

**DISTRICT COUNCIL OF
LOWER EYRE PENINSULA**

**Coffin Bay Foreshore
Vegetation Management Plan**

As adopted by Council at the 19 April 2013 Council Meeting.



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LOWER EYRE PENINSULA**

**Coffin Bay foreshore
Vegetation Management Plan**

Prepared for:

District Council of Lower Eyre Peninsula

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Prepared by:

Lower Eyre Coastcare Association

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VMP-Rev. 1 (As amended 19 April 2013)

This vegetation management plan for the Coffin Bay foreshore zone has been prepared for the District Council of Lower Eyre Peninsula (DCLEP) by Mike Roberts on behalf of the Lower Eyre Coastcare Association.

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Limitations Statement

The purpose of this document is to present an integrated plan for the amelioration of adverse impacts on the native vegetation of the Coffin Bay foreshore zone that have arisen or may arise from developments and other human activities in the zone. The scope of the document specifically excludes a detailed fire risk assessment and management strategy, this being the responsibility of the Lower Eyre Peninsula Bushfire Management Committee in the context of the regional bushfire management plan.

The author derived the data in this report primarily from visual inspections and assessment of the zone in relation to published and unpublished data, and from discussions with and inputs from local residents having a long-standing knowledge of the natural environment of the zone. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and re-evaluation of the findings, observations and conclusions expressed in this plan.

In preparing this plan, the author has relied upon and presumed accurate certain information (or absence thereof) relative to the occurrence of species (both flora and fauna) provided by government officials and authorities, community groups and others identified herein. Except as otherwise stated, the author has not attempted to verify the accuracy or completeness of any such information.

The findings, observations and conclusions expressed in this plan are not an opinion concerning the seasonal occurrence of flora and fauna species. No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed. Further, such data, findings, observations and conclusions are based solely upon site conditions in existence at the time of the investigation.

This plan has been prepared on behalf of and for the exclusive use of DCLEP and other stakeholders identified herein. The author accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any other party.

Revision History

Revision	Date	Comment	Signatures		
			Originated	Checked	Authorised
0	1/11/12	Final report	MLHR	K.McE	MLHR
1	29/04/13	Amendments and adoption by DCLEP	ABD	RP	RP

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Summary

Councils are required under the *Local Government Act 1999* (SA) to prepare management plans for public land under their care and control. Such plans must provide for conformation with all applicable legislation, State policies and plans.

The Lower Eyre Coastcare Association (LECCA) at the request of Council has prepared the following vegetation management plan for the Coffin Bay foreshore zone. Enclosing approximately 65 ha of coastal land between the Esplanade and Long Beach Road and their adjacent shorelines, the zone extends from Kellidie Bay Conservation Park on the eastern side of the town to Coffin Bay National Park in the south-west.

Comprised of some 150 native plant species that in turn support 77 vertebrate animal species the native vegetation throughout the zone is highly variable, ranging from healthy, with high species diversity and few weeds, to poor with numerous dead or old-aged trees, little or no natural regeneration and high weed infestation. In parts the vegetation has been extensively modified by:

- illegal clearing to improve views or to extend outdoor space;
- urban contact pressures such as littering, trampling and unauthorised camping;
- the formation of multiple *ad hoc* tracks and stairways to the shoreline;
- inappropriate off-road use or parking of motor vehicles and trailers; and
- problem plants (weeds), including proclaimed weeds of national and state significance and escaped garden plants.

Unless properly addressed, these issues can have potentially-significant short and long-term effects on the biological and social values of the zone. They are contributing factors for accelerated surface soil and cliff-face erosion; increased fire risk and decreased water quality in the adjacent estuarine environment. Each of these issues is inextricably linked with visual amenity, tourism and the Coffin Bay lifestyle.

The plan recommends a management framework based on four zones, namely:

- Residential (shack);
- Tourism and recreation;
- Natural; and
- Conservation.

Action plans are presented for each of the zones, the leading priorities being:

- preparation of a fire risk assessment and mitigation strategy;
- weed control and eradication;
- improvements to stormwater management and discharge water quality;
- rehabilitation of degraded areas whilst retaining water views;
- selective closure and rehabilitation of *ad hoc* access tracks whilst ensuring the ongoing adequacy and safety for fire management and shoreline access; and
- reducing the incidence of illegal vegetation clearing and dumping through education.

The document concludes that effective care of Coffin Bay's foreshore vegetation asset cannot be realised by disregard, inaction or the disparate efforts of various interests working in isolation. To be successful it requires a co-ordinated (integrated) approach involving the Coffin Bay community, Council and other stakeholders where the issues are addressed in a spirit of co-operation, informed commitment and community pride.

COFFIN BAY FORESHORE ZONE— VEGETATION MANAGEMENT PLAN

1. Introduction

This vegetation management plan (VMP) is applicable to the Coastal (Coffin Bay) and Coastal zones (hereafter referred to as the foreshore zone) within the Coffin Bay town boundary as defined in the District Council of Lower Eyre Peninsula Development Plan (DCLEP 2011) and depicted in Figure 1. It has been prepared at the request of Council by the Lower Eyre Coastcare Association (LECCA).

The VMP will form part of a suite of management plans that Council is preparing that will link on-ground action with its strategic, development, infrastructure and works management plans. It will also assist attainment of the desirable outcomes sought by the State and Eyre Peninsula natural resources management (NRM) plans.

Need for and purpose of the management plan

The need for a VMP arises from the *Local Government Act 1999* (SA) that obligates Councils to prepare management plans for Crown land under their care and control. The *Crown Lands Management Act 2009* (SA) requires that these plans and their implementation must conform to the principles of ecological sustainability.

The purpose of the plan is to identify the values of, and threats to, the native vegetation of the foreshore zone and to develop a management framework to minimise the impacts that urban development (notably weeds, clearance, accelerated soil erosion etc.) can have on those values and on the water quality of the adjacent estuarine environment. The plan specifically excludes a detailed fire risk assessment and management plan, this being an issue requiring the expertise of the Lower Eyre Peninsula Bushfire Management Committee (LEPBMC) in accordance with its regional bushfire management planning priorities and responsibilities.

Structure of the document

The document provides a brief description of the foreshore zone and its vegetation values as background to the plan. Key stakeholders for the plan's implementation are also identified.

The key threats to the zone's bio-diversity are then explained followed by summaries of the existing physical and biological environments that influence the plan. The remainder of the document considers a management framework for the plan together with recommended goals, strategies and priority actions for combating existing land degradation factors in a holistic approach to natural resources management and socio-economic development.

The document concludes with a bibliography of references considered in formulating the plan. Appendices A–D present additional information in support of the plan.

Links with other legislation, policies and plans

As far as practicable, the VMP must support and fit within the context of a range of existing or in preparation natural resources management legislation, policies, strategies and plans at State, regional and local level. Leading references include:

- State legislation:
 - *Coast Protection Act 1972*;
 - *Native Vegetation Act 1991 and Regulations 2003*;
 - *Natural Resources Management Act 2004*;
 - *Fire & Emergency Services Act and Regulations 2005*;
 - *Crown Land Management Act 2009*.

- Regional plans:
 - Eyre Peninsula Natural Resources Management Plan (2009)
 - Eyre Peninsula Coastal Action Plan and Conservation Priority Study (2011).
- DCLEP plans and policies:
 - DCLEP Development Plan;
 - DCLEP Strategic Plan;
 - DCLEP Asset and Infrastructure Management Plan (in preparation).

A list of the legislation/policies/strategies and plans and descriptions of their applicability to vegetation management of the foreshore is provided at Appendix A.

2. Background

The township of Coffin Bay is located on the Port Douglas waterway adjacent to the south-western tip of Eyre Peninsula, approximately 45km by road west of Port Lincoln (Figure 1). From its genesis in the mid to late 1800s as the seasonal home for fishermen exploiting the then rich natural oyster beds of the waterway, the town has evolved into the important district focus it is today for retirement living, seasonal holiday makers, tourists, day visitors and the Pacific Oyster aquaculture industry (DCLEP 2011). With a permanent population of about 600, the town increases to over 4,000 in the peak summer and Easter holiday months creating incremental human impact pressures on the natural environment of the foreshore zone.

Foreshore zone description

The foreshore zone is a narrow strip of coastal land bounded by the Esplanade and Long Beach Road and the high water mark of the adjacent shoreline (Figure 1). It extends for approximately 5.5 km from Kellidie Bay Conservation Park on the eastern side of the town to Coffin Bay National Park in the south-west, and is typically less than 30m wide increasing to approximately 100–200m wide in the central section between Giles Road and the boat ramp.

The zone has a total area of approximately 65 ha comprising 60 ha of coastal clifftop land and 5 ha of beach sand dunes. The shoreline is characterised by low cliffs typically less than 3 m high with small beaches, inter-tidal flats and saltmarshes fronting the adjacent estuary. On the western side of the town the cliffs give way to low sand dunes backing Long Beach.

Most development has occurred in the central section of the zone. The original pre and post-World War II fishing and holiday shacks that were once a feature of the foreshore are being progressively replaced by larger, modern dwellings some of which are now permanently or semi-permanently occupied. These form a ribbon of small-scale residential precincts fronting the coastline, most of which are accessed from the Esplanade by basic unsealed cul de sacs at the rear of the properties. Other major elements of the built environment in the zone include the Coffin Bay Yacht Club, car parks, commercial wharf and slipway, the open space and community facilities of the town centre precinct, a commercial and recreational boat ramp, *ad hoc* steps and paths providing access to the shoreline and private jetties, and various cleared areas at scenic vantage points.

Terrestrial vegetation within the zone is predominantly coastal mallee consisting of a generally mid-level tree canopy over a mixed limestone-loving shrub understorey. Two enclosed, intermittently-inundated saltmarshes are located between Egret and Osprey courts, whilst the sand dunes and edges of the low coastal cliffs support a low open shrubland and tussock grassland.

