infected plants should be removed and disposed of in a way that minimises the spread of myrtle rust.

1. Spray infected and unaffected plants with a fungicide 3-4 days prior to removal. If fungicide treatment is not possible, carefully wet the plants prior to removal to dampen any spores likely to be dispersed during removal.

2. Remove plants. Small plants should be enclosed in a plastic bag before being either pulled or dug out. For potted plants, the whole plant, plus the pot, should be placed into the bag

If you would like to receive this information/publication in an accessible format (such as large print or audio) please call the Customer Service Centre on: 136 186, TTY: 1800 122 969, or email customer.service@dpi.vic.gov.au

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and sealed, if practical. If pots need to be retained, they should be thoroughly scrubbed with detergent and water, then left to dry completely before they are used again.

Larger plants that do not fit in waste bins can be cut into smaller pieces, securely covered with black plastic or similar and put in a sunny place for 3-4 weeks to kill spores.

3. Dispose of bagged plants by burying on-site, placing in general domestic waste bins, or transporting in a covered vehicle/trailer to a general waste disposal site (not a green waste site). Do not use infected plants as mulch.

Remove healthy plants

To reduce the risk of a significant infection developing on your property, plant species known to be highly susceptible to myrtle rust can be removed prior to infection.

Healthy plants showing no signs of infection can be discarded as normal garden waste. If you are unsure whether plants are infected with myrtle rust, use the methods outlined above for removing diseased plants.

Please note: The removal of native vegetation may require a planning permit. Residents who are considering this option should seek advice from their local council on whether or not a permit is required.

Hygiene

After removing and disposing of infected plants, wash clothing and clean any equipment with water and detergent before starting other activities that may infect further plants.

You can reuse pots, wooden stakes and other items that have been in contact with an infected plant. However, you should thoroughly scrub these items with detergent and water, and leave them to dry completely, before reusing them.

Replanting

If infected plants have been removed, replanting with similar species, or other Myrtaceae plants, may result in re-infection. Select replacement plants that are unlikely to become infected. Contact your local nursery for advice.

In bushland areas, including regeneration sites, use local plants not known to be affected by myrtle rust.

Further information

More information about myrtle rust can be found on the DPI website at www.dpi.vic.gov.au/myrtlerust

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Appendix 2 Suitable plant species for use in revegetation, infill and supplementary plantings for each EVC identified in the 14 Bayside reserves assessed as part of this study

Plant species considered suitable for revegetation are listed below for (i) the seven inland reserves a supporting or formerly supporting Sand Heathland, Heathy Woodland or Damp Sands Herb-rich Woodland Ecological Vegetation Classes (EVCs) (Table 63); and (ii) the seven foreshore reserves supporting Coast Banksia Woodland, Coastal Dune Grassland, Coastal Dune Scrub, Coastal Headland Scrub and Spray-zone Coastal Shrubland EVCs (Table 64). Plant species, categorised according to life-form, have been chosen from the reconstructed floristic composition of the EVC based on data from the Flora Information System (DSE 2012b) and species that currently occur in reserves. Excluded are species such as orchids and most annuals, and a range of species that have become extinct in the municipality. There are doubtless other species that could be utilised for revegetation that are not listed here. It is beyond the scope of this Native Vegetation Works Program to detail densities and other attributes. Each revegetation exercise must be approached on a site-by-site basis, taking into consideration remnant vegetation that already exists and a range of other factors such as the extent of site modification and whether or not public access is acceptable or should be excluded.

In some reserves, e.g. Donald McDonald Reserve and Balcombe Park, the EVCs as mapped in Stage 1 (Ecology Australia 2008a) and hence here, may be subject to amendment when it comes to designing appropriate revegetation , particularly those areas invaded by Coast Tea-tree (*#Leptospermum laevigatum*). When these areas are burn to control the *#*Coast Tea-tree, the recovering vegetation recruited from soil-stored seed-banks may indicate that a different EVC is more applicable, despite the mapping, for example Damp Sands Herb-rich Woodland may be more appropriately considered to be Sand Heathland or Heathy Woodland (or vice versa).

Table 61Plant species considered suitable for revegetation in the seven inland
reserves.

Key:	
SH	Sand Heathland
HW	Heathy Woodland

- DSHW Damp Sands Herb-rich Woodland
- Soak Wetland environments such as the soak that is proposed for Balcombe Park
- f Listed as threatened under the Flora and Fauna Guarantee Act 1988
- E Listed as Endangered under the Environment Protection and Riodiversity
- E Listed as Endangered under the Environment Protection and Biodiversity Conservation Act 1999
- e Classified as endangered in Victoria by DSE (2005)
- v Classified as vulnerable in Victoria by DSE (2005)

Inland Revegetation List Scientific Name	Common Name	HS	HW	DSHRW	Soak	Comments
Trees						
Acacia mearnsii	Black Wattle		\checkmark	\checkmark		Limited plantings in HW
Acacia melanoxylon	Blackwood			\checkmark		
Allocasuarina verticillata	Drooping Sheoak			\checkmark		
Eucalyptus camaldulensis subsp. camaldulensis	River Red-gum			✓		Long Hollow only, limited plantings
Eucalyptus ovata var. ovata	Swamp Gum			\checkmark		

