Glamorgan Spring Bay Council

Bicheno Coastal Reserves

NATIVE FLORA AND FAUNA MANAGEMENT PLAN 2014 - 2019

SUMMARY

Glamorgan Spring Bay Council has developed this five year Native Flora and Fauna Management Plan for sections of the Bicheno Coastal Reserve under their management. The intent of the Plan is to provide Council with a strategic approach to the sustainable management of the Reserves.

Remnant native vegetation in the Reserves includes the following communities:

- *Eucalyptus globulus* dry forest & woodland (DGL)
- *Eucalyptus ovata* forest & woodland (DOV)
- *Allocasuarina verticillata* forest (NAV)
- *Melaleuca ericifolia* swamp forest (NME)
- *Acacia longifolia* coastal scrub (SAC)
- Coastal scrub (SSC)
- *Leptospermum* scrub (SLW)
- Coastal grass and herbfield (GHC)

DGL, DOV and NME are listed as threatened communities under the *Nature Conservation Act 2002*.

Other Tasveg non-native vegetation mapping units present are:

- Lichen lithosere (ORO) – the rocky foreshore
- Sand, mud (OSM) – sandy beaches
- Urban areas (FUR).

One threatened plant species, *Zieria littoralis,* listed under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) is present in the Reserves.

The condition of the vegetation is variable. In general the vegetation structure is in tact but weeds are present in all communities. Some weeds, such as mirrorbush, are particularly abundant. However, the vegetation provides a diversity of habitat for native fauna. One species of threatened fauna, listed under the TSPA, for which the Reserves provide foraging habitat is the white-bellied sea-eagle.

Notable weeds are mapped and described. These include 8 species of 'declared weeds' under the *Weed Management Act 1999* and 40 other species considered as environmental weeds.

Management issues identified include:

- Natural values –vegetation, flora, fauna and significant trees
- Weeds
- Illegal clearing of vegetation
- Reserve boundaries
- Walking tracks
- Coastal erosion and beach access track
- Planting and revegetation
- Fire

Recommendations and actions plans are provided to deal with these issues and guide management of the Reserves for all of their natural values whilst not compromising their associated cultural and social values.

ACKNOWLEDGMENTS

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Fieldwork: Dr. Nicky Meeson, Biodiversity Officer

Report preparation: Dr. Nicky Meeson and Mel Kelly

Additional input from: David Tucker (Fire Management); Rosie Jackson, (Aboriginal Heritage); Maureen Martin Ferris, East Coast Heritage Museum Curator and Judie Hastie (Post European Settlement Heritage).

Consultation: Tony Pollard, Works Manager

Mapping*: Insight GIS

Photographs: Dr. Nicky Meeson, Biodiversity Officer

Weed identifications: Tasmanian Herbarium

*Maps in this publication have been reduced from their original A3 format. Hard copies of A3 maps are available upon request from:

NRM Department
Glamorgan Spring Bay Council
(03) 6256 4777

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1. INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

Glamorgan Spring Bay Council has developed this five year Native Flora and Fauna Management Plan for the Bicheno Reserves in proximity to the coast that are under their management. The intent of the Plan is to provide Council with a strategic approach to the management of the Reserves' natural values whilst recognising and considering the Reserves' significant cultural and social values.

Therefore the main objectives of the Plan are to:

- Identify the natural, and associated cultural and social values of the Reserves,
- Identify threats to the natural values,
- Provide action plans to ensure that the Reserves are sustainably managed to preserve and enhance all of their natural values, in accordance with the Tasmanian Reserve Management Code of Practice 2003[1], whilst not compromising their cultural and social values, and
- Raise community awareness of the values of the Reserves and thereby encourage participation in activities that minimise threats to these values.

1.2 GENERAL DESCRIPTION OF THE RESERVE

Bicheno is situated on the central east coast, in the Glamorgan Spring Bay municipality and in the Tasmanian South East bioregion[2]. It occurs in the moist subhumid warm climatic zone where the annual average rainfall is in the region of 600 mm. The altitude across the Reserve ranges from near sea level to approximately 15 m above a.s.l.

The location of the Reserves is depicted in Figure 1. The main Reserve extends from the eastern end of Red Bill Beach around the coast to the Blow Hole at the end of Douglas Street. Other smaller sections occur further south at the end of Harvey's Farm Road. These include three easements that provide access to the coast as well as the headland at the coastal end of one of these easements.

Remnant native vegetation and a rocky foreshore largely dominate the Reserves. A coastal footpath traverses the main Reserve. There are also sections of parkland and recreational facilities.

The main characteristics of the Reserves are provided in the table below. Section 2 provides a more detailed description of the natural values and other biological characteristics of the Reserves. Section 3 provides details of other values of the Reserves.

[1] Parks and Wildlife Service, Forestry Tasmania and Department of Primary Industries, Water and Environment 2003.

[2] IBRA5 – Peters & Thackway 1998. A bioregion is an area of land with similar environmental, physical and climatic conditions and containing characteristic ecosystems.

Reserve characteristics:

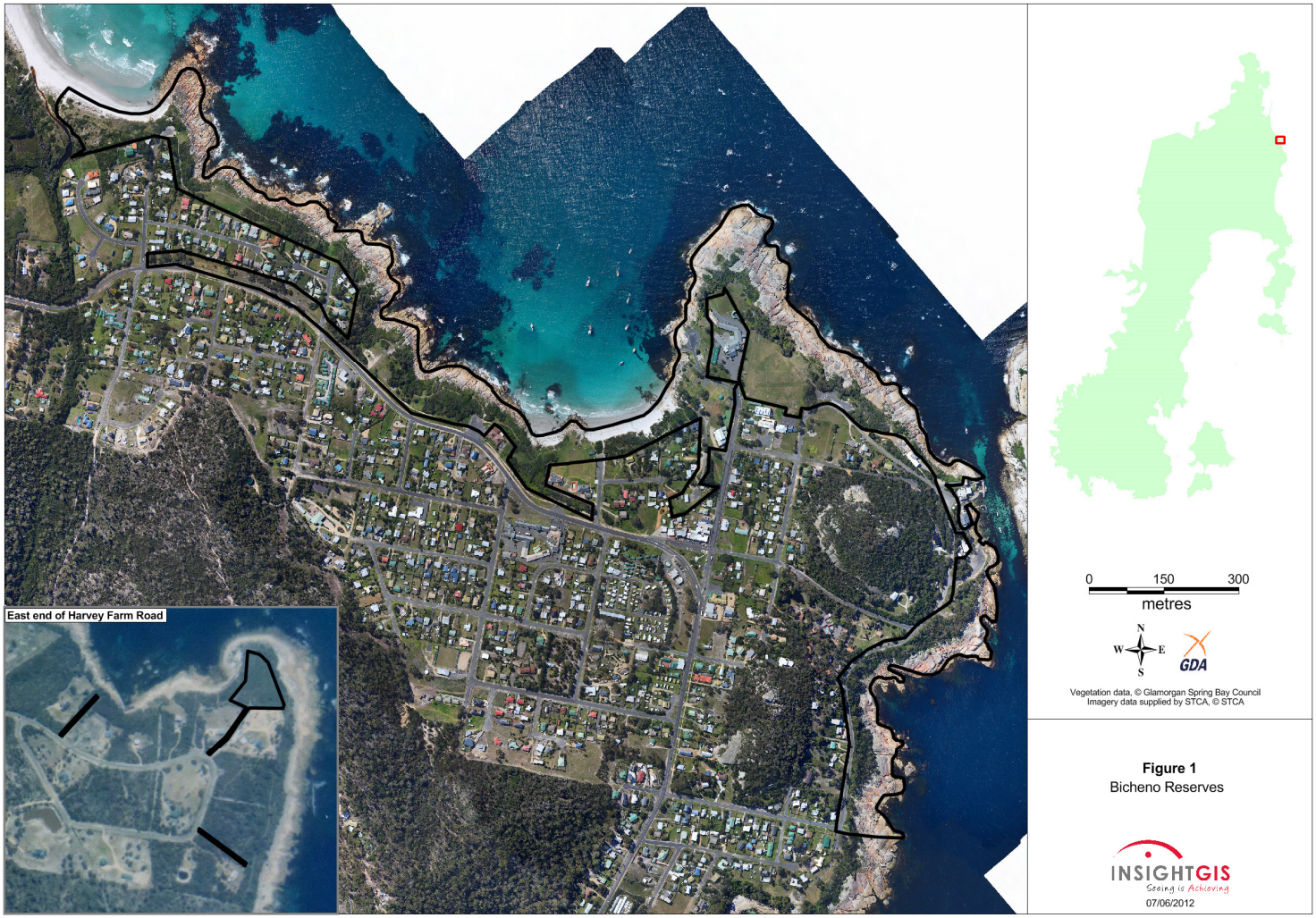
P.I.D. or Title Reference	Location	Extent (ha)	Land tenure	Management responsibility
5282967	Includes most of the Reserve from Redbill Beach to the Blow Hole	33	Coastal Reserve Crown Lands Act DPIPWE	Recreation – Bicheno Crown License Glamorgan Spring Bay Council
5285084	Council Depot	0.5	Authority Land Crown Lands Act DPIPWE	Works Depot – Bicheno Crown License Glamorgan Spring Bay Council
101885/28	Walkway, Harveys Farm Rd	0.1	Glamorgan Spring Bay Council	Beach access Glamorgan Spring Bay Council
101885/24	Walkway & Coastal Reserve, Harveys Farm Rd	1	Glamorgan Spring Bay Council	Beach access Glamorgan Spring Bay Council
101885/29	Walkway, Harveys Farm Rd	0.1	Glamorgan Spring Bay Council	Beach access Glamorgan Spring Bay Council

Natural features:

Coastal vegetation including dry sclerophyll forest, non-eucalypt forest, scrub and grassland communities, rocky and sandy shores, and remnant native trees within parkland.

Parkland, recreation areas and infrastructure:

Walking tracks, grassy parkland, BBQ and picnic areas, childrens' playground, an oval, tennis court, town hall and library, public toilets, road access to the foreshore and public boat ramp and breakwater, Council depot.


East end of Harvey Farm Road
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300
metres
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GDA
Vegetation data, © Glamorgan Spring Bay Council
Imagery data supplied by STCA, © STCA
Figure 1
Bicheno Reserves
INSIGHTGIS
Seeing is Achieving
07/06/2012

2. BIOLOGICAL CHARACTERISTICS

The following details the natural values (vegetation, flora and fauna habitat) and other biological characteristics (weeds and plant pathogens) of the Reserves.

The information provided below is based on the results of a recent survey. The methods adopted for the survey and for assessment of conservation significance are provided in Appendix 1.

A list of vascular plants that occur within the Reserves is provided in Appendix 2. A review of the potential of the Reserves to support threatened species known to occur in the vicinity is provided in Appendices 3A and 3B.

The Council's legislative obligations in relation to the management of threatened species and communities as well as weeds occurring in the Reserves are provided in Appendix 4A. Other legislation and policies relevant to reserve management are provided in Appendix 4B.

2.1 VEGETATION

The vegetation has been classified according to the TASVEG[3]. The survey revealed a greater variation in the vegetation compared with current TASVEG coastal mapping of the Reserves, which is slightly more generalised.

Figure 2 depicts the vegetation communities and other TASVEG mapping units, which were mapped during the survey. In summary, across the Reserves there are eight native vegetation communities present. These include two dry eucalypt forest communities, two non-eucalypt forest communities, three scrub communities and one grassland community.

The condition of the native vegetation is variable. In general the vegetation structure is in tact but weeds are present in all communities. Given the relatively small size of these remnants and the proximity to urban areas, this is to some extent only to be expected. However, some weeds are becoming particularly abundant. Detailed descriptions of the significant (declared and environmental) weeds present are provided in section 2.6.

Three other TASVEG non-native vegetation mapping units are also present in the Reserves. Two of them are 'other natural environments' and one is 'non-native vegetation'.

Table 1 provides a list of all mapping units within the Reserves together with the conservation status of the native vegetation. Detailed descriptions of each mapping unit are provided following table 1.

[3] TASVEG is the abbreviation for the Tasmanian Vegetation Mapping Program (the vegetation map of the entire State)

Table 1. Native vegetation communities and other TASVEG mapping units in the Reserves.

Tasveg code	Tasveg community name	Listed under the Tasmanian *Nature Conservation Act 2002*
NATIVE VEGETATION COMMUNITIES		
DGL	*Eucalyptus globulus* (blue gum) dry forest & woodland	Yes
DOV	*Eucalyptus ovata* (black gum) forest & woodland	Yes
NAV	*Allocasuarina verticillata* (drooping sheoak) forest	
NME	*Melaleuca ericifolia* (coast paperbark) swamp forest	Yes
SAC	*Acacia longifolia* (coast wattle) coastal scrub	
SSC	Coastal scrub	
SLW	*Leptospermum* (teatree) scrub	
GHC	Coastal grass and herbfield	
OTHER NATURAL ENVIRONMENTS		
ORO	Lichen lithosere (rocks)	
OSM	Sand, mud (beaches)	
NON-NATIVE VEGETATION		
FUR	Urban areas (parkland)	

Eucalyptus globulus **(Tasmanian blue gum) dry forest & woodland (DGL)**

This threatened community dominates the vegetated section of the main Reserve from the Gulch around to the Blow Hole as well as between the ends of Sinclair and Gordon Streets. Other smaller patches occur near the end of Fraser Street, at the eastern side of Waubs Beach and along one of the easements at the end of Harveys Farm Road.