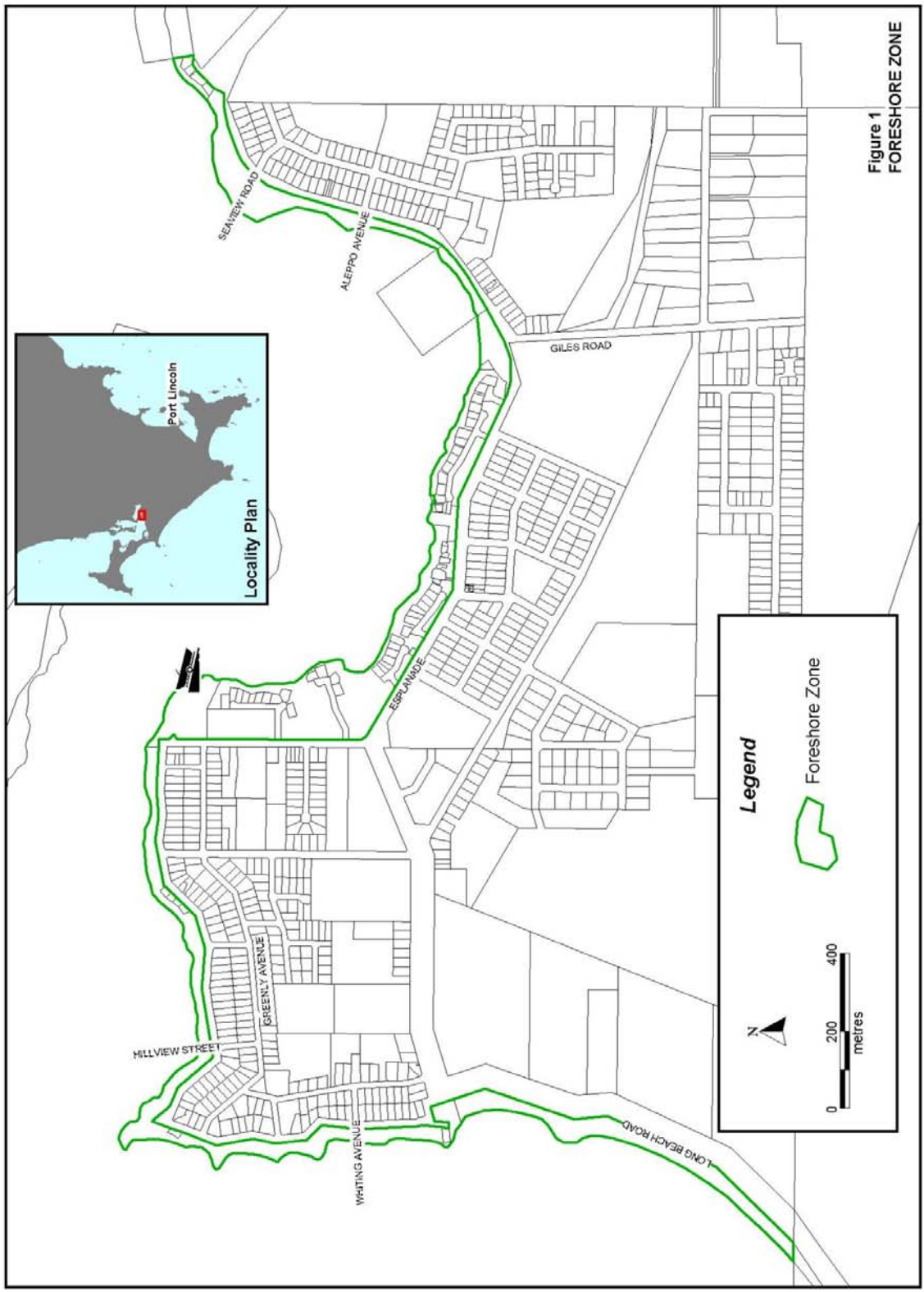


Figure 1
FORESHORE ZONE

Spatially-referenced aerial photography suggests that there is about 75–85% vegetation cover in the zone. However, its condition is highly variable, ranging from healthy, with high species diversity and few weeds, to poor with numerous dead or senescent (old aged) trees, little natural regeneration and high weed infestation. In parts the vegetation has been extensively modified by indiscriminate clearing to improve water views or through encroachment from adjacent residences, and by other urban contact pressures such as littering, trampling and the inappropriate off-road use or parking of motor vehicles. Degradation by problem plants, including proclaimed weeds of national and state significance and escaped garden plants, is widespread.

Constructed as an Australian Bi-centenary project in 1988 the Oyster Walk walking trail transects the zone, with much of its coastal alignment following the original unformed track that once wound its way along the foreshore. The Oyster Walk provides low impact pedestrian access through the coastal vegetation to various vantage points and is an important tourism and lifestyle asset for the town.

Vegetation values

Native vegetation is the integral component of biodiversity conservation in that it binds the various natural systems together by protecting the soil, filtering the air and water, and providing food and shelter for a diverse assemblage of invertebrate species and the animals that depend upon them. Being located in an otherwise cleared residential township, the conservation values of the remnant vegetation are thus significant and are inextricably linked with those of tourism, visual amenity and the general lifestyle of Coffin Bay. The integrity of the vegetation throughout the town is also important to the adjacent conservation areas by minimising the threat from garden escapee weeds.

Specific areas of high conservation value include:

- the saltmarshes that represent isolated local examples of this type of vegetation community and are important habitats for small ground-feeding birds that are nationally under stress from habitat loss (e.g. Thornbills, Scrub and Fairy Wrens and Robins);
- the pockets of naturally-regenerating coastal mallee along the western foreshore and the isolated patches of restricted vegetation (e.g. Quandong, Sea Box); and
- the stabilising vegetation of the cliff tops and the Long Beach sand dunes.

Retaining the natural ground cover of the foreshore vegetation reduces the risks of accelerated surface erosion by wind and water. It slows the speed of overland water flow from adjacent roads and structures during heavy rainfall events, assists in the capture of water-borne sediments, provides a natural filter for potential nutrients and toxins in stormwater run-off prior to its discharge into the marine environment, and contributes to the general stabilisation of the shoreline.

Anecdotal advice from long-time residents with historic ties to Coffin Bay suggests that the River Red gums (*Eucalyptus camaldulensis*) along the Esplanade are the remaining examples of foreshore plantings by early families in the town at least 40–50 years ago. Various protected under the *Native Vegetation Act 1991*, *Development Act 1993* and the *Local Government Act 1999* these trees are arguably of local heritage significance. They also provide important habitat in the form of hollows for dependent birds and bats.

River Red Gum is typically restricted to areas with access to a fresh water source. The locations of these trees along the Esplanade close to the foreshore and adjacent to offshore fresh water springs suggest that they may be rooted in overflow “streams” of the Coffin Bay groundwater lens flowing through the aeolianite limestone to the estuary. As such they could play an important role as an early indicator of salt water intrusion or reduced flows from the aquifer. Annual tree health and safety assessments by a professional arborist are advisable.

Tourism and general lifestyle values centre on the year-round accessibility of the foreshore and adjacent waters for water-based activities such as recreational fishing, boating and shoreline fossicking, and for the views afforded from the various vantage points. The intrinsic value of the Oyster Walk as a passive tourism and recreation asset is totally dependent on conserving the native vegetation through which it passes. The tourism and eco-education values of the vegetation and its associated fauna (especially birdlife) have been recognised by the Coffin Bay Tourist Association through the installation of interpretive signage and seating at numerous sites along the Oyster Walk.

The vegetation is also an important contributor to the visual amenity of the foreshore and the charm of Coffin Bay as a place to live. It softens and “naturalises” developments when viewed from a distance or from the water and frames the scenic beauty of the adjacent waterway from the many vantage points along the coastline. It also has a buffering effect on the foreshore and adjacent residences from the prevailing winds and potentially from the more extreme weather conditions predicted to arise from climate change.

Land tenure

All residential allotments within the foreshore zone are held under freehold title with all the care and maintenance obligations this entails for land holders. The Esplanade road reserve from the eastern town boundary to Giles Road is under the care and control of Council from the Department of Transport, Energy and Infrastructure (DTEI) whilst the remainder of the zone is Crown land administered by the Department of Environment, Water and Natural Resources (DEWNR). DCLEP holds an annual licence from DEWNR to occupy, care for and control the foreshore land between Giles Road and Long Beach Road for community purposes, and is solely responsible for the Long Beach Road reserve to the Coffin Bay National Park boundary.

Key stakeholders

The diversity of tenure and land use suggests that effective care of the foreshore vegetation asset cannot be realised by inaction or through the disparate efforts of various interest groups and management agencies working in isolation or to potentially conflicting goals. To be successful it requires a co-ordinated (integrated) approach involving the Coffin Bay community, Council and government agencies in which the issues are addressed in a spirit of co-operation and commitment. Key stakeholders in the implementation of the VMP are thus:

- DCLEP (overall responsibility for co-ordination and management);
- Coffin Bay residents and property owners;
- Coffin Bay community groups;
- Lower Eyre Peninsula Bushfire Management Committee;
- SA Country Fire Service SA (SACFS);
- Eyre Peninsula Natural Resources Management Board (EPNRMB); and
- DEWNR (consultation/information)

Photo plate 1—Vegetation values



Photo 1—Eastern saltmarsh



Photo 2—Western saltmarsh



Photo 3—Mallee regeneration near Whiting Avenue



Photo 4—Esplanade River Red Gum



Photo 5—Long Beach dune vegetation



Photo 6—Long Beach clifftop vegetation



Photo 7—Oyster Walk near Crinoline Point



Photo 8—Coastal mallee

3. Key biodiversity threats

Oppermann (1999), DEH (2002) and EPNRMB (2009) consider a number of key threats to the biodiversity of coastal regions in South Australia and Eyre Peninsula. This section provides a brief discussion of the threats relevant to vegetation management in the foreshore zone together with site-specific observations on current conditions.

Fragmentation and isolation

The foreshore zone is essentially linear in nature with a long, narrow ecological connectivity extending from Kellidie Bay Conservation Park to Long Beach and Coffin Bay National Park. This warrants careful planning and on-ground management to ensure that fragmentation does not lead to habitat isolation or loss of viability from further vegetation loss due to the 'edge effects' of a large boundary enclosing a relatively small area. It should be noted that the impacts of these effects are typically cumulative, deriving from changes in wind, temperature, radiation and water cycling regimes as a consequence of altered vegetation structure caused by clearance and/or degradation by weeds and pest animals, particularly rabbits.

There is some evidence of fragmentation from vegetation clearance for development between the boat ramp and Aleppo Avenue, and elsewhere in the excessive number of *ad hoc* tracks and paths to access the coastline. However, at present there appear to be sufficient 'blocks' of vegetation remaining in close proximity to each other to allow for flora and fauna migration.

Problem plants (weeds)

Weeds are plants that threaten the natural landscape, generally through reduced diversity of indigenous (i.e. naturally-occurring) plants that must compete directly with the introduced species for available water, light and nutrients. This in turn has a compounding effect on overall biodiversity through reduced habitats and food sources for native animals and insects, and the potential creation of havens for vermin and pest animals. Martin (2003) rates weeds as second only to land clearance as a cause of biodiversity loss.

Fifty-one species of introduced and pest plants (weeds) have been recorded in the foreshore zone (Smyth 2008 and LECCA volunteers) including 34 species that have been categorised by Milne *et al.* (2008) as "Red Alert" weeds due to their highly invasive nature and the risks this poses for native vegetation species and abundance. These are listed in Appendix B, Table B2. They include Bridal Creeper (*Asparagus asparagoides*) and Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*) that are weeds of national significance (WONS) for which national and/or regional weed management strategies have been implemented (A&RMC *et al.* [2000]; EPNRMB [2008]; RMP Environmental [2008]; AWC [2001]). Aleppo Pine (*Pinus halepensis*), feral Olive (*Olea europaea*), Bridal Veil (*Asparagus declinatus*) and African Boxthorn (*Lycium ferocissimum*) are also present and included in the list of proclaimed problem plants in South Australia (DLWBC 2005).

Bridal Creeper, Boneseed, Aleppo Pine and feral Olive are present at numerous sites, whilst African boxthorn has a relatively low incidence. By far the greatest abundance and diversity of weeds, however, are the numerous garden plant species present along 'contact' points adjacent to the Esplanade, most notably Myrtle-leaved Milkwort (*Polygala myrtifolia*), Cape Marigold (*Dimorphotheca pluvialis*), Cotoneaster (*Cotoneaster glaucophyllus serotinus*), Diosma (*Coleonema pulchellum*), Freesia (*Freesia* hybrid), Gazania (*Gazania rigens*) and various succulent species.

Infestations of Bridal Creeper, Polygala, Diosma, Freesia, and feral Olive are widespread and, in parts, extensive. The rust fungus *Puccinia mysiphylli* has been released as a bio-control for Bridal Creeper with infestations showing signs of decreased vigour and seed set, albeit that control in the short-term (i.e. <5–10 years) is unlikely (CSIRO Bridal Creeper control fact sheet). Polygala and Diosma are prolific seed producers with the seeds of Polygala remaining viable for many years (possibly 10+). Feral olive and cotoneaster are spread widely by birds.

If left unmanaged these latter species will continue to proliferate and be even more difficult to remove. Control must be undertaken manually and eradication is possible with a concerted effort over the next five years. Other weed species are in lower abundance and more easily eradicated.

Western Coastal Wattle (*Acacia cyclops*), Golden Wreath Wattle (*A. saligna*) and Tuart (*Eucalyptus gomphocephala*) are present at various locations throughout the zone. Although Australian natives they are introduced species and by definition environmental weeds. Both of the acacias are highly invasive and can rapidly displace other indigenous vegetation. Whilst Tuarts provide some amenity, the benefits are outweighed by the proliferation of seedlings which at some locations are forming dense thickets that are displacing the native vegetation (e.g. Long Beach) and increasing the fire risk. Tuarts are also particularly susceptible to borer infestation leading to falling limbs and tree death, the risks from which Council is currently addressing through the remedial pruning or removal in public areas such as the boat ramp and along the western parts of the Esplanade/Oyster Walk.

The locations of major weed infestations have been determined using a handheld GPS and mapped at a scale of 1:2000 on aerial imagery of the foreshore zone (Figure 2).

Problem (pest) animals

European Red Fox (*Vulpes vulpes*), feral Cat (*Felis catus*) and European Rabbit (*Oryctolagus cuniculus*) have been identified as significant problem animals for the region. Black Rat (*Rattus rattus*) and House Mouse (*Mus domesticus*) are common pest (vermin) species.

