

# **Inverloch Coastal Resilience Project: Ecological Values of the Inverloch and Point Smythe Coastal Dune System**



**Report prepared for the South Gippsland Conservation Society by  
Alison Oates, Oates Environmental Consulting Pty. Ltd. (OEC), June, 2019**



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## EXECUTIVE SUMMARY

Oates Environmental Consulting was contracted by South Gippsland Conservation Society to produce a report on the ecological values of the coastal dune system of the Inverloch foreshore and Point Smythe.

The initial stages involved undertaking a background literature search of flora and fauna reports and management plans, accessing historical photographs and reports and viewing early surveyor maps.

An Ecological Vegetation Class (EVC) map for the dune system of the two study areas (Inverloch foreshore and Point Smythe) was produced, resulting in eight EVCs being described. The eight EVCs represent examples of all main coastal dune vegetation communities and the maps, based on current aerial photography, give a snapshot of the extent of vegetation at a particular point in time. This can dramatically change over days, weeks, months or years, depending on season and rate of recession.

A desktop search was undertaken of flora species recorded in previous reports, from the Victorian Biodiversity Atlas and of known localities of threatened plant species for the Inverloch foreshore. This resulted in 351 plant species being recorded with approximately half of these being native species. Some plant species such as Coast Fescue (*Poa billardierei*) are only known from early records and are no longer growing along the foreshore. For the Point Smythe study area, existing flora records plus a ground survey was conducted, resulting in a total of 220 plant species being recorded with approximately two thirds of these being indigenous species. The dune systems of Inverloch foreshore and the Point Smythe Coastal Reserve represent important habitats for a number of threatened coastal vegetation communities and a diverse range of plant species, including ten vascular plant taxa that are listed as being rare or threatened in Victoria (Victorian Rare or Threatened Plant species - VROTS).

A desktop search was made of any available fauna data for Inverloch, Anderson Inlet and Point Smythe. A total of 236 fauna species, including marine fauna, was recorded for the Inverloch study area (including Anderson Inlet and the Bunurong Coast), of which 220 are native species and 16 species introduced to Victoria. At Point Smythe, a total of 181 fauna species, including 154 bird species, 4 marine species, 18 terrestrial mammals and 5 terrestrial reptiles were recorded, of which 15 were introduced species. Anderson Inlet is a very important foraging, breeding and roosting area for a number of migratory waders and other shorebirds. For the combined study areas (including all of Anderson Inlet), 47 bird species, 4 mammal species, and 2 reptile species are listed as threatened species either under the relevant Victorian or Australian Government Acts.

The Inverloch foreshore is one of the biolinks that is recognised in the Bass Coast Shire Council's Biodiversity Biolinks Plan. It is one of the few east-west biolinks identified in the Plan within Bass Coast Shire with most of the existing biolinks being oriented in a north-south direction to the coast. It thus acts not only as an important corridor for wildlife movement along the coast but also for wildlife movement to and from the coast from the hinterland areas.

The coastal dune system is an important habitat for fauna, especially resident shore birds, and climate change and coastal recession are posing a significant threat to flora and fauna values. Almost half of the



dune system vegetation in some stretches of the Inverloch beach, especially in the vicinity of the Inverloch Surf Lifesaving Club, has been lost due to coastal recession since 2013. Incipient dunes virtually no longer exist from Flat Rocks to just west of Point Norman, resulting in no suitable nesting habitat for some species of shorebirds such as the Hooded Plover. The importance of maintaining suitable low-forming incipient dune habitat for threatened birds such as the Hooded Plover is emphasised in this report, especially the effect of introduced Marram Grass in the formation of steep-sided dunes, thus reducing suitable nesting areas for these birds.

In any coastal dune rehabilitation program, it is important to firstly stabilise the beach, develop the incipient dune through, for example, wet-sand-fencing and sand renourishment and then revegetate the dune. There is increasing scientific evidence from both Australia and overseas that the most effective dune systems in both promoting habitat and providing storm protection are those in which appropriate plant species are used in each vegetation zone to promote a stable dune system.

It is not possible to prevent loss of vegetation due to storm events. However, it is possible to make the dunes more resilient by incorporating a series of measures along the Inverloch foreshore which hopefully will assist in stabilising, to some degree, the dune system and enhancing flora and fauna habitat. These include:

- Monitoring the rates of dune recession by continuing regular drone monitoring under the Victorian Coastal Monitoring Program, supplemented by manual use of a laser level system at selected points along the beach to measure changes in dune height and beach profiles over time, as is being done at Port Fairy East Beach.
- In the event that the trial of two rows of wet sand fencing, in combination with sand renourishment and dune reconstruction, to protect currently threatened infrastructure (adjacent to the Inverloch Surf Life Saving Club building and a section of Cape Paterson-Inverloch Road) proves to be successful in the short-term, consideration should be given to extending the length of the wet sand fencing from the existing 60 metres to a greater section of coastline between Flat Rocks and Point Norman, given the ecological values of the dune system highlighted in this report. It is also suggested that the wet sand fencing be modified to include a 45 degree return at each end to protect adjoining dunes from end effect of erosion.
- Revegetating the newly formed toe of the dune (aided by sand renourishment) behind the wet sand fence by using native grasses such as Hairy Spinifex and appropriate indigenous coastal herbs and shrubs.
- On the eroded primary foredunes behind the wet sand fencing, trialling the thatching of the steep dune slopes with plant debris and dead tea-tree branches in order to help stabilise the dune where slumping has occurred. Also planting Hairy Spinifex on the eroded primary dune slope and the crest of the dune, as rhizomes from this plant will begin to extend down the dune slope and begin binding the sand particles to slow down erosion rates.

- Supplementary planting, where appropriate, especially on the rear dune of the Coast Banksia Woodland vegetation community at Flat Rocks. There is emerging evidence, both within Australia and internationally, of the importance of having a stable rear dune system in coastal areas subject to erosion.
- Effective weed control program, including a 5 Year Action Plan, and either natural regeneration or supplementary planting with appropriate indigenous species in areas where weeds are removed in order to stabilise the dune.
- Effective pest animal control program targeting foxes which predate on native birds and mammals and also rabbits which burrow in the sand and can disturb the stability of the dune system.
- Cordoning off the toe of eroded dunes in front of the Inverloch Surf Lifesaving Club during the peak summer season to prevent human trampling.
- Cordoning off the area between the toe of the foredune and either end of the sand fence to allow for minimal disturbance when revegetating the dune.
- Review and rationalise, if possible, all beach access tracks and where erosion is occurring, establish post and wire fences to avoid trampling of the dune system
- Monitoring the density of introduced grasses such as Marram Grass and Sea Wheat-grass on the sand spit to ensure suitable habitat for shorebirds such as the Hooded Plover.
- No future infrastructure development on the Inverloch dune system and no further removal of native vegetation on an already extremely fragile dune system.
- Continuing public education programs regarding the dynamics and fragility of the coastal sand dune system and the importance of the dunes for flora and fauna habitat
- Continuing liaison with interested stakeholders and relevant land managers on matters of coastal recession and associated loss of flora and fauna habitat in the Inverloch and Point Smythe area.

## 1 Introduction

Oates Environmental Consulting was engaged by the South Gippsland Conservation Society, through funding provided by the Lord Mayor's Charitable Foundation, to report on the ecological values of the Inverloch and Point Smythe coastal dune system. Point Smythe Coastal Reserve is managed by Parks Victoria and the Inverloch foreshore is mainly managed by Bass Coast Shire Council with the area in the vicinity of Flat Rocks managed by Parks Victoria.

Specific project requirements are outlined below:

- Review previous studies of flora and fauna existing within, or utilising, the dune system, supplemented by field reconnaissance
- Provide an Ecological Vegetation Class (EVC) map of both the Inverloch foreshore and Point Smythe dune systems, including descriptions of the EVCs.
- Compile a flora species list, including any rare or threatened flora.
- Compile a fauna species list, including any threatened vertebrate fauna
- Liaise with Birds Australia regarding shorebirds utilising the beach and dune system
- Analyse the value of vegetation as a regional biolink and role as a flyway for migratory birds
- Assess the importance of the coastal dune system as local habitat for fauna
- Assess the effect of coastal recession and consequent loss of habitat on flora and fauna values
- Develop proposals to increase the resilience of the coastal dune system, including revegetation techniques

## 2 Background

The South Gippsland Conservation Society (SGCS) is undertaking an important assessment of the values of the coastal dune system as part of its Inverloch Coastal Resilience Project (ICRP). Below is an excerpt from the South Gippsland Conservation Society's statement for the overall study:

*The objective of the Inverloch Coastal Resilience Project is to compile information about the coast and the views of local residents that can be considered by the Government Working Group in its development of management strategies for the coast. The project will review previous studies, undertake scientific investigations, gather local knowledge from residents, consult with sporting and environmental organisations and liaise with the Government Working Group. A preliminary identification of possible management strategies will also be undertaken and a beach/dune monitoring program developed. Completion of this study prior to the conduct of the Local Coastal Hazard Assessment is intended to ensure that all ecological, social, economic and aesthetic factors are considered in the development of a coastal adaptation strategy for this section of the Bass Coast. This will also take into consideration the consequences of any "retreat" strategy option.*

*The study will take account of, and build on, investigations and consultations undertaken for the report 'What would a Climate-Adapted Settlement look like in 2030? A Case Study of Inverloch and Sandy Point', prepared by Monash University and the National Climate Change Adaptation Research Facility (NCCARF).*

The ICRP comprises four main elements with Part One being the identification and values of the Inverloch and Point Smythe dune system in relation to ecological, geomorphological, cultural heritage and recreation and tourism values. This report covers the ecological values of the Inverloch and Point Smythe coastal dune system.

### **3 Study area**

This project is focussed on coastal dune systems where significant recession is taking place and does not include the mud flats of Anderson Inlet (see Appendix 1). The first study area is the Inverloch foreshore coastal dune system extending from the western end of Flat Rocks beach to Screw Creek in the east, including the sand spit and lagoon just to the east of Point Hughes. The second study area is Point Smythe at Venus Bay and includes the coastal dune system within Point Smythe Coastal Reserve from the north-south firebreak west to the point but excluding the wetland and saltmarsh area in the northern section of the Reserve.

### **4 Literature review**

A number of relevant historical maps, photographs and aerial photographs were researched for this project, together with reports held in various institutions. Below is a summary of relevant information from the above sources in relation to flora, fauna, vegetation communities and dune recession within the two study areas.

#### **4.1 Background history, early reports and maps**

##### **1840**

In 1840, Samuel Anderson and his friend John Thom went into the ranges from his Bass River farm in search of a cattle run and discovered the large body of water now known as Anderson Inlet. In November of the same year, Governor La Trobe sent Assistant Surveyor Thomas Townsend and a survey party to map the inlet. He came by ship and anchored offshore because of the bar across the inlet entrance. The inlet was named Andersons Inlet and Townsend Bluff, east of Inverloch is named after him (Williams 2002).

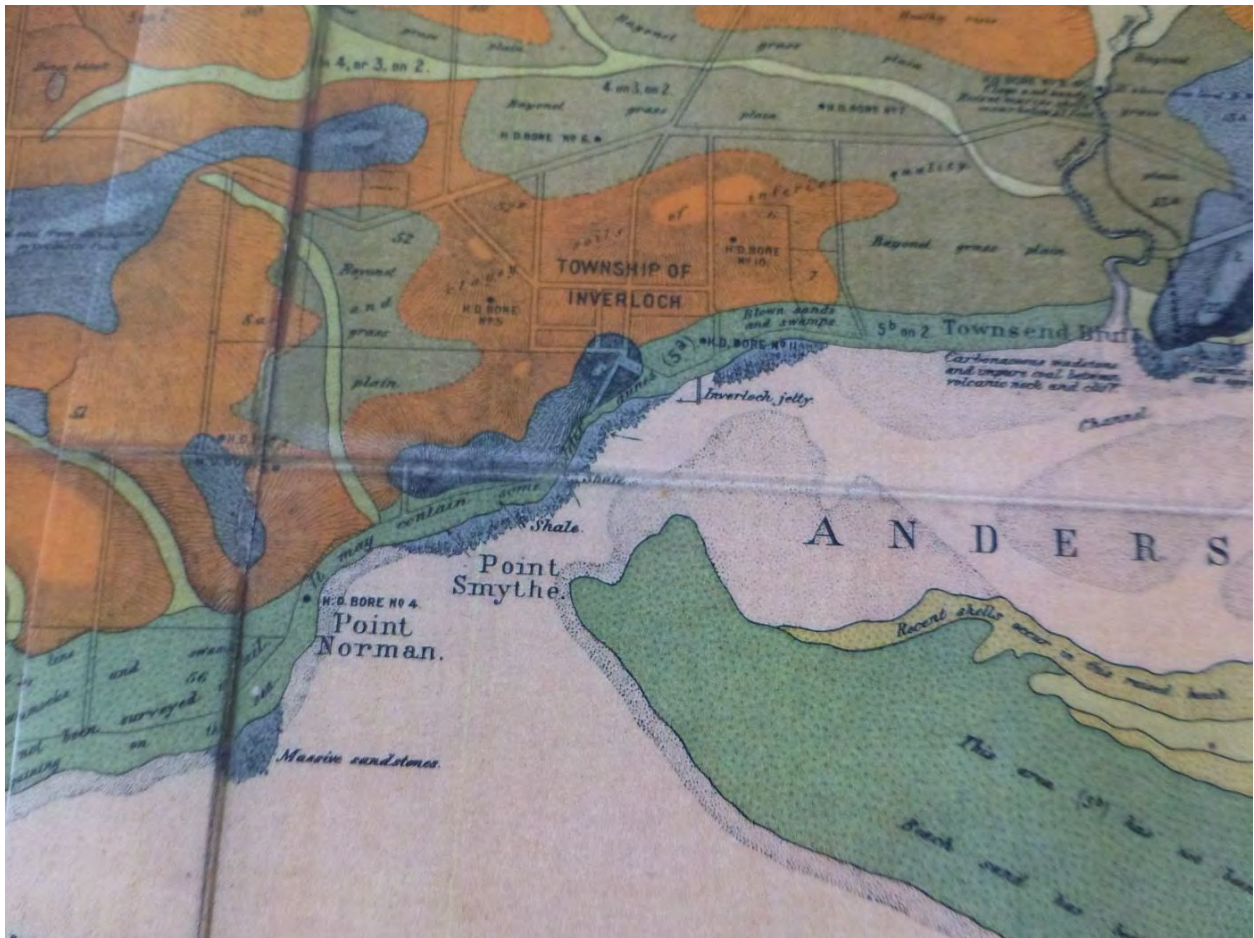
##### **1841-2**

George Smythe surveyed the coastline from Cape Liptrap to Cape Paterson and Point Smythe is named after him. He included in his survey the water features such as creeks and swamps that were close enough to walk to within a day (Williams 2002). His survey maps were often quite detailed, recording in general the types of vegetation that occurred and the suitability of the soil for agriculture.

##### **1909**

*Report on the Lower Powlett, Cape Paterson, and Inverloch Quarter Sheets. No. 8. (Memoirs of the Geological Society of Victoria, 1909).*

W.H. Ferguson, a field geologist with the Geological Survey of Victoria, carried out a geological survey in the Inverloch area in 1903 (see Figure 1 below). It gives an indication of the extent of the coastal dunes and shape of Point Smythe at that time as well as some field notes on the geomorphology of the area.



**Fig. 1: Inverloch survey map 1903, Geological Survey of Victoria 1909**

**Courtesy: Eulalie Brewster, Inverloch**

### 1936-7

*Inverloch Carnival: Official Souvenir and Programme Holiday Carnival 1936-7. (Inverloch Foreshore Committee 1936).*

In describing the work of the Inverloch Foreshore Committee in the above publication, mention is made of the severe coastal recession that occurred there at that time:

*...foreshore erosion began to become serious in 1930. Prior to that the erosion that had been taking place was more or less normal, but by some strange freak of nature this year, the extremity of Point Smythe began to rapidly wash away and within the space of two years at least half a mile of this peninsula which had formed a natural shelter for the beaches on the Inverloch foreshore, had completely disappeared. From then on, when rough seas occurred, the ocean rollers pounded in on the main beaches, with the result that sand and vegetation began to be rapidly washed away in its path, and the area reserved by the Crown as public foreshore, began to rapidly diminish."*

Various experiments were carried out to try and slow down the erosion, including a number of groynes and beach walls (see Figure 2 below) being established along the beach.



**Fig. 2: Sea wall at entrance to Andersons Inlet, Inverloch. Rose Stereographic Company, 1920-1954  
Courtesy: Pictures Collection, State Library of Victoria**

**1998**

*The Golden Coast History of the Bunurong.* (Hayes 1998).

A section of this publication is devoted to the huts, numbering up to twenty, that occupied the Flat Rocks area, the first being erected before 1920. They were built on the low-lying land on the rear of the sand dunes opposite Petrel Rock. The huts were cleared at the end of 1860 but one hut, 'Alimera', remained and was encircled with cypress trees which remain there today. The author points out that *Dolichos (Dipogon lignosus)* was planted to disguise the toilets at the huts and that it is now choking the native vegetation.

#### **4.2 Management plans, technical reports**

**1978**

*The South Gippsland Coastal Reserve: A Resources Inventory.* (DCE 1978).

This publication was the first step towards assisting committees of management and the Department of Crown Lands and Survey in the preparation of coastal management plans on Crown Land in the South Gippsland coastal area. A summary of the vegetation and wildlife for the Anderson Inlet and Venus Bay units is included in this inventory. Much of the description for Anderson Inlet focuses on the saltmarsh areas with the only mention of the dune system being that the coastal scrub had been extensively modified by recreational activities. For Venus Bay, the authors describe one of the best-preserved examples of coastal scrub occurring at Point Smythe. The authors note that in 1975 the Bird Observer's Club identified 114 bird species from the Inverloch region. This would have included the saltmarsh areas as well as the hinterland.

Four reptiles as well as twelve native mammals were also recorded for Anderson Inlet. Within the Anderson Inlet unit, feral animals such as rabbits were listed as common in the coastal scrub and pest plants included Boxthorn, Horehound and Ragwort (probably more common in areas inland from the saltmarsh).

*A Management Plan for Coastal Crown Land at Inverloch and Venus Bay. (Barlow et al. 1978)*

This report comments that almost all the country in this area had been cleared for farming or housing and the remaining thin coastal strip of Crown Land is virtually all that remains of remnant vegetation in the area. The vegetation along the Inverloch Foreshore Reserve had been heavily modified by recreational use and by the introduction of exotic plant species. The stand of Coast Banksia woodland along the foreshore was described as unhealthy and thought to be due to old age with little natural regeneration. The existing vegetation at Point Smythe was thought to only partially represent the original vegetation and has been modified by past fires and grazing.

The report, quoting from *A History of Tarwin Lower 1798-1974* (Charles, 1974) states that the early pioneers wrote about the abundance and diversity of wildlife on the Inlet:

*“Large populations of black swans, and ducks, were seen on the inlet in the late 1800’s as well as pelicans, and penguins – Cape Barren geese, mutton birds, quail, snipe and lyre birds (presumably inland).”*

The authors state that the condition of the beaches on the reserve vary considerably. Flat Rocks had shown little evidence of instability over the years whereas the beaches between Ayr Creek and Point Hughes were being eroded, also the ocean side of Point Norman. In the Wyeth’s Bay area and eastward to the jetty, the proximity of the channel to the beach had made it unsafe for swimming. Both Ayr Creek and Wreck Creek were described as having low flows and “weed choked and polluted”. Much of the Point Smythe area was burned in the early 1970’s but appeared to be regenerating well. The revegetation strategy suggests that weeds and isolated exotic plants should be progressively removed from the foreshore area and revegetation should be carried out with indigenous species.