Scientific NameCommon NameE EE EE ED EEucolyptus vininalis subp. pryorianCoast Manna-gumIIIIExocarpos cupressiformisCherry BallartIVVIExocaripos cupressiformisCherry BallartIVVISmall Trees	Inland Revegetation List						
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Acacia suaveolensSweet WattleImage: Image: Im	Acacia oxycedrus	Spike Wattle	\checkmark	\checkmark			
Banksia marginataSilver BanksiaImage: Image:	Acacia suaveolens	Sweet Wattle	\checkmark	\checkmark			
Cassinia aculeataCommon CassiniaImage: Mark Mark Mark Mark Mark Mark Mark Mark	Banksia marginata	Silver Banksia	\checkmark	\checkmark	\checkmark		
Cassinia arcuataDrooping CassiniaImage: MarcuataDrooping CassiniaImage: MarcuataGoodenia ovataHop GoodeniaImage: MarcuataHop GoodeniaImage: MarcuataImage: MarcuataLeptospermum myrsinoidesHeath Tea-treeImage: MarcuataImage: MarcuataImage: MarcuataImage: MarcuataMonotoca scopariaPrickly Broom-heathImage: MarcuataImage: MarcuataImage: MarcuataImage: MarcuataOlearia glandulosaSwamp Daisy-bushImage: MarcuataImage: MarcuataImage: MarcuataImage: MarcuataOlearia ramulosa var. ramulosaTwiggy Daisy-bushImage: MarcuataImage: MarcuataImage: MarcuataOlearia ramulosa var. ramulosaTwiggy Daisy-bushImage: MarcuataImage: MarcuataImage: MarcuataAccia force pos pinifoliusWedding BushImage: MarcuataImage: MarcuataImage: MarcuataAcacia browniiHeath WattleImage: MarcuataImage: MarcuataImage: MarcuataAcacia ulicifoliaJuniper WattleImage: MarcuataImage: MarcuataImage: MarcuataActus ericoidesCommon AotusImage: MarcuataImage: MarcuataImage: MarcuataAstroloma humifusumCranberry HeathImage: MarcuataImage: MarcuataImage: MarcuataBossiaea cinereaShowy BossiaeaImage: MarcuataImage: MarcuataImage: MarcuataComesperma ericinumHeath MilkwortImage: MarcuataImage: MarcuataImage: MarcuataDilhwring inpergreensGrey Partor.peaImage: Marcuata	Cassinia aculeata	Common Cassinia			\checkmark		
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Olearia glandulosaSwamp Daisy-bushImage: Swamp Daisy-bush <td>Monotoca scoparia</td> <td>Prickly Broom-heath</td> <td>\checkmark</td> <td>\checkmark</td> <td></td> <td></td> <td></td>	Monotoca scoparia	Prickly Broom-heath	\checkmark	\checkmark			
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Ricinocarpos pinifoliusWedding Bush✓✓✓✓Small ShrubsAcacia browniiHeath Wattle✓✓✓Acacia ulicifoliaJuniper Wattle✓✓✓Acrotriche serrulataHoney-pots✓✓✓Aotus ericoidesCommon Aotus✓✓✓Astroloma humifusumCranberry Heath✓✓✓Boronia parvifloraSwamp Boronia✓✓✓Bossiaea cinereaShowy Bossiaea✓✓✓Correa reflexa var. reflexaCommon Correa✓✓✓Dillwwija cinerascensGrey Parrot-pea✓✓✓	Olearia ramulosa var. ramulosa	Twiggy Daisy-bush	\checkmark	\checkmark	\checkmark		Only when absent from an area
Small ShrubsAcacia browniiHeath Wattle✓✓✓Acacia ulicifoliaJuniper Wattle✓✓✓Acrotriche serrulataHoney-pots✓✓✓Aotus ericoidesCommon Aotus✓✓✓Astroloma humifusumCranberry Heath✓✓✓Boronia parvifloraSwamp Boronia✓✓✓Bossiaea cinereaShowy Bossiaea✓✓✓Correa reflexa var. reflexaCommon Correa✓✓✓Dillwynia cinerascensGrey Parrot-pea✓✓✓	Ricinocarpos pinifolius	Wedding Bush	\checkmark	\checkmark	\checkmark		
Acacia browniiHeath WattleImage: Common CorreaImage: Correa reflexa var. reflexaImage: Correa reflexa var. reflexa<	Small Shrubs	1					
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Acrotriche serrulataHoney-pots \checkmark \checkmark \checkmark Aotus ericoidesCommon Aotus \checkmark \checkmark \checkmark Astroloma humifusumCranberry Heath \checkmark \checkmark \checkmark Boronia parvifloraSwamp Boronia \checkmark \checkmark \checkmark Bossiaea cinereaShowy Bossiaea \checkmark \checkmark \checkmark Comesperma ericinumHeath Milkwort \checkmark \checkmark \checkmark Correa reflexa var. reflexaCommon Correa \checkmark \checkmark \checkmark	Acacia ulicifolia	Juniper Wattle	\checkmark	\checkmark			
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Bossiaea cinerea Showy Bossiaea ✓ ✓ ✓ Comesperma ericinum Heath Milkwort ✓ ✓ Correa reflexa var. reflexa Common Correa ✓ ✓ Dillwynia cinerascens Grey Parrot-pea ✓ ✓	Boronia parviflora	Swamp Boronia			\checkmark		
Comesperma ericinum Heath Milkwort ✓ Correa reflexa var. reflexa Common Correa ✓ ✓ Dillwynia cinerascens Grey Parrot-pea ✓ ✓	Bossiaea cinerea	Showy Bossiaea	\checkmark	\checkmark			
Correa reflexa var. reflexa Common Correa ✓ ✓ Dillwynia cinerascens Grey Parrot-nea ✓	Comesperma ericinum	Heath Milkwort			\checkmark		
Dillwynia cinerascens Grey Parrot-nea	Correa reflexa var. reflexa	Common Correa	\checkmark	\checkmark	\checkmark		
Durryna caerasens org ranorpea .	Dillwynia cinerascens	Grey Parrot-pea			\checkmark		



Inland Revegetation List				>		
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Scientific Name	Common Name	SH	MH	DSI	Soal	Comments
Dillwynia glaberrima	Smooth Parrot-pea	~	\checkmark	\checkmark		
Dillwynia sericea	Showy Parrot-pea	\checkmark	\checkmark	\checkmark		
Einadia nutans subsp. nutans	Nodding Saltbush			 ✓ 		
Epacris impressa	Common Heath	\checkmark	\checkmark	\checkmark		
Epacris obtusifolia	Blunt-leaf Heath				\checkmark	
Hibbertia fasciculata var.	Bundled Guinea-					
prostrata	flower	 ✓ 	 ✓ 	 ✓ 		
Hibbertia riparia	Erect Guinea-flower	\checkmark	✓	 ✓ 		
Hibbertia sericea var. sericea	Silky Guinea-flower	 ✓ 	\checkmark	✓		
Isopogon ceratophyllus	Horny Cone-bush	✓	✓			
Leucopogon ericoides	Pink Beard-heath	\checkmark	✓			
Leucopogon virgatus var. virgatus	Common Beard-heath	~	~	~		
Persoonia juniperina	Prickly Geebung	~	~	~		
Pimelea humilis	Common Rice-flower	\checkmark	~	~		
Pimelea octophylla	Woolly Rice-flower	\checkmark	~			
Pimelea phylicoides	Heath Rice-flower	\checkmark	~			
Platylobium obtusangulum	Common Flat-pea	\checkmark	~	~		
Pultenaea dentata	Clustered Bush-pea				~	
Sprengelia incarnata	Pink Swamp-heath				~	
Tufted Grasses or Graminoids	· · · · ·					
Arthropodium strictum	Chocolate Lily			~		
Austrostipa mollis	Supple Spear-grass	\checkmark	\checkmark	~		
Austrostipa pubinodis	Tall Spear-grass			~		
Austrostipa rudis subsp. rudis	Veined Spear-grass			\checkmark		Long Hollow only
Austrostipa semibarbata	Fibrous Spear-grass		\checkmark	\checkmark		
Bulbine bulbosa	Bulbine Lily			~		
Burchardia umbellata	Milkmaids	\checkmark	\checkmark	\checkmark		
Caesia parviflora var. parviflora	Pale Grass-lily			\checkmark		
Carex breviculmis	Common Grass-sedge			\checkmark		
Chamaescilla corymbosa var. corymbosa	Blue Stars			~		
Deyeuxia quadriseta	Reed Bent-grass			~		
Dianella brevicaulis	Small-flower Flax- lily			~		
Dichelachne crinita	Long-hair Plume- grass			~		
Eragrostis brownii	Common Love-grass			✓	\checkmark	Seepage zones
Hypoxis hygrometrica var.						
villosisepala	Golden Weather-glass			✓		
Hypoxis vaginata var. vaginata	Yellow Star			✓		
Isolepis inundata	Swamp Club-sedge				✓	
Juncus pallidus	Pale Rush			\checkmark		Seepage zones