Fox baiting is on-going in the surrounding national and conservation parks, and whilst foxes have been sighted within the town near the rubbish dump there have been no sightings reported in the foreshore zone to date. However, feral/semi-feral cats and rabbits are known to exist and are regularly sighted. Active rabbit warrens have been recorded throughout the town and may be present in the coastal strip. Although rabbit populations are generally subject to seasonal change, the availability of green feed in the town in summer and the propensity for some residents to feed the rabbits makes control within a town area difficult.

Domestic dogs are frequently off-leash throughout the foreshore area with subsequent disturbance to fauna and the creation of human health and amenity impacts from mounds of dog faeces along the Oyster Walk.

Fire

Standing and fallen timber and fine leaf litter associated with dead or senescing, old-age vegetation and seasonal grasses in many parts of the zone have intrinsic fauna habitat values. However, they also present potential fire and safety risks that are exacerbated by the dumping of garden waste, the presence of general roadside litter such as paper and plastics, and the widespread incidence of highly flammable weeds (e.g. Polygala and Olive). This is particularly so in the roadside vegetation corridor that separates the Esplanade from coastal dwellings.

Decreasing the fuel load will require careful planning to manage the spread of weeds and protect essential fauna habitat whilst establishing a fire safety regime for protecting human life and property. It should be noted that it is not within the powers of Council (or private landholders) to unilaterally clear or modify native vegetation on Crown land for fire prevention purposes. Fire risk mitigation measures requiring the removal of such vegetation can only be approved within the context of the regional bushfire management plan.

To allay community concerns it is imperative that the Bushfire Management Committee and SACFS commit to undertaking a specific risk assessment for incorporation into the regional plan. Local mitigation and management needs can then be reflected in the VMP, including aligning the rationalisation of coastal access tracks with the needs of fire management.

Photo plate 2—Example problem plants



Photo 1—Bridal Creeper (WONS)



Photo 2—Polygala (highly invasive garden escapee)



Photo 3—Succulent (garden escapee/waste)



Photo 4—Cape Marigold (garden escapee/waste)



Photo 5—Invasive Tuart seedlings



Photo 6—Understorey Freesias



Photo 7—Fountain grass (invasive landscaping plant)



Photo 8—Succulent (inappropriate off-site planting)

Photo plate 3—Example physical threats



Photo 1—Dumped rubbish



Photo 2—Bare compacted surfaces



Photo 3—*Ad hoc* "short cut" vehicle track



Photo 4—Inappropriate off-road vehicle use



Photo 5—Cleared and dumped vegetation



Photo 6—Trailer parking encroachment



Photo 7—Erosion-prone stormwater outfall



Photo 8—Eroding informal access track



Figure 2: Current weed distribution and density

Vegetation clearance

Illegal vegetation clearance is evident at numerous sites along the Oyster Walk and Esplanade, where vegetation on Crown land has presumably been removed or thinned to improve views from adjacent residences, and in numerous *ad hoc* pedestrian and vehicular ‘convenience’ tracks. Off-road use of motor vehicles is also evident as bare, heavily compacted ground at a number of sites.

As previously indicated it is not within the powers of Council (or private landholders) to clear or modify native vegetation on Crown land for the enhancement and retention of water views or any other purposes. Not only is such clearance unlawful and a blight on visual amenity, the vegetation in many of the existing cleared areas has fewer native species with reduced cover and diversity and little or no natural regeneration. Excessive clearance and surface compaction restricts the natural filtration and infiltration of stormwater run-off, increases the risk of accelerated erosion from uncontrolled or channelled surface water flows, and provides a vector for the transfer and establishment of weeds with compounding effects on vegetation health, fauna habitat, biodiversity and fire fuel loads in general.

Access to the shoreline and the creation of *ad hoc* paths and steps to private jetties have resulted in trampling of vegetation both through the foreshore zone and at the water’s edge. This is particularly evident immediately north of the boat ramp where indiscriminate access for shore based fishing has resulted in little vegetation being left with consequential erosion and destabilisation of the shoreline.

Development encroachment

The edge-effects of development and the impacts of current and increasing human activity (including unauthorised camping) within and at contact points in the foreshore zone encompass all of the previously discussed threats and issues affecting the long term viability of the foreshore vegetation. These include increasing litter, the use of potentially invasive plants on coastal allotments, clearance or trimming of vegetation beyond property boundaries to improve views or to facilitate the construction of larger dwellings than previously existed (including the storage of building materials), and encroachment into adjacent intact vegetation for vehicle, caravan and boat parking or the creation of additional outdoor space and gardens.

Stormwater drainage

Stormwater from the foreshore zone and upstream catchments is disposed of directly into the marine environment either through individual coastal property stormwater drains or via typically un-maintained roadside pits to culverts, excavated V-drains and natural swales as components of the town’s stormwater drainage system. Overland flows from roads and other hard surfaces such as the boat ramp carpark are significant contributors. No engineered controls are employed to slow and/or filter stormwater run-off prior to its discharge, with consequential risks of accelerated soil and cliff-face erosion. There are also adverse downstream effects on estuarine water quality and inter-tidal aquatic vegetation from heavy metals, nutrients, toxins and sedimentation. Vigorous seasonal growths of green algae (*Ulva*) adjacent to the Caravan Park and elsewhere are indicators of eutrophication, the excess nutrients presumably derived from the adjacent shore. This occasionally results in modest blooms of blue-green algae in the same area. Many of the drains are transfer vectors for or foster the growth of a range of weed species in the foreshore zone.

KBR (2009) examined the stormwater drainage system requirements for Coffin Bay, excluding most of the foreshore zone. Design Flow (2010) identified alternative water sensitive urban design measures to reduce pollutants and erosion at coastal outfalls. However, neither report specifically considered the implications of uncontrolled overland flows from developments within the zone. The management of overland flows within or through the zone must be addressed as a matter of high priority.

4. Existing environment

The biogeography of Lower Eyre Peninsula has been described on the basis of recurring topographical, geological and biological factors by Laut *et al.* (1977), refined by Thackway and Cresswell (1995) who situate Coffin Bay in the Talia sub-region of the Eyre Peninsula Interim Biogeographic Region of Australia (IBRA). This is now the accepted national reporting unit for assessing and monitoring ecosystem status.

This section provides summary descriptions of the physical and biological environments of the sub-region that are directly applicable to implementation and reporting of the VMP.

Geology and soils

Derived from the eroded and weathered particles of older, pre-existing carbonate rocks, shell fragments and other organic materials deposited as marine sediments during various sea-level changes in the Pleistocene (1.8 million–10,000 years ago), the surface geology of Coffin Bay is characterised by soft, fine to medium-grained aeolianite dunerock or calcarenite limestone (Parker *et al.* 1985). Occurrences of chemically-precipitated limestone (calcrete) are present as harder horizons within the predominant, wind-blown calcarenite strata (Schwarz 2002).

The offshore estuary area and Long Beach are typically comprised of younger sediments reworked from the calcareous rocks and modern beaches into shallow sub-tidal to intertidal quartz and carbonate sand flats, coastal foredunes and dune sands.

The highly-erodible physical properties of dunerock have resulted in the progressive deflation, undermining and collapse of the low cliffs fronting the estuary in many areas (e.g. Crinoline Point, either side of the boat ramp and at numerous other places along the more exposed coastal frontage of the Esplanade facing Port Douglas). Causal factors are both natural and artificial or human-induced. Natural processes include wind, wave action and/or strong tidal flows, whilst human activities that can accelerate the natural processes include wash from boats, cliff face modifications such as *ad hoc* steps, indiscriminate access, loss of stabilising vegetation and uncontrolled or inadequate stormwater drainage discharge provisions.

Soils within the foreshore zone, as elsewhere in Coffin Bay, are derived from aeolian (windblown) deposition and weathering of the parent rock. This has resulted in the development of limestone sand soils that have inherently low levels of phosphorus and nitrogen and are typically deficient in most trace elements (Northcote *et al.* 1975). They are often non-wetting with low water-holding capacity.

Soil depth varies from skeletal, characterised by a large amount of surface and sub-surface rubble, boulder and float, to deep in the well-formed dunes behind Long Beach. The soils are highly susceptible to accelerated erosion by wind and/or water once the surface has been disturbed or the vegetation cover has been removed or destroyed (Wright 1985).

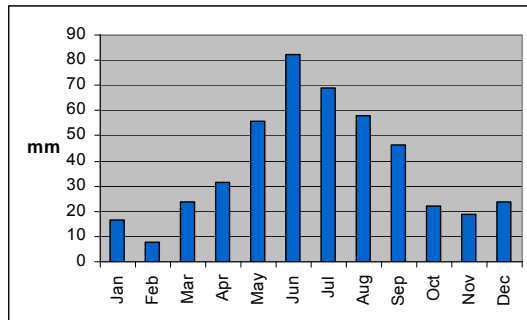
Climate

Eyre Peninsula has a well-defined Mediterranean climate characterised by warm to hot dry summers and cool, wet winters.

Seasonal positions of the mid-latitude high pressure cells are the chief determinants of the prevailing winds (Schwerdtfeger 1985). Summer winds are typically from the south-east shifting into the south-west as a moderate to fresh afternoon and evening sea breeze. Hot, dry northerlies are common occurrences, with potentially prolonged periods of extreme temperatures in excess of 36°C. Wind conditions during April and May are comparatively calm leading into winter when the prevailing winds increase in strength and shift to the south-west and north-west under the influence of low pressure cells associated with the northerly shift of the subtropical ridge. The western shoreline and cliff tops between Long Beach and Crinoline Point and the northern coastline between Snapper Point and the wharf are particularly exposed to wind and wave impacts during extreme wind conditions.

Bureau of Meteorology (BoM) rainfall data for Coffin Bay 1984–2011 (Station No. 18188) are incomplete for all but 10 years of that period. However, continuous observations by the author and others since 2002 and the BoM data are broadly consistent, recording a mean annual rainfall of 494mm, about 70% of which typically falls between May and September each year (Figure 3). Evaporation is high with mean monthly evaporation typically exceeding median monthly rainfall except during winter.

Figure 3—Mean monthly rainfall distribution 2002–2011



CSIRO climate change projections for Eyre Peninsula in Whetton (2001) are for a 1.5°C increase in average temperatures by 2030, which is likely to result in more days of extreme (i.e. >36°C) temperature than are experienced at present. Suppiah *et al.* (2006) suggest that rainfall will be up to 12% lower in winter and 20% in spring with corresponding increases in the already high rate of evaporation. Extreme wind conditions are also predicted to increase, exacerbating the present impacts on exposed coastlines and adjacent residential areas.

Terrestrial vegetation

Only limited biological surveys have been undertaken at regional level (DEH 2002), and no comprehensive published vegetation data or mapping of vegetation communities specific to the foreshore zone have been identified. Appendix B, Table B1 lists the 150 locally indigenous native vascular plant species recorded in the zone by various Coffin Bay LECCA members. Species nomenclature follows ABRS (2010a.). Fifty-one introduced native and pest plant (weed) species have also been recorded and are listed in Appendix B, Table B2.

Three structural terrestrial vegetation units from Milne *et al.* (2008) have been recognised in the zone and are referred to in this plan. They are depicted in Figure 4 and are namely:

- Coastal mallee/low Dryland Tea-tree woodland;
- Coastal dune and cliff vegetation; and
- Saline swamp (saltmarsh) vegetation.

Coastal Mallee/low Dryland Tea-tree woodland

Coastal Mallee/low Dryland Tea-tree woodland is the predominant vegetation unit, occupying approximately 80% of the zone.

Overstorey trees comprise Coastal White Mallee (*Eucalyptus diversifolia* ssp. *diversifolia*), Dryland Tea-tree (*Melaleuca lanceolata*), Drooping Sheoak (*Allocasuarina verticillata*) and Swamp Paperbark (*M. halmaturorum*) in varying proportions of representation and canopy dominance. Other trees occurring less frequently or existing as isolated examples in the overstorey include Mallee Box (*E. porosa*), Kingscote Mallee (*E. rugosa*) and Quandong (*Santalum acuminatum*).