The Gulch to the Blow Hole section is dominated by tall blue gums with an often dense understorey tree layer of oyster bay pine and black sheoak and occasional silver banksia. Common shrubs include coast beardheath, coast wattle, white kunzea, tree broomheath and white correa. The ground layer includes sagg, sedges, lilies, grasses, herbs and creepers.

Between Sinclair and Gordon Streets the blue gums are often stunted through wind pruning but they are taller adjacent to more sheltered sites. Understorey trees are generally absent although shrubs such as white kunzea and coast wattle are common.

Eucalyptus ovata **(black gum) forest & woodland (DOV)**

This is another threatened community. It occurs along two of the Harveys Farm Road easements.

Under the canopy of black gums the often dense understorey consists of trees and tall shrubs including drooping sheoak, black wattle, coast paperbark and white kunzea. Low shrubs, sagg and sedges are common in the lower layers.

Allocasuarina verticillata **(drooping sheoak) forest (NAV)**

Patches of this community occurs in the vicinity of Peggys Point and at the coastal end of one of the Harveys Farm Road easements.

Typically in this community drooping sheoak forms a dense canopy over a dense ground layer of leaf litter, which suppresses the growth of many plants. Within the Reserves the understorey varies considerably. Where the canopy and leaf litter is relatively dense there is a sparse ground layer of herbs, grasses, sedges and sagg. In areas with a more open canopy of drooping sheoak common understorey lifeforms also include shrubs and creepers.

***Melaleuca ericifolia* (coast paperbark) swamp forest (NME)**

This threatened community occurs in the Reserves as two relatively small patches, opposite the end of Lovett Street and near the Blow Hole, and as a larger patch at the coastal end of one of the Harveys Farm Road easements.

Typically this community forms dense stands of coast paperbark with few other species present. The Harveys Farm Road patch does support a few other species, including emergent black gums as well as shrubs, grasses, sagg and sedges around the perimeter.

The other two patches are becoming degraded through weed invasion. The Lovett Street patch has many dead and dying coast paperbarks.

***Acacia longifolia* (coast wattle) coastal scrub (SAC)**

Two patches of this community occur at Waubs Beach and in the vicinity of Redbill Beach.

Coast wattle is dominant but other shrubs present are white correa and coast beardheath. Other typically coastal species present includes creepers such as coastal saltbush and climbing lignum. Herbs, sedges, lilies and grasses include common buzzy, coast swordsedge, shortstem flaxlily, coast fescue and beach spinifex. The introduced marram grass is also common.

Coastal scrub (SSC)

This community is widespread throughout the Reserves.

In the Reserves the SSC community has a similar species composition to the SAC community. However, the SSC has greater species diversity and coast wattle is not as dominant. Other commonly occurring, or co-dominant, shrubs are white kunzea, coast beardheath and white correa. This community generally occurs on rocky substrates whereas SAC generally occurs on sand dunes.

***Leptospermum* (teatree) scrub (SLW)**

One small patch of this community occurs in a poorly drained area close to the edge of Tasman Highway, to the west of Jetty Road.

This patch is not typical of the TASVEG community description for SLW. Although two species of teatree, woolly and common teatree, are present, the patch is dominated by scrambling coralfern. Other emergent trees and shrubs include blue gum, blackwood and prickly moses.

Coastal grass and herbfield (GHC)

Two patches of this community occur at Redbill Beach, the largest of which covers much of the sand dunes behind the beach.

The native beach spinifex and the introduced marram grass are the dominant grasses. Occasional shrubs are coast wattle and coast beardheath. Herbs include both native and introduced species. Sagg, knobby cludsedge and bracken are also present.

Lichen lithosere (rocks) (ORO) and Sand, mud (beaches) (OSM)

The Reserves are largely bounded by a rocky foreshore but also include two sections of sandy beach, Redbill and Waubs Beaches. The rocks and beaches form the interface between the terrestrial and marine environments. Many obligate coastal or saltmarsh

plants thrive in these environments, notably in rock crevices. Whilst most are native species, some hardy introduced species, such as mirrorbush and gazania, also survive the harsh salt-spray zone conditions.

Urban areas (parkland) (FUR)

Whilst the characteristics of 'parkland' within the Reserves are diverse, there is no subdivision of this mapping unit in the TASVEG classification system. Hence all areas largely devoid of native vegetation have been mapped as FUR.

Within the Reserves FUR includes formal parks with picnic facilities, parking areas, road verges, the oval, the tennis court, the town hall and library, toilets and Council depot.

Other areas of FUR are those that are not maintained by Council and where, at some stage in the past, the native vegetation has been cleared adjacent to private property. Often these areas are infested with a wide array of weedy grasses and herbs as well as a number of significant weeds, some of which have obviously been deliberately planted.

2.2 Flora of Conservation Significance

A total of 169 vascular plant species were recorded during the survey including 1 threatened species and 73 introduced species. A full species list is given in Appendix 2.

The threatened species, downy zieria, is listed as 'rare' under the Tasmanian *Threatened Species Protection Act 1995* (TSPA). Further details are provided below.

Appendix 3A lists a total of 31 species of conservation significance previously recorded within the vicinity together with a description of their preferred habitat and an assessment of their likely occurrence within the Reserves.

In summary, apart from the one species recorded in the Reserves, all are considered as having only a low or very low potential to occur in the Reserves. Habitat in the Reserves is generally unsuitable or only marginal for these other 30 species.

Threatened flora recorded in the Reserves

Downy zieria (*Zieria littoralis*) (TSPA: Rare)

Downy zieria occurs on rocky coastal shores and near coastal areas. In Tasmanian it is confined to the central east coast and Bicheno is a stronghold for this species. It is an erect compact shrub with greyish-green foliage that is covered in short, velvety hairs. The small flowers are white or pink and flowering occurs in spring.

Its distribution in the Reserves is depicted in Figure 2. It is abundant along the interface of the vegetation and rocks. In total, over 350 plants were observed during the survey (Plates 1 and 2).

Plate 1: Downy zieria *Zieria littoralis* (whole plant).

Plate 2: Downy zieria *Zieria littoralis* (close up of leaves).

2.3 Fauna Habitat

The diverse nature of the vegetation across all the Reserves, together with the interface with the marine environment, equates to a diverse range of habitat opportunities for native fauna, most notably for terrestrial and coastal birds, as well as mammals, reptiles and a variety of invertebrates.

2.4 Fauna of Conservation Significance

Appendix 3B lists threatened fauna species that have been recorded within the vicinity of the Reserves or that are considered to have the potential to occur. A brief discussion is given to indicate the reasons why habitat is suitable or unsuitable.

In summary, habitat present in the Reserve does not provide core breeding habitat for any threatened fauna. However, foraging habitat is present in the Reserve, or in the immediate vicinity, for the white-bellied sea-eagle. This eagle is listed as 'vulnerable' under the TSPA. Further details are provided below.

Four other threatened fauna species that may potentially forage in the vicinity are the spotted-tailed quoll, wedge-tailed eagle, masked owl and swift parrot.

The Reserves also provides high quality habitat for other fauna species that, whilst not listed as threatened, are of high conservation significance. These are the little penguin and a number of shorebirds whose numbers are in decline. Further details are provided below.

White-bellied sea-eagle (*Haliaeetus leucogaster*) (TSPA: Vulnerable)

White-bellied sea-eagles nest and forage near the coast as well as near inland rivers and lakes. They generally nest within 5 km of open water and breed between August and January. Their nests are usually in large sheltered eucalypts, although they can be fairly tolerant of disturbance. They perch in a prominent place and glide down snatching fish, eels or birds from the surface of the water, or small vertebrates or carrion on land. Their home range may be up to 150 km.

Known nests in the vicinity are beyond the range of any disturbance from activities within the Reserves. However, the eagle is known to forage along the coast in the Bicheno area and, in fact, they were observed during the survey at Redbill Beach and the Gulch.

Some of the large blue gums in the Reserves may provide perching habitat for this species.

Little penguin (*Eudyptula minor*)

The life cycle of little penguins can vary according to food availability and other seasonal factors but they breed annually, producing one, or sometimes two, clutches of two eggs each year. Male penguins generally renovate burrows or dig new ones as early as May and up until August. Burrows are under vegetation or amongst rocks. Following mating eggs are laid as late as November. Egg incubation occurs within 33 to 37 days. The chicks remain in the nest for up to 8 weeks before going to sea. Once chick rearing is complete adults return to the sea to feed for 15 to 21 days before returning to land to moult. This takes up to 15 days and usually occurs between February and April. Young birds often return to their maternal colony to breed at about two years old[4].

Bicheno is renowned for its little penguin colony, which is a significant drawcard for tourists. However, penguins are vulnerable to predation by dogs and domestic or feral cats as well as habitat destruction and uncontrolled viewing. In Bicheno, with development close to the coast, there is a limited area for penguins to expand their nesting habitat, although they are known to nest under buildings.

Shore birds

Shorebirds of conservation significance that are known to utilise beaches in the Reserves as foraging habitat include:

- **Hooded plover (*Thinornis rubricollis*)**
- **Pied oystercatcher (*Haematopus longirostris*)**
- **Red-capped plover (*Charadrius ruficapillus*)**

These birds breed in scrapes in the sand or in seaweed above the high water mark. Their numbers around Tasmanian has declined over recent years mainly due to increased beach use by people. Activities which threatened their breeding success include trampling by people, predation of eggs, chicks and adults by dogs and feral cats, invasive weeds, removal of seaweed and other beach debris and ingestion or entanglement in litter, especially fishing line.

2.5 Significant Trees

In addition to the many trees within the native vegetation communities there are a number of large mature Tasmanian blue gums (*Eucalyptus globulus*) trees within areas mapped as 'FUR – parkland'. The location of these is depicted in Figure 2.

Apart for the aesthetic, visual and cultural value of these trees, they provide valuable foraging and nesting habitat for a range of native birds. They are particularly important as foraging habitat for the swift parrot and potential perching habitat for the white-bellied sea-eagle (see section 2.4 above).

2.6 Weeds

Introduced species recorded during the survey numbered 73. This is over forty percent of all species recorded.

Eight of these are 'declared weeds' under the Tasmanian *Weed Management Act 1999*, six of which are also Weeds of National Significance. Another 40 species are considered to be significant environmental weeds. All of these species are listed in Tables 2A and 2B, a photograph of each is provided in Appendices 5A and 5B, and their distribution is depicted in Figures 3, 4 and 5.

[4] Marker & Wind 2008

Table 2A indicates that the most widespread declared weeds are blackberry, African boxthorn, gorse and boneseed. Table 2B indicates that by far the most widespread environmental weed is mirrorbush. Other weeds that are relatively widespread are sweet pittosporum, trailing daisy, cape ivy, purple groundsel and blue butterflybush.

It should be noted that the number of observations provided in Tables 2A and 2B are intended to give a general indication of relative abundance and does not always reflect actual abundance. There is likely to be more than 311 mirrorbush plants but it would have been impractical to map each one.

Table 2A. Declared weeds* recorded in the Reserves.

* 'Declared weeds' under the *Weed Management Act 1999*. ** WONS = Weed of National Significance. *** Observations = the number of general locations across the Reserve where it was observed.

Common name	*Scientific name*	WONS**	Observations***
african boxthorn	*Lycium ferocissimum*	WONS	51
blackberry	*Rubus fruticosus* aggregate	WONS	83
boneseed	*Chrysanthemoides monilifera* subsp. *monilifera*	WONS	17
fennel	*Foeniculum vulgare*		6
gorse	*Ulex europaeus*	WONS	22
montpellier broom	*Genista monspessulana*	WONS	6
spanish heath	*Erica lusitanica*		2
willow	*Salix* sp.	WONS	1

Table 2B. Other environmental weeds recorded in the Reserve.

* Observations = the number of general locations across the Reserve where it was observed.