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Scientific Name	Common Name	S	<u> </u>	Ā	Ň	Comments
Juncus planifolius	Broad-leaf Rush				✓	Seepage zones
Juncus subsecundus	Finger Rush			✓ ✓		
Lepidosperma gunnii	Slender Sword-sedge			✓		
Lepidosperma longitudinale	Pithy Sword-sedge				✓	
Lepidosperma semiteres	Wire Rapier-sedge			✓ ✓		Long Hollow only
Lomandra filiformis s.l.	Wattle Mat-rush	✓	 ✓ 	 ✓ 		
Lomandra filiformis subsp. coriacea	Wattle Mat-rush			~		
Lomandra longifolia subsp. longifolia	Spiny-headed Mat- rush			\checkmark		
Lomandra multiflora subsp. multiflora	Many-flowered Mat- rush			~		
Lomandra nana	Dwarf Mat-rush			✓		
Luzula meridionalis var. flaccida	Common Woodrush			\checkmark		
Patersonia fragilis	Short Purple-flag	\checkmark	\checkmark	✓	\checkmark	
Patersonia occidentalis	Long Purple-flag			\checkmark	\checkmark	
Philydrum lanuginosum (v)	Woolly Waterlily				\checkmark	
Poa clelandii	Noah's Ark			\checkmark		Long Hollow only
Poa labillardierei var. labillardierei	Common Tussock- grass			~		
Rytidosperma geniculatum	Kneed Wallaby-grass		\checkmark	✓		
	Smooth Wallaby-					
Rytidosperma laeve	grass			 ✓ 		
Rytidosperma pilosum	Velvet Wallaby-grass			 ✓ 		
Rytidosperma racemosum var. racemosum	Slender Wallaby- grass			\checkmark		
	Wetland Wallaby-					
Rytidosperma semiannulare	grass			 ✓ ✓ 	✓	
Rytidosperma setaceum	Bristly Wallaby-grass		 ✓ 	 ✓ ✓ 		
Schoenus apogon	Common Bog-sedge			√	✓ ✓	
Schoenus brevifolius	Zig-zag Bog-sedge				✓	
Stackhousia monogyna s.l.	Creamy Stackhousia	 ✓ ✓ 	 ✓ ✓ 	 ✓ ✓ 		
Stylidium graminifolium s.s.	Grass Triggerplant	↓ ✓	√	√		
	Tuffed Lily				✓	
Themeda triandra	Kangaroo Grass			√		
Thysanotus tuberosus subsp. tuberosus	Common Fringe-lily			~		
Tricostularia pauciflora	Needle Bog-sedge	 ✓ 	\checkmark			
Wurmbea dioica	Common Early Nancy			\checkmark		
Non-tufted Grasses or Graminoids						
Baloskion tetraphyllum subsp. tetraphyllum	Tassel Cord-rush				~	



Inland Revegetation List				8		
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Scientific Name	Common Name	SH	H	DS	Ŝ	Comments
Baumea juncea	Bare Twig-sedge			✓	\checkmark	
Dianella sp. aff. revoluta (Coastal)	Coast Flax-lily			~		
Dianella sp.aff. longifolia (Benambra)	Pale Flax-lily		~	~		
Eleocharis acuta	Common Spike-sedge				\checkmark	Seepage zones
Ficinia nodosa	Knobby Club-sedge			\checkmark		Seepage zones
Gahnia radula	Thatch Saw-sedge	\checkmark	✓	\checkmark		
Hemarthria uncinata var. uncinata	Mat Grass			~	~	
Hypolaena fastigiata	Tassel Rope-rush	~	~			
Lepidosperma concavum	Sandhill Sword-sedge	\checkmark	✓			
Microlaena stipoides var.	Weeping Grass	✓	√	~		
Schoenus maschalinus	Leafy Bog-sedge				1	
Triglochin procera s l	Water Ribbons					
Triglochin striata	Streaked Arrowgrass					
Dicot Herbs	Streaked Allowgluss	1	1	1		
Acaena novae-zelandiae	Bidgee-widgee			\checkmark		
Allittia cardiocarpa	Swamn Daisy			·	✓	
Amperea xiphoclada var.	Broom Snurge					
Centella cordifolia	Centella			✓	~	Seenage zones
Centrolenis fascicularis	Tufted Centrolepis				~	
Chrysocephalum aniculatum s l	Common Everlasting			~		
Comesperma calvmega	Blue-spike Milkwort	✓	~			
Crassula helmsii	Swamp Crassula				\checkmark	
Dichondra repens	Kidney-weed			✓		
Drosera aberrans	Scented Sundew			✓		
Drosera binata	Forked Sundew				~	
Drosera glanduligera	Scarlet Sundew				\checkmark	
Drosera macrantha	Climbing Sundew	~	~	~		
Drosera peltata subsp. auriculata	Tall Sundew		~	~		
Drosera peltata subsp. peltata	Pale Sundew			✓		
Drosera spatulata	Rosy Sundew				\checkmark	
Epilobium billardierianum subsp. cinereum	Grey Willow-herb			~		
Epilobium billardierianum subsp. intermedium	Variable Willow-herb				~	
Eryngium vesiculosum	Prickfoot				\checkmark	
Euchiton collinus	Creeping Cudweed			\checkmark	\checkmark	
Euchiton sphaericus	Annual Cudweed		\checkmark	\checkmark		