The understorey contains a diverse and, in parts, dense range of characteristic low coastal sclerophyll shrub species such as Limestone Wattle (*Acacia leiophylla*), Golden Wattle (*A. pycnantha*), Cockies Tongue (*Templetonia retusa*), Coast Bearded-heath (*Leucopogon*

parviflorus), Velvet-bush (*Lasiopetalum discolor*), Sea Box (*Alyxia buxifolia*), Sea-berry Saltbush (*Rhagodia candolleana*) and Coast Ground-berry (*Acrotriche cordata*).

The ground stratum is widely disparate in condition ranging from poorly developed within built-up areas to diverse and well-established in areas of relatively intact vegetation. Ground level species include orchids (*Caladenia* spp., *Prasophyllum elatum* and *Pterostylis* spp.), Correa (*Correa pulchella*, *C. reflexa*), Fan Flower (*Scaevola* spp.), Everlastings (*Helichrysum* and *Chrysocephalum* spp.) and various sedge and tussock species such as Limestone Saw-sedge (*Gahnia deusta*), Black-grass Saw-sedge (*G. lanigera*), Coast Sword-sedge (*Lepidosperma gladiatum*) and Flax Lily (*Dianella brevicaulis*, *D. revoluta* var. *revoluta*). Several species of the grasses *Austrostipa* and *Austrodanthonia* (spear and wallaby grasses) are also common.

Coastal dune and cliff vegetation

The coastal dune and cliff vegetation unit has been classified as Acacia/Coast beard-heath low shrubland/tussock grassland. It occurs in the dunes behind Long Beach, along the coastal cliff tops and along the essentially cleared coastal verge of the Esplanade between the boat hire and the parking area opposite Aleppo Avenue. The most diverse vegetation is found in the stable dunes and on protected cliff tops, with the least species diversity and abundance being on exposed sites where the vegetation may also be relatively dwarfed in form.

Typical dune species include Short-leaved Wallowa (*Acacia nematophylla*), Coastal Wattle (*A. longifolia* var. *sophorae*), Coastal Umbrella Bush (*A. cupularis*), Coast Bearded-heath and Coast Daisy-bush (*Olearia axillaris*). Pigface (*Carpobrotus rossii*), Knobby Club-rush (*Ficinia nodosa*) and Coast Sword-sedge are common ground stratum species.

Dryland Tea-tree (dwarfed form), Common Boobialla (*Myoporum insulare*), Nitre-bush (*Nitraria billardierei*), Coast Saltbush (*Atriplex cinerea*) and Coast Speargrass (*Austrostipa stipoides*) are commonly found along the cliff tops. The introduced Sea Lavender (*Limonium companyonis*) is a particularly abundant and aggressive coloniser along many of the cliff-top margins.

Saline swamp (saltmarsh) vegetation

Saltmarsh vegetation is represented by the low samphire shrubland in the pair of small, intermittently-inundated salt marshes on either side of Sandpiper Court. Saunders (2008a.) recorded that *Tecticornia arbuscula* is the largest samphire shrub present, particularly on the seaward side of the footbridge over the eastern saltmarsh, with smaller *T. halocnemoides* scattered over the part of western saltmarsh that is furthest from the sea. Between the upper intertidal and supratidal levels *Sarcocornia quinqueflora* is widespread and very common, whilst *S. blackiana* is much less so and generally found just above the high tide mark. Common species in the most low-lying parts include *Suaeda australis*, *Frankenia pauciflora* (and occasionally *F. sessilis*), *Hemichroa pentandra* and *Wilsonia humilis*. Extensive areas of samphire have been displaced by rapidly-colonising Sea Lavender.

The higher parts of the swamps support a low open woodland of Swamp Paperbark (*Melaleuca halmaturorum*) and Salt Honey-myrtle (*M. brevifolia*). Typical fringing species that grade into the surrounding mallee include Drooping Sheoak, Coastal Umbrella Bush, Native Apricot (*Pittosporum angustifolium*), Quandong, Ruby Saltbush (*Enchylaena tomentosa* var. *tomentosa*), Marsh Saltbush (*Atriplex paludosa*) and Sea-berry Saltbush.

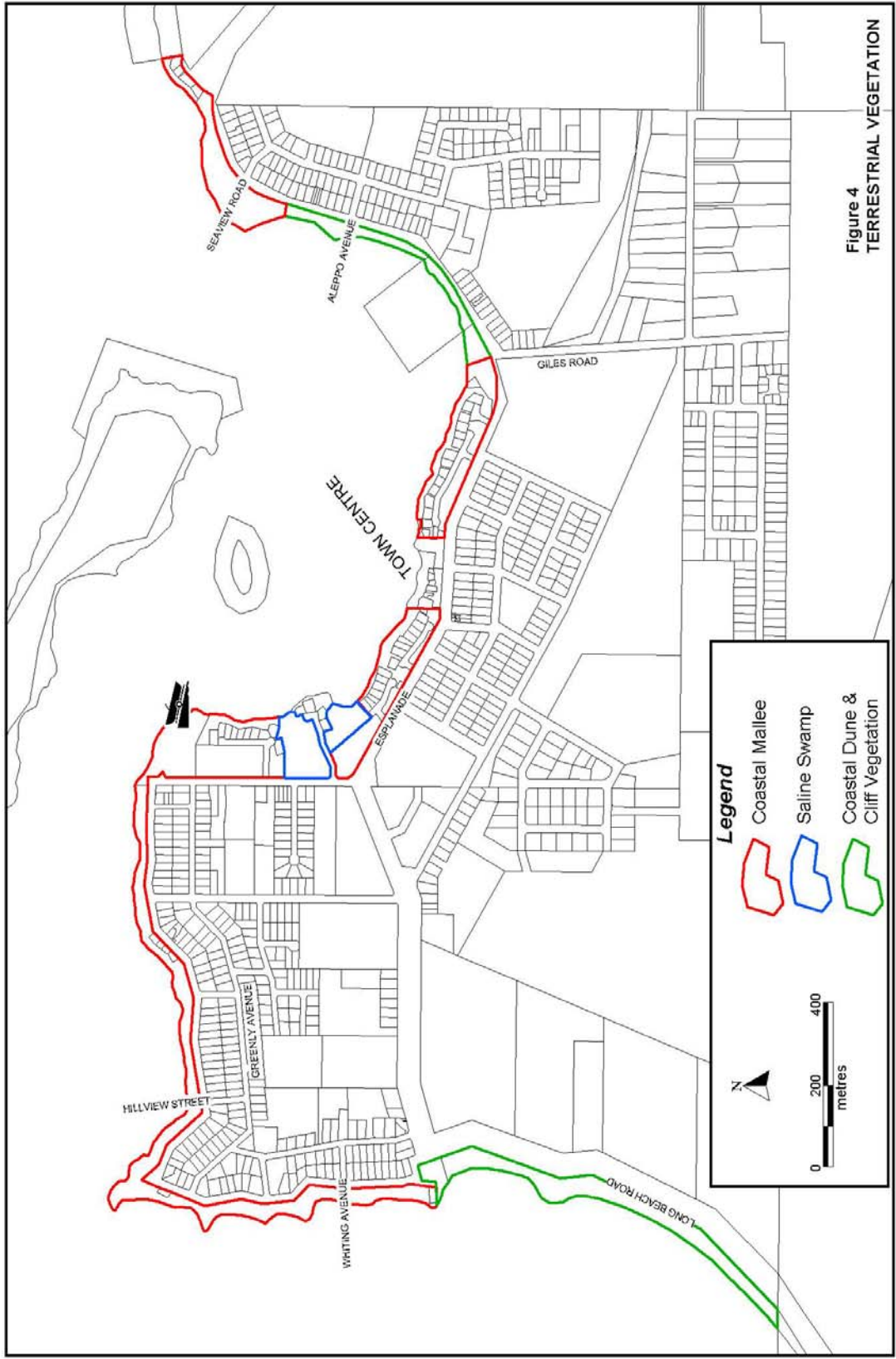


Figure 4
TERRESTRIAL VEGETATION

Fauna

The coastal foreshore zone provides habitat for a myriad of invertebrate species (insects, spiders, snails, worms etc.) which, in turn, support the vertebrate fauna. A total of 77 vertebrate fauna species have been recorded in or are potentially found in habitats available in the foreshore vegetation and immediately adjacent areas. These include:

- nine mammals (including four introduced problem/pest species);
- 44 terrestrial birds (two species listed as “rare” at state level, one “vulnerable” and three introduced pest species);
- one amphibian; and
- 24 reptiles (including two species listed as “rare” at state level and one endemic to Eyre Peninsula).

The species are listed in Appendix B, Table B3. Nomenclature follows ABRS (2010b.).

5. Management framework

Land tenure, the pattern of development, natural characteristics, conservation values, threats to and uses of the foreshore lend themselves to a management strategy based on defined zones in which stakeholders can address the various issues. The aim of this zoning scheme would be to provide a management framework for human uses of the foreshore that do not conflict with each other and that are compatible with the overall need to conserve and, where appropriate, enhance the natural environment. It would also assist Council coordination of stakeholder actions and, where necessary, the allocation or securing of resources including grant funds.

The following four management zones are indicated, namely:

- Residential (shack);
- Tourism and recreation;
- Natural; and
- Conservation.

The distribution of these zones is depicted in Figure 5. The proposed management strategy, constraints and priority actions for each zone are presented in Table 2.

Residential (shack) zone

This zone encompasses the existing residential precincts between the shoreline and the Esplanade in which several highly invasive environmental weeds have begun to naturalise within the zone both along the cliffs and in the vegetation between the shacks and the Esplanade. If left unchecked many of these species (notably *Polygala*, *Diosma*, feral Olive and Aleppo Pine) have the ability to quickly spread throughout all zones and significantly increase the fire risk. The management aim for the zone should thus be to protect the integrity, viability and visual amenity of native vegetation and the adjacent waterway from adverse impacts of human activity through appropriate development and access controls, rehabilitation of degraded areas and increased budgetary provisions for weed eradication and understorey vegetation maintenance.

Community education and acceptance about the legal status of native vegetation and the benefits of better conserving the remnant vegetation in the zone will be essential. This includes the illegality of clearing vegetation on Crown land, not extending gardens or parking areas beyond property boundaries, informed use of garden and container plants and not allowing garden plants to “escape”.

Development Plan control principle (PDC 9) for the Coastal (Coffin Bay) Zone is particularly relevant in that development within the foreshore zone should be “*designed, sited and constructed to maximise the retention of existing trees and shrubs*” (DCLEP 2011). Development approval conditions should include the prohibition on the offsite placement or disposal of building materials and excess excavated spoil over intact vegetation. Data sheets on appropriate plant species would also be beneficial, distributed with planning consents.

Fire risk assessment and management is a key issue to properly inform residents’ bushfire action plans. Management issues to be addressed should include strategic access for fire fighters, fire escape routes, *ad hoc* vehicle access restrictions, understorey maintenance and measures to counter the dumping of garden refuse, building debris and general rubbish.

Tourism and recreation zone

This zone is essentially the “window” to Coffin Bay, encompassing the narrow strip of clifftop land fronting the Esplanade between the carpark opposite Aleppo Avenue and the boat hire facility; the community open-space of the town centre precinct; the boat ramp and associated amenities; the Oyster Walk corridor and the picnic areas at Snapper and Crinoline points and adjacent to Hillview Street. The management aim of this zone should be to concentrate recreational and tourism use in existing highly-modified areas that allow for a high standard of year round vehicle access and minimises the impact of visitors on the environment. However, protection and enhancement of the remnant native vegetation should still be seen as an essential issue, both ecologically and as an element of the streetscape.

Surface stormwater drainage management, cliff stability, shoreline access, car parking and picnic area delineation and enhancement, weed management, the ongoing health and integrity of the River Red Gum along the Esplanade and the incorporation of indigenous native vegetation into visual (streetscape) amenity planting are key elements that need to be considered. A development master plan for the zone would be beneficial to both visual amenity and vegetation management.

Conservation zone

This zone covers each of the two salt marshes and their associated roadside margins.

The management aim of this zone should be to restore and protect the ecological integrity of the marshes from development. A Heritage Agreement over the zone would be an expeditious method by which this could be achieved.

Only pedestrian access should be permitted, ideally by way of a constructed boardwalk with interpretive signage as an adjunct to the Oyster Walk. On-ground works include weed eradication within the marshes and rehabilitation of the margins.