**1982**

*South Gippsland Area District 2 Final Recommendations.* (LCC 1982).

The Land Conservation Council, in its Final Recommendations for South Gippsland Area District 2 report recommended that the coastal area from Cape Paterson to Point Smythe be designated a ‘scenic coast’ with one of its purposes being for the ‘*protection and conservation of natural coastal landscapes, ecosystems, and archaeological, geomorphological and historic features.*’

**1985**

*Coastal Erosion Control Guidelines.* (DCFL 1985).

This publication provides guidelines along Victoria’s coast for revegetation techniques, associated rehabilitation techniques, coastal legislation and a comprehensive list of coastal tolerant native plant species for revegetation purposes.

## 1990

### Andersons Inlet: Resources, Issues and Options for Management. (Harrison et. al. 1990).

The relevant section for this study by Monash University is the comprehensive flora and fauna species lists provided, using a number of sources, for both the Inverloch foreshore and Point Smythe. Species from these lists have been incorporated into the current study. Mention is also made of the decline and lack of regeneration in Coast Banksia (*Banksia integrifolia* subsp. *integrifolia*) stands both at Inverloch and Point Smythe.

## 1992

### Distribution Survey of Flora of the Inverloch Foreshore Reserve. (Blood, 1992).

In 1992, Kate Blood, Department of Conservation and Natural Resources, Yarram, produced an unpublished document on a distribution survey of flora of the Inverloch Foreshore Reserve, including a plant species list. This list has been used as a basis for the species list compiled in the current study.

### A Proposed Management Plan for the Bunurong Marine and Coastal Park. (DCE 1992).

For this current study, the relevant section mentioned in the management plan is the area west of Wreck Creek to the western end of the Flat Rocks beach which is managed by Parks Victoria. The Coast Banksia woodland community in the vicinity of Flat Rocks is mentioned as being in decline with widespread dieback of these trees. Although the exact cause was not known, it was suggested that a number of disturbance factors such as camping, roadworks, grazing, slashing and trampling of soil and vegetation may have contributed. The resultant disturbance changed nutrient composition and water availability, compacted soil and high weed infestation had changed the landscape to a very narrow, fragmented vegetated strip.

Relevant high priority management recommendations for the Bunurong Marine and Coastal Park include prohibiting the removal of indigenous vegetation except under permit, developing a base flora map of the Bunurong, preparing a management plan for the degraded Banksia woodland community adjacent to Flat Rocks and undertaking control works for high priority weeds. The main pest plants mentioned in the report in the Flat Rocks area are Mirror Bush (*Coprosma repens*), Cape Ivy (*Delairea odorata*) and Myrtle-leaf Milkweed (*Polygala myrtifolia*). A bird of interest mentioned in the Banksia woodland adjacent to Flat Rocks is the White-plumed Honeyeater (*Lichenostomus penicillatus*) which is uncommon in south-eastern Victoria and usually occurs in forests, woodlands and wooded farmland containing River Red-gums or gum-barked eucalypts.

The Proposed Management Plan contains an interesting section in the flora guidelines in relation to erosion of sand dunes:

- *Allow erosion of sand dunes to proceed naturally if this is caused by natural processes and where facilities or adjacent freehold land are not threatened.*
- *Stabilisation of sand dunes..... should preferentially use Hairy Spinifex (*Spinifex sericeus*) during the early stages of erosion caused by human and animal impacts. Marram Grass (*Ammophila arenaria*) may be used where severe and threatening erosion occurs. Both primary stabilisers should be seeded initially with secondary stabilisers, particularly Coast Acacia (*Acacia sophorae*).*



## 1994

### *Inverloch Foreshore Reserve and Anderson Inlet Proposed Management Plan (DCNR 1994).*

One of the main management objectives of this plan is to “*protect and conserve the natural ecosystems and environment and allow natural processes to continue with a minimum of interference whilst recognising (i) that such systems are dynamic, (ii) that irreversible alterations may have occurred and (iii) that modified systems may have become or are in the process of being established.*”

In regard to flora management, the Proposed Management Plan emphasises that vegetation is not only important for the protection of the coastline from erosion but also as habitat for fauna. It was also noted that there had been extensive degradation of the indigenous flora and that a lack of baseline data had made it difficult to determine management recommendations for flora and fauna for the whole planning area. Basic flora information was only available for the Inverloch Foreshore Reserve and Screw Creek area after a vegetation survey by Kate Blood in 1991 (Blood 1992). The report recommends that “further surveys be carried out to accurately identify sites of significance for rare and threatened species of flora in the planning area.” It was also suggested that the indigenous sand-binder plant Hairy Spinifex (*Spinifex sericeus*) be used where practicable in dune revegetation.

The Management Plan emphasises the importance of retaining existing indigenous vegetation around the foreshore of the inlet as a corridor for fauna movement, allowing migration and breeding to continue between populations. One of the main aims of fauna management is “to protect indigenous fauna by maintaining, extending and enhancing suitable habitat.”

Anderson Inlet supports almost two percent of Victoria's total wader population and more than one percent of the total Australian population of four species occurred regularly in Anderson Inlet in the early 1990's. These birds included the Double-banded Plover, Lesser Golden Plover, Eastern Curlew and Greenshank.

The Management Plan emphasises the importance of protecting wader roosting sites, particularly at the tip of Point Smythe and that restricting pedestrian access and fencing of dune areas may assist in the protection of nesting, feeding and roosting sites of some significant bird species.

## 1998

### *Inverloch Foreshore Reserve and Anderson Inlet Management Plan (DNRE 1998).*

This was the final management plan for the Inverloch Foreshore Reserve and Anderson Inlet, largely based on the aims and management strategies proposed in the 1994 draft management plan (DCNR 1994). An additional management strategy recommendation is to “protect low sand dune communities from damage by visitor and management activities.”

## 2002

### *A Fauna Survey of Bunurong Marine & Coastal Park (Homan 2002).*

This survey included the Flat Rocks area of the Bunurong Marine and Coastal Park. Ten fauna species were recorded from this area, including six mammals and four reptile species. These species have been

incorporated into the fauna species list for the current study. A number of management recommendations for the Flat Rocks area are relevant:

*The old growth Banksias at Flat Rocks which contain numerous hollows are very important habitat trees and no doubt provide roosting sites for numerous insectivorous bats. These and any other old Banksias within the Park should be preserved wherever possible.*

*Previous management decisions to exclude access to the public from certain areas such as at Flat Rocks are paying dividends. Swamp Rat runways are now evident at the old camp sites at Flat Rocks and this policy should continue wherever possible. The increase in rabbit numbers during the survey is of concern and an eradication program is essential, especially where rabbits may damage revegetation sites.*

## **2003**

### Cape Liptrap Coastal Park Management Plan. (Parks Vic 2003).

The Cape Liptrap Coastal Park extends from the residential subdivision at Waratah Bay to Point Smythe on Anderson Inlet to the low tide mark. Two hundred and seventy plant species, including ten threatened species are recorded for the entire Coastal Park. Thirty threatened fauna species are recorded, including ten species listed under the flora and Fauna Guarantee (FFG) Act of 1988 and seventeen migratory bird species. One of the relevant management strategies listed is to: *'progressively restore the species diversity, structure and age-class diversity of the coastal dune communities.'*

The Management Plan states that seventeen species of waders using Anderson Inlet are covered under the JAMBA and CAMBA international migratory bird agreements. Some of these waders such as the Red-necked Stint and Sanderling, have been observed by Jim Whitelaw feeding and roosting on the ocean beach between Venus Bay and Point Smythe. The critically endangered Orange-bellied Parrot had also been recently recorded feeding on strand vegetation near Point Smythe. A relevant management strategy in the Plan is to *'Investigate the possibility of developing wildlife corridors from the park to link with adjoining reserves and other areas of native vegetation.'* Mention is also made that Point Smythe is an eroding shoreline and since 1930 its area has been reduced by about 40 ha.

## **2006**

### Bunurong Marine National Park, Bunurong Marine Park, Bunurong Coastal Reserve, Kilcunda-Harmers Haven Coastal Reserve Management Plan. (Parks Victoria 2006).

One of the management directions cited for the Bunurong coast in the above document is: *"Identified threats to natural and cultural values of the planning area will be minimised through addressing the outcomes of ongoing monitoring, risk assessment and, where feasible, complementary management of adjacent coastal areas and the catchment."* The two aims of the management plan in relation to terrestrial flora are to:

- *"Maintain the floristic structure and diversity of vegetation communities, and protect them from threatening processes.*
- *Increase knowledge of the planning area's vegetation communities and species, particularly its threatened species, to aid management, protection and appreciation."*

One of the relevant management strategies for this current study is to minimise disturbance to vegetation communities caused by management and visitor activities by encouraging visitors to keep to walking tracks through signs and Park Notes, closing and revegetating unauthorised access tracks and fencing and re-routing walking trails to protect sensitive vegetation. These are important strategies in relation to minimising erosion on the incipient dunes and foredunes, especially along parts of Flat Rocks beach where dune recession is degrading the Banksia woodland and many of these trees are toppling onto the beach.

In 2006, seven flora species within the planning area were listed as rare or threatened in Victoria (DSE 2005, Carr 2003). More than 160 fauna species were recorded, including 130 birds, 15 native mammals, 9 reptiles and 6 amphibians. Of these total figures, 45 fauna species were listed as threatened, including 21 listed under the Flora and Fauna Guarantee (FFG) Act 1988.

The management plan states that fauna conservation in the planning area cannot be seen as isolated from adjacent areas. *“Wildlife corridors linking the planning area to other fauna populations are important for the effective conservation of species, particularly those that rely on remnant vegetation for nesting, feeding and movement. Corridors may serve to maintain genetic diversity and ensure the survival of local populations.”*

Soil erosion was also noted as a problem in some areas and uncontrolled pedestrian access across sand dunes can initiate or accelerate soil erosion. *“Being sandy, these soils are prone to wind and water erosion. The best protection against erosion is the maintenance of the natural vegetation cover, particularly on coastal dunes or where soils are shallow.”* One of the management strategies in the planning area is to *“Manage public access to beaches and rock platforms to prevent degradation of sand dunes or cliffs. Close and revegetate unauthorised access tracks and paths, and sites where degradation has occurred.”*

## **2006**

### *Primary vegetation development on the sand spit of Shallow Inlet. (Heyligers 2006).*

In 2006 a paper was published by Petrus Heyligers on primary vegetation development at a sand spit of Shallow Inlet. The spit had developed over the years since the previous spit was washed out in 1901. In the 1960's Sea Wheat-grass and to a lesser extent Marram Grass began to colonise the spit. These species are native to the coast of western Europe, where they fulfil a key role in dune establishment. (Heyligers 2006). In the abstract of this paper, Heyligers gives an excellent summary on vegetation succession and establishment on incipient dunes and the role of exotic grasses in this process:

*Being able to grow through sand accumulating among the culms, these grasses (Sea Wheat-grass and Marram Grass) formed mounds where seeds or rhizome fragments were washed up during king tides. Where somewhat sheltered from the strongest impact of the westerlies, mounds gradually coalesced and formed short ridges at the landward side of the spit, and 'dune fields' towards its distal end. Circumstances favourable for dune field formation were enhanced by episodic processes in spit growth due to channel shifting in the tidal delta and the gradual lengthening of the main outlet channel. Austrofestuca littoralis and Spinifex sericeus joined the two foreign grasses in their pioneering role. The herbaceous Actites megalocarpa and the shrub Ozothamnus turbinatus established in the lee of the grasses, but conditions on mounds, dune crests and windward slopes are too severe for other species. Only at more sheltered sites is further development of vegetation possible. In the lee*

of the dune fields it has progressed into an open shrubland, initially of *Ozothamnus turbinatus*, *Olearia axillaris* and *Olearia glutinosa*, later enriched by *Acacia longifolia* var. *sophorae*, *Leptospermum laevigatum* and *Leucopogon parviflorus*. Wind-dispersed taxa form the dominant component of the vegetation, but several animal-dispersed species became established as well. The complement of woody species begins to resemble that of the dune scrub found elsewhere along this part of the Victorian coast, but several wind-dispersed species, notably *Banksia integrifolia*, are still lacking and it would appear that dispersal is still a limiting factor in vegetation development. It is pointed out that dune development on the sand spit was initiated by exotic grasses and that without their presence, it is doubtful whether any vegetation would have established there. (Heyligers 2006).

## 2012

### West Gippsland Catchment Management Authority Regional Catchment Strategy (WGCMA 2012).

The West Gippsland Regional Catchment Strategy (RCS) is the main strategic framework for land, water and biodiversity management in the West Gippsland Catchment region. Seven Landscape Priority Areas have been identified in the Strategy, based on high environmental values and areas at most immediate risk. The Strategy identifies what needs to be done to protect and enhance natural resources and the environment within these areas over the next six years. The Strategy states that Bunurong Coastal (relevant to this study) is one of the West Gippsland CMA's seven Landscape Priority Areas that have high environmental values and are at most risk from a number of environmental challenges. Key threats mentioned are urban development and land use pressure, invasive plants, altered flow regimes, sedimentation and poor water quality. The RCS identifies 20-year environmental objectives and actions to address these challenges, which include improving or maintaining:

- native vegetation quality, extent and connectivity
- threatened flora and fauna species conservation status
- soil health
- water quality
- coastal dune integrity
- the health of the marine environment.

## 2014

### Biodiversity Assessment for proposed clearing of Native Vegetation at Inverloch Foreshore Shared Path: in 2014. Abbott Street to Cape Paterson Road. (IDLM 2014).

Indigenous Design Land Management was commissioned by the Bass Coast Shire Council in 2014 to assess the potential biodiversity impacts of a shared use pathway between Abbott Street and Cape Paterson Road along the Inverloch foreshore. Field surveys were carried out over two days and three Ecological Vegetation communities were described as well as 112 vascular plant species recorded. Fifty of the 112 were considered to be native to Victoria and the remaining 62 were weed species. The plant species recorded by Indigenous Design Land Management have been integrated into the plant species list for the current study.

A search of the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 database (DE 2014) within 5 kilometres of the study area identified the possible presence of 5 nationally significant orchid

species. A similar search using the Victorian Biodiversity Atlas (VBA) database (DEPI 2014) found 9 threatened flora species although none of these species was recorded during the fieldwork carried out by Indigenous Design in 2014.

An EPBC database search (DE 2014) within a two-kilometre radius of the study area identified the possible presence of a number of significant fauna species (excluding marine species). Twenty-five bird species, 1 frog species and 8 mammal species were recorded. A VBA database search (DEPI 2014) within 5 kilometres of the study area recorded 35 significant fauna species. The significant fauna species lists have been incorporated into the current study.

## **2014**

### Victorian Coastal Strategy 2014 (VCS 2014).

*“The coastal foreshore serves a number of purposes and is valued for its biodiversity and habitat, economic, recreational and community use, and as natural protection for property and assets. In some areas, rising sea levels and more severe storm events will cause the coastline to move inland and coastal Crown land, habitat, biodiversity and areas for public recreation may be lost. In areas where natural coastal processes occur over long geological timeframes to create habitat (e.g. intertidal rock platforms) change in sea level may occur too rapidly for adaptation to be possible. This in turn will have flow-on impacts for intertidal plants and animals.” (VCS 2014).*

## **2016**

### Bass Coast and Phillip Island Hooded Plover Strategy 2016 (BCSC 2016a).

The Hooded Plover strategy was developed by BCSC to collaborate with like-minded organisations and community members within the Shire to increase the success of Hooded Plover breeding, fledging and survival. Hooded Plover populations have continued to decline over the past 10-20 years. The Strategy aims to identify and manage key threats where possible. Although high tides, storms and higher temperatures cannot be controlled, managing disturbance factors to the Hooded Plover such as humans, their dogs and their vehicles on the beach can be focused on as well as weed management to improve the bird's habitat.

A couple of relevant actions to the current study mentioned in the Strategy include:

#### *Action 3.4: Optimise habitat*

*With the aim of increasing the Hooded Plover population comes the need to identify potential new nesting areas and ensuring their long-term protection. This is also important in response to the changing coastline, as sea levels rise and coastal erosion occurs. Transition and retreat areas will be important to shorebird survival. Weed control and rehabilitation of dunes is an important activity for opening up new nesting areas. These activities should continue in strategically identified areas along the coastlines.*

#### *Action 3.5: Threat management*

*Known threats to Hooded Plovers are:*

- *disturbance by humans and their activities*

- *predators (particularly mammals and birds)*
- *high tides, storms and high temperatures*
- *pollutants and litter*
- *loss of habitat through invasion by weeds, coastal development, erosion control measures, and long-term sea level rise*

## **2016**

### *Bass Coast Shire Council Natural Environment Strategy 2016-2026 (BCSC 2016b).*

The Bass Coast Shire Council's Natural Environment Strategy 2016-2026 follows on from its earlier Environment Sustainability Plan of 2008 to 2013 (BCSC 2008).

*The Natural Environment Strategy will guide Bass Coast Shire's approach to preserve, protect and enhance the natural environment sustainability over the next ten years. It will help successive Council's identify and prioritise environment sustainability activities across the Shire. The Strategy will increase the capacity and understanding of environmental sustainability issues in the community. This Strategy places emphasis on the strategic objective and directions, and action that form a local response to global issues such as climate change, decreasing biodiversity and environmental awareness and value.*

*The Natural Environment Strategy 2016 – 2026 focuses on four strategic directions for the sustainable management of the natural environment across Bass Coast for the next ten years:*

- *Mitigating the forecast impacts of climate change by integrating the predictions into our decision making and planning for infrastructure, services and utilities.*
- *Facilitate appreciation of our unique natural environment through sustainable public access*
- *Improve health of the landscape through increased biodiversity and indigenous vegetation protection.*
- *Develop community partnerships that promote environmental awareness'. (BSCS 2016b)*

Council acknowledges the challenges of climate change, sea level rises and the increase and intensity of storm surges and consequent coastal erosion. Council believes that indigenous revegetation programs on foreshore dunes and hinterland areas present the greatest non-engineering opportunity to mitigate against erosion but adaptation to more sustainable agricultural practices, and working with the dynamic coastal processes offers a better long-term sustainable solution (BCSC 2016b).

### **4.3. Key values of the coastal dune system arising from the literature review**

- Importance of the narrow strip of indigenous vegetation along the Inverloch foreshore due to adjacent extensive clearing for agricultural land and residential areas.
- Point Smythe Coastal Reserve is one of the best-preserved examples of coastal dune vegetation in the area.
- Vegetation is not only important for the protection of the coastline but also for fauna habitat values.
- Indigenous vegetation along the Inverloch foreshore is an important corridor for fauna conservation, allowing movement, migration and breeding to continue between populations.
- Anderson Inlet supports almost two percent of Victoria's total wader population.