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Common Name	S	E	<u> </u>	Ň	Comments
Purple Eyebright		\checkmark	\checkmark		
Creeping Raspwort				~	
Common Raspwort	~	~	\checkmark		
Lanky Goodenia				\checkmark	
Bent Goodenia			\checkmark		
Swamp Goodenia				\checkmark	
Button Everlasting		\checkmark	\checkmark		
Hairy Pennywort				~	
Stinking Pennywort			\checkmark		
Small St John's Wort			\checkmark		
Dwarf Wire-lily		~	\checkmark		
Wiry Buttons			\checkmark		
Angled Lobelia	\checkmark	\checkmark	\checkmark	\checkmark	Seepage zones
Tall Lobelia			~		
Upright Water-milfoil				~	
Amphibious Water-				~	
Broad-leaf Stinkweed			\checkmark		
Variable Stinkweed		~	· ~		
Shady Wood-sorrel		-	\checkmark	\checkmark	
Austral Stork's-bill			\checkmark		
Konata			\checkmark		
Slender Knotweed				~	Seenage zones
Slender Platysace	~	~			
Small Poranthera			~		
Shiny Swamp-mat				~	
Jagged Fireweed			\checkmark		
Annual Fireweed			~	~	
Rough Fireweed			\checkmark		
Shrubby Fireweed			\checkmark	~	
Cotton Fireweed			\checkmark		
Leafy Fireweed			~		
Parsnip Trachymene		~	~		
Parsnip Trachymene		~	~		
Yellow Rush-lilv		~	\checkmark		
Fairies' Aprons				\checkmark	
Slender Speedwell			\checkmark		
	Common NamePurple EyebrightCreeping RaspwortCommon RaspwortLanky GoodeniaBent GoodeniaBent GoodeniaButton EverlastingHairy PennywortStinking PennywortStinking PennywortStinking PennywortStinking PennywortMairy ButtonsAngled LobeliaUpright Water-milfoilAngled LobeliaUpright Water-milfoilBroad-leaf StinkweedVariable StinkweedShady Wood-sorrelAustral Stork's-billKopataSlender KnotweedShiny Swamp-matJagged FireweedRough FireweedRough FireweedParsnip TrachymeneYellow Rush-lilyFaires' ApronsSlender Speedwell	Common Name₹Purple EyebrightCreeping Raspwort✓Common Raspwort✓Lanky GoodeniaBent GoodeniaButton EverlastingHairy PennywortStinking PennywortStinking PennywortSmall St John's WortDwarf Wire-lily✓Wiry ButtonsAngled Lobelia✓Tall Lobelia✓Upright Water-milfoilAmphibious Water-milfoilBroad-leaf StinkweedShady Wood-sorrelAustral Stork's-billKopataSlender KnotweedShang Swamp-matJagged FireweedAnnual FireweedRough FireweedCuton FireweedParsnip TrachymeneYellow Rush-lilyFairies' ApronsSlender Speedwell	Common NameEPurple Eyebright✓Creeping Raspwort✓Common Raspwort✓Common Raspwort✓Lanky GoodeniaIBent GoodeniaIBent Goodenia✓Button Everlasting✓Hairy PennywortIStinking PennywortISmall St John's WortIDwarf Wire-lily✓Wiry ButtonsIAngled Lobelia✓Upright Water-milfoilIBroad-leaf Stinkweed✓Variable Stinkweed✓Shady Wood-sorrelIAustral Stork's-billIKopataISlender Platysace✓Shany Swamp-matIJagged FireweedIRough FireweedIParsnip Trachymene✓Yellow Rush-lily✓Yellow Rush-lily✓	Common NameENPurple Eyebright✓✓Creeping Raspwort✓✓Common Raspwort✓✓Lanky Goodenia✓✓Bent Goodenia✓✓Bent Goodenia✓✓Button Everlasting✓✓Hairy Pennywort✓✓Stinking Pennywort✓✓Small St John's Wort✓✓Dwarf Wire-lily✓✓Wiry Buttons✓✓Angled Lobelia✓✓Tall Lobelia✓✓Upright Water-milfoil✓✓Broad-leaf Stinkweed✓✓Variable Stinkweed✓✓Shady Wood-sorrel✓✓Slender Platysace✓✓Shiny Swamp-mat✓✓Jagged Fireweed✓✓Cotton Fireweed✓✓Parsnip Trachymene✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Slender Speedwell✓✓Slender Speedwell✓✓Slender Speedwell✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓✓Yellow Rush-lily✓ <td< td=""><td>Common NameEMEMPurple Eyebright✓✓✓Creeping Raspwort✓✓✓Common Raspwort✓✓✓Common Raspwort✓✓✓Lanky Goodenia✓✓✓Bent Goodenia✓✓✓Button Everlasting✓✓✓Hairy Pennywort✓✓✓Stinking Pennywort✓✓✓Stinking Pennywort✓✓✓Dwarf Wire-lily✓✓✓Wiry Buttons✓✓✓Angled Lobelia✓✓✓Upright Water-milfoil✓✓✓Broad-leaf Stinkweed✓✓✓Slender Knotweed✓✓✓Slender Knotweed✓✓✓Shaly Wood-sorrel✓✓✓Slender Platysace✓✓✓Shall Poranthera✓✓✓Shiny Swamp-mat✓✓✓Jagged Fireweed✓✓✓Parsnip Trachymene✓✓✓Parsnip Trachymene✓✓✓Parsnip Trachymene✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓<!--</td--></td></td<>	Common NameEMEMPurple Eyebright✓✓✓Creeping Raspwort✓✓✓Common Raspwort✓✓✓Common Raspwort✓✓✓Lanky Goodenia✓✓✓Bent Goodenia✓✓✓Button Everlasting✓✓✓Hairy Pennywort✓✓✓Stinking Pennywort✓✓✓Stinking Pennywort✓✓✓Dwarf Wire-lily✓✓✓Wiry Buttons✓✓✓Angled Lobelia✓✓✓Upright Water-milfoil✓✓✓Broad-leaf Stinkweed✓✓✓Slender Knotweed✓✓✓Slender Knotweed✓✓✓Shaly Wood-sorrel✓✓✓Slender Platysace✓✓✓Shall Poranthera✓✓✓Shiny Swamp-mat✓✓✓Jagged Fireweed✓✓✓Parsnip Trachymene✓✓✓Parsnip Trachymene✓✓✓Parsnip Trachymene✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓✓✓Slender Speedwell✓ </td