Measures to reduce the volume of stormwater runoff in the catchments prior to outfall into the marshes would greatly benefit the marsh ecology as would any opportunities for water quality improvement such as an infiltration basin with upstream inlet rain gardens as suggested in Design Flow (2010). Outfalls into the marshes may need to incorporate gross pollutant traps, noting that they will need ongoing maintenance to remove accumulated debris and sediment.

Natural zone

This zone encompasses the remainder of the foreshore vegetation not incorporated in the previous zones. The management aim of this zone should be to maintain and enhance the existing mosaic of vegetation associations and fauna habitats for both the intrinsic ecological values they represent and as the natural corridor for the Oyster Walk. The need to “*preserve and protect the predominantly natural and densely vegetated character of those parts of the zone to the west of the boat ramp and north-east of the oyster processing facility*” (essentially Snapper Point to Paradise Court) is recognised in PDC 23 (DCLEP 2011).

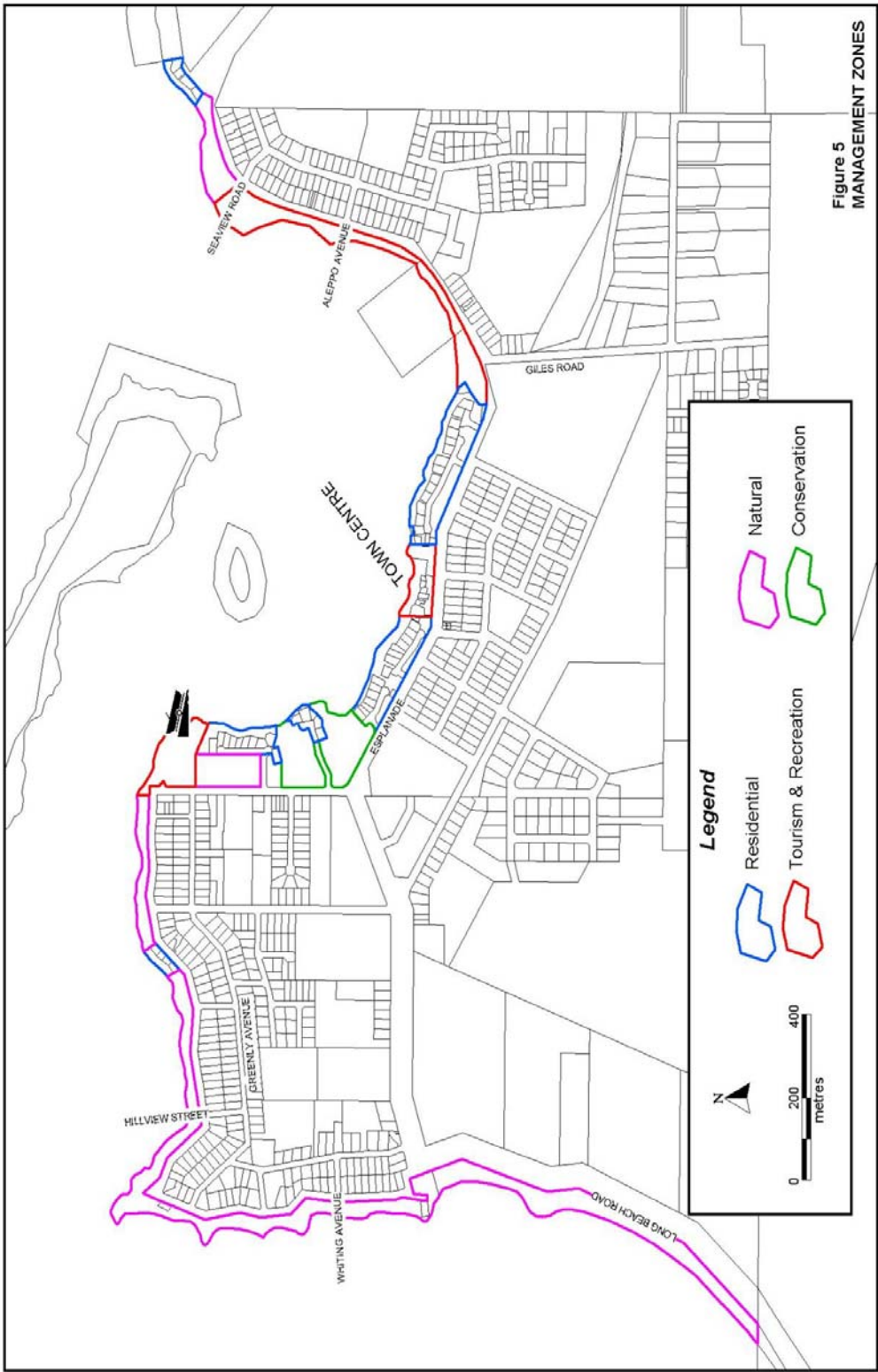


Figure 5
MANAGEMENT ZONES

Numerous *ad hoc* tracks have evolved through this zone with subsequent degradation of the native vegetation through trampling, illegal clearing, accelerated erosion and encroachment by weeds. Being typically poorly-formed and un-maintained, the tracks present potential safety issues for persons heading to the shoreline, particularly along the cliff areas or down embankments, with consequent public liability considerations for Council.

Access to the zone should be on foot except where formed car parks are provided at scenic vantage points, recreational fishing facilities and at Long Beach. Unauthorised camping and with it the potential for inappropriate waste disposal also needs to be addressed.

Pest plant and animal control and access rationalisation are the major issues and cost for management of this zone.

Revegetation framework

The purpose of any revegetation identified in this plan is to redress the encroachment of weeds and to minimise the risks from accelerated erosion by wind and water. Areas of broad-scale weed eradication in which the risk of weed reinfestation needs to be minimised and other physically degraded areas such as those in which bare, actively eroding surfaces have been created are prime examples. It is not a means by which existing vegetation communities will be augmented, although revegetation with like species or encouraging natural regeneration may be appropriate where vegetation has been illegally cleared.

The guiding principles for any revegetation works should be that:

- plant species at maturity will not obstruct existing coastal views from adjacent properties based on the coastal views existing as of 19 April 2013 (refer Note 1);
- revegetation shall not exacerbate the fire risks identified in the regional bushfire management plan;
- revegetation will typically be with indigenous groundcovers and shrubs having a mature height about 1.5–2 m and judiciously-placed trees to provide “filtered” views, noting that illegally cleared vegetation post 19 April 2013 may be replaced by like species that may be taller (refer Note 1); and
- in accordance with current protocols any revegetation works on Council-managed land will require approval via an Application to Undertake Works;
- Revegetation and the removal of dead and fallen timber will be deferred pending assessment by Council of a Bushfire Risk Assessment report for the area from the boat ramp to Crinolin Point (refer Note 1).

Suggested revegetation species are listed in Table 1 (CFS fire resistant species (*)).

Table 1—Suggested revegetation species

Species	Common name	Species	Common name
<i>Acacia anceps</i>	Flat-stemmed Wattle	<i>Myoporum insulare</i> (*)	Common Boobiialla
<i>Adriana quadripartita</i>	Coast Bitterbush	<i>M. parvifolium</i> (*)	Creeping Boobiialla
<i>Carpobrotus</i> spp. (*)	Pigface	<i>Olearia axillaris</i> (*)	Coast Daisy-bush
<i>Correa reflexa</i>	Native fuchsia	<i>O. pimeleoides</i>	Showy Daisy-bush
<i>Dianella revoluta</i>	Spreading Flax Lily	<i>O. ramulosa</i>	Twiggy Daisy-bush
<i>Dodonaea viscosa</i>	Sticky Hop-bush	<i>Pomaderris obcordata</i>	Wedge-leaved Pomaderris
<i>Enchylaena tomentosa</i> (*)	Ruby Saltbush	<i>Rhagodia candolleana</i>	Seaberry Saltbush
<i>Goodenia varia</i>	Sticky Goodenia	<i>Scaevola crassifolia</i>	Cushion Fanflower
<i>Kennedia prostrata</i> (*)	Running Postman	<i>Templetonia retusa</i>	Cockie’s tongue
<i>Lasiopetalum discolor</i>	Velvet Bush	<i>Threlkeldia diffusa</i>	Coast Bonefruit
<i>Logania crassifolia</i>	Coast Logania	<i>Zygophyllum billardierei</i>	Coast Twinleaf

Note 1 – reference to 19 April 2013 and deferment of revegetation and timber removal added by Council Resolution W170 (8) – DCLEP Council Meeting held on 19 April 2013.

Table 2—Foreshire vegetation management zones

Zone	Objective	Management strategy	Access	Developments	Recommended priority actions
RESIDENTIAL (SHACK) ZONE	To limit the impacts of residential development and urban-type land use.	Encourage property owners to control weeds and replace potentially invasive garden plant species.	Access confined to formed roads and pathways.	Developments and clearing contained within property boundaries.	Weed and erosion control. Fire risk assessment and management plan. Community education to counter unlawful vegetation clearance and dumping. Coastal and roadside vegetation protection and rehabilitation.
TOURISM & RECREATION ZONE	To enable residents and visitors to access a range of recreational resources in a convenient and safe fashion.	Concentrated recreational use in areas with infrastructure and management appropriate to keep impacts at acceptable levels.	Formalised access for conventional vehicles (including caravans and motor homes at designated sites).	Boat ramp, Town Centre, replacement fishing jetties at Snapper Point and Crinoline points, Oyster Walk, interpretive signage, car parks, picnic areas and shoreline lookouts.	Weed and erosion control. Stormwater management Rationalisation, improvement and rehabilitation of <i>ad hoc</i> coastal car parks.
CONSERVATION ZONE	To protect the salt marshes from development and conserve their biological integrity.	Formal protection and conservation	Peripheral pedestrian access only as a deviation of the Oyster Walk.	Perimeter boardwalk and interpretive signage.	Heritage Agreement. Stormwater drainage controls. Weed control.
NATURAL ZONE	To maintain the diversity of species and habitats within the coastal mallee, dune and cliff vegetation associations.	Dispersed recreational use based on the Oyster Walk and a limited number of access points through intact vegetation.	Pedestrian and wheel chair access only along the Oyster Walk.	Oyster Walk. Interpretive signage. Formalised car parking at shoreline lookouts.	Fire risk assessment and management plan. Pest plant and animal control. Rationalisation and rehabilitation of <i>ad hoc</i> paths. Weed and erosion control. Community education to counter unlawful vegetation clearance and dumping

6. Recommended actions and priorities

This section presents a series of recommended management actions for each of the foreshore vegetation management zones together with their respective priorities that have been assigned as follows:

- On-going:** Already established and essential actions to be continued to achieve the stated zone objectives.
- High:** Imperative actions to achieve the stated zone objectives.
- Medium:** Very important actions to achieve the stated zone objectives but subject to the availability of resources.
- Low:** Desirable actions that would only be undertaken if the necessary resources are available or other stated conditions can be fulfilled.

The action plans recognise that much of the on-ground work will have to be undertaken by volunteer community groups supported by Council and other Government agencies where the tasks are beyond the physical or technical capabilities of those groups. It is acknowledged that some aspects of the respective plans may prove difficult to manage in an urban-type environment and that implementation is almost totally dependent on community and other stakeholder support and co-operation. This should be accepted as a challenge rather than an excuse for inaction or deferral.

Co-ordination and management

Goal: To provide for Council co-ordination and implementation of vegetation management actions within the foreshore zone.

<u>Action</u>	<u>Priority</u>
Work with Lower Eyre Peninsula Bushfire Management Committee (LEPBMC) and SACFS to incorporate a specific bushfire risk assessment and mitigation strategy for Coffin Bay in the regional bushfire management plan.	High
Develop a weed management strategy with short and long term goals.	High
Develop and implement a community education strategy to address the threat issues for native vegetation identified in this plan	High
Establish sites to monitor changes associated with on-ground works at key sites incorporating photo-points and using bushland condition monitoring indicators.	High
Identify specific vegetation management activities in annual budgets.	High/Medium
Ensure impacts on foreshore vegetation are addressed in strategic, capital works, development, infra-structure and asset maintenance and fire management plans.	Medium
Finalise the Coffin Bay stormwater management plan to incorporate both engineering services and discharge water quality improvements.	Medium
Maintain liaison with and between community stakeholder groups and Government agencies in order to ensure actions are co-ordinated and effective.	On-going
Obtain technical/scientific advice from applicable Government agencies in order to assist natural resources management of the foreshore zone.	On-going
Facilitate applications for grant funds for vegetation and other associated natural resources management activities by community groups.	On-going

Residential (shack) zone

Goal: To retain the integrity, viability and visual amenity of native vegetation from the impacts of human habitation.