Common name	*Scientific name*	Observations*
african daisy	*Arctotis stoechadifolia* (pale yellow)	1
agapanthus	*Agapanthus praecox*	16
arum lily	*Zantedeschia aethiopica*	3
banana passion fruit	*Passiflora tarminiana*	3
bears breeches	*Acanthus mollis*	2
bell tree dahlia	*Dahlia imperialis*	1
blue butterflybush	*Psoralea pinnata*	23
blue periwinkle	*Vinca major*	6
blue periwinkle (variegated form)	*Vinca major*	1
bluebell creeper	*Billardiera heterophylla*	15
bottlebrush	*Melaleuca* sp.	1
butterfly bush	*Buddleja davidii*	1
cape honeysuckle	*Tecoma capensis*	2
cape ivy	*Delairea odorata*	32
cape wattle	*Paraserianthes lophantha* subsp. *lophantha*	8
cotoneaster	*Cotoneaster* sp.	15
dolichos pea	*Dipogon lignosus*	13
fig	*Ficus carica*	1
gazania	*Gazania* sp.	10

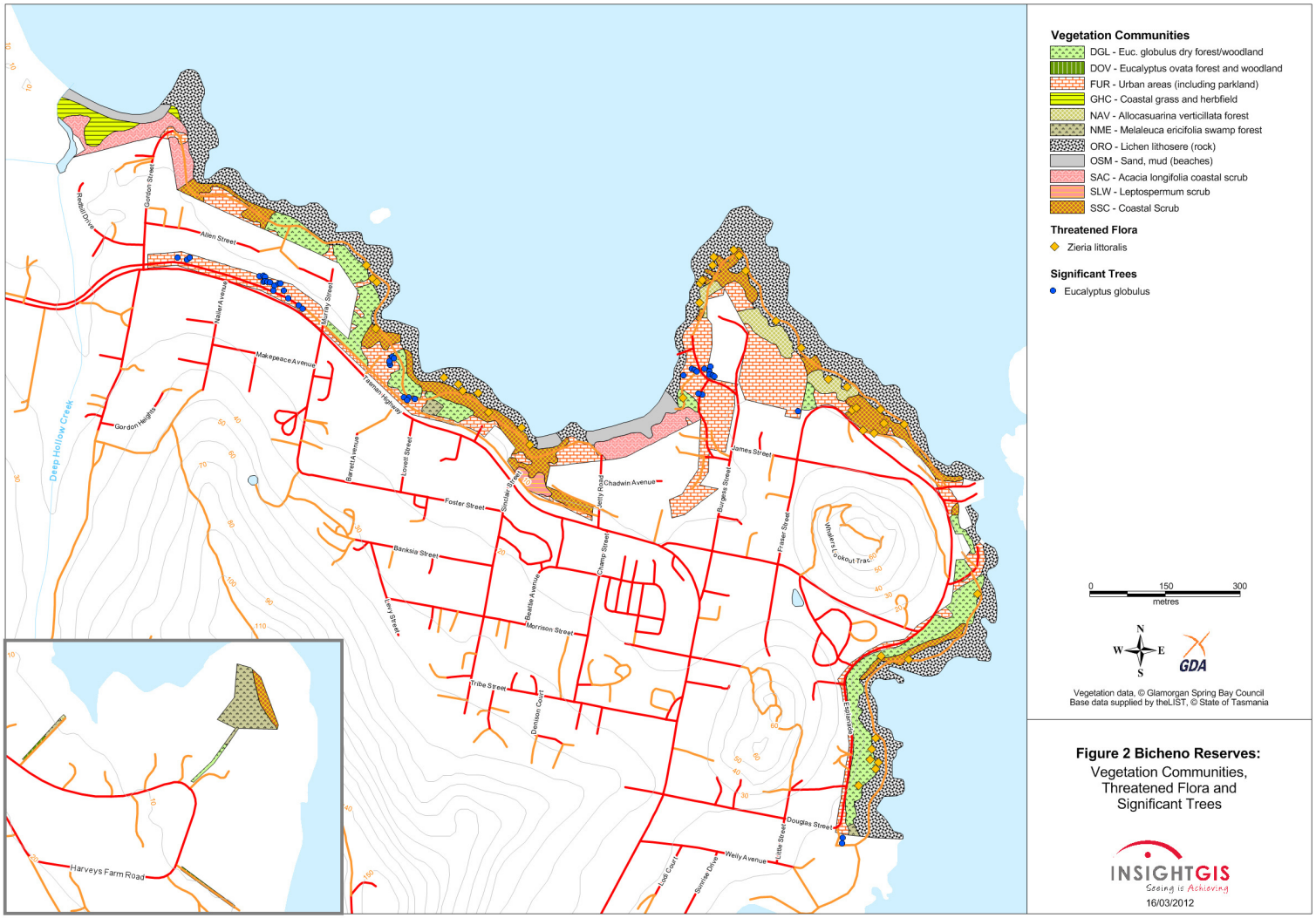
Common name	*Scientific name*	Observations*
geranium	*Pelargonium* sp.	6
giant honeymyrtle	*Melaleuca armillaris* subsp. *armillaris*	2
ivy	*Hedera helix*	1
japanese honeysuckle	*Lonicera japonica*	11
marguerite	*Argyranthemum frutescens*	10
milkwort	*Polygala myrtifolia*	16
miniature pine tree	*Crassula tetragona*	1
mirrorbush	*Coprosma repens*	311
monterey cypress	*Cupressus macrocarpa*	1
nasturtium	*Tropaeolum majus*	16
pride-of-madeira	*Echium candicans*	1
purple groundsel	*Senecio elegans*	28
radiata pine	*Pinus radiate*	4
radiata pine (juvenile/seedlings)	*Pinus radiate*	2
rubus	*Rubus* sp.	2
shade crassula	*Crassula multicava*	3
soap aloe	*Aloe maculate*	1
sweet pittosporum	*Pittosporum undulatum*	43
trailing daisy	*Osteospermum fruticosum*	40
tree lucerne	*Chamaecytisus palmensis*	6
tree mallow	*Malva dendromorpha*	7
wandering creeper	*Tradescantia fluminensis*	1
yellow pigface	*Carpobrotus edulis*	2

2.7 *PHYTOPHTHORA CINNAMOMI*

Commonly known as dieback or root rot fungus, *P. cinnamomi* is a soil borne fungal pathogen that invades the roots of plants and starves them of nutrients and water. Heath communities are the most susceptible to infection with a consequent serious loss of species diversity. It is generally spread by the transportation of soil on vehicles, construction machinery and walking boots. The establishment and spread of *P. cinnamomi* is favoured in areas that receive above 600 mm of rainfall per annum, are below 800 m altitude and have a predominantly heathy shrub layer[5].

Bicheno is situated close to the known distribution of *P. cinnamomi* and on the limit of its favoured climatic zone. However, no vegetation communities that are highly susceptible to the fungus are present in the Reserve and no obvious evidence of its presence was observed.

[5] Rudman 2005


Vegetation Communities
DGL - Euc. globulus dry forest/woodland
DOV - Eucalyptus ovata forest and woodland
FUR - Urban areas (including parkland)
GHC - Coastal grass and herbfield
NAV - Allocasuarina verticillata forest
NME - Melaleuca ericifolia swamp forest
ORO - Lichen lithosere (rock)
OSM - Sand, mud (beaches)
SAC - Acacia longifolia coastal scrub
SLW - Leptospermum scrub
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Threatened Flora
Zieria littoralis
Significant Trees
Eucalyptus globulus
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metres
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GDA
Vegetation data, © Glamorgan Spring Bay Council
Base data supplied by theLIST, © State of Tasmania
Figure 2 Bicheno Reserves:
Vegetation Communities,
Threatened Flora and
Significant Trees
INSIGHTGIS
Seeing is Achieving
16/03/2012
Deep Hollow Creek
Gordon Street
Allen Street
Makepeace Avenue
Gordon Heights
Tasman Highway
Foster Street
Banksia Street
Morrison Street
Tribe Street
Chadwin Avenue
James Street
Douglas Street
Harveys Farm Road

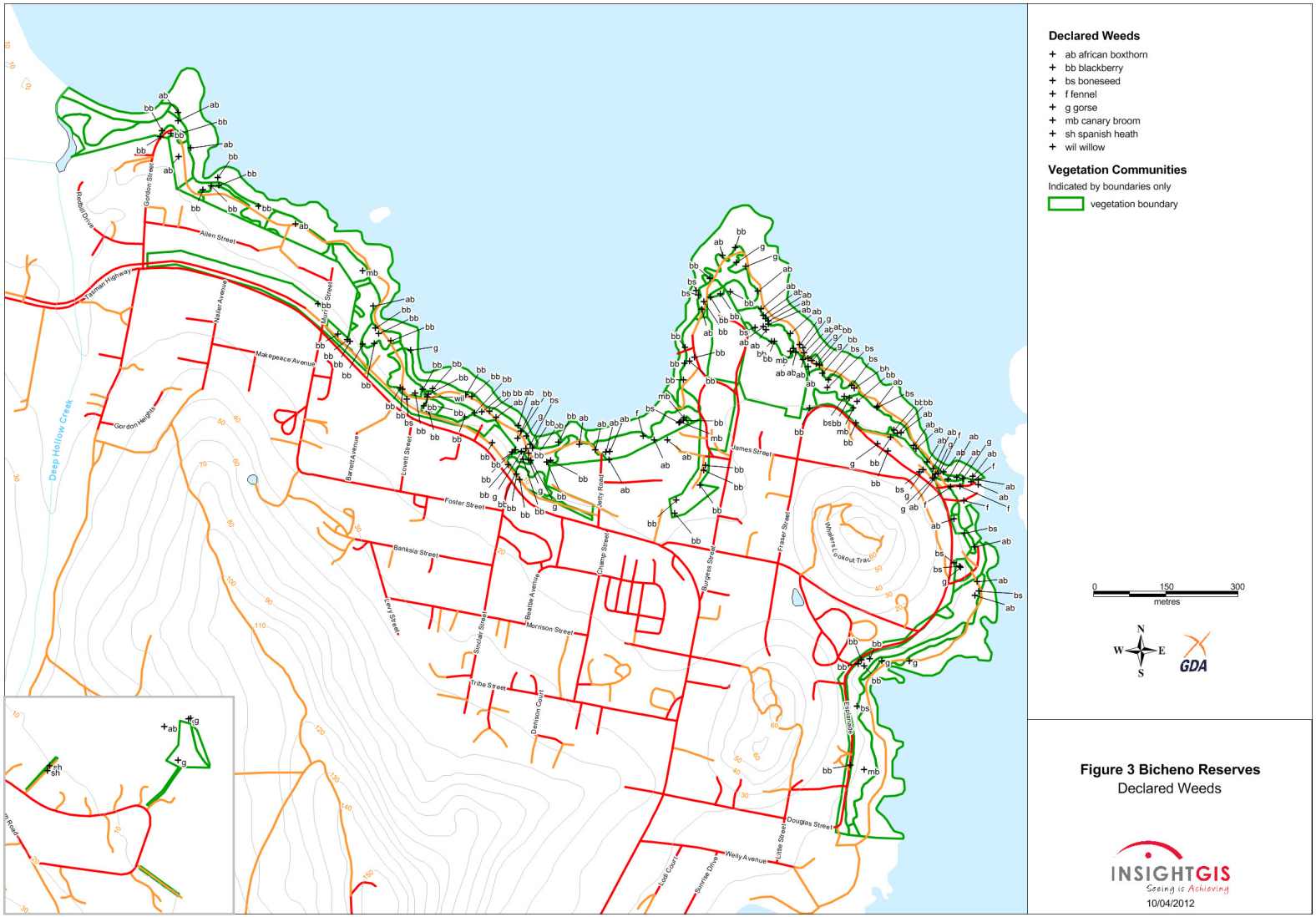
Declared Weeds
ab african boxthorn
bb blackberry
bs boneseed
f fennel
g gorse
mb canary broom
sh spanish heath
wil willow
Vegetation Communities
Indicated by boundaries only
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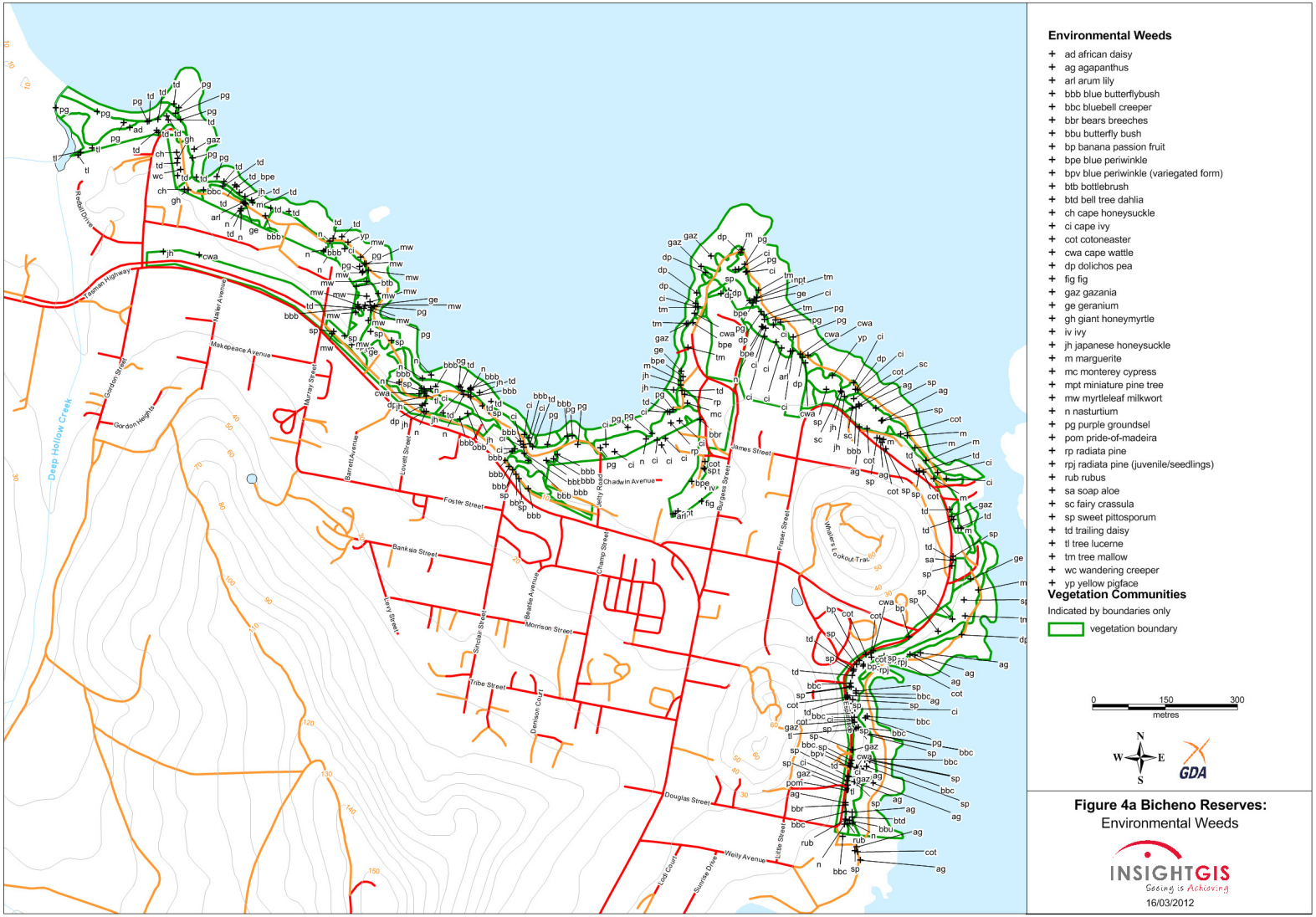
Figure 3 Bicheno Reserves
Declared Weeds
INSIGHTGIS
Seeing is Achieving
10/04/2012
Deep Hollow Creek
Tasman Highway
Allen Street
Makepeace Avenue
Gordon Heights
Foster Street
Banksia Street
Morrison Street
Tribe Street
James Street
Douglas Street
Welly Avenue