Inland Revegetation List			>	HRW	lk	
Scientific Name	Common Name	HS	HV	DS	Soa	Comments
	Running Marsh-					
Villarsia reniformis	flower				 ✓ 	
Viola cleistogamoides	Hidden Violet	\checkmark	\checkmark	\checkmark		
Viola hederacea sensu Thiele & Prober	Ivy-leaf Violet			✓		
Wahlenbergia stricta subsp. stricta	Tall Bluebell			✓		
Xanthosia huegelii	Heath Xanthosia	\checkmark	\checkmark	\checkmark		
Robust Ferns	•					
Gleichenia microphylla	Scrambling Coral- fern				~	
Pteridium esculentum	Austral Bracken	\checkmark	\checkmark	\checkmark		
Small Ferns						
Lindsaea linearis	Screw Fern			\checkmark		
Selaginella uliginosa	Swamp Selaginella				\checkmark	
Scramblers / Climbers						
Billardiera mutabilis	Common Apple-berry		\checkmark	\checkmark		
Bossiaea prostrata	Creeping Bossiaea		\checkmark	\checkmark		
Clematis microphylla	Small-leaved Clematis			~		
Comesperma volubile	Love Creeper		\checkmark	\checkmark		
Hovea heterophylla	Common Hovea		\checkmark	\checkmark		
Kennedia prostrata	Running Postman	~	\checkmark	\checkmark		
Thysanotus patersonii	Twining Fringe-lily	\checkmark	\checkmark	\checkmark		
Mistletoes						
Amyema pendula subsp. pendula	Drooping Mistletoe			✓		Host: <i>Eucalyptus viminalis</i> subsp. pryoriana
Muellerina eucalyptoides	Creeping Mistletoe			~		Host: Eucalyptus camaldulensis ssp. camaldulensis

Table 62Plant species considered suitable for revegetation in the seven foreshore
reserves

Key:	
CBW	Coast Banksia Woodland
CDG	Coastal Dune Grassland
CDS	Coastal Dune Scrub
CHS	Coastal Headland Scrub
SZCS	Spray Zone Coastal Shrubland
(k)	Classified as poorly known in Victoria but thought t

Foreshore Revegetation List	Common Nomo	BW	DG	SQ	SH	ZCS	Notos
Trees	Common Name		0			S	
Acacia implexa	Lightwood	\checkmark					
Acacia mearnsii	Black Wattle	✓					
Acacia melanoxylon	Blackwood	✓			~		
Allocasuarina verticillata	Drooping Sheoak	✓			✓		
Banksia integrifolia subsp. integrifolia	Coast Banksia	~		~	~		
Banksia marginata	Silver Banksia				~		
Eucalyptus viminalis subsp. pryoriana	Coast Manna-gum				~		Limited plantings
Exocarpos cupressiformis	Cherry Ballart	\checkmark					
Small Trees	1						
Acacia pycnantha	Golden Wattle	\checkmark			\checkmark		Brighton Dunes only
Leptospermum laevigatum	Coast Tea-tree	\checkmark		\checkmark	\checkmark		
Myoporum insulare	Common Boobialla	\checkmark		\checkmark	\checkmark	\checkmark	
Large Shrubs				_	_	_	
Acacia longifolia subsp. sophorae	Coast Wattle	~		\checkmark	\checkmark	\checkmark	
Alyxia buxifolia	Sea Box	\checkmark		\checkmark	\checkmark	\checkmark	
Bursaria spinosa - the non-spiny tree version formerly known as Bursaria spinosa var. macrophylla	Sweet Bursaria	✓		~	~		
Medium Shrubs							
Acacia paradoxa	Hedge Wattle	\checkmark		\checkmark	\checkmark		
Atriplex cinerea	Coast Saltbush		\checkmark			\checkmark	
Correa alba var. alba	White Correa	\checkmark		\checkmark	\checkmark	\checkmark	
Goodenia ovata	Hop Goodenia			\checkmark			
Leucopogon parviflorus	Coast Beard-heath	\checkmark		\checkmark	\checkmark	\checkmark	
Olearia axillaris	Coast Daisy-Bush	\checkmark		\checkmark	\checkmark	\checkmark	
Olearia ramulosa var. ramulosa	Twiggy Daisy-bush	\checkmark		\checkmark	\checkmark		
Pomaderris paniculosa subsp. paralia	Coast Pomaderris	~		\checkmark	\checkmark		
Rhagodia candolleana subsp. candolleana	Seaberry Saltbush	✓		✓	✓	~	
Small Shrubs							

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to be rare or threatened by DSE (2005)

Foreshore Revegetation List		_					
Scientific Name	Common Name	CBW	CDG	CDS	CHS	SZC	Notes
Dillwvnia cinerascens s.s.	Grey Parrot-pea	✓ ✓					
Einadia nutans subsp. nutans	Nodding Saltbush	\checkmark		\checkmark	\checkmark		
Hibbertia sericea s.s.	Silky Guinea-flower	\checkmark		\checkmark	\checkmark		
Lasiopetalum baueri	Slender Velvet-bush	\checkmark		\checkmark	\checkmark		
Leucophyta brownii	Cushion Bush			\checkmark	\checkmark	\checkmark	
Pimelea humilis	Common Rice- flower	~		~	~		
Suaeda australis	Austral Seablite					\checkmark	Seepage zones
Tufted Grasses or Graminoids							
Austrostipa flavescens	Coast Spear-grass	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
Austrostipa mollis	Supple Spear-grass	\checkmark					
Austrostipa stipoides	Prickly Spear-grass				\checkmark	\checkmark	
Deyeuxia quadriseta	Reed Bent-grass	\checkmark					
Dianella brevicaulis	Small-flower Flax- lily	\checkmark		\checkmark	\checkmark	\checkmark	
Juncus pallidus	Pale Rush	\checkmark			\checkmark		
Lachnagrostis billardierei subsp. billardierei	Coast Blown-grass	~	~	~	~	~	
Lachnagrostis filiformis	Common Blown- grass					\checkmark	
Lepidosperma gladiatum	Coast Sword-sedge	\checkmark		\checkmark	\checkmark	\checkmark	
Lomandra filiformis s.l.	Wattle Mat-rush	\checkmark			\checkmark		
Lomandra longifolia subsp. longifolia	Spiny-headed Mat- rush	~		\checkmark	\checkmark		
Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush				~		
Poa poiformis var. poiformis	Coast Tussock-grass	\checkmark	~	\checkmark	\checkmark	\checkmark	
Rytidosperma caespitosum	Common Wallaby- grass	~		~	~		
Rytidosperma erianthum	Hill Wallaby-grass			~	~		
Rytidosperma geniculatum	Kneed Wallaby- grass	~		~	~		
Rytidosperma racemosum var. racemosum	Slender Wallaby- grass	~					
Rytidosperma setaceum var. setaceum	Bristly Wallaby- grass	~		~	~		
Non-tufted Grasses or Graminoids							
Carex pumila	Strand Sedge			\checkmark			
Dianella sp. aff. revoluta (Coastal)	Coast Flax-lily	\checkmark		\checkmark	\checkmark	~	
Distichlis distichophylla	Australian Salt- grass		~	~	~	~	
Ficinia nodosa	Knobby Club-sedge	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
Imperata cylindrica	Blady Grass	\checkmark					
Juncus kraussii subsp. australiensis	Sea Rush					~	