- More than one percent of the total Australian population of four bird species: Double-banded Plover, Lesser Golden Plover, Eastern Curlew and Greenshank occurred regularly in Anderson Inlet in the early 1990's.
- Seventeen species of waders using Anderson Inlet in 2003 are covered under the JAMBA and CAMBA international migratory bird agreements.
- The critically endangered Orange-bellied Parrot has been seen feeding on strand vegetation near Point Smythe and near Cape Paterson in recent years.

## **5 Ecological Vegetation Class (EVC) Maps**

The Ecological Vegetation Class (EVC) maps for the study area (see Appendix 2) include the Inverloch foreshore from the western end of Flat Rocks to Screw Creek and Point Smythe Coastal Reserve, west of the north-south fire break and excluding the wetland area in the northern section of the Reserve. The EVC mapping was carried out by the current author using aerial photograph interpretation and ground-truthing of both areas. Lines were drawn onto hard copy 2017 laminated aerial photographs supplied by Bass Coast Shire Council and digitised by Holocene Environmental Science. EVCs were drawn with reference to ESRI aerial imagery and some vegetation boundaries may differ when overlaid on other imagery.

## **6 Ecological Vegetation Class Descriptions**

Ecological Vegetation Class (EVC) is the standard unit used in Victoria for classifying vegetation types. There are over 300 EVCs that have been mapped across the State.

Eight EVCs have been mapped for the study areas in the coastal dune system (see Table 1 for EVC names and threat status). A brief description follows for each EVC.

The relevant codes and definitions for the threat status of EVCs in Victoria is as follows:

### **Vulnerable**

10 to 30% pre-European extent remains; OR Combination of depletion, degradation, current threats and rarity is comparable overall to the above:

- greater than 30% and up to 50% pre-European extent remains and moderately degraded over a majority of this area; or
- greater than 50% pre-European extent remains and severely degraded over a majority of this area; or
- naturally restricted EVC where greater than 30% pre-European extent remains and moderately degraded over a majority of this area; or
- rare EVC cleared and/or moderately degraded over a minority of former area.

### **Depleted**

Greater than 30% and up to 50% pre-European extent remains; OR Combination of depletion, degradation and current threats is comparable overall to the above and:

- greater than 50% pre-European extent remains
- and moderately degraded over a majority of this area.



**Least Concern**

Greater than 50% pre-European extent remains and subject to little to no degradation over a majority of this area.

**N/A**

Not as yet classified by Department of Environment, Land, Water and Planning (DELWP).

**Table 1: Ecological Vegetation Classes (EVCs) found on the coastal dune system within the two study areas and threat status**

EVC/Vegetation Community Name	EVC No.	Threat Status
Coast Banksia Woodland	2	Vulnerable
Coastal Dune Grassland	879	Depleted
Coastal Dune Scrub	160	Depleted
Damp Sands Herb-rich Woodland	3	Vulnerable
Estuarine Reedbed	952	n/a
Estuarine Scrub	953	n/a
Estuarine Wetland	10	Least Concern
Wet Saltmarsh Herbland	n/a	n/a

**6.1 Coast Banksia Woodland**



**Fig. 3: Coast Banksia Woodland, Point Smythe**





**Fig. 4: Coast Banksia Woodland, Flat Rocks, Inverloch**

This EVC occurs on deep, calcareous sands with a higher organic content and greater soil horizon development than Coastal Dune Scrub (Oates & Taranto 2001). It develops in sheltered sites on transgressive dunes such as towards the central and western end of Flat Rocks and behind Coastal Dune Scrub to the west of Screw Creek. Coast Banksia Woodland was also mapped at Point Smythe in sheltered dune swales inland from Coastal Dune Scrub and often in a mosaic with this EVC. The overstorey is dominated by Coast Banksia (*Banksia integrifolia* var. *integrifolia*) often with a shrub layer variously including Coast Wattle (*Acacia longifolia* subsp. *sophorae*), Coast Tea-tree (*Leptospermum laevigatum*), Coastal Beard-heath (*Leucopogon parviflorus*), Sweet Bursaria (*Bursaria spinosa*) and Seaberry Saltbush (*Rhagodia candolleana* subsp. *candolleana*). Bower Spinach (*Tetragonia implexicoma*) is common in the understorey and Coast Sword-sedge (*Lepidosperma gladiatum*), Knobby Club-sedge (*Ficinia nodosa*) and Small-leaved Clematis (*Clematis microphylla*) are also often present. Herbs such as Kidney-weed (*Dichondra repens*) can also be common.



## 6.2 Coastal Dune Grassland



**Fig. 5: Coastal Dune Grassland forming on incipient foredunes and dominated by native Hairy Spinifex, southern coast, Point Smythe**



**Fig. 6: Hairy Spinifex established on foredune on Anderson Inlet Angling Club beach track**





**Fig. 7: Coastal Dune Grassland dominated by introduced Sea Wheat-grass at the lagoon, Inverloch beach**



**Fig. 8: Coastal Dune Grassland being colonized by Sea Wheat-grass and Marram Grass, southern coast, Point Smythe**



Coastal Dune Grassland is dominated by grasses that can occupy the incipient dunes of high-energy beaches. The soils of these foredunes are deep, unconsolidated siliceous sands that have a very low humic content (Oates & Taranto 2001).

Coastal Dune Grassland is not common, especially to the west of Pont Hughes due to the severe coastal dune recession due to recent storms and high tides. Incipient dunes are forming from Ayr Creek east to Screw Creek except for the stone wall area west of the jetty. A very modified patch of Coastal Dune Grassland was mapped to the west of the EVC, Estuarine Wetland, at Toy's Backwater that was dominated by Sea Wheat-grass (*Thinopyrum junceiforme*) on the incipient dune and included atypical species on the rear of the low dune such as Common Reed (*Phragmites australis*), and Prickly Spear-grass (*Austrostipa stipoides*). At Point Smythe, extensive incipient dunes are forming on the southern coast and mainly being colonized by Sea Wheat-grass above the high tide mark and Marram Grass as the dune becomes more established. This EVC is the favoured habitat of the endangered Hooded Plover.

Introduced grasses dominating this EVC include the highly invasive grasses such as Sea Wheat-grass (*Thinopyrum junceiforme*) that can be locally dominant towards the strand zone and Marram Grass (*Ammophila arenaria*). The native grass, Hairy Spinifex (*Spinifex sericeus*), is sporadic along the coastline, having mainly been displaced by Marram Grass. Herbs are mostly only a minor component and are more common on the established dune. Species can include Australian Hound's-tongue (*Cynoglossum australe*), Rough Fireweed (*Senecio hispidulus*), Variable Groundsel (*Senecio pinnatifolius*) and Shady Wood-sorrel (*Oxalis rubens*). Coast Flax-lily (*Dianella* sp. aff. *revoluta*) is sometimes present and the introduced grass, Dune Fescue (*Vulpia fasciculata*), is common, as well as the invasive introduced herbs, Sea Rocket (*Cakile maritima*) and Petty Spurge (*Euphorbia peplus*).

### 6.3 Coastal Dune Scrub



Fig. 9: Coastal Dune Scrub, southern coast, Point Smythe





**Fig. 10: Coastal Dune Scrub, west of Screw Creek**

Coastal Dune Scrub is the most common EVC mapped in the two study areas, extending along most of the coast east of approximately the RACV turnoff to Screw Creek and along the northern and southern coast of the Point Smythe Coastal Reserve study area.

Coastal Dune Scrub occurs as a scrub or shrubland, forming on unconsolidated coastal sand dunes subject to strong salt-laden winds. Soils are deep, uniformly textured siliceous and calcareous sands that are potentially subject to disturbance from soil movement by onshore winds (Oates & Taranto 2001). This EVC forms on the foredunes inland from Coastal Dune Grassland and can extend inland on the rear dune system such as at Point Smythe. The vegetation structure of the dune can range from a scattered, open shrubland on the foredunes, to a dense shrubland on the rear dunes, depending on exposure, stability, soil composition and salinity.

Low shrubs of Coast Wattle (*Acacia longifolia* subsp. *sophorae*) and Coast Daisy-bush (*Olearia axillaris*) will often colonise the incipient dunes once they are stabilised by dune grasses. In more protected sites of the transgressive dunes, denser and taller scrub becomes established dominated by mixtures of Coast Tea-tree (*Leptospermum laevigatum*) and Coast Beard-heath (*Leucopogon parviflorus*). Understorey shrubs can include Seaberry Saltbush (*Rhagodia candolleana* subsp. *candolleana*), Coast Stackhousia (*Stackhousia spathulata*) and Coast Everlasting (*Ozothamnus turbinatus*). Sweet Bursaria (*Bursaria spinosa* subsp. *spinosa*) can often be present in the more sheltered areas. Where the shrub-layer is more open, the ground layer can include the graminoids Coast Sword-sedge (*Lepidosperma gladiatum*), Knobby



Club-sedge (*Ficinia nodosa*) and Coast Flax-lily (*Dianella sp. aff. revoluta*). A diverse range of herbs can be present in more established dunes, including Dune Wood-sorrel (*Oxalis rubens*), Common Bottle-daisy (*Lagenophora stipitata*), Austral Bugle (*Ajuga australis*), Variable Crane's-bill (*Geranium sp. 2*), Kidney-weed (*Dichondra repens*), Coast Groundsel (*Senecio pinnatifolius* subsp. *maritimus*) and a number of orchid species.

#### 6.4 Damp Sands Herb-rich Woodland



**Fig. 11: Remnant Manna Gums, Ramsey Boulevard, Inverloch foreshore**

Damp Sands Herb-rich Woodland was mapped as a modified EVC (mainly in association with Coastal Dune Scrub and Coast Banksia Woodland) for most of the coastal strip from Ayr Creek east to Toy's Backwater. This modified EVC is discussed in more detail in Section 7.



The structure of this EVC is a woodland with a grassy and/or bracken-dominated understorey and, in relatively intact examples, a ground layer rich in herbs, grasses and orchids. It occurs mainly on fertile and relatively well-drained, pale grey, loamy sands (Oates & Taranto 2001).

The dominant overstorey tree for Damp Sands Herb-rich Woodland within the Inverloch study area is Manna Gum (*Eucalyptus viminalis*). Occasional Swamp Gum (*Eucalyptus ovata*) can be present. The Cypresses along the Inverloch foreshore have mainly been planted within this EVC. Understorey trees and shrubs in intact patches can include Black Wattle (*Acacia mearnsii*), Sweet Bursaria (*Bursaria spinosa* var. *spinosa*) and Kangaroo Apple (*Solanum aviculare*). Austral Bracken (*Pteridium esculentum*) is present in some areas but the ground layer has mostly been cleared in the past and is now mown grass along the bicycle/walking track. A variety of native herbs are usually found within this EVC and if present can include species such as Hairy Pennywort (*Hydrocotyle hirta*), Kidney-weed (*Dichondra repens*), Bottle-daisy (*Lagenophora gracilis*) and (*Lagenophora stipitata*) and Annual Fireweed (*Senecio glomeratus*). A diversity of grasses and sedges can also be present, including Weeping Grass (*Microlaena stipoides* var. *stipoides*), Thatch Saw-sedge (*Gahnia radula*), Wallaby-grass (*Rytidosperma* spp.), Spear-grass (*Austrostipa* spp.) and Spiny-headed Mat-rush (*Lomandra longifolia*). Creepers common within this EVC can include Small-leaved Clematis (*Clematis microphylla*) and Forest Clematis (*Clematis aristata*).

## 6.5 Estuarine Reedbed



Fig. 12: Estuarine Reedbed fringing Wreck Creek, Inverloch

Estuarine Reedbed was mapped fringing Wreck Creek, Inverloch, between the road and the mouth of the creek. This EVC is dominated by Tall Reeds in association with a sparse ground layer of salt-tolerant herbs. It often occurs in sub-saline situations of coastal estuaries, often where the mouth is blocked by a sandbar (DSE 2012). At Wreck Creek the dominant species is Common Reed (*Phragmites australis*) fringing the water's edge with scattered herbs such as Creeping Brookweed (*Samolus repens*) and Austral Seablite (*Suaeda australis*).

## 6.6 Estuarine Scrub



**Fig. 13: Estuarine Scrub, near southern shores of Anderson's Inlet, Point Smythe Coastal Reserve**

Estuarine Scrub was mapped in a dune swale in the north-eastern end of the Point Smythe study area, just inland from the southern shores of Anderson Inlet. It appears that this area is inundated from time to time by an ephemeral drainage line which extends east through saltmarsh to Anderson Inlet. The sub-saline habitat is able to sustain shrubs via fresh input such as groundwater and rainfall but periodic inundation by brackish water from the drainage line results in a halophytic ground layer. Soils are typically high in organic matter and are dark brown with a sand component.

This EVC is dominated by Swamp Paperbark (*Melaleuca ericifolia*) with a salt-tolerant ground layer dominated by tussock grasses and herbs. These can include Salt-grass (*Distichlis distichophylla*), Beaded Glasswort (*Sarcocornia quinqueflora*), Creeping Brookweed (*Samolus repens* var. *repens*), Rounded Noon-flower (*Disphyma crassifolium* subsp. *clavellatum*), Angled Pigface (*Carpobrotus aequilaterus*), Toad Rush (*Juncus bufonius*), Creeping Rush (*Juncus revolutus*), Common Blown-grass (*Lachnagrostis filiformis* s.l.), Coast Barb-grass (*Parapholis incurva*), Shiny Bog-sedge (*Schoenus nitens*), Angled Lobelia (*Lobelia anceps*), Creeping Cotula (*Leptinella reptans*), Austral Seablite (*Suaeda australis*), Small Loosestrife (*Lythrum hyssopifolia*), Small River Buttercup (*Ranunculus amphitrichus*) and Shiny Swamp-mat (*Selliera radicans*). Shrubs such as Common Boobialla (*Myoporum insulare*) and Seaberry Saltbush (*Rhagodia candolleana* subsp. *candolleana*) and the scrambler, Bower Spinach (*Tetragonia implexicoma*), may also be present.



## 6.7 Estuarine Wetland



**Fig. 14: Estuarine Wetland dominated by Sea Rush in background, Toy's Backwater, Inverloch**

This EVC mainly occurs on inundation-prone, near-coastal, salinised flats. In the study area, Estuarine Wetland was mapped at Toy's Backwater. The structure of Estuarine Wetland is locally a rushland with a component of small halophytic herbs. The dominant species at Toy's Backwater is Sea Rush (*Juncus kraussii*), with halophytic species present including Beaded Glasswort (*Sarcocornia quinqueflora*), Creeping Brookweed (*Samolus repens*), Swamp-mat (*Selliera radicans*), Austral Seablite (*Suaeda australis*) and Streaked Arrowgrass (*Triglochin striata*).



## 6.8 Wet Saltmarsh Herbland



**Fig. 15: Wet Saltmarsh Herbland, Point Smythe Coastal Reserve**

Wet Saltmarsh Herbland, a wetland EVC which was originally part of the Coastal Saltmarsh Complex label, was mapped in the middle of Estuarine Scrub near the southern shores of Andersons Inlet in Point Smythe Coastal Reserve. This EVC occupies low-lying areas of Coastal Saltmarsh that receive regular inundation. It is a low herbland dominated by succulent to semi-succulent halophytic herbs or semi-shrubs and is confined to areas of suitable habitat in sheltered parts of the coast (DSE 2012). At the site at Point Smythe, Beaded Glasswort (*Sarcocornia quinqueflora*) dominated the ground layer with a scattering of Creeping Brookweed (*Samolus repens*) and Trailing Hemichroa (*Hemichroa pentandra*) on the edges of the herbland.

## 7 Discussion of EVC map

The Inverloch foreshore is a very dynamic coastal dune system and has changed dramatically over time by both natural coastal recession and human impacts such as residential development, recreational activities and stone sea structures. (The coastal geomorphology of the Inverloch foreshore and Point Smythe and coastal erosion processes will be discussed in a separate report by Neville Rosengren). From the vegetation point of view, it is a very modified ecosystem and it is difficult to map the EVCs individually without combining some areas as a mosaic of EVCs. The natural landscape profile for the coastal dune system in the Inverloch area (from above high watermark to the rear of the dune system) is Coastal Dune Grassland, Coastal Dune Scrub, Coast Banksia Woodland and Damp Sands Herb-rich Woodland, respectively. This has been altered over time, mainly by the rate of coastal recession with some established

vegetation communities such as Coastal Dune Scrub having been severely reduced in size during high erosion events but only to re-establish during times of sand accretion. At present along the western section of Flat Rocks beach, the Coastal Dune Scrub community has presumably disappeared sometime in the past due to high erosion activity in that area with Coast Banksia Woodland also rapidly disappearing during severe storm events, especially over the recent winter period.

Below are short descriptions of the EVC mapping of various localities within the study area. Please refer to the study area map at the end of this report for geographic localities and road names.

### **7.1 Flat Rocks beach**

From approximately the RACV driveway west to the end of Flat Rocks beach, no Coastal Dune Grassland or Coastal Dune Scrub communities were mapped, most likely having been lost due to the receding shoreline. The remaining EVC, Coast Banksia Woodland, was mapped along this stretch of beach but it is also being severely eroded with mature Coast Banksia trees currently (December 2018) toppling from the top of the dune into the sea.

### **7.2 Flat Rocks huts site to Ozone Street, Inverloch**

Along this stretch of the coastline, intermittent Coast Banksia trees are to be found at the rear of the dunes within Coastal Dune Scrub dominated by Coast Tea-tree. This area has been mapped as a mosaic of Coastal Dune Scrub and Coast Banksia Woodland due to the fact that apart from Coast Banksia trees being present, some of the ground layer plants also have affinities with the EVC Coast Banksia Woodland.

Closer to the main surf beach, the foredunes to the west of the Surf Lifesaving Club and east to approximately Ozone Street, are being severely eroded and stands of Coast Tea-tree close to the edge of the foredune are dying off and falling into the water.

### **7.3 Ozone Street to the jetty**

The dunes along this stretch of coastline from Ozone Street to Ayr Creek were also mapped as a mosaic of Coastal Dune Scrub and Coast Banksia Woodland and dominated by both young and old stands of Coast Tea-tree.

Interestingly, newly formed incipient dunes begin at approximately Ozone Street and extend east to Veronica Street. Plants are slowly starting to colonise these bare sand areas, especially at the sand spit but are dominated mainly by introduced grasses such as Sea Wheat-grass (*Thinopyrum junceiforme*) and Marram Grass (*Ammophila arenaria*).

From Ayr Creek westward to the jetty, the EVC Damp Sands Herb-rich Woodland was mapped at the rear of the dunes, often coinciding with the seaward side of the newly established bicycle/footpath track. Remnant, old-growth Manna Gums (*Eucalyptus viminalis*) are found scattered south of Surf Parade together with well-established Cypress trees. The Cypress trees, together with the Manna Gums, are well

established in these areas which suggests that the soils must be much higher in organic matter compared to the more infertile sands found in Coast Banksia Woodland.

The area south of the playground was mapped as a mosaic of Coast Banksia Woodland and Coastal Dune Scrub closer to the shoreline but it was noted that scattered Manna Gums and exotic overstorey trees were also present.

Coastal Dune Grassland which forms on the incipient dunes extends from Ayr Creek to the coastline near the playground. The largest area is where the lagoon has formed to the west of Point Hughes. Eulalie Brewster (*pers. comm.*) recalls that in 1974 there were two sand dunes that needed to be crossed along the bush track from the end of St. Kilda Street to the beach. Today, only a very low incipient dune is present.