<u>Action</u>	<u>Priority</u>
Control weeds, particularly Aleppo Pine, Polygala, Diosma, and feral Olive.	High
Undertake specific on-ground works and implement strategies identified by the LEPBMC and SACFS for Coffin Bay in the regional bushfire management plan. Revise the VMP as necessary.	High
Address inherent vegetation issues in development applications and approval conditions with particular emphasis on landscape planting and any need to trim or remove vegetation external to property boundaries for construction access or building clearance.	High
Address <i>Native Vegetation Act</i> compliance, boundary encroachment, waste dumping, vehicle/trailer parking and off-road vehicle use in the context of community education.	High/on-going
Increase maintenance of the roadside vegetation corridor, remove potential havens for vermin and pest animals, assist litter control and improve visual amenity through the town centre.	Medium/on-going
Relieve compaction in bare areas and consider replanting with endemic shrubs and ground cover plants to assist infiltration of stormwater.	Medium
Educate the community on appropriate garden plant species for coastal areas and encourage the replacement of inappropriate or risk species.	Medium
Install appropriate barriers to off-road vehicle access where necessary in the context of visual amenity, traffic management and vegetation protection.	Low

Tourism and recreation zone

Goal: To minimise potentially adverse impacts on native vegetation from tourism and recreation developments/ activities.

<u>Action</u>	<u>Priority</u>
Control weeds.	High/On-going
Monitor surface erosion during winter and mitigate/remediate as required.	High/On-going
Monitor by professional arborist inspection the health and integrity of the Esplanade River Red Gums.	High/On-going
Formally delineate car parks. Install barriers to or implement other mechanisms to prevent vehicle parking on the Oyster Walk (including at adjacent residences).	High
In conjunction with the Community Reference Group formulate a development and landscaping master plan for foreshore tourism and recreation assets such as lookouts, picnic areas and car parks.	High
Revegetate bare areas bordering the Oyster Walk including cliff tops, road embankments and stormwater catch banks to stabilise and reduce sediment flow and weed infestation.	Medium
Give priority to stormwater drainage, erosion control and water quality for this zone in the context of implementing an appropriate stormwater management strategy for Coffin Bay.	Medium

Tourism and recreation zone (cont.)

Action

Construct shoreline access stairs (coast protection) north of the boat ramp. Rationalise access and install directional signage to guide people to the beach via the most appropriate route in the interim.

Priority

Medium

Install signage at access points to the Oyster Walk to encourage people to control and clean up after their dogs.

Medium

Conservation zone

Goal: To protect and conserve the biological integrity of the salt marshes

Action

Protect the salt marsh complex by Heritage Agreement.

Priority

High

Control weeds.

High

Implement stormwater runoff controls and water sensitive bio-remediation measures to minimise adverse freshwater impacts on samphire vegetation.

Medium

Install interpretive signage relating to the flora and fauna of the saltmarshes adjacent to the Oyster Walk.

Low

Construct a perimeter boardwalk as a tourism feature and to protect the marsh ecology from pedestrian impact.

Low

Natural zone

Aim: To maintain and enhance the existing mosaic of vegetation associations and fauna habitats.

Action

Develop a weed management strategy to prioritise weed eradication in the short and long term.

Priority

High/On-going

Monitor and control weeds, especially invasive environmental weeds.

High/On-going

Monitor the spread and effectiveness of biological control agents for Bridal Creeper and enhance as appropriate.

High/On-going

Maintain the Oyster Walk corridor through extant vegetation to the minimum width necessary for safe pedestrian access (including disabled).

High/On-going

Undertake specific on-ground works and implement strategies identified by the LEPBMC and SACFS for Coffin Bay in the regional bushfire management plan. Revise the VMP as necessary.

High

Close and rehabilitate a number of car and pedestrian access ways as assessed and approved by the District Council, whilst providing safe, signposted pedestrian access at strategic (popular) access points to the shoreline (refer Note 2).

High

Control problem animals (especially rabbits).

Medium

Implement measures to control unauthorised camping.

Medium

Protect and maintain habitat features including natural fallen timber, leaf litter and dead vegetation whilst undertaking selective removal of dead wood.

Medium/Low

Control erosion

On-going

Encourage owners to control and clean up after their dogs.

On-going

Note 2 – methodology and assessment of the closure of car and pedestrian access ways added by Council Resolution W170 (8) – DCLEP Council Meeting held on 19 April 2013. As of 19 April 2013 Figure 6 is a reference map and does not delineate specific locations for closure of access ways.

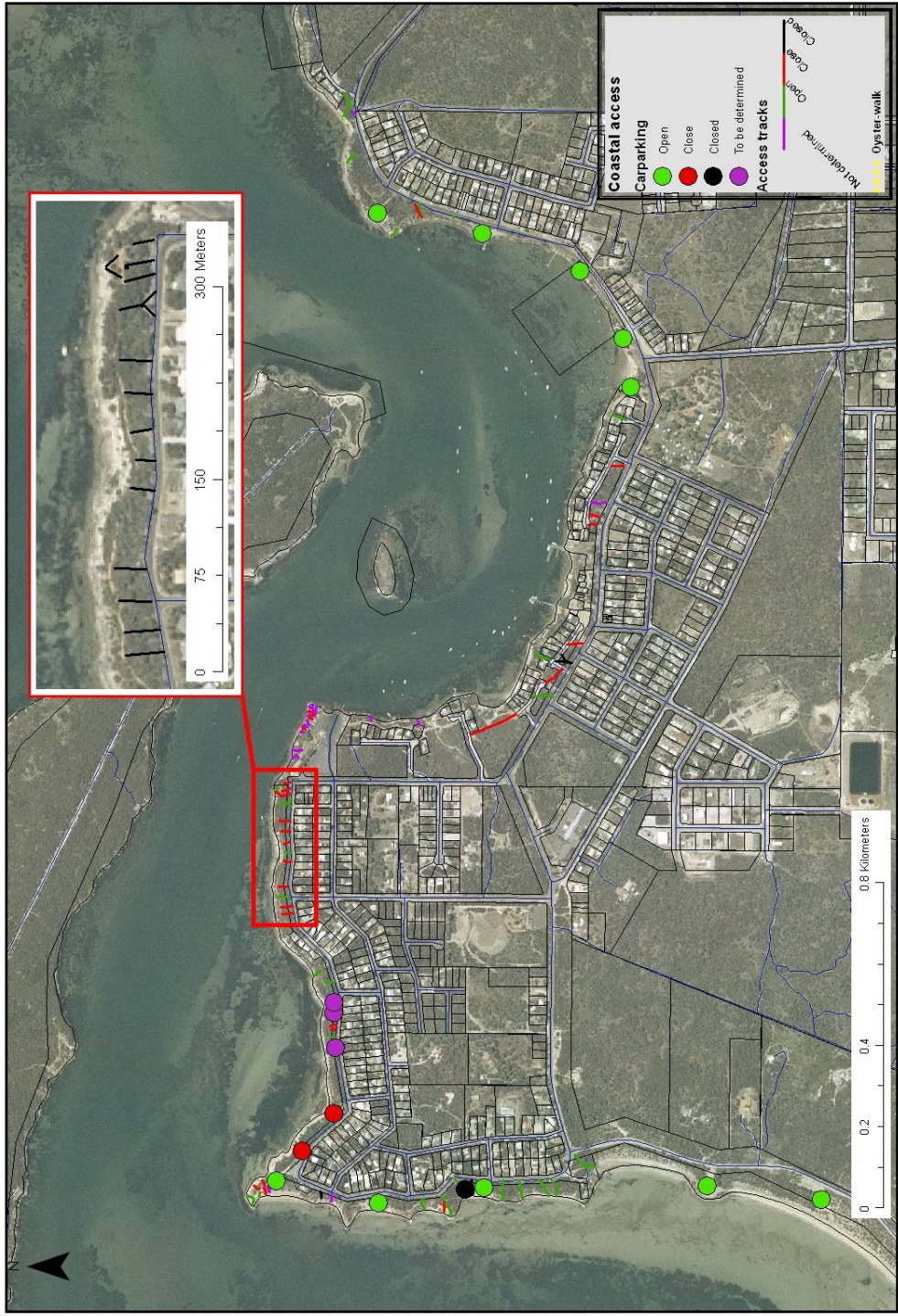


Figure 6: Coastal access, pedestrian and vehicle.

7. Monitoring and evaluation

In order to engender support and involvement, the wider community needs assurance that the management actions of the plan are both necessary and working effectively. An essential element of the plan is thus the assessment of its goals, objectives and actions to ensure that they remain relevant and achievable or need to be modified within both the context of the VMP and the wider foreshore management plan.

It is a two stage process in which qualitative and quantitative spatial and seasonal (temporal) information from on-ground observations and fixed-point photography is firstly collected and recorded (monitoring) and then evaluated to determine the quality, value and/or priority of each activity whether it is proposed, on-going or completed. This in turn leads to better targeting of on-ground works, identifies budgetary requirements and supports applications for funding. The recorded data also contribute to regional and state natural resources knowledge, validate legislative compliance and assist in the identification of external influences on the health of the foreshore vegetation that may require remedial action through other plans and/or intervention programmes.

Data collection and recording

Natural resources data collection and monitoring is envisaged to be undertaken primarily by LECCA members and, where appropriate, Council works supervisors and maintenance staff using simple data collection sheets for consistency. The data should be managed by LECCA, for evaluation, recording and reporting to Council.

Example revegetation and vegetation monitoring data collection sheets are at Appendix C.

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Appendix A

**LEGISLATION/POLICIES/
STRATEGIES AND PLANS
APPLICABLE TO
VEGETATION MANAGEMENT
OF THE FORESHORE ZONE**

LEGISLATION/POLICIES/STRATEGIES AND PLANS APPLICABLE TO VEGETATION MANAGEMENT OF THE FORESHORE ZONE

State	Application
<i>Crown Lands Act 1929</i>	Devolution to Council of responsibility for vegetation management on Crown land under its care and control.
<i>Crown Land Management Act 2009</i>	Requires that the principles of ecological-sustainability must be observed in the management and administration of Crown land.
<i>Coast Protection Act 1972</i>	Provisions for coastline conservation and protection.
<i>National Parks and Wildlife Act 1972</i>	Declaration of sanctuaries for flora and fauna conservation.
<i>Native Vegetation Act 1991</i>	Regulatory control of native vegetation clearance. Part 5, Div 1, S26, S27, S28 and S29, and Schedule 1, Principles 1(b) and 1(g) are particularly relevant.
<i>Native Vegetation Regulations 2003</i>	Identifies circumstances and conditions under which exemptions from native vegetation clearance controls may be granted.
<i>Development Act 1993</i>	Authority for Council to plan and regulate development.
<i>Fire and Emergency Services Act and Regulations 2005</i>	Identifies responsibilities and duties for fire management on Crown and private land
<i>Local Government Act 1999</i>	Requirements for the preparation of management plans for Crown land under the care and control of Council.
<i>Natural Resources Management Act 2004</i>	Provisions for the development of an integrated system for natural resources management, including pest plant and animal controls.
<i>Local Government (Stormwater Management) Amendment Act 2007</i>	Requires Council to prepare a stormwater management plan to meet environmental and sustainability objectives.
<i>State Natural Resources Management Plan</i>	State level strategic policy for natural resources management and the framework for regional planning and investment.
<i>South Australia's Strategic Plan 2007</i>	Objective 3: Attaining sustainability includes four biodiversity targets.
<i>No Species Loss—A Biodiversity Strategy for South Australia 2007–2017</i>	Key policy for the protection of biodiversity in the State and is applicable to the foreshore zone (and elsewhere).
<i>Tackling Climate Change: South Australia's Greenhouse Strategy 2007–2020</i>	Relates to sustainable management of natural resources. Includes requirements to assess potential risks associated with climate change influences on native and invasive species.
<i>South Australian Biosecurity Strategy 2008–2013 (Draft)</i>	Presents a Biosecurity risk management framework through a summary review of threats posed by pest plants and animals in the State, plus potential implementation requirements. The strategy is applicable to the foreshore zone (and elsewhere).
<i>Environmental Protection (water quality) Policy 2003</i>	Water quality of urban stormwater discharge.