Environmental Weeds
+ ad african daisy
+ ag agapanthus
+ arl arum lily
+ bbb blue butterflybush
+ bbc bluebell creeper
+ bbr bears breeches
+ bbu butterfly bush
+ bp banana passion fruit
+ bpe blue periwinkle
+ bpv blue periwinkle (variegated form)
+ btb bottlebrush
+ btd bell tree dahlia
+ ch cape honeysuckle
+ ci cape ivy
+ cot cotoneaster
+ cwa cape wattle
+ dp dolichos pea
+ fig fig
+ gaz gazania
+ ge geranium
+ gh giant honeymyrtle
+ iv ivy
+ jh japanese honeysuckle
+ m marguerite
+ mc monterey cypress
+ mpt miniature pine tree
+ mw myrtleleaf milkwort
+ n nasturtium
+ pg purple groundsel
+ pom pride-of-madeira
+ rp radiata pine
+ rpj radiata pine (juvenile/seedlings)
+ rub rubus
+ sa soap aloe
+ sc fairy crassula
+ sp sweet pittosporum
+ td trailing daisy
+ tl tree lucerne
+ tm tree mallow
+ wc wandering creeper
+ yp yellow pigface
Vegetation Communities
Indicated by boundaries only
vegetation boundary
0 150 300
metres
N W E S
GDA
Figure 4a Bicheno Reserves:
Environmental Weeds
INSIGHTGIS
Seeing is Achieving
16/03/2012
Deep Hollow Creek
Tasman Highway
Redan Drive
Gordons Hill
Gordon Heights
Walker Avenue
Makepeace Avenue
Murray Street
Barnett Avenue
Loyett Street
Foster Street
Banksia Street
Kate Street
Sinclair Street
Beatrix Avenue
Morrison Street
Champ Street
Tribe Street
Denison Court
Jetty Road
Chadwin Avenue
Burgess Street
James Street
Fraser Street
Douglas Street
Welly Avenue
Little Street
Lodi Court
Sunrise Drive

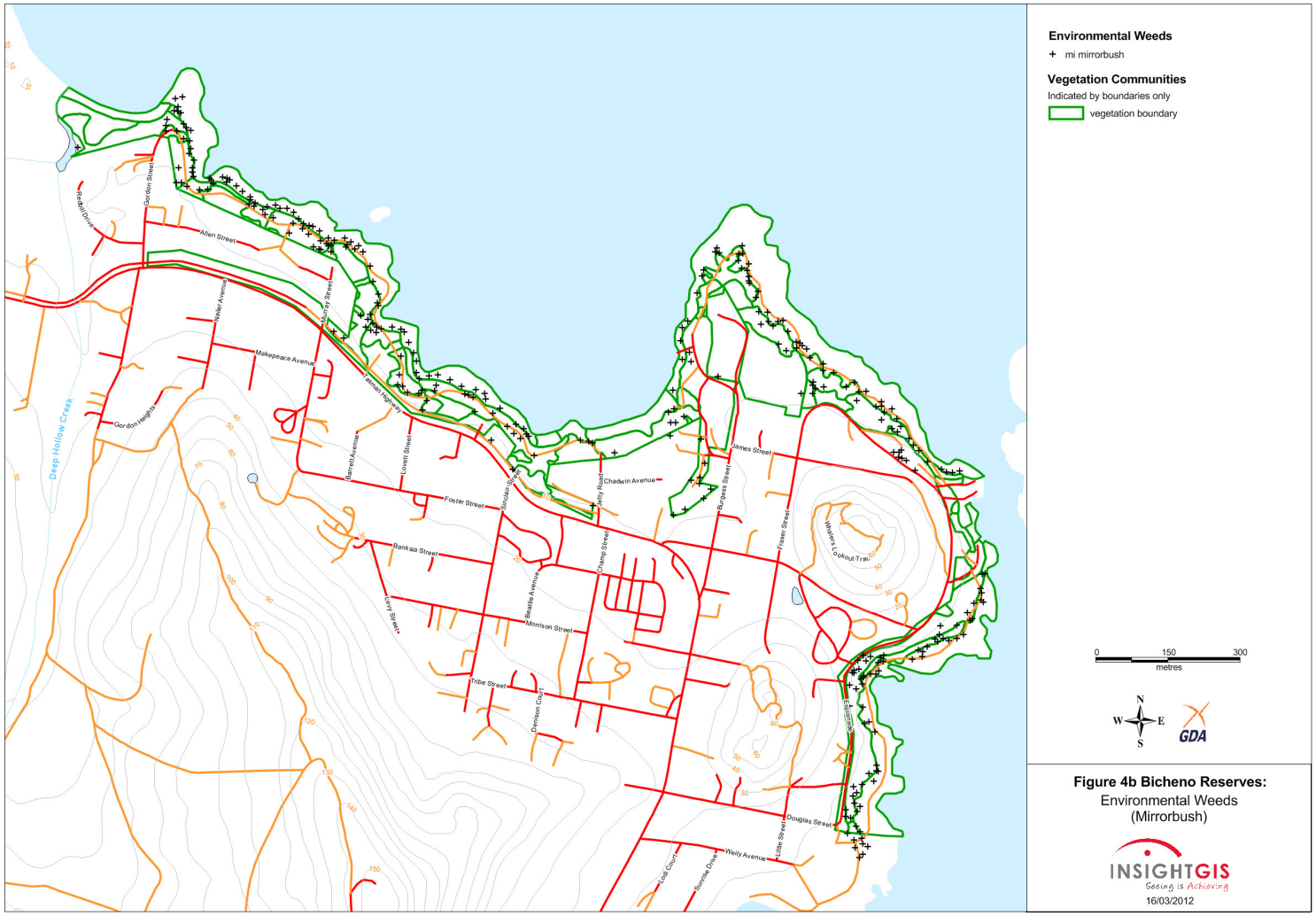


Figure 4b Bicheno Reserves:
Environmental Weeds
(Mirrorbush)

INSIGHTGIS
Seeing is Achieving
16/03/2012

3. OTHER RESERVE VALUES

3.1 CULTURAL HERITAGE

- **Aboriginal heritage**

The Reserves hold cultural significance for the contemporary Aboriginal community. Cultural heritage values connect contemporary Aboriginal Tasmania with the people and events of the past. The Leetermairremener band from the Oyster Bay nation occupied the area at the time of European arrival.

- **Post European settlement heritage**

The Post European settlement heritage values of the Reserves are closely linked with the histories of the town and the municipality. These have been documented in various publications, including Davenport & Amos (1988) and Guiler (1998).

Many other publications and historical documents and photographs on both Aboriginal and Post European Settlement heritage are housed at the Glamorgan Spring Bay Historical Society Inc, which is located at 22 Franklin Street, Swansea.

3.2 RECREATIONAL VALUES

Both residents and visitors use the Reserves for a wide range of passive and active recreational activities. These include beach use and surfing, walking, jogging, dog exercise, wildlife viewing and fishing. The popular coastal walking track facilitates many of these activities. Other facilities also provide additional recreational opportunities. These include the tennis court, oval, barbeque and picnic areas, childrens' playground and access to the breakwater and boat ramp.

3.3 EDUCATIONAL VALUES

All the reserves in the Glamorgan Spring Bay area have educational value, whether it be as an outdoor classroom for our local schoolchildren or for visitors to the area interested in our natural and cultural history. There are many opportunities to communicate the many values of our reserves to the locals and visitors alike, whether that be through interpretation signage, walk and talks over the summer months or information brochures and articles in the local newsletters. In the future other technology could be utilised such as smart phones to provide interaction educational experiences.

3.4 SUMMARY OF OTHER VALUES

Although there are many other values in our reserves this plan focuses on the management of the native vegetation and associated biodiversity values. Other values particularly recreational values are addressed through other processes and resourcing avenues such as Council's capital works and renewal programs for walking tracks, recreational facilities, parks and gardens.

4. MANAGEMENT ISSUES

4.1 NATIVE VEGETATION, FLORA, FAUNA AND SIGNIFICANT TREES

Maintaining the natural values of the Reserves is a primary objective of management. Protecting native vegetation communities is the most effective way of conserving flora and fauna values. A high priority should be given to managing threatening processes or activities that are likely to have an impact on species and communities of high conservation significance.

Within the Reserves these include one species of threatened flora and foraging habitat for at least one species of threatened fauna, which are variously listed under the TSPA and/or EPBCA. Three vegetation communities listed as threatened under the NCA are also present in the Reserve. Legislative obligations in relation to threatened species and communities are provided in Appendix 4.

With regard to the little penguin colony, there is little quantitative information available, such as the size of the population and whether this is changing over time. There is some anecdotal evidence that numbers are in decline in some parts of Bicheno but more research is required to determine the status of the colony as a whole and to identify specific threats to the colony's persistence.

With regard to shorebirds, Redbill Beach in particular is important foraging habitat for the hooded plover, pied oystercatcher and red-capped plover. There are information signs at several beaches in the area requesting beach users to remain below the high water mark during the breeding season and keeping dogs and cats under control. This issue has gained prominence with the recent GSBC/NRM South Shorebird Project, the GSBC Dog Management Policy and the introduction of the Cat Management Act.

In addition to the many trees within the native vegetation communities there are several large mature blue gums present within areas mapped as 'FUR – parkland'. As these trees senesce they often form tree hollows which are important nesting habitat for many native birds and small mammals. Some scattered regeneration of these trees is occurring in the DGL community and protection of this regeneration is vital to ensure this community's persistence.

All of these blue gums are significant from a conservation perspective, particularly for the swift parrot, as well as from an aesthetic and visual perspective. Management should aim to retain as many trees as possible, and not only blue gums. Whilst some trees may be perceived as 'dangerous', it does not necessarily follow that they should be felled. Removing potentially dangerous limbs may be all that is required.

<u>Recommendation 1</u> – Train Council staff who are involved with day-to-day management of the Reserves to recognise the natural values present and provide them with strategies to protect these values during management activities.

<u>Recommendation 2</u> – Develop a Little Penguin Habitat Protection project in partnership with the local community environmental action group, the Earth & Ocean Network (EON). This would require some funding from outside sources.

The project could include:

- **detailed mapping of penguin burrows,**
- **undertaking a population count and regular monitoring,**
- **establish the main threats to the population, and**
- **identify management actions required to ameliorate any such threats.**

The project should involve the community such as through:

- **utilisation of community knowledge and past activities, and**
- **awareness raising, such as through an arts/wildlife project involving the school.**

Such a project would also provide valuable information to guide weed control activities (see section 4.2 below).

<u>Recommendation 3</u> – Maintain community awareness of the penguin and shorebird habitat values present in coastal areas. This can be achieved through regular:

- **articles in local newsletters, and**
- **distribution of information brochures.**

4.2 WEEDS

The Glamorgan Spring Bay Weed Management Plan (GSBWMP)[6] recognise that weeds are one of the most serious threats to the natural environment. Any plant growing outside its natural range is a potential weed that may have a detrimental effect on the natural values of reserves. Management objectives include eradicating weeds or preventing or minimising their spread to native vegetation communities.

It is recognised that weed control in the Reserves is currently an ongoing day-to-day management activity. However, both declared and other environmental weeds are still widespread across the Reserve. The survey conducted for this Plan provides a detailed inventory of weeds and the basis for a more strategic approach to their management.

At Bicheno weed control poses a particular challenge due of the presence of little penguins, whose burrows appear to be widely distributed throughout the main Reserve. A major risk is disturbing or destroying penguin habitat or disrupting their breeding cycle during weed control activities. Penguins do not discriminate between native and introduced plants when constructing their burrows. However, guidelines have been developed for working in penguin habitat[7] and these should be used when planning weed control activities.

Another major challenge at Bicheno is mirrorbush. Due to its widespread distribution and abundance, as well as the fact that little penguins often nest under mirrorbush, containment of this aggressive weed may be the only option in the short to medium term.

[6] Glamorgan Spring Bay Natural Resource Management Committee 2008

[7] Marker & Wind 2008

Its distribution is also more extensive than indicated on Figure 5. It occurs to the north and south of the main Reserve on sections of the foreshore that are under the management of the Parks & Wildlife Service (PWS). Therefore a strategic plan to manage this weed should be formulated in conjunction with PWS.

Furthermore, it is also important in weed management planning in an urban context to recognise the futility of eliminating all non-native species. Hence, in areas of parkland with a ground cover of introduced grasses and herbs the focus of weed management should also be on containment.