#### 7.4 Toy's Backwater

It appears that Toy's Backwater (east of the jetty) was part of the Inlet until the 1960's when it was blocked off by sand (see Fig. 16 below). Over the years it has developed into an estuarine wetland with the drier western section being dominated by Common Reed (*Phragmites australis*). This drier section was mapped as a form of modified Coastal Dune Grassland. The remnant patch of vegetation between Estuarine Wetland and the road was mapped as Damp Sands Herb-rich Woodland.



**Fig. 16: Inverloch beach east of jetty in the 1960's before Toy's Backwater was blocked off by sand.**  
*Courtesy: Eulalie Brewster, Inverloch*

## **7.5 Toy's Backwater to Screw Creek**

Most of this stretch of coastline was mapped as a mosaic of Coastal Dune Scrub and Coast Banksia Woodland. Within the Inverloch Foreshore Camping Area, Coast Banksia Woodland was more evident on the sheltered slopes of the transgressive dunes. From the carpark at the eastern end of the Camping Area to Screw Creek, Coastal Dune Scrub dominated although there were some old Coast Banksia tree stumps adjacent to the foreshore in one area, suggesting that extensive dune erosion has taken place in the past in some areas along this shoreline.

## **7.6 Point Smythe Coastal Reserve Study Area**

This is a very dynamic part of the coastline and it was observed during the field survey that the dunes on the southern shores of Andersons Inlet are actively eroding whereas on the southern coastline of Point Smythe extensive incipient dunes are forming and becoming established with coastal grasses, mainly exotic Sea Wheat-grass and Marram Grass species. In the north-eastern section of the study area, a narrow band of Estuarine Scrub and Wet Saltmarsh Herbland was mapped along an intermittent drainage line. The rest of the study area consisted of Coastal Dune Scrub on the dunes with Coast Banksia Woodland in the most protected dune swales and Coastal Dune Grassland on the incipient dunes of the southern coastline.

# **8 Flora**

## **8.1 Compilation of plant species lists**

A desktop search was initially made of available data for the two study areas.

For the Inverloch foreshore, the main resources used were DELWP's Victorian Biodiversity Atlas database, a list of plant species compiled by Kate Blood in 1992 as part of an Inverloch foreshore survey (Blood, 1992), and a biodiversity assessment undertaken by Indigenous Designs for Bass Coast Shire Council for the proposed clearing of native vegetation at Inverloch foreshore for the shared path project (Indigenous Designs, 2014). The collated list includes a number of saline species outside the current study area, such as on the mudflats of the Screw Creek area and east of Townsend Bluff and some species found inland from the dune system.

For Point Smythe Coastal Reserve, a list of terrestrial plant species was initially compiled from DELWP's VBA database (DELWP 2018) and from the 1990 Monash University study entitled "Andersons Inlet: Resources, Issues and Options for Management." (Monash University 1990). Additional species were added to the list as a result of a ground survey carried out in November 2018 by the current author and botanist, Doug Frod (Pathways Bushland and Environment) who recorded 151 species in total. The Point Smythe collated list, as for the Inverloch foreshore list, includes some plant species not associated with the dune system but recorded from nearby areas such as the mudflats of Anderson Inlet.

## **8.2 Summary of flora species**

### Inverloch Foreshore and adjacent areas

It was not possible to compile a flora species list from a desktop study specifically for the Inverloch foreshore without carrying out a ground survey. Thus, the compiled flora species list from several sources includes



the Inverloch foreshore, and in some instances, adjacent areas to the dune system, such as the mangrove/saltmarsh communities of Anderson Inlet. A total of 351 plant species was compiled from the various sources for the general Inverloch area. Of the 351 total plant species present, 168 were indigenous natives, 6 non-indigenous natives and 177 species introduced to Victoria (see Appendix 3). Of the 168 indigenous species recorded, approximately half are typical species of the coastal dune system.

For future revegetation projects of the dune system, a site-specific list relevant to EVCs of the dune system would need to be carefully compiled from the overall list.

### Point Smythe /Venus Bay

A total of 220 plant species was recorded for the general Point Smythe -Venus Bay area, of which 148 were indigenous natives, 1 non-indigenous native and 71 species introduced to Victoria (see Appendix 4). For Point Smythe study area only, a total of 150 plant species was recorded by Doug Frod during a field survey in November 2018, comprising 94 native species, 1 non-indigenous native and 55 weeds.

### **8.3 Significant flora**

A total of twelve plant taxa that are regarded as being rare or threatened in Victoria (Victorian Rare or Threatened Plant species - VROTS) have been recorded for the two study areas - Inverloch foreshore and Point Smythe Coastal Reserve. However, *Avicennia marina* subsp. *australasica* (Grey Mangrove) and *Limonium australe* (Yellow Sea-lavender) were excluded as these species occur on mud flats and saltmarsh areas and not within the coastal dune system. None of the plant taxa recorded from the study areas, either previously or during the current survey, have been designated threat codes at the National level. Below is an explanation for VROT codes: VROT codes and definitions are as follows (definitions from Ross and Walsh 2003):

- e Endangered in Victoria: at risk of disappearing from the wild state if present land use and other casual factors continue to operate
- v Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
- r Rare in Victoria but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area
- k Poorly known in Victoria and suspected, but not definitely known to, belong to the one of the categories Presumed Extinct, Endangered, Vulnerable or Rare in Victoria. At present, accurate distribution information is inadequate.

Below is a brief description for each of ten plant species that are considered rare or threatened or poorly known in Victoria. The relevant State rare or threatened plant codes are provided on the left margins preceding the species names.

- v *Adriana quadripartita* (Coast Bitterbush)
- r *Atriplex paludosa* subsp. *paludosa* (Marsh Saltbush)

- r *Corybas fimbriatus* (Fringed Helmet-orchid)
- r *Juncus revolutus* (Creeping Rush)
- r *Oxalis rubens* (Dune Wood-sorrel)
- r *Poa billardierei* (Coast Fescue)
- r *Pomaderris oraria* subsp. *oraria* (Bassian Pomaderris)
- v *Pterostylis alveata* (Coastal Greenhood)
- k *Stackhousia spathulata* (Coast Stackhousia)
- r *Zoysia macrantha* subsp. *walshii* (Walsh's Couch)

*Adriana quadripartita* (Coast Bitterbush)

Coast Bitterbush is considered vulnerable in Victoria. It is a spreading shrub 1-3m high, apparently confined to established dunes in coastal and near-coastal areas west from Wilsons Promontory. There are a couple of disjunct occurrences of this species in the north and west of Victoria (VicFlora 2018) This species was not observed by the author during the flora survey at Point Smythe for this project.

*Atriplex paludosa* subsp. *paludosa* (Marsh Saltbush)

Marsh Saltbush is considered rare in Victoria. It is a sprawling shrub that is locally common on the fringes of coastal saltmarshes (VicFlora 2018). This species was growing in the EVC, Estuarine Scrub, near Creeping Rush (*Juncus revolutus*), on the north-south firebreak near the southern shores of Anderson's Inlet in Point Smythe Coastal Reserve. It is also present outside the study area at Screw Creek.

*Corybas fimbriatus* (Fringed Helmet-orchid)

Fringed Hemet-orchid is considered rare in Victoria. This species of Helmet-orchid flowers between May and September and usually forms colonies on moist, shaded sandy soil near the coast and generally east of Western Port Bay (VicFlora 2018). It was found growing on the rear dunes in the shade of Coast Tea-tree at Point Smythe Coastal Reserve during the field survey in November 2018. It had not previously been recorded for either study area.

*Juncus revolutus* (Creeping Rush)

Creeping Rush is considered rare in Victoria. It is an extensively rhizomatous, perennial small rush that grows in saline conditions. Within the study area, it was found growing in the same location as Marsh Saltbush in the Point Smythe Coastal Reserve. This species has not been recorded for the Inverloch Foreshore Reserve.

*Oxalis rubens* (Dune Wood-sorrel)

Dune Wood-sorrel is considered rare in Victoria. It is a weakly rhizomatous herb which is mostly restricted to near-coastal site (VicFlora 2018). It often grows on stabilised sand-dunes, in Coast Banksia Woodland and along beaches amongst Hairy Spinifex (*Spinifex sericeus*) plants. A number of patches of Dune Wood-sorrel were observed, mainly in the more established dune system at Point Smythe. It is highly likely that this species is also to be found along the Inverloch foreshore but has not been recorded to date.

*Poa billardi* (Coast Fescue)

Coast Fescue is considered rare in Victoria. It is a coastal tussock perennial to 60 cm high with an erect, branching rhizome. The plants are of scattered occurrence on coastal sand dunes from near Nelson in the far south-west to the NSW border, but infrequently collected in recent times and possibly being displaced by the superficially similar, introduced Marram-grass (VicFlora 2018). This species was not observed by the author during survey work for this project. It has previously been recorded for the Inverloch foreshore. It may be worth investigating propagation methods for this species and re-introducing it for future dune revegetation programs.

*Pomaderris oraria* subsp. *oraria* (Bassian Pomaderris)



**Fig. 17: Bassian Pomaderris, Point Smythe**

Bassian Pomaderris is considered rare in Victoria. It is a compact, much-branched shrub to about one metre in height and occurs on low exposed dunes and in coastal scrub on deep siliceous sands on coasts between Cape Paterson and the Ninety Mile Beach (VicFlora 2018). It was found growing on the established dunes on the southern coast of Point Smythe (see Fig. 17 above). *Pomaderris oraria* has previously been recorded for the Inverloch foreshore but not the rare subspecies although it is quite likely that the subspecies does occur along the foreshore.



*Pterostylis alveata* (Coastal Greenhood)

Coastal Greenhood is considered vulnerable in Victoria. This orchid has a flowering stem to 20 cm tall with 3-5 spreading stem-leaves. The flower is 12-15 mm long, erect, green and white with the labellum red-brown towards the apex. This species is found mostly in near-coastal areas east of Melbourne in coastal woodland and scrub on stabilized dunes. At Inverloch there are known populations in the dune system along the coastal walking track just west of Screw Creek (Glare, G. pers. com.).

*Stackhousia spathulata* (Coast Stackhousia)



**Fig. 18: Coast Stackhousia growing on southern shore of Point Smythe**

Coast Stackhousia is poorly known within Victoria and has only been recorded in scattered areas along the Victorian coast. It is a glabrous, sub-shrubby perennial that is found occasionally on foredunes of ocean beaches but seldom common (VicFlora 2018). A small group of plants were found on the southern coastline of Point Smythe at the rear of an establishing dune (see Fig. 18 above). This species has not been recorded for the Inverloch foreshore.

*Zoysia macrantha* subsp. *walshii* (Walsh's Couch)

This grass grows only to about 10 cm in height and occurs in coastal saltmarsh and halophytic vegetation fringing salt lakes, mostly in western Victoria but scattered east of Port Phillip to the Gippsland Lakes. It is shorter in stature than the closely related *Zoysia macrantha* subsp. *macrantha*. This species was found growing in Estuarine Scrub in Point Smythe Coastal Reserve. It has not been recorded for the Inverloch foreshore.

**8.4 Significant vegetation patches**

A patch of significant vegetation was found along the side of a track during the Point Smythe fieldwork. The herb patch was quite diverse and was growing on sheltered, established rear dunes with a reasonably dense overstorey of Coast Tea-tree (*Leptospermum laevigatum*). A number of orchid species were noted, including *Corybas*, *Caladenia* and *Microtis* species as well as Coast Swainson-pea (*Swainsona lessertiifolia*) which tends to grow on more calcareous sands. Austral Bugle (*Ajuga australis*) was also present which has very few database records for this area.

## **9 Fauna**

### **9.1 Compilation of fauna species lists**

A desktop search was made of any available fauna data, including marine fauna, for Inverloch, Anderson Inlet and Point Smythe.

For the Inverloch foreshore, a search within a one to five kilometre radius of the study area was undertaken using both the Victorian Biodiversity Atlas (VBA) database (DELWP 2018) and the BirdLife Australia database (BirdLife Australia 2018a). Older records were also included from Monash University (1990) “Andersons Inlet: Resources, Issues and Options for Management”, and from the 1999 South Gippsland Conservation Society (SGCS) publication “Anderson Inlet Waders and Waterbirds.” The 1990 Monash University study area included the northern and southern shores of Anderson Inlet, Crown Land at the western end of Point Smythe, the Inverloch foreshore west to Wreck Creek and Crown Land abutting Pound and Screw Creeks. The SGCS study included birds of Anderson Inlet and the Bunurong Coast as well as mammals and reptiles. All lists were updated with current taxonomic names and conservation status derived from the Victorian Biodiversity Atlas website (DELWP 2018).

For Point Smythe Coastal Reserve, a search within a one kilometre radius of the study area was undertaken using both the Victorian Biodiversity Atlas (VBA) database (DELWP 2018) and the BirdLife Australia database (BirdLife Australia 2018a). Older records were also included from the 1978 Management Plan for Coastal Crown Land at Inverloch and Venus Bay (Monash University 1978). Additional fauna species were added from the SGCS’s 1978 publication “Anderson Inlet Waders and Waterbirds.”

### **9.2 Summary of fauna species**

A total of 236 fauna species, including marine fauna, was recorded for the Inverloch study area (including Anderson Inlet and the Bunurong Coast), of which 220 are native species and 16 species introduced to Victoria (Appendix 5).

At Point Smythe, a total of 181 fauna species, including 154 bird species, 4 marine species, 18 terrestrial mammals and 5 terrestrial reptiles were recorded. This included 15 species introduced to Victoria (Appendix 6). For a more detailed listing of birds of the general Anderson Inlet area, please refer to the Inverloch species list in Appendix 5.

### **9.3 Significant fauna**

For fauna species recorded for both the Inverloch and Point Smythe study areas (including all of Anderson Inlet), 47 bird species, 4 mammal species, and 2 reptile species are listed as threatened species either under the Victorian Flora and Fauna Guarantee (FFG) Act 1988 (DELWP 2018), Victorian Threatened Species Advisory List 2013 (DELWP 2018) or the Australian Government’s Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (DEE 2018). See Table 2 below for the list of fauna species and corresponding conservation status. The relevant codes and definitions for the status of fauna in Victoria (Advisory List) are as follows:

### Critically Endangered (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (IUCN Standards and Petitions Subcommittee 2010), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

### Endangered (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (IUCN Standards and Petitions Subcommittee 2010), and it is therefore considered to be facing a very high risk of extinction in the wild.

### Vulnerable (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (IUCN Standards and Petitions Subcommittee 2010), and it is therefore considered to be facing a high risk of extinction in the wild.

### Near Threatened (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for, or is likely to qualify for, a threatened category in the near future.

**Table 2: Significant fauna species recorded for Inverloch (including Anderson Inlet) and Point Smythe**

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. Status
Azure Kingfisher	<i>Alcedo azurea</i>			Near threatened
Bar-tailed Godwit	<i>Limosa lapponica</i>		Vulnerable	
Black Falcon	<i>Falco subniger</i>	Nominated		Vulnerable
Black-browed Albatross	<i>Thalassarche melanophris</i>		Vulnerable	Vulnerable
Black-faced Cormorant	<i>Phalacrocorax fuscescens</i>			Near threatened
Black-tailed Godwit	<i>Limosa limosa</i>			Vulnerable
Blue-billed Duck	<i>Oxyura australis</i>	Listed		Endangered
Caspian Tern	<i>Hydroprogne caspia</i>	Listed		Near threatened
Common Greenshank	<i>Tringa nebularia</i>			Vulnerable
Curlew Sandpiper	<i>Calidris ferruginea</i>		Critically Endangered	Endangered
Eastern Curlew	<i>Numenius madagascariensis</i>		Critically Endangered	Vulnerable
Fairy Prion	<i>Pachyptila turtur</i>		Vulnerable	Vulnerable
Fairy Tern	<i>Sternula nereis nereis</i>	Listed	Vulnerable	Endangered
Great Egret	<i>Ardea alba</i>	Listed		Vulnerable
Great Knot	<i>Calidris tenuirostris</i>	Listed	Critically Endangered	Endangered
Grey Plover	<i>Pluvialis squatarola</i>			Endangered
Grey-tailed Tattler	<i>Tringa brevipes</i>	Listed		Critically endangered
Hardhead	<i>Aythya australis</i>			Vulnerable
Hooded Plover	<i>Thinornis cucullatus</i>	Listed	Vulnerable	Vulnerable
Hooded Robin	<i>Melanodryas cucullata</i>	Listed		Near threatened
Indian Yellow-nosed Albatross	<i>Thalassarche carteri</i>	Listed	Vulnerable	Vulnerable
Intermediate Egret	<i>Ardea intermedia</i>			Threatened
Leatherback Turtle	<i>Dermochelys coriacea</i>	Listed	Endangered	Critically Endangered

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Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. Status
Latham's Snipe	<i>Gallinago hardwickii</i>			Near threatened
Lesser Sand Plover	<i>Charadrius mongolus</i>		Endangered	Critically endangered
Light-mantled Sooty Albatross	<i>Phoebastria palpebrata</i>	Listed		
Little Egret	<i>Egretta garzetta</i>	Listed		Endangered
Little Tern	<i>Sternula albifrons sinensis</i>	Listed		Vulnerable
Loggerhead Turtle	<i>Caretta caretta</i>		Endangered	
Marsh Sandpiper	<i>Tringa stagnatilis</i>			Vulnerable
Musk Duck	<i>Biziura lobata</i>			Vulnerable
Nankeen Night-heron	<i>Nycticorax caledonicus</i>			Near threatened
Northern Giant-Petrel	<i>Macronectes halli</i>	Listed	Vulnerable	Near threatened
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	Listed	Critically Endangered	Critically endangered
Pacific Golden Plover	<i>Pluvialis fulva</i>			Vulnerable
Pacific Gull	<i>Larus pacificus pacificus</i>			Near threatened
Pectoral Sandpiper	<i>Calidris melanotos</i>			Near threatened
Pied Cormorant	<i>Phalacrocorax varius</i>			Near threatened
Red Knot	<i>Calidris canutus</i>		Endangered	Endangered
Royal Spoonbill	<i>Platalea regia</i>			Near threatened
Ruddy Turnstone	<i>Arenaria interpres</i>			Vulnerable
Sanderling	<i>Calidris alba</i>			Near threatened
Shy Albatross	<i>Thalassarche cauta</i>	Listed	Vulnerable	Vulnerable
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>			Near threatened
Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	Listed	Endangered	Near threatened
Southern Right Whale	<i>Eubalaena australis</i>	Listed	Endangered	Critically endangered
Southern Toadlet	<i>Pseudophryne semimarmorata</i>			Vulnerable
Spotted Harrier	<i>Circus assimilis</i>			Near threatened
Swamp Antechinus	<i>Antechinus minimus maritimus</i>	Listed	Vulnerable	Near threatened
Terek Sandpiper	<i>Xenus cinereus</i>	Listed		Endangered
Whimbrel	<i>Numenius phaeopus</i>			Vulnerable
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Listed		Vulnerable
White-footed Dunnart	<i>Sminthopsis leucopus</i>	Listed		Near threatened
White-throated Needletail	<i>Hirundapus caudacutus</i>			Vulnerable

**Legend:**

**FFG Act** - Victorian Flora and Fauna Guarantee (FFG) Act 1988

EPBC Act: - Environment Protection and Biodiversity Conservation (EPBC) Act 1999

Vic. Adv. Status - Victorian Threatened Species Advisory List, (2013)

A total of four bird species are considered as 'Critically Endangered' nationally under the EPBC Act, including Curlew Sandpiper, Great Knot, Orange-bellied Parrot and Eastern Curlew and one marine mammal, the Southern Right Whale. The Lesser Sand Plover and Red Knot have a conservation status of 'Endangered' under the EPBC Act, together with one mammal species, Southern Brown Bandicoot and two marine reptiles, Loggerhead Turtle and Leatherback Turtle. Another nine fauna species, including Hooded

Plover and Swamp Antechinus have a national threat status of 'Vulnerable'. The Victorian Advisory list contains three bird species and one marine species from the study area that have a threat status of 'Critically Endangered', including Orange-bellied Parrot, Lesser Sand Plover, Grey-tailed Tattler and the Leatherback Turtle. Another eight bird species, one marine mammal (Southern Right Whale) and two marine reptiles (Loggerhead Turtle and Leatherback Turtle) are considered endangered in Victoria.