Regional	
<i>Eyre Peninsula NRM Plan (2009)</i>	Regional plan and investment strategy for natural resources management including vegetation conservation, coastal protection and pest plant and animal control.
<i>Lower Eyre Peninsula Bushfire Management Plan</i>	Identifies regional bushfire risks and mitigation strategies
Local	
<i>DCLEP Development Plan</i>	Identifies council-wide (CW) and zone-specific objectives and principles of development control (PDC) relating to the retention and protection of native vegetation. CW Objectives 40–45, 48–50, 52, 53 and PDC 84–92, and Coastal (Coffin Bay) Objectives 5, 6 and PDC 9,16,22,23 are particularly relevant.
<i>DCLEP Strategic Plan 2012–2021</i>	Identifies sustainable natural resources use and management as a strategic objective and commits Council to support and work cooperatively with EPNRM and other appropriate agencies to achieve this objective.
<i>DCLEP Asset and Infrastructure Management Plan (in prep.)</i>	Needs to address stormwater drainage management, parking areas, community amenities and Oyster Walk maintenance within the foreshore zone.
<i>DCLEP annual business plans</i>	Identifies budget provisions for capital works and on-going Council services affecting the VMP.
<i>DCLEP Foreshore Management Plan (to be prepared)</i>	Strategic Plan commitment. This VMP will form a component of the overall management plan

Appendix B

SPECIES LISTS

Appendix B

SPECIES LISTS

Table B1—Terrestrial vascular plant species recorded in the foreshore zone (excluding weeds)

Species	Common name	Conservation status	
		State [#]	EP
<i>Acacia anceps</i>	Flat-stemmed Wattle		
<i>A. leiophylla</i>	Limestone Wattle		
<i>A. cupularis</i>	Coastal Umbrella Bush		
<i>A. longifolia</i> var. <i>sophorae</i>	Coastal Wattle		
<i>A. myrtifolia</i>	Myrtle Wattle		
<i>A. nematophylla</i>	Short-leaved Wallowa		
<i>A. paradoxa</i>	Kangaroo Thorn		
<i>A. pycnantha</i>	Golden Wattle		
<i>A. rupicola</i>	Rock Wattle		
<i>A. spinescens</i>	Spiny Wattle		
<i>A. triquetra</i>	Mallee Wreath Wattle		
<i>Acrotriche cordata</i>	Coast Ground-berry		
<i>A. patula</i>	Shiny Ground-berry		
<i>Adriana quadripartita</i>	Coast Bitterbush		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyogyne huegelii</i>	Lilac Hibiscus		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Asteridea athrixioides</i>	Wirewort		
<i>Astroloma conostephioides</i>	Flame Heath		
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>A. paludosa</i>	Marsh Saltbush		
<i>Austrodanthonia</i> spp. *	Wallaby grasses		
<i>Austrostipa elegantissima</i>	Elegant Speargrass		
<i>A. nodosa</i> *	Speargrass		
<i>A. scabra</i> *	Speargrass		
<i>A. stipoides</i>	Coast Speargrass		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i>	Sweet Apple-berry		
<i>B. sericea</i> *	Apple-berry		
<i>B. uniflora</i>	Apple-berry		
<i>Bulbine semibarbata</i>	Small Bulbine Lily		
<i>Burchardia umbellata</i>	Bulbine Lily		
<i>Bursaria spinosa</i>	Christmas Bush		
<i>Caladenia cardiochila</i>	Heart-lip Spider-orchid		
<i>C. latifolia</i>	Pink Ladies		
<i>Callitris canescens</i>	Scrubby Cypress-pine		
<i>Calytrix tetragona</i>	Fringe Myrtle		
<i>Carpobrotus rossii</i>	Pigface		
<i>Cassytha glabella</i>	Snotty-gobble		

Species	Common name	Conservation status	
		State#	EP
<i>C. peninsularis</i>	Strangle Vine		
<i>Chrysocephalum apiculatum</i>	Common Everlasting		
<i>Clematis microphylla</i>	Old man's Beard		
<i>Comesperma volubile</i>	Love Creeper		
<i>Convolvulus erubescens</i>	Australian Bindweed		
<i>Correa pulchella</i>	Red Bells		
<i>C. backhouseana</i> var. <i>coriacea</i>	Native Fuchsia		
<i>Comesperma volubile</i>	Love Creeper		
<i>Corysanthes despectans</i>	Coast Helmet Orchid		
<i>Craspedia glauca</i>	Bachelors Buttons		
<i>Crassida</i> spp.	Yellow Billy-button		
<i>Cyrtostylis robusta</i>	Winter-flower Gnat Orchid		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>D. revoluta</i> var. <i>revoluta</i>	Spreading Flax-lily		
<i>Disphyma crassifolium</i>	Round-leaved Pigface		
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush		
<i>Drosera auriculata</i>	Tall Sundew		
<i>D. planchonii</i>	Sundew		
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush		
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum		
<i>E. diversifolia</i> ssp. <i>diversifolia</i>	Coastal White Mallee		
<i>E. porosa</i>	Mallee Box		
<i>E. rugosa</i>	Kingscote Mallee		
<i>Eutaxia microphylla</i>	Mallee Bush Pea		
<i>Exocarpos cupressiformis</i>	Native Cherry		
<i>E. syrticola</i>	Slender Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Frankenia pauciflora</i>	Common Sea-heath		
<i>F. sessilis</i>	Sea-heath		
<i>Gahnia deusta</i>	Limestone Saw-sedge		
<i>G. lanigera</i>	Black-grass Saw-sedge		
<i>Goodenia affinis</i>	Silver Goodenia		
<i>G. geniculata</i>	Yellow Goodenia		
<i>G. glabra</i>	Smooth-leaved Goodenia		
<i>G. varia</i>	Sticky Goodenia		
<i>Goodia lotifolia</i>	Clover Tree		
<i>Hakea vittata</i> *	Striped Hakea		
<i>Hardenbergia violacea</i>	Native Lilac		
<i>Helichrysum leucopsidium</i>	Coast Everlasting		
<i>Hemichroa pentandra</i>	Trailing Hemichroa		
<i>Hibbertia riparia</i>	Erect Guinea-flower		
<i>Hypoxis pusilla</i>	Star Lily		
<i>Ixodia achillaeoides</i> **	Sand Ixodia	E	
<i>Kennedia prostrata</i>	Running Postman		
<i>Lasiopetalum discolor</i>	Velvet Bush		

Species	Common name	Conservation status	
		State [#]	EP
<i>Laurencia squamata</i>	Thorny Lawrenceia		
<i>Lepidosperma carphoides</i>	Sedge		
<i>L. gladiatum</i>	Coast Sword-sedge		
<i>L. viscidum</i>	Sedge		
<i>Leucophyta brownii</i>	Coast Cushion-bush		
<i>Leucopogon parviflorus</i>	Coast Bearded-heath		
<i>Linum marginale</i>	Native Flax		
<i>Lobelia alata</i>	Angled Lobelia		
<i>Logania crassifolia</i>	Coast Logania		
<i>L. ovata</i>	Ovate-leaved Logania		
<i>Lomandra collina</i>	Mat-rush		
<i>L. effusa</i>	Scented Irongrass		
<i>Lotus australis</i>	Austral Trefoil		
<i>Maireana oppositifolia</i>	Blue-bush		
<i>Melaleuca brevifolia</i>	Salt Honey-myrtle		
<i>M. halmaturorum</i>	Swamp Paperbark		
<i>M. lanceolata</i>	Dryland Tea-tree		
<i>Microcybe pauciflora</i>	Yellow Microcybe		
<i>Microseris lanceolata</i>	Yam Daisy		
<i>Microtis arenaria</i>	Onion-orchid		
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>M. viscosum</i>	Sticky Boobialla		
<i>Nicotiana maritima</i>	Coast Tobacco		
<i>Nitraria billardieri</i>	Nitre-bush		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Pelargonium australe</i>	Native Stork's bill		
<i>P. littorale</i>	Stork's bill		
<i>Pimelea stricta</i>	Gaunt Riceflower		
<i>Pittosporum angustifolium</i>	Native Apricot		
<i>Poa poiformis</i> *	Coast Tussock-grass		
<i>Pomaderris obcordata</i>	Wedge-leaved Pomaderris		
<i>P. paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Prasophyllum elatum</i>	Tall Leek-orchid		
<i>Pterostylis dolichochila</i>	Greenhood Orchid		
<i>P. nana</i>	Dwarf Greenhood Orchid		
<i>Pultenaea canaliculata</i>	Coast Bush-pea		
<i>Rhagodia candolleana</i>	Seaberry Saltbush		
<i>Santalum acuminatum</i>	Quandong		
<i>Sarcocornia blackiana</i>	Thick-headed samphire		
<i>S. quinqueflora</i>	Bearded samphire		
<i>Scaevola augustata</i>	Fanflower		
<i>S. crassifolia</i>	Rough Fanflower		
<i>Senecio pinnatifolius</i>	Yellow Daisy		
<i>Spinifex hirsutus</i>	Hairy Spinifex		

Species	Common name	Conservation status	
		State#	EP
<i>Stackhousia aspericocca</i>	Bushy Candles		
<i>Suaeda australis</i>	Samphire		
<i>Tecticornia arbuscula</i>	Samphire		
<i>T. halocnemoides</i>	Samphire		
<i>Templetonia retusa</i>	Cockie's tongue		
<i>Tetragonia implexicoma</i>	Bower spinach		
<i>Thelymitra nuda</i>	Scented Sun-orchid		
<i>T. rubra</i>	Common pink Sun-orchid		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Thysanotus patersonii</i>	Twining Fringe-lily		
<i>T. wangariensis</i>	Wangary Fringe-lily		
<i>Trachymene pilosa</i>	Dwarf Trachymene		
<i>Tricoryne elatior</i>	Yellow Rush-lily		
<i>Velleia arguta</i>	Spur Valleia		
<i>Veronica hillebrandii</i>	Coast Speedwell		
<i>Vittadinia australasica var. australasica</i>	Sticky New Holland Daisy		
<i>Wahlenbergia stricta</i>	Bluebell		
<i>Westringia dampieri</i>	Shore Westringia		
<i>Wilsonia humilis</i>	Low Wilsonia		
<i>Wurmbea dioica</i>	Early Nancy		
<i>Zygophyllum billardierei</i>	Coast Twinleaf		

* Possibly represented by single plants.