Foreshore Revegetation List		>	75			x	
Scientific Name	Common Name	CBV	ğ	CDS	CHS	ZC	Notes
	Sandhill Sword-						
Lepidosperma concavum	sedge				\checkmark		
stipoides	Weeping Grass	\checkmark		\checkmark	\checkmark		
Spinifex sericeus	Hairy Spinifex		\checkmark	\checkmark			
Sporobolus virginicus	Salt Couch		\checkmark			\checkmark	
Dicot Herbs							
Actites megalocarpus	Dune Thistle		\checkmark	\checkmark		\checkmark	
Brachyscome parvula	Coast Daisy			\checkmark	\checkmark		
Carpobrotus rossii	Karkalla	\checkmark	\checkmark	\checkmark	\checkmark		
Disphyma crassifolium subsp. clavellatum	Rounded Noon- flower	~		\checkmark	~	~	
Epilobium billardierianum subsp. cinereum	Grey Willow-herb	\checkmark		\checkmark	~		
Euchiton collinus	Creeping Cudweed	\checkmark		\checkmark	\checkmark		
Geranium potentilloides var. potentilloides	Soft Crane's-bill	~					
Gonocarpus tetragynus	Common Raspwort	~		\checkmark	\checkmark		
Helichrysum scorpioides	Button Everlasting	~			~		
Pelargonium australe	Austral Stork's-bill	\checkmark		\checkmark	\checkmark		
Pelargonium inodorum	Kopata				~		
	Thick-head						
Sarcocornia blackiana	Glasswort					 ✓ 	Seepage zones
Sarcocornia quinqueflora subsp. quinqueflora	Beaded Glasswort					\checkmark	
Scutellaria humilis	Dwarf Skullcap	\checkmark		\checkmark	\checkmark		
Selliera radicans	Shiny Swamp-mat					\checkmark	Seepage zones
Senecio biserratus	Jagged Fireweed	\checkmark		\checkmark	\checkmark		
Senecio glomeratus subsp. glomeratus	Annual Fireweed	\checkmark					
Senecio hispidulus	Rough Fireweed	\checkmark		\checkmark	\checkmark		
Senecio quadridentatus	Cotton Fireweed	\checkmark					
Stackhousia spathulata (k)	Coast Stackhousia			\checkmark	\checkmark		
Veronica gracilis	Slender Speedwell	\checkmark	\checkmark				
Veronica plebeia	Trailing Speedwell	\checkmark			\checkmark		
Acaena novae-zelandiae	Bidgee-widgee	\checkmark					
Apium prostratum subsp. prostratum var. filiforme	Sea Celery		~	\checkmark	~	\checkmark	
Centella cordifolia	Centella	\checkmark					Seepage zones
Dichondra repens	Kidney-weed	\checkmark		\checkmark	\checkmark	\checkmark	
Hydrocotyle laxiflora	Stinking Pennywort	\checkmark		\checkmark	\checkmark		
Oxalis exilis	Shady Wood-sorrel	\checkmark		\checkmark	\checkmark		
Oxalis perennans	Grassland Wood- sorrel	\checkmark		\checkmark	\checkmark		
Samolus repens	Creeping Brookweed					\checkmark	Seepage zones

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Foreshore Revegetation List							
Scientific Name	Common Name	CBW	CDG	CDS	CHS	SZC	Notes
Scramblers / Climbers							
	Common Apple-						
Billardiera mutabilis	berry	\checkmark					
	Small-leaved						
Clematis microphylla	Clematis	\checkmark		\checkmark	\checkmark		
Comesperma volubile	Love Creeper	\checkmark		\checkmark	\checkmark		
Kennedia prostrata	Running Postman	\checkmark		\checkmark	\checkmark		
Muehlenbeckia australis	Climbing Lignum	\checkmark		\checkmark	\checkmark	\checkmark	
Tetragonia implexicoma	Bower Spinach	\checkmark		\checkmark	\checkmark	\checkmark	
Threlkeldia diffusa	Coast Bonefruit	\checkmark		\checkmark	\checkmark	\checkmark	



Appendix 3 Risk Assessment for Bayside's inland and foreshore reserves.

In order to prioritise the management issues for the inland and coastal reserves, a Risk Assessment has been undertaken. Below is the results of the Risk Assessment for the inland (Table 61), and foreshore (Table 62) reserves, and a description of the methodology used to reach the Management Priority outcome.

Table 63 The results of the Risk Assessment for the seven Inland Reserves - Balcombe Park, Bay Road Heathland Sanctuary, Cheltenham Park Flora and Fauna Reserve, Donald McDonald Reserve, George Street Reserves, Gramatan Avenue Heathland Sanctuary and Long Hollow Heathland.

See explanation of scoring system below (following Table 62)

Key Values	Threat Category	Threat	Severity (Score 1-5)	As	sociation	Consequence	Likelihood	Risk	Management Strategy	Proportion of key	Tractability (1-3)	Reasoning (tractability)	Management Priorities
				Score (1-4)	Confidence (L,M,H)					values benefited			(H, M, L, VL)
Remnant Ecological Vegetation	Weeds	Priority 1 weeds: decline of indigenous flora & fauna.	5	4	High	Catastrophic	Almost certain	Extreme	Weed control	100%	3	Reduction in cover and abundance of weeds is achievable	High
Class(es) (EVCs)		Priority 2 weeds: decline of indigenous flora & fauna.	4	4	High	Major	Almost certain	Extreme	Weed control	100%	3	Reduction in cover and abundance of weeds is achievable	Moderate
Indigenous flora		Priority 3 + 4 weeds: decline of indigenous flora & fauna.	4	4	High	Major	Almost certain	Extreme	Weed control	100%	2	Reduction in cover and abundance of weeds is achievable but costly	Low
Indigenous fauna Landscape amenity		Hybridisation: demise of plant species through genetic pollution.	4	4	High	Major	Almost certain	Extreme	Remove hybrid progeny, and introduced parents as applicable	25%	2	Difficulty identifying some hybrids; parents and hybrids located offsite on private property	High
	Excessive cover of indigenous plant species	Over-abundance of indigenous plants decreasing diversity.	4	4	High	Major	Likely	Extreme	Ecological thinning	100%	3	Reduction in cover and abundance readily achievable	High
	Pest animals	Foxes: predation of fauna; weed-seed dispersal.	3	3	High	Minor	Almost certain	High	Predator control	25%	1	Baiting and shooting restrictions in urban areas; a landscape- scale rather than reserve-scale issue.	Very Low
		Cats: predation of fauna.	3	3	High	Minor	Almost certain	High	Predator control	25%	1	Baiting and shooting restrictions in urban areas; a landscape- scale rather than reserve-scale issue.	Very Low
		Rodents (rats and mice): predation of fauna; grazing/browsing of plants; weed-seed dispersal; transmission of diseases.	3	3	High	Minor	Almost certain	High	Rodent control	75%	1	Universally present in the municipality	Very Low
		Exotic birds (Common3Myna, Blackbird, FeralPigeon, etc.): aggressiveexclusion of indigenous	3	3	High	Minor	Almost certain	High	Exotic bird control	75%	1	Universally present in the municipality	Very Low
		birds; occupation of nesting hollows; weed-seed dispersal; transmission of avian diseases						Hollow monitoring / removal	25%	1	Experience suggests hollows are rapidly recolonised by Mynas	Very Low	