Coastal dunes and beaches provide important habitat for a large range of bird species. A number of migratory birds will forage on beaches for invertebrates and often roost either in sheltered areas along beaches or in nearby low dune vegetation. Examples of some of the threatened birds listed in the above table that are reliant on dune vegetation and beach habitat are described below.

#### Hooded Plover (*Thinornis cucullatus*)

The Hooded Plover inhabits sandy beaches with ocean swells and feeds on tiny invertebrates at the water's edge. The highest densities of these birds are in areas with large amounts of beach-washed seaweed. It forages at all levels of the beach during all tide phases. It is most usually seen in pairs or small groups. The bird constructs its nest by digging a scrape in fine sand above high tide mark or in nearby low dunes (BirdLife Australia 2018b). These birds are most vulnerable to human disturbance such as dogs off leashes on beaches and also to the establishment of exotic weeds such as Marram Grass on the incipient dunes which has resulted in much steeper dunes rendering the habitat unsuitable for Hooded Plovers.

#### Fairy Tern (*Sternula nereis nereis*)

The Fairy Tern usually nests above the high tide mark on sandy beaches, spits or ridges by making a shallow scrape in the sand. It feeds almost entirely on fish in shallow water and when feeding its young will catch small fish near the shoreline. The young birds will often shelter under flotsam on the beach (BirdLife Australia 2018c).

#### Orange-bellied Parrot (*Neophema chrysogaster*)

The Orange-bellied Parrot is one of Australia's most threatened species, with less than 50 parrots thought to exist in the wild today. This critically endangered species breeds in south-western Tasmania and migrates across Bass Strait to spend the winter months on southern mainland Australia. It is seen almost exclusively in coastal and sub-coastal areas, preferring peninsulas and islands. Saltmarshes, littoral (shore) heathlands and low scrublands are preferred habitats as well as grassy areas. It feeds on the ground or on low-growing shrubs, with food consisting of seeds, fruits, flowers and berries of sedges, herbaceous plants and plants that grow in salty or alkaline conditions such as saltmarshes. (BirdLife Australia 2018). Although preferred habitat is in saltmarsh areas, two Orange-bellied Parrots were observed at Point Smythe in April 1989 feeding on the introduced Sea Rocket (*Cakile maritima*). It was thought that these parrots may have been using Anderson Inlet as a resting and feeding site during their annual migration between Tasmania and Victoria (DCNR 1994). The last recorded sighting of an Orange-bellied Parrot along the Bunurong coast, to the author's knowledge, was in a saltmarsh area at the Coal Creek estuary, Harmers Haven in 2014 and 2015 (Amaryll Perlesz, *pers. comm*).

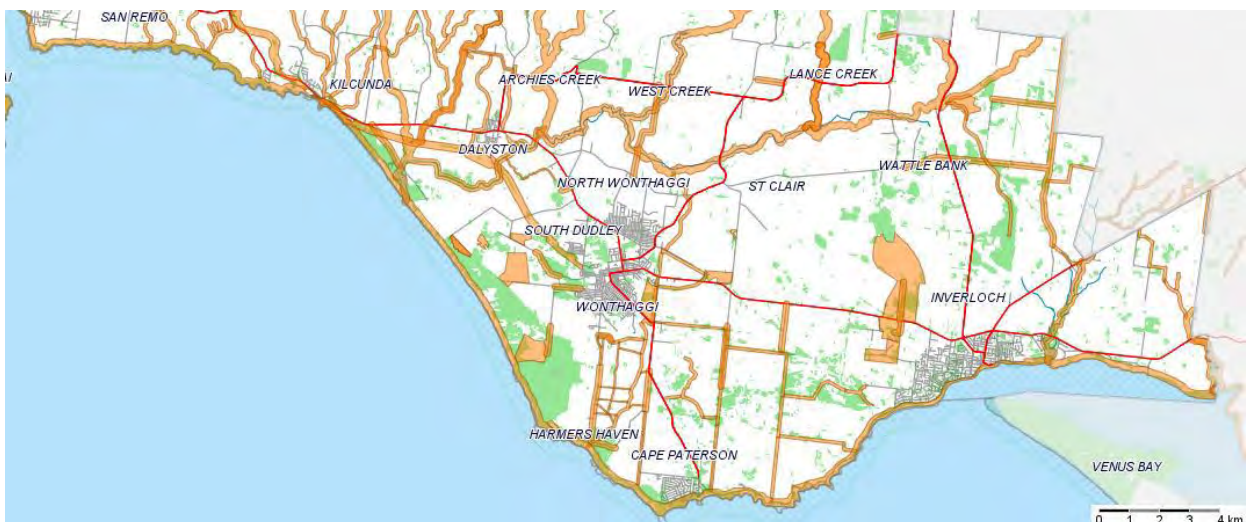
## 10 Inverloch coastal dune system and the BCSC Biolinks project

According to the Australian Government's National Wildlife Plan (DSEWPC 2012), fragmentation of our landscape reduces the capacity of species and ecosystems to adapt to altered climatic conditions. The Plan emphasises that wildlife corridors are one of the most effective tools available for conserving biodiversity and preparing landscapes for climatic change. In 2010, the West Gippsland Catchment Management Authority commissioned Alluvium Consulting Australia to produce a strategic directions statement on the Bunurong Catchment Ecosystem. This Statement emphasises the importance of biolinks in providing ecological connectivity across a fragmented landscape. The report suggests that money should be invested in providing an east-west link between the Westernport and Wilsons Promontory/Corner Inlet flagship areas to protect and enhance the condition of Bunurong Coastal Areas (Zavadil *et. al.* 2010).

In 2018, Bass Coast Shire Council (BCSC) developed a Bass Coast Biodiversity Biolinks Plan with the purpose of providing connectivity in the landscape by linking remnant patches of native vegetation using wildlife corridors. The aim is to restore ecological connectivity to encourage the movement of wildlife and to allow greater genetic diversity in breeding faunal populations. This would ensure long term viability for some of the more threatened and isolated species such as the Southern Brown Bandicoot. The Plan identifies important patches of vegetation, assets and threats to native vegetation and important linkages to this remnant vegetation (BCSC 2018).

One of the proposed biolinks in the Bass Coast Biodiversity Biolinks Plan is the Bunurong coastal strip, including the Inverloch foreshore study area (see Fig. 19 below). This is an important east-west biolink as most of the other proposed biolinks are in a north-south direction, apart from a proposed inland east-west corridor north of Wattle Bank. The Inverloch foreshore is on Crown Land and managed by public land managers but it is important that larger intact remnant vegetation patches inland be linked by north-south corridors to the coastal strip.

Another important link is the Screw Creek riparian corridor and extending this corridor further north which would provide greater connectivity for a number of fauna species.



**Fig. 19: Biolinks identified around Wonthaggi and Inverloch that will provide connectivity across the landscape (BCSC 2018)**

The coastal dune system is important habitat for many bird species. Bush birds such as whistlers, pardalotes and Grey Fantails are insect eaters and some species such as honeyeaters and Silvereyes feed on nectar and are important pollinators for a variety of trees and shrubs. These birds require a combination of broader leaved trees to forage and an abundance of lower shrubby species for shelter and breeding. A number of these species undertake regular seasonal movements either for breeding or following food sources. These birds prefer to travel from cover to cover and unless there is more or less continuous tree or shrub cover, their movements are restricted (Blyth 1997).

Similarly, small birds that inhabit the ground and low shrub layer in the dune system such as the Superb Fairy-wren and White-browed Scrubwren require denser vegetation for foraging, nesting and shelter. By developing a north-south wildlife corridor to the coast by planting a range of vegetation structures from trees to tall shrubs and smaller shrubs, additional resources for feeding, shelter and nesting would become available. This would potentially result in an increased movement of birds along the wildlife corridor and a resultant greater species genetic diversity and an increase in population numbers. A number of fauna species such as the Eastern Grey Kangaroo, Swamp Wallaby, small marsupials and snakes would also benefit by the establishment of extensions to their coastal habitat.

## **11 Importance of the coastal dune system as a habitat for fauna**

Below is a statement produced by Birdlife Australia in regard to the importance of dune habitat for shorebirds (BirdLife 2018d).

*The coastal zone between Eagles Nest and Point Smythe, which includes the sub tidal and intertidal sand flats and rock platforms, beaches, dunes, inlet and small sand islands that occur within the inlet, are critical habitats for migratory and resident shorebirds and seabirds. In fact, Anderson Inlet, which is one of the largest estuaries on the Victorian coast is recognised internationally as a Key Biodiversity Area (KBA) for providing a home to > 1% of the world population of the migratory Red-necked Stint. While this complex coastal environment is dynamic and changeable through time, it is a constant source of foraging, roosting and breeding habitat for these avifauna. Islands may temporarily form, the creek mouths can change their course, and beaches can grow or dissipate. Resident shorebirds such as the Hooded Plover, Pied Oystercatcher and Red-capped Plover will maintain territories within the area that provide space to adapt to local changes in beach dynamics. Their continued persistence at a site requires maintenance of particular habitat features, availability of food to sustain the breeding pair and future chicks, and suitable nesting locations. The sand islands when present are often utilised by nesting terns.*

*The dunes in particular are important to the threatened Hooded Plover (Listed as Vulnerable at the global, national and state level) and the area has been shown to support up to five breeding pairs (1.5% of the state population). (Birdlife Australia, 2018d).*



## 12 Effect of climate change and dune recession on flora and fauna values

### 12.1 Flora

Dune recession over recent years along the Inverloch foreshore has had a significant impact on vegetation cover within the already existing narrow coastal strip (see Figs. 20-23 below). This is quite evident in the area west of Point Hughes to Flat Rocks as observed in the photographs below taken in October 2018.



**Fig. 20: Beach in front of Surf Lifesaving Club**



**Fig. 21: Flat Rocks beach, Inverloch**



**Fig. 22: Flat Rocks beach, Inverloch**



**Fig. 23: White road marker in background on Cape Paterson-Inverloch Road, Inverloch**

The dune recession is posing problems especially for the Coast Banksia vegetation community on the dunes at Flat Rocks (see Figs. 24-25 below). The original foredune vegetation of Coastal Dune Grassland and Coastal Dune Scrub has now disappeared and the wave action is now eroding into the rear dune of Coast Banksia Woodland.

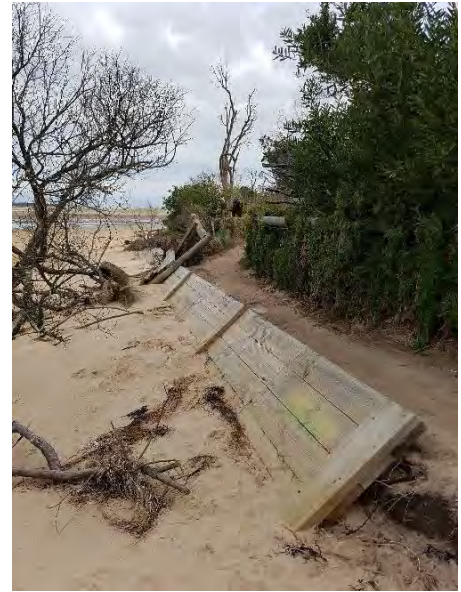
Many of these trees have been affected by unknown dieback in the past, possibly from salt spray, and those close to the shoreline now have exposed roots and are slowly toppling over onto the beach. To the immediate west of Screw Creek storm surges have also affected Coast Banksia Woodland with coastal recession being evident. However, prograding of the shoreline is also occurring in this section of beach with



incipient dunes starting to become established but dominated by introduced Marram Grass and Sea Wheat-grass.



**Fig. 24: Coast Banksias on eroding dune edge, Flat Rock**



**Fig. 25: Beach erosion adjacent to walking track, Screw Creek, May 2019**

The southern shores of Anderson Inlet and the tip of Point Smythe Coastal Reserve have also suffered from severe coastal erosion with dead Coast Tea-tree lining the shoreline as seen in the below photographs taken at Point Smythe.



**Fig. 26: Western end of Point Smythe**



**Fig. 27: South-western end of Point Smythe**

## 12.2 Avifauna

Below is a statement produced by Birdlife Australia in regard to the effects of climate change on habitat loss for shorebirds (BirdLife 2018d).

*Climate change is a recognised threat to these beach-nesting birds, through its impact on dune systems. Many dune systems are now limited in capacity to natural retreat due to the presence of infrastructure in the dunes as well as the resultant actions to protect this infrastructure such as sea walls, dune matting, etc. Loss of dunes, even via weed infestations, can lead to direct loss of breeding habitat for resident shorebirds as well as erosion and subsequent loss of foredunes and beach sand. Nests*

will be subject to greater flooding risk, there will be less available habitat for nest placement. Furthermore, other threats within the coastal system could be exacerbated through climate change, e.g. recreational users will be in closer proximity to nesting birds intensifying disturbance impacts. In the event of a total loss of the dune system the mudflat and saltmarsh habitat in the Inlet which is currently protected by the dunes is likely to deteriorate or be lost altogether.

In addressing the risks of climate change on the dune system BirdLife Australia advocates for an approach that takes into account the maintenance and sustainability of habitat of the important resident and migratory shorebird populations of the Inverloch area. This may include actions to plan for climate change resilience or mitigation of climate change effects but also management of other threats to shorebirds to compensate for climate change effects.

The most vulnerable part of the coast that will be affected by storm surges and rising sea levels will be the incipient dunes and foredunes. In areas where sand accretion does occur, it is important to have suitable dune habitat for shorebird survival. Below are some photographs of the effect of the 2018 winter storms on the Inverloch foreshore and the consequent loss of vegetation on the shoreline.



**Fig. 28: Effect of winter storms on coastal dune vegetation, Inverloch foreshore**

Where sand is accreting in the study area, especially east of Point Hughes and on the southern coast of Point Smythe, the incipient dunes are being colonised by introduced plants such as Marram Grass and Sea Wheat-grass.

Marram Grass was introduced to Victoria in the late 1800's to stabilise sand dunes. The grass develops deep and extensive rhizomes and spreads rapidly over long distances. It produces dense clumps of grass which are able to entrap sand and outcompete native grasses such as Hairy Spinifex (Parks and Wildlife Service Tasmania 2003). Marram Grass tends to change the morphology of the dunes (see Fig. 29 below), leading to much steeper and taller incipient dunes and foredunes. It also reduces open sand areas, results in a reduction of native sand-binding plants and facilitates the invasion of native shrubs. As well as altering the shape and density of foredunes, Marram Grass colonisation can also have long-term impacts on the development of coastal barriers through restricting the development of transgressive dunes (Hilton *et al.* 2006). Below are two photographs of Marram Grass growing along the southern coast of Point Smythe showing the steep dune faces.





**Fig. 29: Marram Grass forming steep-faced dunes, southern coast of Point Smythe**

Sea Wheat-grass was first recorded in Victoria in 1933 and has rapidly spread along the Victorian coast. It is a rhizomatous grass that forms low, wide foredunes that are generally in low to moderate energy conditions (Rudman 2003). As wind conditions increase, the dunes become increasingly hummocky (Hilton *et al.* 2006). Sea Wheat-grass provides a much denser cover than Hairy Spinifex, is highly salt-tolerant and grows closer to the high tide mark than Marram Grass. This results in a narrower beach and broader incipient dunes, particularly on prograding coastlines (Water Technology 2014). Sea Wheat-grass is one of the main colonisers on the sand spit at Inverloch (see Fig. 30 below).



**Fig. 30: Sea Wheat-grass and Marram Grass colonising on the sand spit, Inverloch township**

### Implications for shorebirds

- Loss of foredunes due to increased storm surges and consequent loss of bird habitat for both shorebirds and coastal bush birds.
- Reduction in availability and suitability of nesting habitat for beach-nesting birds due to invading weedy dune grasses. For example, Marram Grass produces dense swards that result in a Hooded Plover nest in the dune being more likely to be predated, especially by rodents (Cousens *et al.* 2013).
- Reduction in habitat area (Sea Wheat-grass will narrow the width of the beach). Densities of Hooded Plovers are lowest on narrow, steep beaches, where there are few or no dunes, and where human activities are most intensive (BirdLife Australia 2018b).
- Reduction in suitable dune morphology for Hooded Plovers due to the steepness of the dunes caused by Marram Grass colonisation.

### 12.3 Other fauna

The threatened mouse-like marsupial carnivore, the White-footed Dunnart, is found in a range of different vegetation types, including coastal dune vegetation and coastal forest. The main threats to this species are loss and fragmentation of habitat, modification and disturbance of habitat in coastal forests and foredune complexes and predation by foxes and cats (OEH 2018). The habitat of this species will be further reduced over time by increasing coastal recession. It is important to address issues on the dune system such as habitat modification by actively managing weed infestations and revegetating areas to stabilize the dune vegetation in order to improve habitat and potentially increase population numbers of this marsupial.

A number of other mammals and reptiles are dependent on the coastal strip along the Inverloch foreshore for habitat needs and are threatened by the decreasing amount of land available due to coastal recession and population and housing pressures. It is important to actively maintain existing habitat, especially inland of the active eroding dune and try to stabilize the coastal vegetation. For example, at Flat Rocks supplementary planting of Coast Banksia trees between the road and the eroding dune may be an option.

## 13 Recommendations

The recommendations below are intended to assist in stabilising the dune system and enhancing habitat for flora and fauna and need to be carefully considered within the two study areas. Problems in one area of the coast such as dune recession may be quite different to another adjacent area of the coast where sand accretion may be occurring and causing other problems such as dense exotic grass invasion on the incipient dunes and resultant loss of shorebird habitat. It is important to not just look at what is occurring along the beach front but also what is happening on the rear of the dunes where other pressures such as weed infestations and human activities may be impacting on the dune ecosystem.

### 13.1 Monitoring rates of dune recession: Port Fairy Coastal Group

A changing climate is already having an impact on many coastal towns throughout Australia. During this century the Victorian coast will be impacted by sea level rise, increased storm surge, changing sea temperatures, altered rainfall and ocean acidification (VCS 2014). Many coastal councils are already being proactive in trying to mitigate the impact of climate change.