** Species identification uncertain.

E=Endangered R= Rare V= Vulnerable

Table B2—Introduced and pest plant (weed) species recorded in the foreshore zone

Species	Common name	Category	Invasive risk
<i>Acacia cyclops</i>	Western Coastal Wattle	Introduced native	
<i>A. saligna</i>	Golden-wreath Wattle	Introduced native	3
<i>Agave americana</i>	Century plant	Garden escapee/waste	
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Environmental	1
<i>Asparagus asparagoides</i>	Bridal Creeper	WONS, proclaimed SA weed	5†#
<i>A. declinatus</i>	Bridal Veil	Proclaimed SA weed	5†#
<i>A. scandens</i>	Asparagus Fern	Garden escapee/waste	5†#
<i>Asphodelus fistulosus</i>	Onion Weed	Agricultural	2
<i>Avena</i> spp.	Wild Oats	Agricultural	2
<i>Centaurea melitensis</i>	Maltese Cockspur	Environmental	2
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	Boneseed	Proclaimed SA weed	4
<i>Coleonema pulchellum</i>	Diosma	Garden escapee/waste	
<i>Coprosma repens</i>	New Zealand Mirror Bush	Environmental	3#
<i>Cotoneaster glaucophyllus serotinus</i>	Cotoneaster	Proclaimed SA weed	3†
<i>Cotyledon orbiculata</i>	Cotyledon	Environmental	3#
<i>Crassula</i> spp.	Crassula		
<i>Crococsmia x crocosmiifolia</i>	Montbretia		
<i>Cynodon dactylon</i>	Couch	Garden escapee/waste	3†#
<i>Dimorphotheca pluvialis</i>	Cape Marigold	Garden escapee/waste	
<i>Diplotaxis tenuifolia</i>	Lincoln Weed	Proclaimed SA weed	2
<i>Dipogon lignosus</i>	Dolichos Vine	Environmental	3#
<i>Echium plantagineum</i>	Salvation Jane	Proclaimed SA weed	2
<i>Eucalyptus gomphocephala</i>	Tuart	Introduced native	
<i>Euphorbia terracina</i>	False Caper	Environmental	
<i>E. paralias</i>	Sea-spurge	Environmental	3#
<i>Foeniculum vulgare</i>	Fennel	Environmental	2
<i>Fraxinus</i> sp.	Ash	Garden escapee	
<i>Freesia</i> hybrid	Freesia	Environmental	3†
<i>Gazania rigens</i> .	Gazania	Garden escapee/waste	3#
<i>Hedera helix</i>	Ivy	Garden escapee/waste	
<i>Limonium companyonis</i>	Sea-lavender	Environmental	2
<i>Lolium rigidum</i>	Annual Ryegrass	Environmental	2
<i>Lycium ferocissimum</i>	African Boxthorn	Proclaimed SA weed	4#
<i>Melia azedarach</i>	White Cedar	Garden escapee	
<i>Olea europaea</i> ssp. <i>europaea</i>	Feral Olive	Proclaimed SA weed	4
<i>Oxalis pes-caprae</i>	Soursob	Proclaimed SA weed	3
<i>Pelargonium</i> sp.	Geranium	Garden escapee/waste	1
<i>Pennisetum clandestinum</i>	Kikuyu	Garden escapee/waste	3†#
<i>Petroselinium crispum</i>	Parsley	Garden escapee/waste	
<i>Pinus halepensis</i>	Aleppo Pine	Proclaimed SA weed	3
<i>Piptatherum miliaceum</i>	Rice Millet		
<i>Plantago</i> spp.	Plantain	Environmental	
<i>Polygala myrtifolia</i>	Myrtle-leaved Milkwort	Garden escapee/waste	4#
<i>Prunus persica</i>	Nectarine	Garden escapee	

Species	Common name	Category	Invasive risk
<i>Rhamnus alaternus</i>	Buckthorn	Environmental	4
<i>Scabiosa atropurpurea</i>	Pincushion	Environmental	2
<i>Senecio pterophorus</i>	African Daisy	Environmental	3†
<i>Solanum nigrum</i>	Black-berry Nightshade	Environmental	2
<i>Sparaxis bulbifera</i>	Harlequin Flower	Environmental	
<i>Trifolium spp.</i>	Clover species	Environmental	2
<i>Viola odorata</i>	Violet	Garden escapee/waste	

WONS=Weeds of National Significance

Invasive risk categories from Milne et al. (2008):

- 5 Highly invasive with rapid spread in disturbed or intact vegetation. Forms very dense stands and blanket cover with potential to eliminate all native understorey species. Very difficult to control without external assistance.
- 4 Highly invasive with rapid spread in disturbed or intact vegetation. Forms dense stands given suitable habitat and/or vectors with potential to reduce species diversity and abundance. Can be controlled with sustained effort.
- 3 Invasive in intact vegetation with moderate potential to reduce species diversity. Rate of spread is slower than for Cat 4 and 5 weeds but once present will persist and threaten biodiversity. May produce dense stands over a wide area but can be controlled with sustained effort.
- 2 Generally only invade disturbed vegetation, but may spread rapidly. Generally only a slight potential to reduce native species diversity unless present at high densities.
- 1 Generally only invade disturbed vegetation. Often widespread and abundant but not considered a significant threat to native biodiversity unless present at very high densities.

† Threat potential largely confined to saline swamps and drainage areas.

Threat potential largely confined to sandy/saline areas.

Note:

Risk category 3, 4 and 5 species are 'Red Alert Weeds' for priority control due to the threat they pose for native vegetation species.

Table B3—Fauna species recorded in, potentially in or adjacent to the foreshore zone

Species	Common name	Conservation status	
		Cwlth ⁺	State [#]
Mammals			
<i>Cercartetus concinnus</i>	Western Pygmy-possum		
<i>Chalinolobus morio</i>	Chocolate-wattled Bat		
<i>Felis catus</i> *	Feral Cat	Problem	Problem
<i>Macropus fuliginosus</i>	Western grey Kangaroo		
<i>Mus domesticus</i> *	House Mouse	Pest	Pest
<i>Nyctophilus geoffroyi</i>	Lesser-eared Bat		
<i>Oryctolagus cuniculus</i> *	European Rabbit	Problem	Problem
<i>Rattus fuscipes greyi</i>	Bush Rat		
<i>R. rattus</i> *	Black Rat	Pest	Pest
Terrestrial birds			
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Barnardius zonarius Race zonarius</i>	Port Lincoln Ringneck		
<i>Charadrius ruficapillus</i>	Red-capped Plover		
<i>Chalcites basalus</i>	Horsfield's Bronze-Cuckoo		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Corvus sp.</i>	Raven		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Dromaius novaehollandiae</i>	Emu		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria griseogularis</i>	Western Yellow Robin		
<i>Falco cenchroides</i>	Nankeen Kestrel		
<i>F. longipennis</i>	Australian Hobby		
<i>Grallina cyanoleuca</i>	Magpie Lark (Peewee)		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>M. pulcherrimus</i>	Blue-breasted wren		Rare
<i>Neophema petrophila</i>	Rock Parrot		Rare
<i>Ninox boobook</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen (Rufous) Night Heron		
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Passer domesticus</i> *	House Sparrow	Pest	Pest
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Psephotus varius</i>	Mulga Parrot		
<i>Rhipidura albiscapa</i>	Grey Fantail		

Species	Common name	Conservation status	
		Cwlth ⁺	State [#]
<i>R. leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Smicornis brevirostris</i>	Weebill		
<i>Stagonopleura guttata</i>	Diamond Firetail		Vulnerable
<i>Strepera versicolor</i>	Grey Currawong		
<i>Sturnus vulgaris</i> *	Common Starling	Pest	Pest
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Turdus merula</i> *	Common Blackbird	Pest	Pest
<i>Tyto alba delicatula</i>	Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing (Plover)		
<i>Zosterops lateralis</i>	Silvereeye		
Amphibians			
<i>Crinia signifera</i>	Common Froglet		
Reptiles			
<i>Acanthophis antarcticus</i>	Southern (common) Death Adder		
<i>Bassiana trilineata</i>	Western three-lined Skink		Rare
<i>Christinus marmoratus</i>	Marbled Gecko		
<i>Cryptoblepharus virgatus</i>	Striped Wall Skink		
<i>Ctenophorus fionni</i>	Peninsula Dragon		Endemic EP
<i>Ctenotus orientalis</i>	Eastern spotted Ctenotus		
<i>Delma australis</i>	Barred Snake Lizard		
<i>Diplodactylus granariensis</i>	Western Stone Gecko		
<i>Drysdalia mastersii</i>	Master's Snake		
<i>Egernia multiscutata</i>	Bull Skink		
<i>Hemiergis peronii</i>	Four-toed earless Skink		
<i>Lampropholis delicata</i>	Delicate Skink		
<i>Lerista bougainvillii</i>	Bougainville's Skink		
<i>L. dorsalis</i>	Southern four-toed Slider		
<i>Morethia obscura</i>	Mallee Snake-eye		
<i>Nephrurus milii</i>	Barking Gecko		
<i>Notechis ater niger</i>	Peninsular Black Tiger Snake		
<i>Pogona barbata</i>	Eastern bearded Dragon		
<i>Pseudonaja inframacula</i>	Peninsula Brown Snake		
<i>Rhamphotyphlops australis</i>	Southern Blind Snake		
<i>Tiliqua occipitalis</i>	Western Bluetongue		
<i>T. rugosa</i>	Sleepy Lizard		
<i>Tympanocryptis lineata</i>	Five-lined earless Dragon		
<i>Varanus rosenbergi</i>	Rosenberg's Goanna		Rare

+—Environment Protection and Biodiversity Conservation Act 1999

#—National Parks and Wildlife Act 1972, and National Parks and Wildlife (Miscellaneous) Amendment Act 2000

*—introduced (problem/pest) species

Appendix C

**FIELD DATA
SHEETS**

FIELD DATA SHEETS

The field data sheets included in this appendix provide for recording and identifying the details of revegetation sites, for the on-going monitoring of the work that was undertaken and for recording/monitoring sites of weed infestation. The data can be used to compare the success of planting from site to site, particularly in relation to site preparation, species selection, soil conditions, weed control and seedling survival.

It is important that the same monitoring procedure is carried out for every site being revegetated or rehabilitated.

Monitoring guidelines are included on the relevant field data sheet which should be forwarded to the LECCA Secretary for recording and evaluation. Collated records should be forwarded periodically to Council (Works Manager) for updating spatial data sets relating to the foreshore zone.

REVEGETATION SITE DATA SHEET

Forward this to the Secretary LECCA.

SITE LOCATION _____
 (GPS Co-ordinates or distance from easily identified feature e.g. street)

DATE AREA PLANTED _____

SITE REFERENCE No. _____

IS THIS A REVEGETATION OR REHABILITATION (infill planting) SITE?
 (tick one)

BROAD DESCRIPTION OF SITE SOIL (e.g. shallow stony sand, clifftop, deep sandy soil) _____

REVEGETATION UNDERTAKEN BY _____

1. Purpose of revegetation _____
2. Estimated area of site (m²) _____
3. Total number of plants _____
4. Approximate plant spacing (for row planting) _____
5. Site preparation (tick applicable)

Ripping	<input type="checkbox"/>
Augering	<input type="checkbox"/>
Scalping	<input type="checkbox"/>
Hand digging	<input type="checkbox"/>
6. Were any fertilizers used? YES/NO
7. If so, what type/brand _____
8. Plant supplier _____
9. List of species planted (by number). Attach list if insufficient room.

10. Weed control (product, method?) _____
11. Other information that might add to the knowledge base about the site

Attach site plan and photographs. Identify the photo point on the plan and on the ground (e.g. star picket).

REVEGETATION MONITORING SITE DATA SHEET

Forward this to the Secretary LECCA.

Refer to the guidelines for a description of how to undertake the monitoring

SITE REFERENCE No. _____

IS THIS A REVEGETATION OR REHABILITATION (infill planting) SITE?
(tick one)

MONITORING UNDERTAKEN BY _____

DATE _____

Time of monitoring after planting	Number of seedlings
Initial 6 months	
1 year	
1.5 years	
2 years	
2.5 years	
3 years	
4 years	
5 years	

Guidelines for revegetation monitoring

It is important that monitoring is carried out for each revegetation site to determine the percentage survival of tree and shrub species in particular. Over time it may prove impractical to monitor ground stratum plants due to the natural recruitment of other plant species. To determine the survival rate, follow these steps:

1. Mark out the boundaries of the site by reference to the initial establishment plan and photographs. If planting has been in rows, mark the ends of each row with a stake.
2. Count the number of living seedlings in the site quadrat or row. Do not include dead or dying seedlings.
3. Photograph the site from the same site as the original photography. Mark each photograph with the site number and the date the photograph was taken.
4. Revisit the site and repeat the procedure every six months for the first three years and then every 12 months thereafter. After five years reassess the need for further monitoring.

WEED MONITORING SITE DATA SHEET

Use this sheet for monitoring an existing major weed control site or the identification of a new site.

Forward this to the Secretary LECCA.

Refer to the guidelines for a description of how to undertake the monitoring.

SITE REFERENCE No. (Existing recorded site): _____

SITE LOCATION (New site): _____

REPORTED BY _____

DATE: _____

Weed species	No. of plants	Site area (m ²)	Density (/m ²)

Weed control

UNDERTAKEN BY: _____ ON: _____

METHOD: _____

RESULTS: _____

Guidelines for site recording

It is important that regular monitoring is carried out to enable timely remedial action and to reduce the risk of major infestations.

1. Mark out the boundaries of the site and calculate its area.
2. Count the number of individual weeds in the site if practicable and calculate the plant density per square metre.
3. Photograph the site and include with the report.

Appendix D

ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

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Weeds mapping

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Map production

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Brian Saunders

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