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Bayside Native Vegetation Works Program - Stage 2

Key Values	Threat Category	Threat	Severity (Score 1-5)	As Score	sociation Confidence	Consequence	Likelihood	Risk	Management Strategy	Proportion of key values	Tractability (1-3)	Reasoning (tractability)	Management Priorities (H, M, L, VL)
				(1-4)	(L,M,H)					benefiteu			
Remnant EVCs	Pest animals (continued)	Unrestrained dogs: disturbance to fauna, particularly birds.	3	3	High	Minor	Almost certain	High	Install/maintain fences	75%	3	Dogs restricted from remnant vegetation	High
flora	Fire	Exclusion of fire (fuel	3	4	High	Moderate	Almost	Extreme	Maintain use of fire	100%	3	Appropriate fire	High
Indigenous fauna		reduction burns and scorching) as a vegetation management tool: senescence of vegetation;					certain		as a vegetation management tool, as in outlined in the Bushland Strategy			regime repeatedly demonstrated to benefit vegetation	8
Landscape amenity		decline in species richness.							(Bayside City Council 2002)				

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Table 64 The results of the Risk Assessment for the seven foreshore reserves - Beaumaris Foreshore - north, Black Rock - south, Brighton Dunes, Picnic Point, Red Bluff, Ricketts Point Hinterland and Sandringham Foreshore – south.

See explanation of scoring system below (following this table)

Key Values	Threat Category	Threat	Severity (Score 1-5)	As	ssociation	Consequence	Likelihood	Risk	Management Strategy	Proportion of key values	Tractability (1-3)	Reasoning for Tractability score	Management Priorities (H. M. L. VI.)
				Score (1-4)	Confidence (L,M,H)	•				benefited		store	(11, 11, 2, 12)
Remnant Ecological Vegetation Class(es) (EVCs)	Weeds	Priority 1 weeds: decline of indigenous flora & fauna.	5	4	High	Catastrophic	Almost certain	Extreme	Weed control	100%	3	Reduction in cover and abundance of weeds is achievable	High
Indigenous flora		Priority 2 weeds: decline of indigenous flora & fauna.	4	4	High	Major	Almost certain	Extreme	Weed control	100%	3	Reduction in cover and abundance of weeds is achievable	Moderate
Indigenous fauna Landscape amenity		Priority 3 + 4 weeds: decline of indigenous flora & fauna.	4	4	High	Major	Almost certain	Extreme	Weed control	100%	2	Reduction in cover and abundance of weeds is achievable but costly	Low
		Hybridisation: demise of plant species through genetic pollution.	4	4	High	Major	Almost certain	Extreme	Remove hybrid progeny, and introduced parents as applicable	25%	2	Difficulty identifying some hybrids; parents and hybrids located offsite on private property	High
	Excessive cover of indigenous plant species	Over-abundance of indigenous plants decreasing diversity	4	4	High	Major	Likely	Extreme	Ecological thinning	100%	3	Reduction in cover and abundance readily achievable	High
		Invasion of Coastal Dune Grassland by indigenous shrubs, eliminating the EVC.	4	4	High	Major	Almost certain	Extreme	Removal of shrubs (except <i>Atriplex</i> <i>cinerea</i>)	100%	3	Removal of shrubs (except <i>Atriplex</i> <i>cinerea</i>) is readily achievable	High
	Pest animals	Foxes: predation of fauna; weed-seed dispersal.	3	3	High	Minor	Almost certain	High	Predator control	25%	1	Baiting and shooting restrictions in urban areas; a landscape- scale rather than reserve-scale issue.	Very Low
		Cats: predation of fauna.	3	3	High	Minor	Almost certain	High	Predator control	25%	1	Baiting and shooting restrictions in urban areas; a landscape- scale rather than reserve-scale issue.	Very Low
		Rabbits: grazing & browsing of plants; weed seed dispersal; soil disturbance & erosion.	3	4	High	Moderate	Almost certain	Extreme	Rabbit control	75%	2	Technical difficulties implementing control, but elimination has been demonstrated in some reserves	Moderate
		Rodents (rats and mice): predation of fauna; grazing/browsing of plants; weed-seed dispersal; transmission of diseases.	3	3	High	Minor	Almost certain	High	Rodent control	75%	1	Universally present in the municipality	Very Low

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Key Values	Threat Category	Threat	Severity (Score 1-5)	Severity Asso (Score 1-5)	sociation	Consequence	Likelihood	Risk	Management Strategy	Proportion of key values	Tractability (1-3)	Reasoning for Tractability score	Management Priorities (H, M, L, VL)
				Score (1-4)	Confidence (L,M,H)					benefited			
Remnant Ecological Vegetation Class(es) (EVCs)	Pest animals (continued)	Exotic birds (Common Myna, Blackbird, Feral Pigeon, etc.): aggressive exclusion of indigenous birds: commetion of	3	3	High	Minor	Almost certain	High	Exotic bird control	75%	1	Universally present in the municipality	Very Low
Indigenous flora Indigenous fauna		nesting hollows; weed- seed dispersal; transmission of avian diseases							Hollow monitoring / removal	25%	1	Experience suggests hollows are rapidly recolonised by Mynas	Very Low
Landscape amenity		Unrestrained dogs: disturbance to fauna, particularly birds	3	3	High	Minor	Almost certain	High	Install/maintain fences	75%	3	Dogs restricted from remnant vegetation	High
	Adverse impacts from on-ground works	Damage to vegetation by machinery used for beach 'nourishment' and sand raking	4	3	High	Moderate	Possible	High	Instruct machinery operators to avoid damaging vegetation, and conduct auditing	100%	3	Avoidance of damage is very simple	High
	Recreational pressures	Creation of informal tracks damaging soils, vegetation and fauna habitats	4	4	High	Major	Likely	Extreme	Fence/obstruct and revegetate informal tracks	100%	2	Closing tracks is effective; user- related pressures unlikely to abate	High

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Risk Assessment methodology and explanation of scoring system

1. IDENTIFY KEY VALUES

The values identified across the Bayside Reserves were grouped together under four different categories: remnant Ecological Vegetation Classes (EVCs), indigenous flora, indigenous fauna and landscape amenity. For this Bayside Risk Assessment, the Values have not been ranked as they are all considered to be highly important irrespective of their condition/quality given the scarcity of remnant vegetation within the municipality.