The Moyne Shire Council in western Victoria, for example, has already undertaken a coastal hazard assessment at Port Fairy as well as a coastal erosion engineering and feasibility study for Port Fairy East Beach. Port Fairy also has a very active coastal volunteer group, Port Fairy Coastal Group (PFCG), who has been measuring changes since 2012 to the beach and dune systems in Port Fairy Bay (see Figs. 31-33 below). Every month a team of volunteers makes an accurate survey of a dozen cross-sections of the beach using a laser level. The team presents a monthly report and shares the detailed analysis of the data with Council and State Government to help inform management decisions. The Coastal Group is also working under the guidance of Deakin University on a Victorian Coastal Mapping Project using a UAV (Drone) to extensively photograph sections of the coast. The images are processed off line and 3D models produced that provide distance and height measurements of the beach and dunes as well as sand volumes contained in any area of interest (Port Fairy Coastal Group *pers. comm.*). See Figures 34-35 below.

## Measuring the Beach – Dune Recession



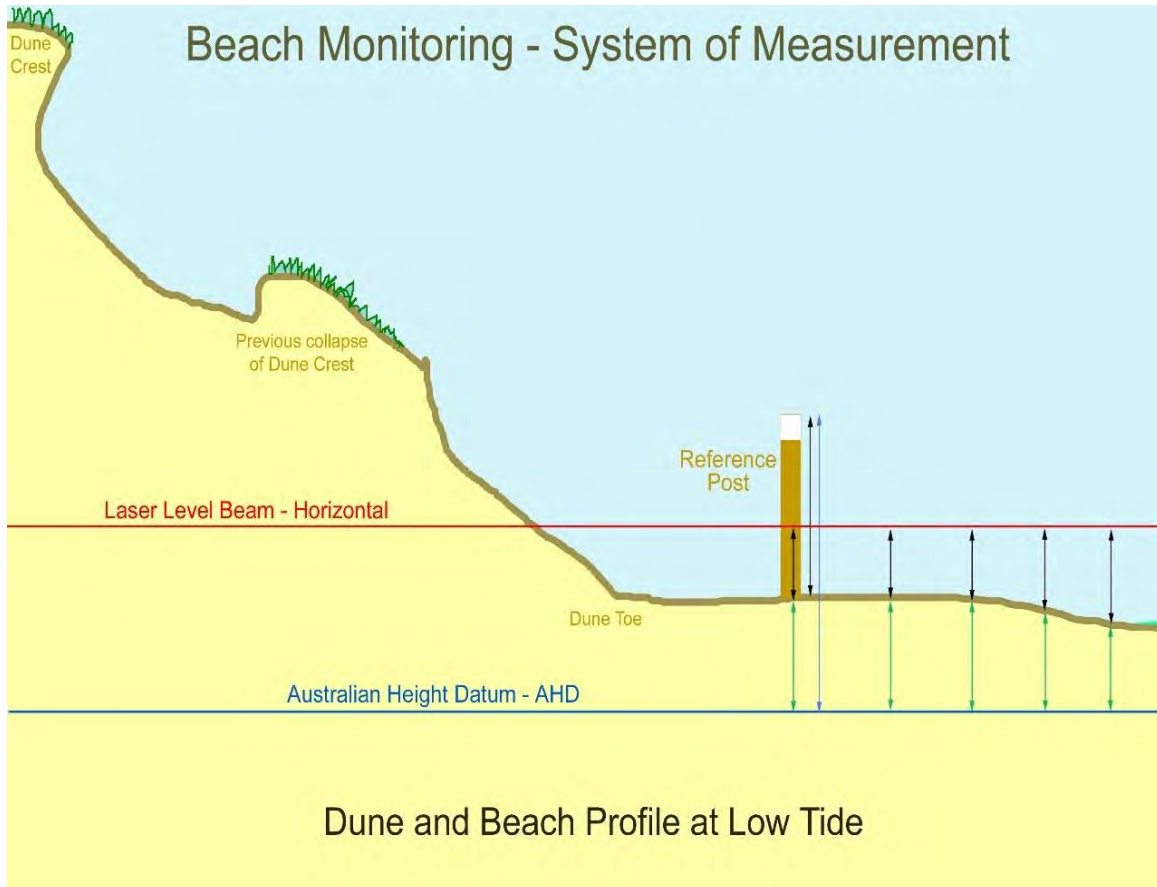
**Fig. 31: Measuring dune recession at East Beach, Port Fairy.**  
**Courtesy: Port Fairy Coastal Group.**



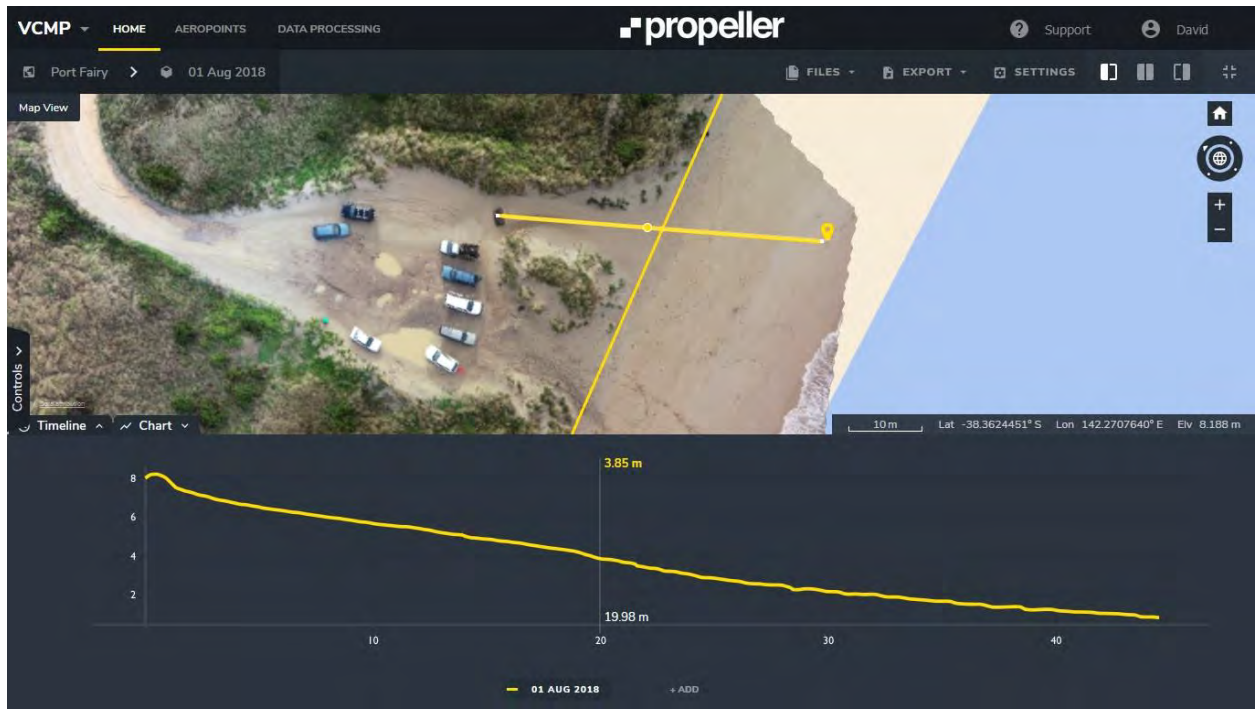
## East Beach Monitoring – Laser Level Measurement



**Fig. 32: Laser level beach monitoring, East Beach, Port Fairy.**  
Courtesy: Port Fairy Coastal Group



**Fig. 33: Diagram showing dune and beach profile at low tide. East Beach, Port Fairy.**  
Courtesy: Port Fairy Coastal Group.



**Fig. 34: Drone monitoring data showing a transverse cross-section at East Beach, Port Fairy. Courtesy: Deakin University, Warrnambool.**



**Fig. 35: Drone monitoring data showing a longitudinal cross-section at East Beach, Port Fairy. Courtesy: Deakin University, Warrnambool.**

The South Gippsland Conservation Society has set up a similar volunteer monitoring group at Inverloch to monitor sand change over time. The author and SGCS member, Philip Heath, visited Port Fairy in December 2018 to hold discussions with various members of the Port Fairy Coastal Group and to visit monitoring sites. The SGCS has also initiated a regular drone survey in conjunction with Deakin University along the Inverloch foreshore. This will be invaluable information not only for observing sand movement but also to see changes in vegetation communities over time and to manage accordingly.



### 13.2 Rebuilding and rehabilitation of sand dunes: A case study at East Beach, Port Fairy

Beach erosion at East Beach was first identified at the night soil site (most southern of the two land fill sites) from the Port Fairy Coastal Group (PFCG) review of aerial photography in 2011. Moyne Shire Council responded by installing seven initial measuring posts in 2012 and PFCG commenced monitoring of a 4.5km section of the beach with a laser level manual system.

#### Wave Energy Dissipation Structures

In 2013, unusual dune recession (one metre per year compared with the previously estimated three cm per year) was detected over the central section of the beach encompassing the two former landfill sites (a night soil site and a general tip site). Moyne Shire responded to the threat by installing a 30m length of two rows of wet sand fencing at the night soil site in 2013. Erosion at the general tip site led to construction of a Wave Energy Dissipation Structure (WEDS) to dissipate wave energy and to protect the dune toe from further erosion (see Fig. 36 below). The 150m structure consisting of a rock wall was completed in June 2014 and proved to be successful in protecting the dune over the following winter, although some undercutting of the dunes at either end of the wall did occur.

The WEDS was then extended to 210m and two rows of 30m long double sand trap fences were added at either end in 2015. In some areas, a low geotextile fence was installed at the rear of the rock wall to provide shelter at the toe of the dune and to encourage plant growth. Sand has built up to form a dune to approximately 1-2m in height behind these fences (see Fig. 37 below).



**Fig. 36: Double layered rock wall, East Beach, Port Fairy**



**Fig. 37: Fence covered with geotextile material behind rock Wall, East Beach, Port Fairy**

#### Sand Fences

Two parallel 30m sand fences were installed in 2015 at either end of the 210m WEDS described above, located adjacent to the carpark near the Port Fairy Links Golf Course (see Figs. 38-41 below).

*Each picket is a flattened diamond shape which is oriented side on to the prevailing water/wind and generates turbulence to convert its kinetic energy into heat as the \*fluid passes between the pickets, almost independent of the angle of approach.*



Wave height is reduced as it passes through each fence so that in a relatively short distance, a large wave is reduced to lower energy foam to minimize damage the dune toe. By dissipating most of the wave energy, the high sand levels nearer the dune toe are preserved for longer to provide some resistance against the larger waves.

Sand trap fences are also designed to provide wind protection and work well in dry sand due to the picket's special shape. When operated as a wind break, the Wattle and Wire fence is said to have a high protection ratio; that is for every metre of fence height, several metres of distance behind the fence will have an effective wind break' (PFCG 2018b).



**Fig. 38: Double trap sand fence at end of rock wall East Beach, Port Fairy**



**Fig. 39: Double trap sand fence in action, East Beach, Port Fairy (Courtesy: Port Fairy Coastal Group)**

The sand fences have been strengthened after storms. It was noted during the recent visit to Port Fairy by the author that the outer sand fence is out of alignment in some places due to wave pressure. Two sand fences that had been installed further south, closer to the township of Port Fairy, at the night soil site in 2013 have since been buried by sand as beach accretion has occurred over the past few years.



**Fig. 40: Sand fence installation, East Beach, 2013 Source: Wattle & Wire 2018**



**Fig. 41: Intact dune area behind fence after June 2014 winter storm, East Beach, Port Fairy**

The Port Fairy Coastal Group has found that revegetating the toe of the dune has been successful but more beneficial against wind and rain erosion rather than the sea. Deliberate plantings of the reconstructed dune face have been successful to a certain extent and in the area between the dune toe and behind the sand fences there has been considerable regrowth but dominated by weeds such as Marram Grass and Sea Spurge (see Figs. 42-43 below). The rock wall constructed along part of the beach has also been successful

in preventing most of the water from reaching the revegetation area and causing any damage. The Group believes that revegetation without protection would not have worked in this situation (PFCG. *pers. comm.*).



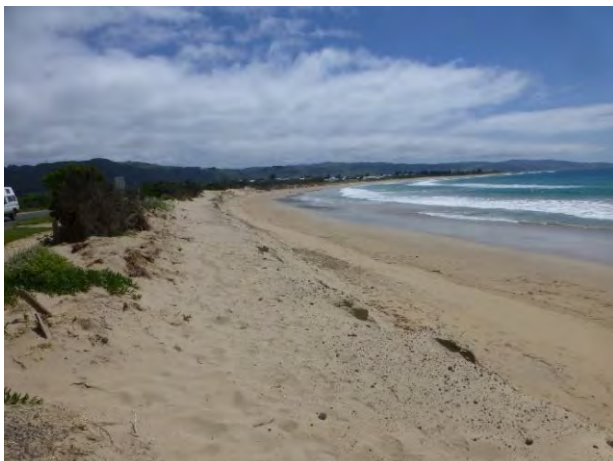
**Fig. 42: Dune revegetation dominated by Sea Spurge, Pea Soup Beach, Port Fairy**



**Fig. 43: Dune revegetation, East Beach, Port Fairy**

#### Sand nourishment and geotextile fencing at Apollo Bay

In the winter of 2011 short-term coastal erosion on the western coastline of Victoria was widespread. Along the Apollo Bay coast, impacts included loss of sand and vegetation, exposure of important infrastructure and in some areas too much sand was deposited (Otway Coast Committee, *pers. comm.*). At Apollo Bay's Marengo Beach, a sand nourishment program was carried out in 2017 to relocate 16,000 cubic metres of sand from the Barham River spit to Marengo Beach. This was hoped to create an extra three metres of sand dune along approximately 500 metres of beach, providing an immediate buffer from winter storms and also promote natural beach building. It has been partially successful with the build-up of incipient dunes but erosion is still occurring on the dune face and shrubs are dying off on the dune slope and crest due to exposure, especially over the winter months (see Fig. 44 below). Coconut husk 'coir' logs and jute matting were placed on the dune and revegetation of indigenous species was also carried out. The coir logs have not been able to stabilise the vegetation and the dune slopes are mostly bare of vegetation due to wind erosion (see Fig. 45 below).



**Fig. 44: Incipient dune, Marengo Beach, Apollo Bay**



**Fig. 45: Coir logs at Marengo Beach, Apollo Bay**



In some areas along Marengo Beach, dune thatching has been carried out with plant debris and dead branches to help stabilise the sand (see Fig. 46 below). This has been quite effective in trapping the sand and allowing grasses and sedges to establish.



**Fig. 46: Marengo Beach, Apollo Bay showing successful dune thatching along the re-nourished beach**

Along the beach front in the vicinity of the Cawood Street Carpark at Apollo Bay, to the east of the township, the beach has suffered from severe dune recession and parts of the beach path have collapsed. Attempts are currently being made to stabilise the situation by constructing a rock revetment wall and fencing it off with the use of a wire netting fence covered in a geotextile fabric to trap the sand. The footpath in places is also being re-constructed further inland towards the Great Ocean Road (see Figs. 47-49 below).



**Fig. 47: Dune recession and treatment works, Great Ocean Road, Apollo Bay**





**Fig. 48: Erosion adjacent to Great Ocean Road, Apollo Bay**



**Fig. 49: Revetment works adjacent to Great Ocean Road, Apollo Bay**

### 13.3 Rebuilding and rehabilitation of sand dunes: Inverloch Foreshore

Two separate wet sand fences were installed in March 2019 along the Inverloch foreshore as a temporary mitigation measure to protect the sand dunes (see Figs. 50 and 51 below). One was constructed in front of the Inverloch Surf Lifesaving Club building and at Flat Rocks along the section of the Cape Paterson-Inverloch Road where the recession of the dunes has come to within a few metres of the road. A couple of storm events since installation have damaged the fences but there has been some build-up of sand between the fence and the toe of the dune, especially in the middle section. During a storm, wave surge occurs at each end of the fence, eroding away the base of the primary dune causing undercutting and consequent slumping and vegetation loss.

In the event that the trial of two rows of wet sand fencing, in combination with sand renourishment and dune reconstruction proves to be successful in the short-term, consideration should be given to extending the length of the wet sand fencing from the existing 60 metres to a greater section of coastline between Flat Rocks and Point Norman, given the ecological values of the dune system highlighted in this report. It is also suggested that the wet sand fencing be modified to include a 45 degree return at each end to protect adjoining dunes from end effect of erosion.



**Fig. 50: Wet Sand Fence in front of Inverloch Surf Lifesaving Club, April 28, 2019**



**Fig. 51: Wet sand fence submerged during storm event at Inverloch foreshore, March 25, 2019**  
 Courtesy: Dave Sutton, Inverloch

### **13.4 Natural regeneration**

Natural regeneration of a vegetation community is the preferred option for a stable ecosystem. In many areas along the Inverloch coastline this is occurring, especially on established Coastal Dune Scrub on the transgressive dunes. If weeds are controlled appropriately and human activity is monitored then natural regeneration should occur. If there is limited competition from Marram Grass (for example hand weeding in small areas of the dune where Hairy Spinifex is present) then Hairy Spinifex will re-establish if it is present nearby. If Hairy Spinifex is located on the dune slope or the crest of the dune, rhizomes from the plant will begin to extend down the dune slope and begin binding the sand particles to slow down erosion rates.

### **13.5 Supplementary planting in native vegetation**

In areas that have been disturbed either by human impact, weed infestations or coastal recession and where there is virtually no potential for natural recruitment then supplementary planting may be required. This is especially the case in the stand of Coast Banksia Woodland at Flat Rocks. There is little Coast Banksia recruitment and many of the remaining mature trees are under threat from further dune recession. It is suggested that supplementary planting of this species together with some taller understorey shrubs/small trees such as Sweet Bursaria (*Bursaria spinosa*) and Coastal Beard-heath (*Leucopogon parviflorus*) be carried out.

Other mapped areas of Coastal Dune Scrub/Coast Banksia Woodland along the Inverloch foreshore could also be supplementary planted, where required with the above species, in sheltered areas at the rear of transgressive dunes. It is important when considering supplementary planting or revegetation to look at the plant succession currently occurring on the dune system from the coast inland and plant accordingly with appropriate indigenous species. There is increasing scientific evidence from both Australia and overseas that the most effective dune systems in both promoting habitat and providing storm protection are those in which appropriate plant species are used in each vegetation zone to promote a stable dune system (Wootton *et. al.* 2016).

### **13.6 Revegetation**

A revegetation program was undertaken at East Beach, Port Fairy on the dune face behind the now submerged sand fence in an attempt to stabilise the dune. Below are two photographs taken (Figs. 52-53), one in June 2014 and the other in September 2018 (fence now buried by sand). The dune slope has stabilised but has mainly become dominated by the introduced Marram Grass.



**Fig. 52: Completed sand fence at night soil site, East Beach, Port Fairy, May 2014**

**Fig. 53: Revegetated dune at same site, Sept. 2018**

**Courtesy: Port Fairy Coastal Group**

There is an opportunity to trial the planting of Hairy Spinifex on the renourished sand dune at the rear of the two double trap sand fences on the Inverloch foreshore. A number of papers have been published on the varying successes of growing Hairy Spinifex plants by seed or vegetatively and it will be a matter of experimenting with both methods in the short term (Maze, K & Whalley, R.1992, Bergin & Kimberley 1999).

Other native species that could be trialled to assist in the initial stabilisation of the dunes include Coast Daisy-bush (*Olearia axillaris*), Bower Spinach (*Tetragonia implexicoma*), Coast Wattle (*Acacia longifolia* subsp. *sophorae*) and Rounded Noon-flower (*Disphyma crassifolium* subsp. *clavellatum*).