Priorities for weed control should focus on declared and other environmental weeds that are having, or have the potential to have, a negative impact upon the native flora and which are also manageable. Therefore a hierarchy of priorities has been developed for weeds in the Reserve, which are applied to each species in Tables 3A and 3B. The priority system is as follows, where 1 is the highest priority and 3 is the lowest:

Priority	Reasons for priority rating
1	Declared weeds, and/or
	Easily controlled or eradicated, and/or
	Only small infestations or small numbers of infestations are present, and/or
	Likely to spread quickly.
2	Requires a substantial time allocation due to the size of infestations, and/or
	Creepers that require all plant parts to be remove, and/or
	Unlikely to spread quickly.
3	Plantings that require monitoring only to ensure that they do not spread.
	Large infestations that would require substantial investment in rehabilitation of the site. This mainly relates to mirrorbush.
NB:	**-Plants with more than one priority rating in Tables 3A & 3B indicate that infestations in different locations vary in size and/or manageability.** **-Most plants will require monitoring for re-emergence and follow-up control.**

Table 3A. Priorities for declared weeds in the Reserve.

* Observations = the number of general locations across the Reserve where it was observed.

common name	*Scientific name*	Observations*	Priority
blackberry	*Rubus fruticosus* aggregate	83	1
african boxthorn	*Lycium ferocissimum*	51	1
gorse	*Ulex europaeus*	22	1
boneseed	*Chrysanthemoides monilifera* subsp.	17	1
fennel	*Foeniculum vulgare*	6	1
montpellier broom	*Genista monspessulana*	6	1
spanish heath	*Erica lusitanica*	2	1
willow	*Salix* sp.	1	1

Table 3B. Priorities for other environmental weeds in the Reserve.

* Observations = the number of general locations across the Reserve where it was observed.

** mirrorbush: Priority 1 = outlying, small infestations, notably on the rocks in the salt-spray zone.

common name	*Scientific name*	Observations*	Priority
mirrorbush	*Coprosma repens*	311	1 & 3 **
sweet pittosporum	*Pittosporum undulatum*	43	1
trailing daisy	*Osteospermum fruticosum*	40	2
cape ivy	*Delairea odorata*	32	2
purple groundsel	*Senecio elegans*	28	3
blue butterflybush	*Psoralea pinnata*	23	2
agapanthus	*Agapanthus praecox*	16	1
milkwort	*Polygala myrtifolia*	16	2
nasturtium	*Tropaeolum majus*	16	1
bluebell creeper	*Billardiera heterophylla*	15	1
cotoneaster	*Cotoneaster* sp.	15	1
dolichos pea	*Dipogon lignosus*	13	2
japanese honeysuckle	*Lonicera japonica*	11	2
gazania	*Gazania* sp.	10	1
marguerite	*Argyranthemum frutescens*	10	1
cape wattle	*Paraserianthes lophantha* subsp. *lophantha*	8	1
tree mallow	*Malva dendromorpha*	7	1
blue periwinkle	*Vinca major*	6	2
geranium	*Pelargonium* sp.	6	1
tree lucerne	*Chamaecytisus palmensis*	6	1
arum lily	*Zantedeschia aethiopica*	3	1
banana passion fruit	*Passiflora tarminiana*	3	2
shade crassula	*Crassula multicava*	3	2
bears breeches	*Acanthus mollis*	2	1
cape honeysuckle	*Tecoma capensis*	2	3
giant honeymyrtle	*Melaleuca armillaris* subsp. *armillaris*	2	3
radiata pine	*Pinus radiata*	2	3
radiata pine (seedlings)	*Pinus radiata*	2	1
rubus	*Rubus* sp.	2	1
yellow pigface	*Carpobrotus edulis*	2	3
african daisy	*Arctotis stoechadifolia* (pale yellow)	1	3
bell tree dahlia	*Dahlia imperialis*	1	1
blue periwinkle	*Vinca major*	1	2
bottlebrush	*Melaleuca* sp.	1	1
butterfly bush	*Buddleja davidii*	1	1
fig	*Ficus carica*	1	1
ivy	*Hedera helix*	1	1
miniature pine tree	*Crassula tetragona*	1	3
monterey cypress	*Cupressus macrocarpa*	1	3
pride-of-madeira	*Echium candicans*	1	1
soap aloe	*Aloe maculata*	1	1
wandering creeper	*Tradescantia fluminensis*	1	2

<u>Recommendation 4</u> – Control Priority 1 weeds (see Tables 3A and 3B) in accordance with the guidelines for working in little penguin habitat.

<u>Recommendation 5</u> – Control Priority 2 weeds (see Tables 3A and 3B) in accordance with the guidelines for working in little penguin habitat.

<u>Recommendation 6</u> – Regularly monitor for re-growth of Priority 1 and 2 weeds, as well as the spread of Priority 3 weeds, and take follow-up control action as necessary (in accordance with the guidelines for working in little penguin habitat).

<u>Recommendation 7</u> – Undertake a further survey to establish the extent of mirrorbush along the foreshore adjacent to the Reserve, and formulate a strategic plan to manage this infestation in conjunction with PWS.

It is also important to acknowledge that the presence of most weeds recorded is probably a consequence of the proximity of the reserves to urban areas and associated gardens, which provide a source of ongoing infestation. Therefore, in conjunction with direct on-ground weed control actions, a campaign to educate residents about the consequences associated with garden escapes and garden waste dumping on the Reserve should be ongoing.

<u>Recommendation 8</u> – In conjunction with Recommendation 3, continue to raise community awareness of the values present in their local environment focusing on the threats posed to these values most notably by garden escape plants and dumping of garden cuttings. Such a campaign could include:

- **making this Plan publicly available through the GSBC website,**
- **a public presentation/workshop,**
- **brochures/posters/articles in local news letter, and**
- **field days and working bees.**

4.3 Illegal Clearing of Vegetation

As noted in section 2.1 (at the end of the 'Urban areas' section), there are areas of the Reserve where, at some stage in the past, the native vegetation has been cleared adjacent to private property. Often these areas are infested with a wide array of weedy grasses and herbs as well as a number of significant weeds, some of which have obviously been deliberately planted.

Intermittently Council receives reports of illegal clearing of trees and other foreshore vegetation. Usually it is difficult for Council to apprehend or prosecute offenders. Therefore, alternative strategies are required to deal with this issue. This could include the erection of Bush Watch signs. Bush Watch is a Tasmania Police initiative that encourages the public to report unusual, suspicious or criminal activity and vandalism to the Police. The signs provide a phone number (131 444), which is a direct link to the police. The GSBC Natural Resource Management (NRM) Committee is a member of Bush Watch.

<u>Recommendation 9</u> – Raise community awareness of the problem illegal clearing, outlining the legislative implications and encouraging people to report offender to the police. This should be in conjunction with Recommendations 3 and 8, but also may involve the erection of signage, such as 'Bushwatch' signs. Investigate the development of a 'by-law' that addresses the illegal clearing of vegetation on Council managed public land.

4.4 Reserve Boundaries

In managing any reserve it is obviously important that reserve boundaries are known to both reserve managers and adjacent landowners. There are issues of undefined boundaries in some sections of the Reserve. Perhaps as a consequence, some gardens have encroached onto the reserves to varying degrees. This issue is linked to some extent with the issue of illegal clearing.

On-ground marking of undefined boundaries may be necessary in some instances in order to clarify the council's authority in implementing some of the actions required to protect the reserve values. Such on-ground markers could include fencing or a row of large boulders. Alternatively it may merely require a verbal recognition by other land owners.

<u>Recommendation 10</u> - Clarify Reserve boundaries. Liaise with landowners regarding the most appropriate way to more clearly define these boundaries and, where deemed necessary, install on-ground boundary markers.

4.5 Walking Tracks

An existing walking track traverses the entire length of the main Reserve. It largely passes through the foreshore vegetation but substantial sections follow the rocky foreshore and beaches. The track is greatly utilised by both local residents and visitors.

Council staff regularly trims the vegetation adjacent to the track.

<u>Recommendation 11</u> – Ensure Council staff conduct vegetation trimming outside of the little penguin breeding season. This should be incorporated into Recommendation 1.

4.6 Coastal Erosion and Beach Access Tracks

Coastal erosion is often a natural process. For example, long shore drift results in the alternating process of seasonal erosion and accretion of sandy beaches. In the longer term coastal erosion is likely to be exacerbated by climate change and associated rises in sea level and increases in the size of storm surge.

In the Reserve the beaches are the most susceptible to coastal erosion. At Redbill Beach, following winter storms, erosion creates a very steep sided and tall foredune although accretion during the calmer months deposits some sand to 're-shape' the dune. However, without long-term monitoring it is unclear whether erosion is greater than accretion.

Erosion can also be exacerbated by uncontrolled beach access through the dunes, which may be occurring at Waubs Beach. A 2009 survey and report on erosion at Waubs Beach[8] partly attributed erosion to informal beach access tracks.

<u>Recommendation 12</u> – At Waubs Beach, implement measure to rehabilitate the dunes. These include recommendations as outlined in the 2009 report by Sally Johns under the headings 'Access Management' and 'Dune Rehabilitation and Revegetation'.

<u>Recommendation 13</u> – Establish photo-point monitoring sites:

- **At Redbill and Waubs Beaches to determine if erosion is exceeding accretion over the long-term, and**
- **At Waubs Beach to assess the success of Recommendation 12, and re-assess rehabilitation measures as necessary.**

4.7 Plantings and Revegetation

Plantings of introduced or non-local native species within the Reserves are limited to a few along road verges. Whilst these may be appropriate in parkland that is regularly maintained, the use of introduced or non-local native species should be considered carefully. Many have the potential to 'escape' into native vegetation and exacerbate the problem of environment weeds, which in turn leads to the degradation of Reserves' natural values.

In consultation with the local community, any future plantings should preferably use local native species, which have a number of benefits. They are adapted to the local climate and soil and consequently require less maintenance, including watering, and the risk of escape resulting in degradation of the natural values is nullified. Furthermore, local native plants also attract and provide habitat for native birds, which in turn are natural pest control agents as well as providing pleasure to a great number of people.

Following weed control, it is preferable to allow areas to naturally regenerate with native species. However, if there is little or no nearby source of native species seed or other regenerative parts then weed invasion may be ongoing. In such cases revegetation is likely to be required. Any of the native species listed in Appendix 2 are appropriate for revegetation work, as well as other plantings, in the Reserve.

<u>Recommendation 14</u> – In consultation with the local community, any plantings and revegetation work should preferably use local native species.

[8] Johns 2009

4.8 Fire

The primary objective of fire management in reserves is to protect human life and property from fire. Other objectives include the maintenance of biodiversity through appropriate fire regimes and the of protection conservation values from the adverse impacts of fire in so far as these are consistent with the primary objective.

Developing a fire management plan is complex. Many native vegetation communities and plant species require fire to trigger regeneration. Conversely, some communities and species are killed by fire depending on factors such as their growth stage, fire frequency and fire intensity. Therefore the maintenance of a mosaic of fire age classes is preferable. Total exclusion of fire may result in periodic and devastating hot summer wildfires. Conversely, over frequent and comprehensive fuel reduction burning will also modify the structure and composition of vegetation.

However, in a coastal setting it is generally recommended to exclude fire as fire can lead to the destabilisation of coastal landforms and soil. The use of fire as a tool to reduce fuel loads in urban reserves can also be controversial as well as hazardous to people and property. Furthermore, maintaining biodiversity values whilst minimising wildfire hazard may not always necessarily require the use of fire. Therefore alternative approaches, such as raking litter and removing dead wood by hand is preferable[9].

Recommendation 15 – Conduct regular assessments of fuel loads and remove litter and dead wood as necessary but retain at least some large habitat logs if they are present.

Notwithstanding the above, small patch burns may be periodically necessary if, for example, localised fuel loads become unmanageable by other removal methods, or, as a management tool for particular weed infestations. In such cases a fire management plan should be developed with the advice of the Tasmania Fire Service.

Recommendation 16 – Patch burn as the need arises in accordance with a fire management plan developed in consultation with the Tasmania Fire Service.

4.9 Plan Review

This Native Flora and Fauna Management Plan covers the 5 year period from 2014 to 2019. A review of the Plan, including the success in achieving its objectives, is due to be conducted in 2019 and an updated Plan will be developed. This process will be ongoing for each consecutive 5 year period.

Recommendation 17 – Review the current Native Flora and Fauna Management Plan near the end of the current 5 year period, including the success in achieving its objectives, and develop a Plan for the period 2020 to 2024.

[9] Wood & Knee 1999

5. ACTION PLANS

The following tables provide action plans that are based on the above recommendations. Table 5.1 is a weed management action plan and Table 5.2 includes all other actions. Each action has been assigned a time frame and a performance measure.

With regard to weeds, the distribution of the declared and other environmental weeds recorded during the survey is provided in Figures 3, 4 and 5 and a photo of each weed is provided in Appendices 5A and 5B. The maps and photos should be used as a resource to guide and direct weed control actions. However, the maps should be used with caution as the point locations of weeds were recorded with a hand-held gps with a potential error of several metres. Furthermore, the maps should not be considered as a comprehensive guide as some weeds may have emerged since surveys were undertaken and others may have been missed. Additionally, as weed control is an ongoing task performed by Council Officers and the local community group, Earth and Ocean Network, some weed may have already been treated.

5.1 Weed Action Plan

Recommendation No.	Recommendation / Specific Action	Timing	Performance Measure
4	Control Priority 1 weeds (see Tables 3A & 3B) in accordance with the guidelines for working in little penguin habitat.	Ongoing	Eradication of weeds, or at least, a reduction in weed abundance each year.
5	Control Priority 2 weeds (see Tables 3A & 3B) in accordance with the guidelines for working in little penguin habitat.	Ongoing following initial control of Priority 1 weeds	Eradication of weeds, or at least, a reduction in weed abundance each year.
6	Monitor for re-growth of Priority 1 and 2 weeds, Monitor for the spread of Priority 3 weeds, and Take follow-up control action as necessary in accordance with the guidelines for working in little penguin habitat.	At least once a year in Spring and opportunistically	Minimise new weed infestations.
7	Undertake a further survey to establish the extent of mirrorbush along the foreshore adjacent to the Reserve, and Formulate a strategic plan to manage this infestation in conjunction with PWS.	2015	Map of extent of mirrorbush outside the Reserves Strategic plan in place.
17	Review the success of weed control actions through further weed mapping and develop a new weed action plan.	July-December 2019	New weed action plan in place for 2020-2024.