2. IDENTIFY THREATS

The threats were categorised and their key impacts identified in Section 4. Only the major threats/issues were assessed in this Risk Assessment.

3. SEVERITY SCORE

The matrix below was used to rank the severity of each threat based on its impacts to values. A score was assigned for each factor assessed, and the average rating became the Severity Score.

Rating	Values Impacted	Potential for major / irreversible change	Difficulty to control	Scale	Timeframe to impact
5	Widespread and multiple key biological and amenity values	Almost certain	Very High	Multiple reserves	Short term
4	Widespread and multiple key biological and amenity values	Possible	High	Multiple reserves	Short to medium term
3	Widespread and one/few key biological and amenity values	Unlikely	Moderate to High	Multiple reserves	Medium term
2	Local and one/few key biological and amenity values	Unlikely	Moderate	Single reserve	Medium to long term
1	Local and one/few biological and amenity values	Not likely	Low	Part of a reserve	Long term

4. ASSOCIATION SCORE

The Association Score was determined based on how much influence a particular threat can have on the values.

- 4 High (threat always or often impacts the value)
- 3 Medium (Threat may impact the value)
- 2 –Low (Threat does not impact the value, but is remotely possible)
- 1 –None (Threat does not impact the value)

5. CONFIDENCE RATING

The Confidence Rating is used to show how much evidence there is for the assigned Association Score, whereby:

High - Repeated scientific or empirical evidence supports association

Medium - Consensus within scientific community, or direct evidence from highly relevant study/studies

Low - Logical/plausible connection, documented in single studies or limited observations suggests association

6. CONSEQUENCE RATING

The Consequence Rating is assigned using the determined Association Score and Severity Score, and the impacts to the highly important Values within the Bayside reserve system. The matrix below is used to determine the Consequence Rating.

		Assoc	iation Score for t	hreat impacting	values
		4 (High)	3 (Moderate)	2 (Low)	1 (None)
	No Data	Catastrophic	Major	Moderate	None
ofthreat	5 Catastrophic		Major	Moderate	None
	4 Major		Moderate	Minor	None
score	3	Moderate	Minor	Insignificant	None
rity S	2	Minor	Insignificant	None	None
Seve	1	Insignificant	None	None	None
	0	None	None	None	None

The resultant Consequence Rating should be relatively consistent with the following definitions:

Catastrophic - Major ecological kill, long-term or permanent disruption of ecological processes, substantial ecological change

Major - Likelihood of long-term or permanent, major ecological impact

Moderate - Temporary ecological impact extending beyond originating disturbance, some local or shortterm ecologically important impact

Minor - Temporary and non-serious ecological impact

Insignificant - No serious ecological impact

7. LIKELIHOOD

The likelihood of the threat impacting on the value was determined based on the following definitions:

Almost Certain - The threat impacting the value(s) is expected to occur in most circumstances (more than 85% chance of occurring within a specified time-frame)

Likely - The threat impacting the value(s) probably will occur in most circumstances (50-85% chance of occurring in a specified time-frame)

Possible - The threat impacting the value(s) might occur at some time (21-49% of occurring in specified time-frame (once in a while)

Unlikely - The threat impacting the value(s) could occur at some time (1-20% chance of occurring in a specified time-frame)

Rarely - The threat impacting the value(s) is not expected to happen (<1% chance of occurring in a specified time-frame) or may occur only in exceptional circumstances

8. RISK

The Environmental Risk was determined using the Consequence Rating, the Likelihood and the Risk matrix below. This matrix follows the Australian Standard for Risk Assessments (Standards Australia 2004).

			Co	onsequence Rati	ng		
		Insignificant	Minor	Moderate	Major	Catastrophic	
	Almost Certain	High	High	Extreme	Extreme	Extreme	
poo	Likely	Moderate	High	High	Extreme	Extreme	
celiho	Possible	Low	Moderate	High	Extreme	Extreme	
Lik	Unlikely	Low	Low	Moderate	High	Extreme	
	Rarely	Low	Low	Moderate	High	High	

9. MANAGEMENT ACTION AND PROPORTION OF KEY VALUES BENEFITTED

The possible management strategies/actions that would be recommended to ameliorate the threat were listed and the proportion of key values that would benefit from the action determined.

10. TRACTABILITY SCORE

The tractability of a threat needs to be considered to determine if the cost and benefit of a particular action is worthwhile or justifiable. It considers a number of issues, including the scale of the problem, the technical practicability of management and resource limitations. The Tractability Score was determined based on the following definitions:

- 1 Little practical likelihood of control efforts containing or eradicating the threat
- 2 Reasonable likelihood that control measures will reduce threat/impact
- 3 High likelihood of success (e.g. eradication)

The reasoning for the Tractability Score is also given to explain the rational used to derive the score.

11. MANGEMENT PRIORITIES:

Based on the determined Risk, the achievable benefits (portion of values benefited and the tractability of the problem), and the outcome of previous or current management practices, each management action was prioritised as one of four categories:

High – The threat should be managed as soon as practicable

Moderate - The threat requires management in the medium term

Low – The threat can be addressed once High and Moderate Priority management issues are under control

Very Low – At this stage the threat is deemed unmanageable given the scale of the issue, the biodiversity benefits and the management costs associated with controlling the threat. This rating can change if significant new values are identified (e.g. predator exclusion/control if an important species is found, such as a small native mammal) or if resources are increased or remain after the High, Moderate and Low priorities have been adequately addressed.

Appendix 4 Draft annual monitoring proforma, Bayside Native Vegetation Works Program Stage 2

The annual monitoring proforma should be finalised as the quadrats are established in the first year of monitoring.

Site:	Permanent Plot	no.:	Date:		
Assessor(s):					
Previous management works:					
General condition of native vegetation (ci	rcle one): Good	Mostly-good	Moderate	Poor Ver	ry-poor
Note: - 'Good' = few weeds, healthy foliage, mini - 'Very-poor' = high weed cover, vegetative	mal disturbance (tramp dieback and mortality	oling, erosion, e y, high levels of	etc.). disturbance		
Management issues					
Major weed species:					
• % cover of weeds (circle one):	<5% 5-2	25% 2	25-50%	>50%)
Signs of pest animals:					
• Trampling:					
• Erosion:					
• Dog faeces:					
• Litter:					
• Revegetation / supplementary plant	ings condition (cir	ccle one): C	Good Mo	derate P	oor
Notes:					