Another recommendation would be to trial the thatching of the steep dune slopes with plant debris and dead tea-tree branches in order to help stabilise the dune where undercutting and consequent slumping has occurred. As discussed above, this method has been successfully applied at Marengo Beach, Apollo Bay.

In Texas, research is being carried out on the role of vegetation in dune erosion resiliency.

*“The role of restored vegetation in dune erosion resiliency has not yet been rigorously investigated. Results from a small-scale mobile-bed wave flume experiment with live plants clearly showed that the presence of the plants significantly reduced the volume of dune erosion and the dune scarp retreat rate by over 30%. Shear testing indicated that dune plant roots increase the mechanical strength of non-cohesive sediment. The presence of mature plant roots doubled the amount of time before structural failure occurred and increased the cumulative shear required to break down sediment by 180%”.* (Sigren, J. et al. 2014).

The authors also studied the importance of seaweed and arbuscular mycorrhizal fungi (AMF) in dune restoration. AMF is scarce in degraded dune systems and inoculations of AMF drastically improve plant health. Seaweed is also used as a buffer against wave erosion and when high piles of seaweed accumulate on the Texan beaches they are often transported by a front loader from the shoreline to the back of the beach where they slowly decay.



### **13.7 Amenity plantings**

A number of amenity plantings with appropriate indigenous species could be established in the Damp Sands Herb-rich Woodland vegetation community in the vicinity of the bicycle/footpath track to the east of Ayr Creek. Bass Coast Shire has already planted out a number of areas with indigenous grasses and small shrubs along this section between the bicycle/footpath track and the coast. As the lawned areas under the Cypress trees are popular picnicking areas for visitors, it is unlikely that these areas would be considered for intensive indigenous plantings. However, if dune recession intensifies in this area over time, restoring the area to the original EVC, Damp Sands Herb-rich Woodland, would provide a much more stable dune system than the exotic lawned area that currently exists.

### **13.8 Weed control**

Inverloch foreshore has a higher proportion of weed species than indigenous species and it is vitally important that the most invasive weeds are managed so that the dune system remains stable. Planting of indigenous species following a staged process of weed removal is important for the stability of the dune system in this area. Bass Coast Shire Council manages the Inverloch foreshore from Screw Creek west to Wreck Creek. Monitoring and control of the major woody weeds is part of the Council's vegetation management program and is carried out on a regular basis. It is recommended that a weed management plan be prepared specifically for the Inverloch foreshore, together with a 5-year action plan.

Parks Victoria is the land manager for Point Smythe Coastal Reserve and Flat Rocks, west of Wreck Creek. One of the main invasive weeds is Dolichos (*Dipogon lignosus*) which has established on the transgressive dunes in Coastal Dune Scrub at Point Smythe Coastal Reserve. Apart from the invasive Marram Grass, Sea Wheat-grass, Sea Spurge and Sea Rocket on the incipient dunes, weeds are mainly limited to weedy annual grasses and herbs with some Mirror Bush.

### **13.9 Pest animal management**

One of the main threats to indigenous fauna, apart from loss of habitat, is predation by domestic dogs and feral cats and foxes. Rabbits and hares are also a major problem as they compete with indigenous fauna for food sources and rabbits disturb the ground layer vegetation when digging burrows, thus disturbing the stability of the dune system. It is important that there is an effective and regular fox and rabbit control program along the Inverloch foreshore and at Point Smythe and that there is co-ordination between the various land managers, including private landholders, to ensure success of such a program.

### **13.10 Access and fencing**

The Inverloch foreshore has a network of beach access tracks, many of which are narrow tracks through the dunes. A suggestion would be to review and rationalise, if possible, all beach access tracks and where erosion is occurring, establish post and wire fences to avoid trampling of the dune system. It is also recommended to cordon off the toe of the eroded dune in front of the Inverloch Surf Lifesaving Club during the peak summer season as it was observed that tourists, especially children, were seen playing and

digging holes in the steep, unstable dune face. An option to consider would be dune thatching with plant debris and dead branches to help stabilise the sand which has been largely successful at Apollo Bay.

The relatively recently constructed main track from the Surf Lifesaving Club to the beach, which involved removal of indigenous vegetation, was partially obstructed last year by the lookout tower until it was moved onto the beach for the 2018/19 summer season. The lookout tower was then moved further back from the beach to the eastern side of Wreck Creek but was damaged by recent April/May storms and has now been dismantled (see Fig. 54 below). The Surf Lifesaving Club is now looking at other options for the location and design of the lookout tower for the 2019/20 summer season.

It is recommended that the area from the toe of the existing dune to the wet sand fence (where the incipient dune will establish through sand accretion and re-nourishment and be revegetated) in front of Inverloch Lifesaving Club and to the east of Flat Rocks be cordoned off to prevent human trampling, especially during the summer period.



**Fig. 54:** *Inverloch Surf Lifesaving Club observation tower on main beach access track in September, 2018 (left) and after storm in April 2019 near Wreck Creek (right).*

### 13.11 Education

It is important to educate the community and visitors to the area about the dynamic and fragile coastal environment and how to minimise human impact on the coastal dune system and its associated biodiversity (see Fig. 55 below). It is valuable to include the importance and rarity of flora and fauna along this stretch of coastline in educational programs at Bunurong Environment Centre and also to hold periodic public exhibitions so that the community can learn more about the biodiversity values of the coast.



**Fig. 55: Signage at Inverloch Surf Lifesaving Club indicating dune erosion hazard**

### **13.12 Monitoring of grasses on sand spit adjacent to lagoon, Inverloch**

The sand spit at Inverloch has many similarities with the one at Shallow Inlet as described by Heyligers (2006) and is at the stage of being colonized by Sea Wheat-grass and Marram Grass as the dunes become more defined (see Fig. 56 below). It was interesting to note that Heyligers believed that no dune development would have occurred at the spit at Shallow Inlet without the colonization of these exotic grasses. In the author's opinion, and after discussions with geomorphologist, Neville Rosengren, it is probably not worth the effort in trying to establish the native grass, Hairy Spinifex, on the incipient dunes on the spit as it will still be outcompeted by Marram Grass and Sea Wheat-grass and at some stage in the future the sand mass on the spit will migrate east as has happened in the past. Once the dunes become established with colonizing grasses, shrubs such as coast Wattle (*Acacia longifolia* subsp *sophorae*) and Coast Everlasting (*Ozothamnus turbinatus*) that can tolerate exposure will become established behind the incipient dunes. This process can be observed to the west of the lagoon at Point Hughes (see Fig 57 below).



However, it would be worthwhile monitoring the growth of Sea Wheat-grass and Marram Grass to ensure that it does not become too dense for Hooded Plover habitat (Maguire, undated). A University of Melbourne project is currently being undertaken by Marita McGuirk on quantifying the sand accumulation capability of different species of backshore dune plants with one of the proposed sites being the spit at Inverloch.



***Fig. 56: Sea Wheat-grass beginning to colonize the sand spit, Inverloch***



***Fig. 57: Coast Wattle establishing on incipient dune at Point Hughes***

### **13.13 Infrastructure development and removal of native vegetation**

Any future infrastructure development on the Inverloch dune system should be carefully considered due to the fragility of the dune system and the dynamic processes occurring locally with the impact of climate change. It is vital that no further native vegetation be removed from the Inverloch foreshore which would result in further instability of the dune system. This applies not only to the foredunes but also to the rear dunes adjacent to Surf Parade and the Cape-Paterson-Inverloch Road.

### **13.14 Communication with stakeholders**

It is imperative that for a successful outcome on coastal erosion mitigation that Bass Coast Shire Council, South Gippsland Shire Council, DELWP, Parks Victoria, VicRoads, West Gippsland CMA, BirdLife Australia, community groups and other interested parties continue to liaise on matters of coastal recession and associated loss of flora and fauna habitat in the Inverloch area and effectively monitor and address these issues. A Bunurong Inverloch Coastal Erosion Working Group has already been formed involving most of the above land management agencies as well as community groups such as the South Gippsland Conservation Society.

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## **15 Appendices**

### **Appendix 1: Study Area Map**



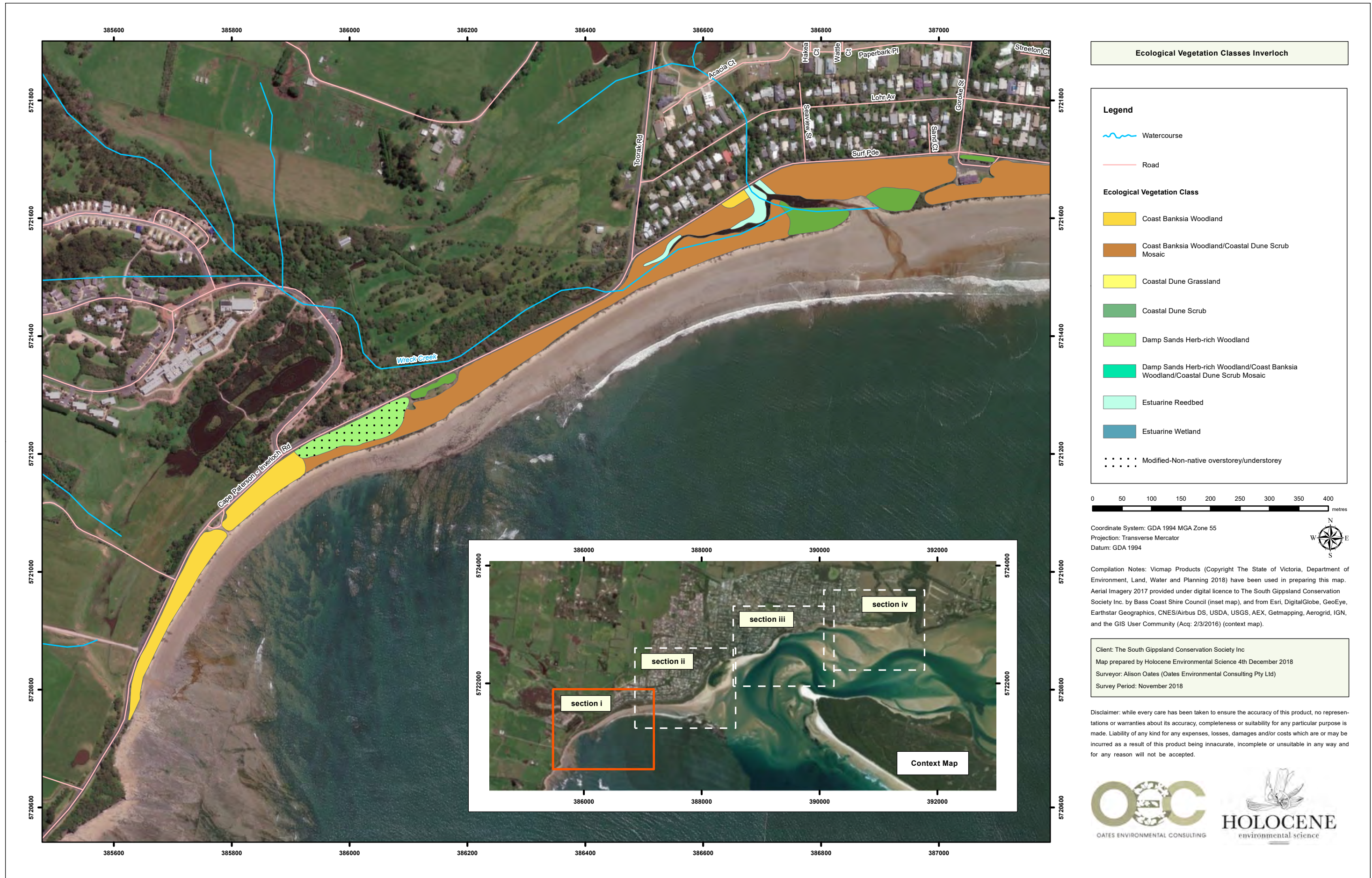


Map 1: Location of Inverloch Coastal Reserve (Flat Rocks to Screw Creek) and Point Smythe Coastal Park study area



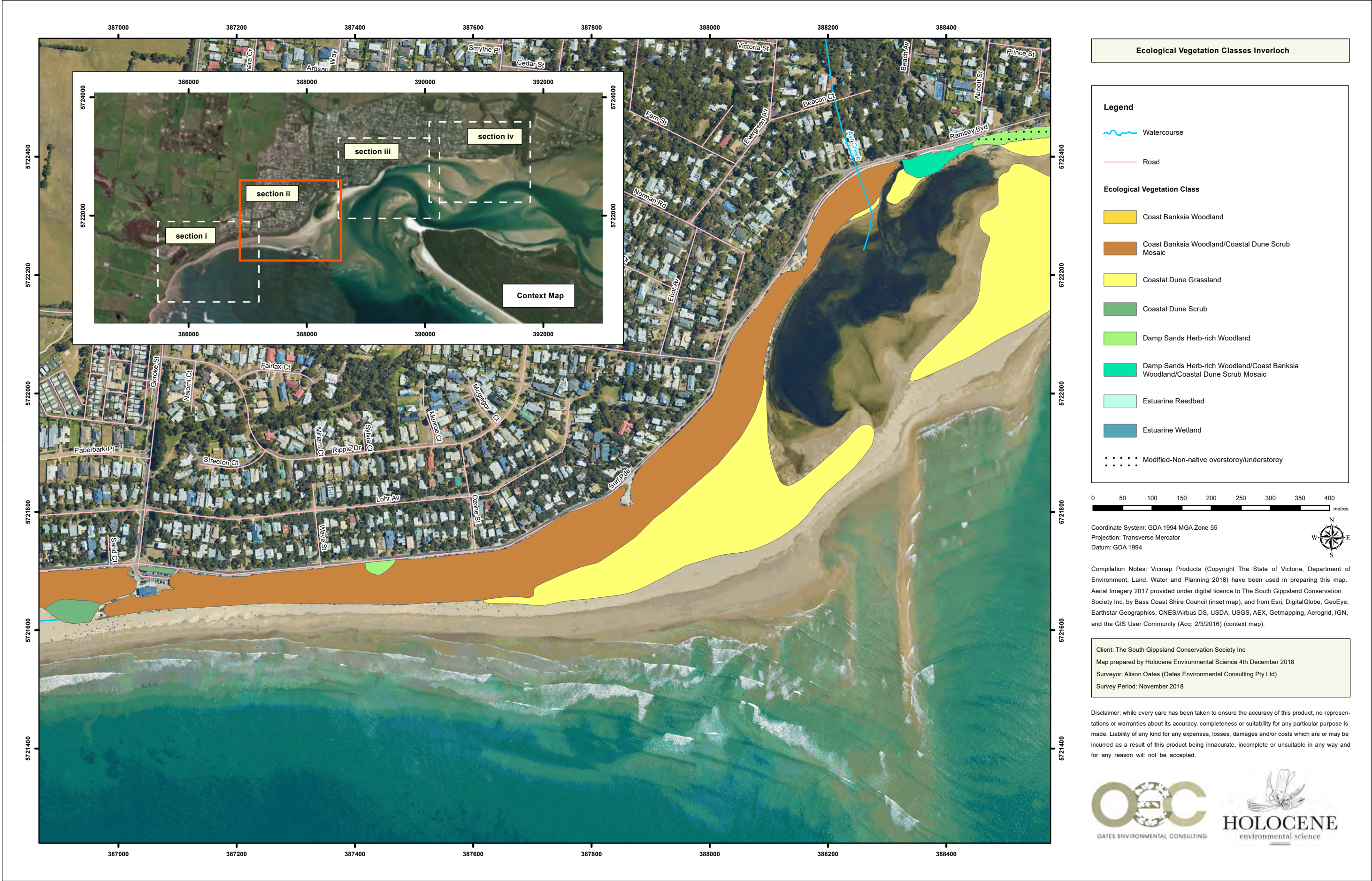
**Appendix 2: Ecological Vegetation Class Maps**





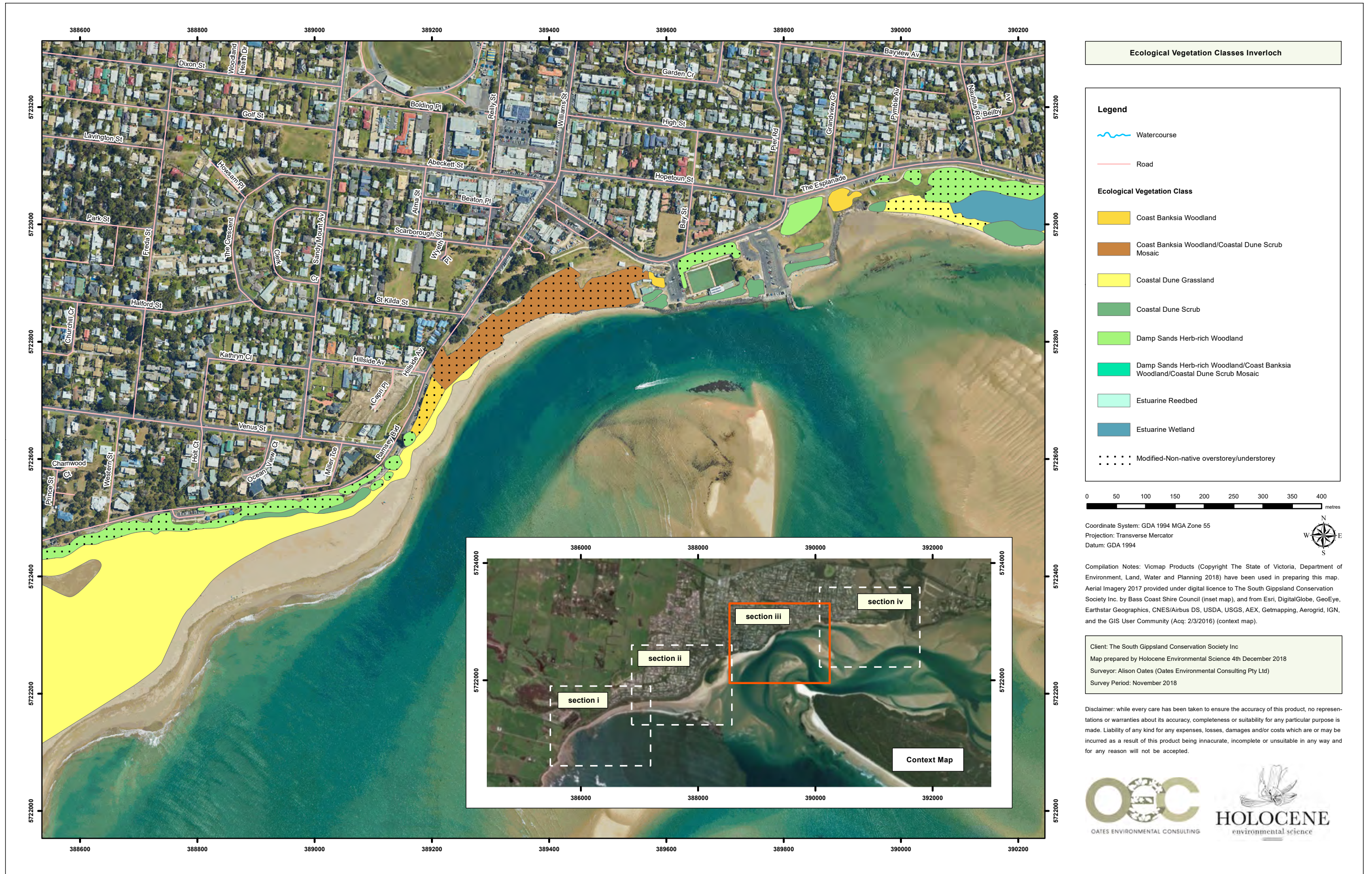
Map 2: Ecological Vegetation Classes, Inverloch Coastal Reserve (Flat Rocks to Screw Creek), Inverloch (section i)