5.2 General Action Plan

Recommendation No.	Recommendation / Action	Timing	Performance Measure
1 & 11	Train Council staff who are involved with day-to-day management of the Reserve to recognise the natural values present and provide them with strategies to protect these values during management activities. Notably this should including ensuring that they are aware of the guidelines for working in little penguin habitat.	2015	Education of Council staff and added protection of Reserve natural values.
2	Develop a Little Penguin Habitat Protection project in partnership with the local community environmental action group, the Earth & Ocean Network (EON). This would require some funding from outside sources. The project could include: • detailed mapping of penguin burrows, • undertaking a population count and regular monitoring, • establish the main threats to the population, and • identify management actions required to ameliorate any such threats. The project should involve the community such as through: • utilisation of community knowledge and past activities, and • awareness raising, such as through an arts/wildlife project involving the school.		
	Develop project proposal	2014	Proposal developed
	Apply for funding	As opportunities arise	Funding received
	Implement project	2014 - 2019	Increased knowledge of the little penguin colony Reduction in risk of impacting their habitat through weed control activities Improved community awareness

Recommendation No.	Recommendation / Action	Timing	Performance Measure
3, 8 & 9	Continue to raise community awareness of: • Penguin & shorebird habitat and other natural values in the Reserves, • Threats to these values, such as garden escapes & dumping of garden waste, • The problem of illegal clearing and legislative implications. Such a campaign could include: • making this Plan publicly available through the GSBC website, • a public presentation/workshop, • brochures/poster/articles in local news letter, • field days & working bees, and erection of 'Bushwatch' signs.	Ongoing	Education of community, and reduction of risk of habitat degradation and loss of Reserve values.
9	Investigate the development of a 'by-law' that addresses the illegal clearing of vegetation on Council managed public land.	2015	Investigation complete.
10	Clarify Reserve boundaries. Liaise with landowners regarding the most appropriate way to more clearly define these boundaries and, where deemed necessary, install on-ground boundary markers. Survey boundary line and liaise with landowners Install boundary markers as necessary	 2015 2016	Clarification of reserve boundary locations.
12	At Waubs Beach, implement measure to rehabilitate the dunes. These include recommendations as outlined in the 2009 report by Sally Johns under the headings 'Access Management' and 'Dune Rehabilitation and Revegetation'.	2014 - 2019	Improved beach access, enhanced amenity value and sand stabilisation.
13	Establish photo-point monitoring sites: a. At Redbill and Waubs Beaches to determine if erosion is exceeding accretion over the long-term, and b. At Waubs Beach to assess the success of Recommendation 12, and re-assess rehabilitation measures as necessary.	Establish: 2014 Monitor: twice each year Following implementation of 13a.	Establish if long-term erosion is occurring. Record of success of sand stabilisation.

Recommendation No.	Recommendation / Action	Timing	Performance Measure
14	In consultation with the local community, any plantings and revegetation work should preferably use local native species.	As required	Natural values of Reserve enhanced.
15	Conduct regular assessments of fuel loads and remove litter and dead wood as necessary but retain at least some large habitat logs if they are present.	Late winter each year	Assessment of and reduction in wild fire hazard.
16	Patch burn as the need arises in accordance with a fire management plan developed in consultation with the Tasmania Fire Service.	As required	Reduced hazard (depending on reason for burn).
17	Review the current Native Flora and Fauna Management Plan near the end of the current 5 year period, including the success in achieving its objectives, and develop a Plan for the period 2020 to 2024.	2019	New Native Flora and Fauna Management Plan in place for 2020-2024.

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APPENDIX 1 – SURVEY METHODS

Background Research

The following source was used for biological records from the region:

- Natural Values Atlas[10] - all threatened plant and animal records within 5 km of the study area plus potential suitability for other threatened fauna.

Botanical and Vegetation Survey

The reserve was surveyed during late spring/early summer 2011. The vegetation was mapped and all vascular plant species were recorded. The location of significant features, including threatened plants and weeds, were recorded by a hand-held GPS. Botanical nomenclature follows the current census of Tasmanian plants [11].

Fauna Habitat Assessment

The study area was assessed for fauna habitat with respect to threatened fauna species known from the area, or considered to potentially occur there. This assessment was based on the overall structure of the vegetation including identification of factors such as the presence of old growth trees with hollows and logs. Evidence of native animal presence, such as scats and burrows, were also noted.

Assessment of Conservation Significance

Vegetation types have been classified according to TASVEG[12]. The conservation status of a vegetation type relates to its current extent compared with the modelled extent prior to European settlement. This has allowed an estimate of the extent of loss to land clearing to be calculated. A 2007 amendment to the *Nature Conservation Act 2002* included the listing of threatened native vegetation communities in accordance with their conservation status.

The conservation significance of species is determined at a state and federal level by legislation (Tasmanian *Threatened Species Protection Act 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), the implications of which are considered in the light of relevant legislation (Appendix 4).

Limitations/Disclaimer

While the survey was undertaken in late spring/early summer, no botanical survey can guarantee that all vascular plants will be recorded due to the limitations of the sampling technique, seasonal and annual variation in abundance and the possible absence of fertile material for identification. Additional species are likely to occur that may be recorded by repeated visits over several years and at different seasons.

Fauna assessment is limited to the identification of habitat of significant fauna species known from the area.

[10] Natural Values Report # 43029 (29 August 2011), Threatened Species Section, DPIPWE

[11] Buchanan 2009

[12] Harris & Kitchener 2005

APPENDIX 2 – VASCULAR PLANT SPECIES LIST

Status codes:

STATE SCHEDULE – TSP Act 1995
e – endangered
v – vulnerable
r – rare

NATIONAL SCHEDULE – EPBC Act 1999
CR – critically endangered
EN – endangered
VU – vulnerable

ORIGIN
i - introduced
d - declared weed WM Act 1999
en - endemic to Tasmania

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
		Dicotyledonae										
		AIZOACEAE										
		Carpobrotus rossii	native pigface	+		+		+	+		+	
		Tetragonia implexicoma	bower spinach	+		+		+	+			
		APIACEAE										
		Apium prostratum	sea-celery	+				+	+		+	+
	d	*Foeniculum vulgare*	fennel					+	+			
		Hydrocotyle sp.	pennywort	+			+					
		APOCYNACEAE										
	i	*Vinca major*	blue periwinkle			+		+	+			
		ASTERACEAE										
		Actites megalocarpus	dune thistle						+		+	
	i	*Arctotis stoechadifolia* (pale yellow variant)	africa daisy						+			
	i	*Argyranthemum frutescens*	marguerite	+				+				
		Cassinia aculeata	dollybush	+								
	d	*Chrysanthemoides monilifera* subsp. *monilifera*	boneseed	+		+		+				
	i	*Cirsium vulgare*	spear thistle	+								
	i	*Cotula coronopifolia*	water buttons					+				+
	i	*Dahlia imperialis*	bell tree dahlia	+								
	i	*Delairea odorata*	cape ivy	+		+		+	+			
		Euchiton collinus	common cottonleaf		+		+					
	i	*Gazania* sp.	gazania	+				+				+
	i	*Hypochoeris radicata*	rough catsear	+		+		+	+			+
	i	*Osteospermum fruticosum*	trailing daisy	+			+	+	+		+	
		Ozothamnus obcordatus	yellow everlastingbush	+								

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
		Senecio biserratus	jagged fireweed	+		+	+	+			+	
	i	*Senecio elegans*	purple groundsel			+		+	+		+	
		Senecio quadridentatus	cotton fireweed					+				
	i	*Sonchus asper*	prickly sowthistle	+				+	+			
	i	*Sonchus oleraceus*	common sowthistle	+		+		+	+			
	i	*Vellereophyton dealbatum*	white cudweed	+		+		+				+
		BIGNONIACEAE										
	i	*Tecoma capensis*	cape honeysuckle						+			
		BRASSICACEAE										
	i	*Cakile edentula*	american searocket						+			
	i	*Raphanus* sp.	radish					+				
		BUDDLEJACEAE										
	i	*Buddleja davidii*	butterfly bush	+								
		CAMPANULACEAE										
		Lobelia anceps	angled lobelia					+			+	+
		Wahlenbergia sp.	bluebell	+		+		+				
		CAPRIFOLIACEAE										
	i	*Lonicera japonica*	japanese honeysuckle	+			+	+				
		CARYOPHYLLACEAE										
		Scleranthus biflorus	twinflower knawel					+				
		CASUARINACEAE										
		Allocasuarina littoralis	black sheoak	+				+				
		Allocasuarina verticillata	drooping sheoak	+	+	+	+	+	+			
		CHENOPODIACEAE										
		Rhagodia candolleana subsp. *candolleana*	coastal saltbush	+		+	+	+	+			
		CONVOLVULACEAE										
		Dichondra repens	kidneyweed	+		+		+				
		CRASSULACEAE										
	i	*Cotyledon orbiculata*	pigs ear					+				
	i	*Crassula multicava*	shade crassula					+				
		Crassula sieberiana	rock stonecrop	+				+				+

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
	i	*Crassula tetragona*	miniature pine tree					+				
		DILLENIACEAE										
		Hibbertia riparia	erect guineaflower					+				
		EPACRIDACEAE										
		Acrotriche serrulata	ants delight					+				
		Epacris impressa	common heath	+	+							
		Epacris obtusifolia	bluntleaf heath							+		
		Leucopogon parviflorus	coast beardheath	+	+	+		+	+		+	
		Monotoca elliptica	tree broomheath	+								
		ERICACEAE										
	d	*Erica lusitanica*	spanish heath				+					
		FABACEAE										
		Bossiaea cinerea	showy bossia	+								
	i	*Chamaecytisus palmensis*	tree lucerne	+					+			
		Daviesia ulicifolia	spiky bitterpea		+	+						
		Dillwynia glaberrima	smooth parrotpea							+		
	i	*Dipogon lignosus*	dolichos pea			+	+	+				
	d	*Genista monspessulana*	montpellier broom	+					+			
		Kennedia prostrata	running postman					+				
	i	*Lotus* sp.	trefoil					+				
	i	*Medicago* sp.	medick	+				+				
		Platylobium formosum	handsome flatpea	+								
	i	*Psoralea pinnata*	blue butterflybush	+			+	+		+		
		Pultenaea daphnoides var. *obcordata*	heartleaf bushpea	+	+		+					
	i	*Trifolium* sp.	clover					+				
	d	*Ulex europaeus*	gorse			+		+				
	i	*Vicia* sp.	vetch						+			
		FUMARIACEAE										
	i	*Fumaria muralis* subsp. *muralis*	wall fumitory					+				
		GENTIANACEAE										
	i	*Centaurium erythraea*	common centaury		+			+				

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
		GERANIACEAE										
		Geranium sp.	cranesbill	+				+				
		Pelargonium australe	southern storksbill	+				+			+	+
	i	*Pelargonium* sp.	geranium			+		+	+			
		GOODENIACEAE										
		Goodenia ovata	hop native-primrose	+								+
		Selliera radicans	shiny swampmat					+				
		HALORAGACEAE										
		Gonocarpus humilis	shade raspwort	+			+					
		LAURACEAE										
		Cassytha sp.	dodderlaurel		+							
		MALVACEAE										
	i	*Malva dendromorpha*	tree mallow	+		+		+				
		MIMOSACEAE										
	i	*Acacia baileyana*	cootamundra wattle	+								
		Acacia longifolia subsp. *sophorae*	coast wattle	+	+	+	+	+	+		+	
		Acacia mearnsii	black wattle	+	+	+	+	+				
		Acacia melanoxylon	blackwood	+			+	+		+		
		Acacia suaveolens	sweet wattle							+		
		Acacia terminalis	sunshine wattle							+		
		Acacia verticillata	prickly moses	+			+			+		
	i	*Paraserianthes lophantha* subsp. *lophantha*	cape wattle	+			+	+				
		MYOPORACEAE										
		Myoporum insulare	common boobialla					+				
		MYRTACEAE										
		Eucalyptus globulus subsp. *globulus*	tasmanian blue gum	+	+		+	+		+		
		Eucalyptus ovata var. *ovata*	black gum		+		+	+				
	en	*Eucalyptus tenuiramis*	silver peppermint		+							
		Kunzea ambigua	white kunzea	+	+	+	+	+	+	+		+
		Leptospermum lanigerum	woolly teatree							+		
		Leptospermum scoparium	common teatree	+	+		+	+		+		

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
	i	*Melaleuca armillaris* subsp. *armillaris*	giant honeymyrtle					+				
		Melaleuca ericifolia	coast paperbark	+	+	+	+	+				
		ONAGRACEAE										
		Epilobium sp.	willowherb								+	
		OXALIDACEAE										
		Oxalis perennans	grassland woodsorrel			+			+			
	i	*Oxalis* sp.	sorrel						+		+	
		PASSIFLORACEAE										
	i	*Passiflora tarminiana*	banana passionfruit	+								
		PITTOSPORACEAE										
	i	*Billardiera heterophylla*	bluebell creeper	+				+				
		Bursaria spinosa subsp. *spinosa*	prickly box	+				+				
		Pittosporum bicolor	cheesewood	+								
	i	*Pittosporum undulatum*	sweet pittosporum	+				+				
		PLANTAGINACEAE										
	i	*Plantago coronopus*	buckshorn plantain	+		+		+			+	+
	i	*Plantago lanceolata*	ribwort plantain	+				+	+			
		POLYGALACEAE										
	i	*Polygala myrtifolia*	milkwort	+								
		POLYGONACEAE										
		Muehlenbeckia adpressa	climbing lignum	+		+		+	+			
	i	*Rumex crispus*	curled dock					+	+			
		PRIMULACEAE										
	i	*Anagallis arvensis* var. *arvensis*	scarlet pimpernel					+				
		Samolus repens	creeping brookweed	+							+	+
		PROTEACEAE										
		Banksia marginata	silver banksia	+	+			+		+		
		RHAMNACEAE										
		Pomaderris elliptica	dogwood		+		+					
		ROSACEAE										
		Acaena novae-zelandiae	common buzzy	+		+		+	+		+	

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
	i	*Cotoneaster* sp.	cotoneaster	+				+				
	d	*Rubus fruticosus* aggregate	blackberry	+		+	+	+	+			
	i	*Rubus* sp.	rubus				+					
		RUBIACEAE										
	i	*Coprosma repens*	mirrorbush	+		+	+	+	+		+	+
	i	*Galium aparine*	cleavers				+		+			
		RUTACEAE										
		Correa alba	white correa	+		+		+	+			
		Correa reflexa	correa	+								
r / -		*Zieria littoralis*	downy zieria	+		+		+				+
		SALICACEAE										
	d	*Salix* sp.	willow				+					
		SANTALACEAE										
		Exocarpos cupressiformis	common native-cherry	+	+				+			
		Leptomeria drupacea	erect currantbush	+	+		+					
		SAPINDACEAE										
		Dodonaea viscosa subsp. *spatulata*	broadleaf hopbush					+				
		SOLANACEAE										
	d	*Lycium ferocissimum*	african boxthorn	+		+		+	+			
		Solanum laciniatum	kangaroo apple	+				+	+			
		THYMELAEACEAE										
		Pimelea glauca	smooth riceflower					+				
		TROPAEOLACEAE										
	i	*Tropaeolum majus*	nasturtium	+			+	+	+			
		Gymnospermae										
		CUPRESSACEAE										
		Callitris rhomboidea	oyster bay pine	+				+				
		PINACEAE										
	i	*Pinus radiata*	radiata pine					+	+			

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
		Monocotyledonae										
		ARACEAE										
	i	*Zantedeschia aethiopica*	arum lily			+		+				
		COMMELINACEAE										
	i	*Tradescantia fluminensis*	wandering creeper						+			
		CYPERACEAE										
		Ficinia nodosa	knobby clubsedge								+	+
		Gahnia sp.	sawsedge		+		+					
		Isolepis cernua	nodding clubsedge					+				+
		Lepidosperma concavum	sand swordsedge	+	+			+				
		Lepidosperma gladiatum	coast swordsedge	+		+		+	+			
		Lepidosperma longitudinale	pithy swordsedge		+							
		IRIDACEAE										
	i	*Romulea rosea* var. *australis*	lilac oniongrass					+				
		JUNCACEAE										
		Juncus kraussii subsp. *australiensis*	sea rush	+								+
		Juncus pallidus	pale rush	+	+		+	+				
		JUNCAGINACEAE										
		Triglochin striatum	streaked arrowgrass									+
		LILIACEAE										
	i	*Agapanthus praecox* subsp. *orientalis*	agapanthus	+				+				
		Burchardia umbellata	milkmaids							+		
		Dianella brevicaulis	shortstem flaxlily	+		+		+	+			+
		Dianella revoluta var. *revoluta*	spreading flaxlily					+				
		Dianella tasmanica	forest flaxlily	+								
		ORCHIDACEAE										
		Microtis sp.	onion-orchid					+				
		POACEAE										
	i	*Agrostis* sp.	bent					+				
	i	*Ammophila arenaria*	marram grass					+	+		+	
		Austrodanthonia sp.	wallabygrass			+	+	+				

TSPA/ EPBCA	origin	**Group FAMILY** *Scientific name*	common name	DGL	DOV	NAV	NME	SSC	SAC	SLW	GHC	ORO
		Austrofestuca littoralis	coast fescue						+			
		Austrostipa sp.	speargrass		+		+	+	+		+	
		Austrostipa stipoides	coast speargrass	+		+		+			+	+
	i	*Briza maxima*	greater quaking-grass	+				+				
	i	*Bromus* sp.	brome				+	+	+			
	i	*Dactylis glomerata*	cocksfoot	+				+	+			
		Distichlis distichophylla	australian saltgrass								+	
	i	*Ehrharta erecta*	panic veldtgrass	+			+	+	+			
	i	*Holcus lanatus*	yorkshire fog	+		+		+	+			+
	i	*Hordeum* sp.	barley	+					+			
	i	*Lagurus ovatus*	harestail grass	+				+	+		+	
	i	*Lolium perenne*	perennial ryegrass	+								
		Poa labillardierei	tussockgrass	+				+				
		Poa poiformis	tussockgrass			+						
		Spinifex sericeus	beach spinifex						+		+	
		Themeda triandra	kangaroo grass						+			
		XANTHORRHOEACEAE										
		Lomandra longifolia	sagg	+	+	+	+	+			+	+
		Pteridophyta										
		ASPLENIACEAE										
		Asplenium obtusatum subsp. *northlandicum*	shore spleenwort									+
		BLECHNACEAE										
		Blechnum nudum	fishbone waterfern					+				
		DENNSTAEDTIACEAE										
		Pteridium esculentum	bracken	+			+	+	+	+	+	
		GLEICHENIACEAE										
		Gleichenia microphylla	scrambling coralfern					+		+		

APPENDIX 3A – REVIEW OF THREATENED FLORA

The following details threatened flora species, from the Natural Values Report, that have previously been recorded with a 5 km radius. It also provides an assessment of the likely occurrence of each within the study area.

Species	Status[13] TSPA/EPBCA	Potential to occur	Observations and Preferred Habitat[14]
Known from within 500 m			
Brachyloma depressum spreading heath	Rare / -	LOW	Fifteen previous records are mostly recent. Occurs in shrubby heathland amongst granite boulder/sheets or on granite soils. While some suitable habitat is present it is unlikely to have been overlooked.
Caladenia caudata tailed spider-orchid	Vulnerable / VULNERABLE	LOW	Three previous records from the 1970s & 1980S. Widespread but localised in distribution. It occurs in heathy and grassy open eucalypt woodlands often with she-oaks and in heathland on sandy and loamy soil. It is most often found on sunny north-facing slopes. It flowers in spring and prolifically the first season after a hot fire and then declines. Habitat is very marginal for this species.
Calandrinia granulifera pygmy purslane	Rare / -	LOW	One previous record is from 1942. Occurs in gravelly and sandy soils in dry sclerophyll forest or woodland. Unlikely to be present.
Desmodium gunnii southern ticktrefoil	Pending Vulnerable / -	LOW	Four previous records including a recent one. Occurs in very small isolated populations in dry sclerophyll forest and woodland and forms dense mats in moist soil. Habitat is marginal and unlikely to have been overlooked.
Lasiopetalum micranthum tasmanian velvetbush	Rare / -	VERY LOW	One previous record from 1912. Occurs on shallow, dry dolerite soils in dry sclerophyll forest. No suitable habitat is present.
Pimelea flava subsp. *flava* yellow riceflower	Rare / -	VERY LOW	Six previous records from between 1900 & 2009 but only one, with a large error, within 500m. Prefers moderately fertile sites including shrubby *E. amygdalina* damp forest with co-dominants of *E. obliqua*, *E. ovata* and *E. pulchella*, or scrubby *E. amygdalina* forest on dolerite in sub-coastal area. No suitable habitat is present.
Pterostylis grandiflora superb greenhood	Rare / -	LOW	Two previous records are from 1970 & 1984. Uncommon and localised especially in coastal areas. It occurs in heathy and shrubby open eucalypt forest and in grassy she-oak woodland on moderately to well drained sandy and loamy soils. It would not have been in flower at the time of the survey but only a limited amount of marginal habitat is present.

[13] TSPA - Tasmanian *Threatened Species Protection Act 1995;* EPBCA - Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

[14] Natural Values Report; Jones *et al.* 1999; Wapstra *et al. 2008;* Notesheets and Listing Statements, Threatened Species Unit, DPIPWE

Species	Status[13] TSPA/EPBCA	Potential to occur	Observations and Preferred Habitat[14]
Pterostylis squamata ruddy greenhood	Rare / -	LOW	Two previous records are from 1959 and have a large error. Uncommon and localised in lowland heathy and grassy open eucalypt forest and heathland on well-drained sandy and loamy soils. Habitat is very marginal for this species.
Thryptomene micrantha ribbed heathmyrtle	Vulnerable / -	LOW	Seven previous records include two recent ones. Occurs in dry sclerophyll forest mainly on the central east coast but also in the Midlands. Some suitable habitat is present but unlikely to have been overlooked.
Veronica plebeia trailing speedwell	Rare / -	VERY LOW	Five previous records from 2009. Occurs in wet sclerophyll forest. No suitable habitat is present.
Zieria littoralis downy zieria	Rare / -	**present**	Many previous records. Occurs in rocky habitats on, or close to, the coast. It is widespread within the study area. More details provided in the Flora section.
Known from within 5 km			
Acacia axillaris midlands wattle	Vulnerable / VULNERABLE	VERY LOW	One previous record from 2000. Most commonly associated with watercourses and soaks although it can extend onto surrounding slopes. No suitable habitat is present.
Brachyscome radicata spreading daisy	Rare / -	LOW	Occurs in shrubby forest and wet sclerophyll forest in eastern Tasmania as well as montane habitats elsewhere. Unlikely to be present.
Callitris oblonga subsp. *oblonga* south esk pine	Vulnerable / ENDANGERED	VERY LOW	Thirteen previous records. Restricted to riparian scrub and woodland in low rainfall areas, usually in sandy soil. Occurs along the Apsley River but unlikely to occur along the coast or to have been overlooked.
Carex gunniana mountain sedge	Rare / -	LOW	One previous record from 1989. Occurs in wet eucalypt forest and sandy heathlands, on stream banks, littoral sands and shingle with seepage. Some marginal habitat present but unlikely to have been overlooked.
Deyeuxia decipiens trickery bentgrass	Rare / -	LOW	One previous record from 1968 with a large error. Occurs under light forest cover around the central east coast. Habitat is very marginal.
Epacris apsleyensis apsley heath	Endangered / ENDANGERED	VERY LOW	Many previous records. Occurs in dry sclerophyll forest on sheltered midslopes of Jurassic dolerite, from 20 to 250 m altitude. Occurs along the Apsley River. No suitable habitat is present.
Epacris grandis tall heath	Endangered / ENDANGERED	VERY LOW	Four previous records. Occurs in dry sclerophyll forest and riparian scrub on dolerite from 30-400 metres altitude. Most of the population occurs in Douglas-Apsley National Park. No suitable habitat is present.
Eucalyptus barberi barbers gum	Rare / -	VERY LOW	Ten previous records. Occurs on the edges of dolerite rock plates in dry sclerophyll forest and scrub. No suitable habitat is present.
Glycine microphylla small-leaf glycine	Vulnerable / -	LOW	One previous record from 2006. Occurs in dry sclerophyll forest and woodland. Some marginal habitat is present but neither this species nor the more common *Glycine clandestine* was observed.

Species	Status[13] TSPA/EPBCA	Potential to occur	Observations and Preferred Habitat[14]
Haloragis heterophylla variable raspwort	Rare / -	LOW	One previous record from 2006. Known from moist areas in *Themeda* grassland, roadsides and woodland. No suitable habitat is present.
Isoetes drummondii subsp. *drummondii* plain quillwort	Rare / -	LOW	One previous record from 1991. A semi-aquatic species occurring in mud or temporary water and in damp soil depressions. Only some very marginal habitat is present.
Isoetes elatior tall quillwort	Rare / -	VERY LOW	One previous record from 1990 with a large error. Grows fully submerged rooted in the substrate of calm to swift flowing water. No suitable habitat is present.
Lachnagrostis robusta tall blown grass	Rare / -	LOW	One previous record from 1990. Known from marshy, estuarine habitat and moist sandy flats. Only some very marginal habitat is present.
Pellaea calidirupium hotrock fern	Rare / -	LOW	One previous record from 2004. Occurs in rocky habitats in areas of low to moderate rainfall growing in crevices and on ledges on exposed or semi-exposed rock outcrops. Habitat along the coast is very marginal for this species and unlikely to have been overlooked.
Persicaria decipiens slender waterpepper	Vulnerable / -	VERY LOW	One previous record from 1980. Occurs on stream and river banks. No suitable habitat is present.
Pimelea curviflora curved rice-flower	Pending assessment	VERY LOW	One previous record from 2004. Occurs in wet sclerophyll forest. No suitable habitat is present.
Polyscias aff. *sambucifolia* ferny panax	Endangered / -	VERY LOW	Two previous records are from the 1990s. Known only from dolerite and granite slopes on the central east coast. Unlikely to have been overlooked.
Pterosytlis ziegeleri grassland greenhood	Vulnerable / VULNERABLE	LOW	Two previous records are from 1964 & 1972. In coastal areas it occurs on the slopes of low stabilised sand dunes and in grassy dune swales. Some suitable habitat may be present. The survey was conducted during the flowering period for this species but it was not observed
Spyridium lawrencei small-leaf dustymiller	Vulnerable / ENDANGERED	VERY LOW	Eight previous records including a recent one. Most populations occur on dolerite rock plates or generally open ground. It is most abundant in disturbed woodland and open forest. Unlikely to be present or to have been overlooked.
Stonesiella selaginoides clubmoss bushpea	Endangered / ENDANGERED	VERY LOW	Ten previous records the most recent of which is from 1996. Occurs in heathy scrub on Jurassic dolerite in areas of moderate rainfall and/or periodic flooding. Occurs along the Apsley River. No suitable habitat is present.

APPENDIX 3B – REVIEW OF THREATENED FAUNA

The following details threatened fauna species, from the Natural Values Report, that have previously been recorded, or could potentially occur, with a 5 km radius. It also provides an assessment of the likely occurrence of each within the study area.

Species	Status TSPA/ EPBCA[15]	Potential to occur	Observations and preferred habitat[16]
MAMMALS			
Spotted-tailed quoll *Dasyurus maculatus maculatus*	Rare / VULNERABLE	Foraging: MODERATE Nesting: LOW	One previous sighting is from 1988. This naturally rare forest-dweller most commonly inhabits wet forest but also occurs in dry forest. It forages and hunts on farmland and pasture, travelling up to 20 km at night, and shelters in logs, amongst rocks or thick vegetation. Maternal dens are underground burrows, hollow logs or under rocks. No active dens were observed in the reserve but suitable nesting, shelter and foraging habitat is present.
New holland mouse *Pseudomys novaehollandiae*	Endangered / VULNERABLE	Foraging: VERY LOW Nesting: VERY LOW	Previous survey effort has been low and habitat may be broader than described. Core habitat is coastal dry heath on a sandy substrate with a dense and floristically diverse understorey. Habitat in the study area does not accord with core habitat.
Eastern-barred bandicoot *Perameles gunnii gunnii*	- / VULNERABLE	Foraging: LOW Nesting: LOW	Favours a mosaic of open grassy areas for foraging with thick vegetation cover for shelter and nesting. This habitat mosaic is present although there have been no previous sightings in the vicinity.
Tasmanian devil *Sarcophilus harrisii*	Endangered / ENDANGERED	Foraging: LOW Nesting: VERY LOW	Three previous sightings are from between 1973 & 1993. Inhabits forest, woodland and agricultural areas, sheltering during the day in caves, old burrows and thick scrub. Although devil facial tumour disease is the main threat to this species the protection of maternal dens to ensure successful breeding is important to assist recovery. Unlikely to currently occur in the coastal reserve although foraging habitat is present.
BIRDS			
Wedge-tailed eagle *Aquila audax fleayi*	Endangered / ENDANGERED	Foraging: MODERATE Nesting: NONE	Three previous sightings are from the 1980s & 1990s. Requires large sheltered trees for nesting and is highly sensitive to disturbance during the breeding season. There is no suitable nesting habitat within the coastal reserve and a known nest in the vicinity is beyond the range of potential disturbance. However, it may forage in the general vicinity.
White-bellied sea-eagle *Haliaeetus leucogaster*	Vulnerable / -	Foraging: HIGH Nesting: VERY LOW	Five previous sightings from between 1998 & 2009. Similar habitat requirements to the wedge-tailed eagle but it is generally more tolerant of disturbance. It is unlikely to nest in the coastal reserve and known nests in the vicinity are beyond the range of potential disturbance. However, it may utilise some of the eucalypts in the reserve as perching trees whilst foraging in adjacent waters.

[15] TSPA – Tasmanian *Threatened Species Protection Act 1995*; EPBCA – Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*

[16] Natural Values Report; Bryant & Jackson 1999.

Species	Status TSPA/ EPBCA[15]	Potential to occur	Observations and preferred habitat[16]
Grey goshawk *Accipiter novaehollandiae*	Endangered / -	Foraging: VERY LOW Nesting: NONE	Inhabits large tracts of wet forest. No suitable habitat is present. However, juveniles or non-breeding adults may visit the area on occasion.
Masked owl *Tyto novaehollandiae castanops*	Endangered / VULNERABLE	Foraging: MODERATE Nesting: NONE	Three previous sightings in the vicinity are from the 1980s & 1990s. Preferred habitat is coastal and sub-coastal dry forest and woodland of the north, north east, east and south east. Requires a mosaic of forest and open areas for foraging and large old-growth hollow-bearing trees for nesting. There are no suitable nesting trees in the reserve and there are no known nests within 5km. However, it may forage in the general vicinity.
Swift parrot *Lathamus discolor*	Endangered / ENDANGERED	Foraging: LOW to MODERATE Nesting: VERY LOW	It migrates from the mainland each year to breed mainly near the Tasmanian east coast. Requires tree hollows for nesting and feeds on nectar of blue gum and black gum flowers. There are many blue gums in the reserve and some may have hollows. However there have been no previous sightings of the parrot in the vicinity and there are no known nesting sites in this part of the east coast.
Forty-spotted pardalote *Pardalotus quadragintus*	Endangered / ENDANGERED	Foraging: NONE Nesting: NONE	Restricted to dry grassy forest and woodland along the east coast containing mature white gum. There are no known breeding colonies in the vicinity and no mature white gums were observed in the reserve.
White-fronted tern *Sterna striata*	Vulnerable / -	NONE	One previous sighting is undated. A coastal species with small numbers breeding on offshore islands. It may forage in adjacent waters and potential breeding habitat may be present on Diamond and Governor Islands but not within the reserve.
FROGS			
Green and gold frog *Litoria raniformis*	Vulnerable / VULNERABLE	NONE	Requires permanent fresh water for breeding preferably shallow water with diverse emergent vegetation. No suitable habitat is present.
INVERTEBRATES			
Blind velvet worm *Tasmanipatus anophthalmus*	Endangered / ENDANGERED	NONE	Preferred habitat is in narrow wet gullies, on creek and river flats and drainage lines on steep hillsides. They live deep within large decaying eucalypt logs or occasionally under moss-covered or shaded stones, in deep litter or on log surfaces among friable composting material. No suitable habitat is present.
FISH			
Australian grayling *Prototroctes maraena*	Vulnerable / VULNERABLE	NONE	Inhabits permanent rivers and streams. No suitable habitat is present.
Swan galaxias *Galaxias fontanus*	Endangered / ENDANGERED	NONE	Inhabits slow to moderately fast-flowing freshwater, rocky streams with shelter both within-stream and from stream-side vegetation. No suitable habitat is present.

APPENDIX 4A – LEGISLATIVE OBLIGATIONS RELEVANT TO NATURAL VALUES OF RESERVES

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA)

No species of flora that are listed under the EPBCA occur in the Reserves.

Although the Reserves do not provide core breeding habitat for any fauna species listed under the EPBCA, four species may potentially forage in the vicinity. These include the spotted-tailed quoll, wedge-tailed eagle, masked owl swift parrot.

Referral under the EPBC Act is necessary if any management activity within the reserves are likely to have a significant impact on listed threatened species. In this regard the Act states:

'An action has, will have, or is likely to have a significant impact on a critically endangered, endangered or vulnerable species if it does, will or is likely to (amongst other things):

- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- adversely affect habitat critical to the survival of a species.'

Tasmanian *Threatened Species Protection Act 1995* (TSPA)

One flora species occurring in the Reserves that is listed under the TSPA is *Zieria littoralis*.

One fauna species known to forage in the vicinity of the Reserves that is listed under the TSPA is the white-bellied sea-eagle. Others that may potentially forage in the vicinity are the spotted-tailed quoll, wedge-tailed eagle, masked owl swift parrot.

Any management activities in the reserves that will impact on these species would require a permit application to be submitted to the Development and Conservation Assessment Branch (DCAB) of DPIPWE with regard to the populations affected.

Tasmanian Forest Practices Regulations 2005

The Forest Practices Regulations[17] require a Forest Practices Plan (FPP) where clearing of forest is in excess of 1 hectare or 100 tonnes of timber or involves 'vulnerable land' where the thresholds become less.

Under the terms of the Forest Practices Regulations, any native vegetation which has the potential to develop to a height exceeding 5 m is considered 'forest'. 'Vulnerable' land includes land supporting threatened vegetation communities or species listed as threatened under the TSPA and/or the EPBCA. Three threatened communities that occurs in the Reserves are DGL, DOV and NME. Threatened species are listed above under the EPBCA and TSPA headings.

Any clearing activities on 'vulnerable land' will require an FPP, irrespective of the volume of timber or area of vegetation involved (unless the clearing or harvesting is necessary to protect public safety or to maintain existing infrastructure and it involves less than 1 ha or 5 tonnes of timber).

Tasmanian *Weed Management Act 1999* (WMA)

The following table summarises the status within the Glamorgan Spring Bay municipality of 'declared weeds' present in the reserves according to relevant Weed Management Plans prepared under the Act.

[17] Tasmanian State Government 2005.

Common name	*Scientific name*	Status in the GSB municipality	Municipal classification
african boxthorn	*Lycium ferocissimum*	Localised infestation	B
blackberry	*Rubus fruticosus* aggregate	Widespread	B
boneseed	*Chrysanthemoides monilifera* subsp. *monilifera*	Localised infestation	A
fennel	*Foeniculum vulgare*	Isolated occurrences	A
gorse	*Ulex europaeus*	Widespread	B
montpellier broom	*Genista monspessulana*	Localised infestation	A
spanish heath	*Erica lusitanica*	Isolated occurrences	A
willow	*Salix* sp.	Localised infestation	A

According to the provisions of the WMA Zone A municipalities are those that host infestations of a 'declared weed' that are currently deemed eradicable. Achieving and maintaining a total absence of the weed from within the municipal boundaries is the ultimate management outcome.

Zone B municipalities are those that host infestations of the 'declared weed' that are not deemed eradicable because the feasibility of effective management is low at this time. Therefore, the objective is containment of infestations. The objective includes preventing spread of the 'declared weed' from the municipality and preventing spread to properties currently free of them. There is a requirement to prevent spread of the 'declared weeds' to properties containing sites for significant flora, fauna and vegetation communities such as those present here.

APPENDIX 4B – OTHER LEGISLATION AND POLICIES RELEVANT TO RESERVE MANAGEMENT

Strategic policies

- Glamorgan Spring Bay Planning Scheme
- State Coastal Policy
- Tasmanian Reserve Management Code of Practice 2003

Legislation

- *Aboriginal Relics Act 1975*
- *Cat Management Act 2009*
- *Crown Lands Acts 1976*
- *Environmental Management and Pollution Control Act 1994*
- *Historical Cultural Heritage Act 1995*
- *Land Use Planning and Approvals Act 1993*
- *Local Government Act 1993*
- *National Parks and Reserves Management Act 2002*
- *Nature Conservation Act 2002*

APPENDIX 5A – DECLARED WEED PHOTOS

african boxthorn *Lycium ferocissimum*

blackberry *Rubus fruticosus* aggregate

boneseed *Chrysanthemoides monilifera* subsp.*monilifera*

fennel *Foeniculum vulgare*

fennel *Foeniculum vulgare* (close-up of leaves)

gorse *Ulex europaeus*

montpellier broom *Genista monspessulana*

spanish heath *Erica lusitanica*

willow *Salix* sp.

willow *Salix* sp.
(close-up of leaves)

APPENDIX 5B – ENVIRONMENTAL WEED PHOTOS

african daisy *Arctotis stoechadifolia*

agapanthus *Agapanthus praecox*

arum lily *Zantedeschia aethiopica*

banana passion fruit *Passiflora tarminiana* (leaves)

banana passion fruit *Passiflora tarminiana* (with fruit)

bears breeches *Acanthus mollis*

bell tree dahlia *Dahlia imperialis* (leaves)

bell tree dahlia *Dahlia imperialis* (showing base of stem)

blue butterflybush *Psoralea pinnata*

blue periwinkle *Vinca major*

blue periwinkle (variegated form) *Vinca major*

bluebell creeper *Billardiera heterophylla*

bottlebrush *Melaleuca* sp.

butterfly bush *Buddleja davidii*

cape honeysuckle *Tecoma capensis*

cape ivy *Delairea odorata*

cape wattle *Paraserianthes lophantha* subsp. *Lophantha* (with fruit)

cotoneaster *Cotoneaster* sp. 1

cotoneaster *Cotoneaster* sp. 2

dolichos pea *Dipogon lignosus*

fig *Ficus carica*

gazania *Gazania* sp.

geranium *Pelargonium* sp.

giant honeymyrtle *Melaleuca armillaris* subsp. *armillaris*

ivy *Hedera helix*

japanese honeysuckle *Lonicera japonica*

marguerite *Argyranthemum frutescens*

milkwort *Polygala myrtifolia*

miniature pine tree *Crassula tetragona*

mirrorbush *Coprosma repens*

mirrorbush *Coprosma repens*
(growing in rock crevices)

monterey cypress *Cupressus macrocarpa*

nasturtium *Tropaeolum majus*

pride-of-madeira *Echium candicans*

purple groundsel *Senecio elegans*

radiata pine *Pinus radiata*

rubus *Rubus* sp

shade crassula *Crassula multicava*

soap aloe *Aloe maculata*

sweet pittosporum *Pittosporum undulatum*

trailing daisy *Osteospermum fruticosum*

tree lucerne *Chamaecytisus palmensis* (flowering)

tree lucerne *Chamaecytisus palmensis* (with fruit)

tree mallow *Malva dendromorpha*

wandering creeper *Tradescantia fluminensis*

yellow pigface *Carpobrotus edulis*