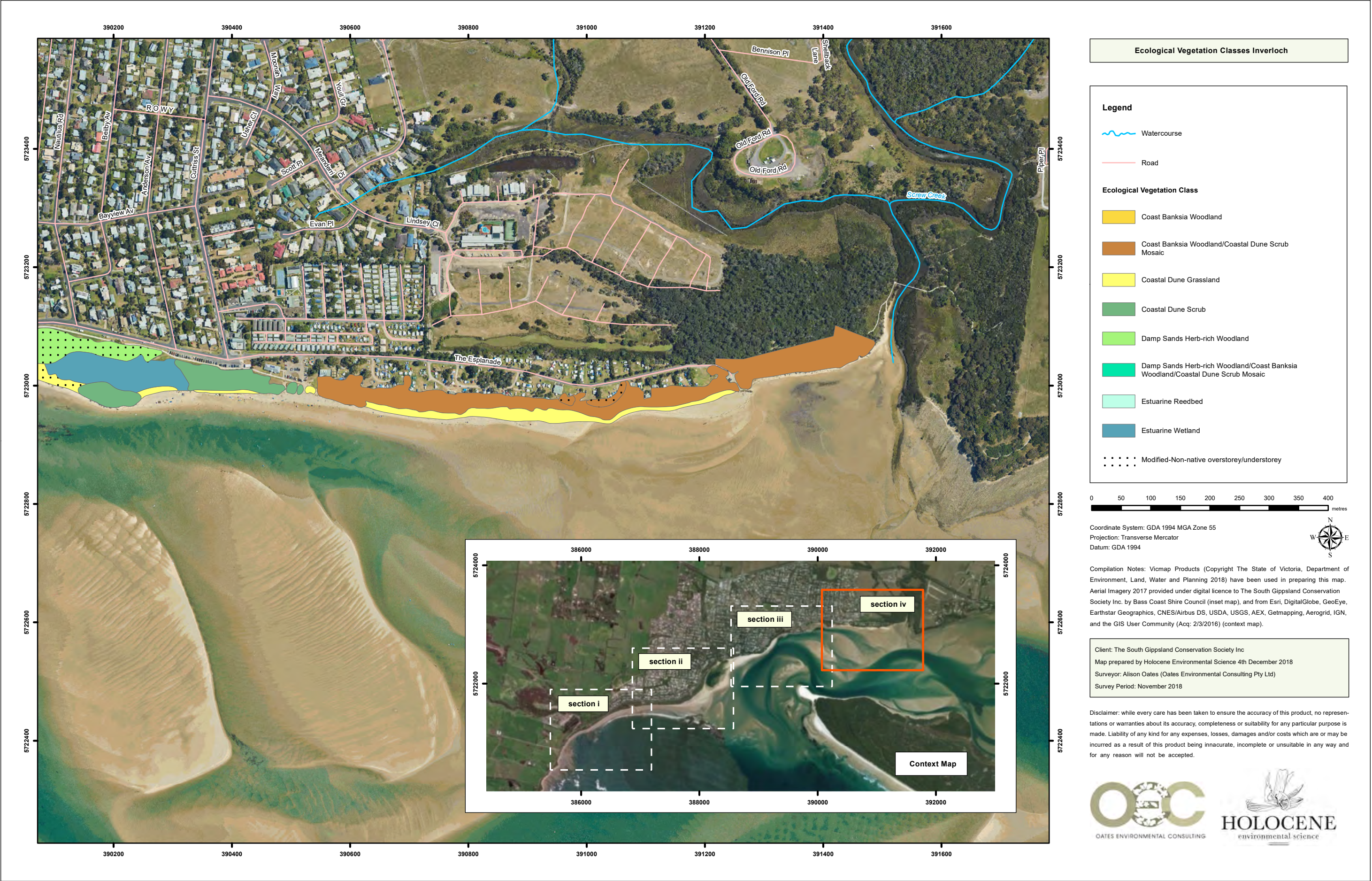
Map 3: Ecological Vegetation Classes, Inverloch Coastal Reserve (Flat Rocks to Screw Creek), Inverloch (section ii)





Map 4: Ecological Vegetation Classes, Inverloch Coastal Reserve (Flat Rocks to Screw Creek), Inverloch (section iii)





Map 5: Ecological Vegetation Classes, Inverloch Coastal Reserve (Flat Rocks to Screw Creek), Inverloch (section iv)





Map 6: Ecological Vegetation Classes, Point Smythe Coastal Park, Venus Bay

**Appendix 3: List of Vascular Flora Species for the Inverloch foreshore and adjacent areas**
**Key to Codes Used within Table:**
**Status:**

The symbol '\*' preceding the scientific name of a species denotes that it is considered introduced in Victoria.

The symbol '#' preceding the scientific name of a species denotes that it is considered introduced within the study area, but indigenous within some other part of Victoria.

**Bold letters:** indigenous species typical of the coastal dune system

VROT codes (from DELWP Advisory List of Rare and Threatened Flora):

r Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.

v Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.

**Source of information within Table:**

Vic. Adv. List: - Victorian Threatened Species Advisory List, (2013)

Taxon Status: (see above for description of symbols)

VBA 2018: - Victorian Biodiversity Atlas (targeted database search)

Monash Uni 1978: (Barlow *et. al.* 1978). *A Management Plan for Coastal Crown Land at Inverloch and Venus Bay*

Monash Uni 1990: - (Harrison *et. al.*, 1990.) *Andersons Inlet: Resources, Issues and Options for Management.*

ID 2014: Indigenous Designs (2014): - *Biodiversity Assessment for proposed clearing of Native Vegetation at Inverloch Foreshore Shared Path (Abbott Street to Cape Paterson Road).* Indigenous Design Land Management.

Blood 1992: - (Blood, K, 1992). *Distribution Survey of Flora of the Inverloch Foreshore Reserve.*

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA 2018	Monash Uni 1978	Monash Uni 1990	ID 2014	Blood 1992
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle			x				
<b><i>Acacia longifolia</i> subsp. <i>sophorae</i></b>	<b>Coast Wattle</b>			x	x		x	
<i>Acacia melanoxylon</i>	Blackwood					x		
<i>Acacia pycnantha</i>	Golden Wattle		#		x	x		
<i>Acacia suaveolens</i>	Sweet Wattle					x		
<i>Acacia verticillata</i>	Prickly Moses					x		
<b><i>Acaena novae-zelandiae</i></b>	<b>Bidgee-widgee</b>			x		x		
<b><i>Acianthus</i> spp.</b>	<b>Mosquito Orchid</b>					x		
<i>Acrotriche serrulata</i>	Honey-pots					x		
<b><i>Actites megalocarpus</i></b>	<b>Dune Thistle</b>					x		
<b><i>Adriana quadripartita</i></b>	<b>Coast Bitter-bush</b>	vulnerable			x	x		
<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	Agapanthus		*				x	x
<i>Agapanthus</i> spp.	Agapanthus		*				x	
<i>Agonis flexuosa</i>	Willow Myrtle		*					x
<i>Agrostis capillaris</i>	Brown-top Bent		*	x				x
<i>Aira caryophyllea</i> subsp. <i>caryophyllea</i>	Silvery Hair-grass		*					x

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<i>Allium triquetrum</i>	Angled Onion		*	x	x	x	x	x
<i>Allocasuarina paludosa</i>	Scrub Sheoak					x		
<i>Allocasuarina verticillata</i>	Drooping Sheoak				x	x	x	
<i>Aloe spp.</i>	Aloe		*				x	x
<i>Alyssum spp.</i>	Alyssum		*					x
<b><i>Alyxia buxifolia</i></b>	<b>Sea Box</b>					x		
<i>Ammophila arenaria</i>	Marram Grass		*			x		x
<i>Amperea xiphioclada</i>	Broom Spurge					x		
<i>Anagallis arvensis</i>	Scarlet Pimpernel		*					x
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass		*	x				x
<b><i>Apium prostratum</i></b>	<b>Sea Celery</b>					x		
<i>Arctotheca calendula</i>	Cape Weed		*				x	x
<i>Asparagus aethiopicus</i>	Emerald Fern		*				x	
<i>Asparagus asparagoides</i>	Bridal Creeper		*	x	x		x	x
<i>Asparagus filicinus</i>	Fern Asparagus		*		x			
<i>Asparagus scandens</i>	Asparagus Fern		*			x	x	x
<i>Aster subulatus</i>	Aster-weed		*				x	
<i>Astroloma humifusum</i>	Cranberry Heath					x		
<i>Atriplex cinerea</i>	Coast Saltbush				x	x		
<b><i>Atriplex paludosa subsp. paludosa</i></b>	<b>Marsh Saltbush</b>	rare			x			
<i>Atriplex prostrata</i>	Hastate Orache		*	x				
<i>Austrocynoglossum latifolium</i>	Forest Hound's-tongue					x		
<b><i>Austrostipa flavescens</i></b>	<b>Coast Spear Grass</b>			x			x	
<i>Austrostipa stipoides</i>	Prickly Spear-grass					x		
<i>Avena fatua</i>	Wild Oat		*			x		
<i>Avena sativa</i>	Oat		*				x	x
<i>Avicennia marina subsp. australasica</i>	Grey Mangrove	rare			x			
<b><i>Banksia integrifolia subsp. integrifolia</i></b>	<b>Coast Banksia</b>			x	x	x	x	
<i>Banksia marginata</i>	Silver Banksia					x		
<i>Banksia spp.</i>	Banksia		*					x
<i>Bellis perennis</i>	English Daisy		*					x
<i>Billardiera fusiformis</i>	Bluebell Creeper		*					x
<i>Billardiera scandens s.l.</i>	Common Apple-berry					x		
<i>Brachyscome graminea</i>	Grass Daisy					x		
<i>Briza maxima</i>	Large Quaking-grass		*					x
<i>Briza minor</i>	Lesser Quaking-grass		*					x
<i>Bromus catharticus</i>	Prairie Grass		*				x	x
<i>Bromus diandrus</i>	Great Brome		*	x			x	
<i>Bromus hordeaceus subsp. hordeaceus</i>	Soft Brome		*					x



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<i>Bromus sterilis</i>	Sterile Brome		*					x
<b><i>Burchardia umbellata</i></b>	<b>Milkmaids</b>					x		
<b><i>Bursaria spinosa</i></b>	<b>Sweet Bursaria</b>				x	x		
<b><i>Bursaria spinosa subsp. spinosa</i></b>	<b>Sweet Bursaria</b>			x				
<i>Cakile maritima subsp. maritima</i>	Sea Rocket		*	x	x	x		x
<b><i>Caladenia latifolia</i></b>	<b>Pink Fairies</b>					x		
<i>Callistemon spp.</i>	Bottlebrush		#					x
<i>Callitris spp.</i>	Cypress-pine		*					x
<i>Calystegia sepium subsp. roseata</i>	Large Bindweed							x
<i>Cardamine aff. flexuosa</i>	Flick Weed		*				x	
<i>Cardamine hirsuta s.l.</i>	Common Bitter-cress		*					x
<i>Cardamine spp.</i>	Bitter Cress			x				
<i>Carduus pycnocephalus</i>	Slender Thistle		*					x
<i>Carduus spp.</i>	Slender Thistle		*	x				
<b><i>Carex inversa</i></b>	<b>Knob Sedge</b>						x	
<i>Carex spp.</i>	Sedge			x	x			
<b><i>Carpobrotus aequilaterus</i></b>	<b>Angled Pigface</b>					x		
<b><i>Carpobrotus rossii</i></b>	<b>Karkalla</b>					x	x	
<i>Cassinia aculeata</i>	Common Cassinia					x		
<i>Cassinia longifolia</i>	Shiny Cassinia						x	
<b><i>Cassytha melantha</i></b>	<b>Coarse Dodder-laurel</b>			x				
<i>Cenchrus clandestinus</i>	Kikuyu		*	x			x	x
<i>Centaureum spp.</i>	Centaury		*	x		x		x
<i>Cerastium glomeratum s.l.</i>	Common Mouse-ear Chickweed		*					x
<i>Chamaecytisus palmensis</i>	Tree Lucerne		*					x
<i>Chrysocephalum apiculatum s.l.</i>	Common Everlasting					x		
<i>Cirsium vulgare</i>	Spear Thistle		*	x		x	x	x
<i>Clematis aristata</i>	Mountain Clematis					x		
<b><i>Clematis microphylla s.l.</i></b>	<b>Small-leaved Clematis</b>				x	x	x	
<i>Convolvulus arvensis</i>	Common Bindweed		*					x
<i>Conyza bonariensis</i>	Flaxleaf Fleabane		*			x		x
<i>Conyza sumatrensis var. sumatrensis</i>	Tall Fleabane		*				x	
<i>Coprosma quadrifida</i>	Prickly Currant-bush			x				
<i>Coprosma repens</i>	Mirror Bush		*	x	x	x	x	x
<i>Coronidium scorpioides s.s.</i>	Button Everlasting					x		
<b><i>Correa alba var. alba</i></b>	<b>White Correa</b>				x	x	x	
<i>Cortaderia selloana</i>	Pampas Grass		*					x
<b><i>Corybas diemenicus s.l.</i></b>	<b>Veined Helmet-orchid</b>					x		

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<i>Cotoneaster glaucophyllus</i> var. <i>serotinus</i>	Large-leaf Cotoneaster		*			x		
<i>Cotoneaster</i> spp.	Cotoneaster		*					x
<i>Cotula australis</i>	Common Cotula					x		
<i>Cotula coronopifolia</i>	Water Buttons		*					x
<i>Crassula multicava</i> subsp. <i>multicava</i>	Shade Crassula		*				x	
<i>Crataegus monogyna</i>	Hawthorn		*		x			x
<i>Crocsmia X crocosmiflora</i>	Montbretia		*			x		x
<i>Cupressus glabra</i>	Smooth Arizona Cypress		*		x	x		
<i>Cupressus macrocarpa</i>	Monterey Cypress		*		x	x		
<i>Cupressus</i> sp.	Cypress		*			x		x
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch		*				x	x
<b><i>Cynoglossum australe</i></b>	<b>Australian Hound's-tongue</b>			x				
<i>Cynosurus echinatus</i>	Rough Dog's-tail		*	x				x
<i>Cyperus eragrostis</i>	Drain Flat-sedge		*	x				
<i>Cyperus gymnocaulos</i>	Spiny Flat-sedge				x	x		
<i>Dactylis glomerata</i>	Cocksfoot		*	x		x	x	x
<i>Delairea odorata</i>	Cape Ivy		*	x	x	x	x	x
<b><i>Dianella brevicaulis</i></b>	<b>Small-flower Flax-lily</b>						x	
<b><i>Dianella revoluta</i> s.l.</b>	<b>Black-anther Flax-lily</b>			x				
<b><i>Dianella</i> sp. aff. <i>revoluta</i> (Coastal)</b>	<b>Coast Flax-lily</b>						x	
<i>Dianella tasmanica</i>	Tasman Flax-lily					x		
<b><i>Dichondra repens</i></b>	<b>Kidney-weed</b>			x		x	x	
<i>Dillwynia cinerascens</i> s.l.	Grey Parrot-pea					x		
<i>Dimorphotheca fruticosa</i>	Trailing African Daisy		*				x	
<i>Dipogon lignosus</i>	Common Dipogon		*	x	x	x	x	x
<b><i>Disphyma crassifolium</i> subsp. <i>clavellatum</i></b>	<b>Rounded Noon-flower</b>					x		
<b><i>Distichlis distichophylla</i></b>	<b>Australian Salt-grass</b>				x	x		
<i>Dodonaea viscosa</i> 'Purpurea'	Purple Hop-bush		*				x	x
<i>Drosanthemum candens</i>	Rodondo Creeper		*				x	
<i>Ehrharta erecta</i>	Panic Veldt-grass		*	x		x	x	x
<i>Ehrharta longiflora</i>	Annual Veldt-grass		*			x	x	
<i>Epacris impressa</i>	Common Heath					x		
<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>	Grey Willow-herb					x		
<i>Eriobotrya japonica</i>	Loquat		*					x
<i>Eucalyptus botryoides</i>	Southern Mahogany		#		x	x		x
<i>Eucalyptus goniocalyx</i> s.l.	Bundy		#		x	x		
<i>Eucalyptus kitsoniana</i>	Bog Gum				x	x		
<i>Eucalyptus megacornuta</i>	Warted Yate		#		x	x		x

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<i>Eucalyptus obliqua</i>	Messmate					x		
<i>Eucalyptus ovata</i>	Swamp Gum				x			
<i>Eucalyptus radiata s.l.</i>	Narrow-leaf Peppermint				x	x		
<b><i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i></b>	<b>Coast Manna-gum</b>				x		x	
<i>Euphorbia peplus</i>	Petty Spurge		*	x			x	x
<b><i>Ficinia nodosa</i></b>	<b>Knobby Club-sedge</b>			x	x	x	x	
<i>Foeniculum vulgare</i>	Fennel		*		x	x		x
<i>Freesia alba</i> x <i>Freesia leichtlinii</i>	Freesia hybrid		*				x	x
<i>Fuchsia</i> spp.	Fuchsia		*					x
<i>Fumaria bastardii</i>	Bastard's Fumitory		*				x	
<i>Fumaria muralis</i> subsp. <i>muralis</i>	Wall Fumitory		*					x
<i>Fumaria</i> spp.	Fumitory		*	x				
<i>Gahnia filum</i>	Chaffy Saw-sedge					x		
<i>Gahnia radula</i>	Thatch Saw-sedge					x		
<i>Galium aparine</i>	Cleavers		*	x		x	x	x
<i>Galium murale</i>	Small Goosegrass		*					x
<i>Gazania linearis</i>	Gazania		*					x
<i>Gazania</i> spp.	Gazania		*	x		x	x	
<i>Genista monspessulana</i>	Montpellier Broom		*		x	x	x	x
<i>Geranium homeanum</i>	Rainforest Crane's-bill			x				
<i>Geranium molle</i>	Dove's Foot		*	x				x
<b><i>Geranium solanderi s.l.</i></b>	<b>Austral Crane's-bill</b>					x		
<i>Geranium</i> spp. (garden spp.)	Geranium		*					x
<i>Geranium</i> spp.	Crane's-bill						x	
<b><i>Glycine clandestina</i></b>	<b>Twining Glycine</b>					x	x	
<i>Gnaphalium</i> spp.	Cudweed					x		
<i>Gonocarpus micranthus</i>	Creeping Raspwort					x		
<i>Gonocarpus tetragynus</i>	Common Raspwort					x		
<i>Goodenia ovata</i>	Hop Goodenia					x		
<i>Hakea nodosa</i>	Yellow Hakea					x		
<i>Hedera helix</i>	English Ivy		*		x	x	x	x
<i>Helminthotheca echioides</i>	Ox-tongue		*					x
<b><i>Hibbertia sericea s.l.</i></b>	<b>Silky Guinea-flower</b>				x	x	x	
<i>Holcus lanatus</i>	Yorkshire Fog		*	x				x
<i>Hordeum leporinum</i>	Barley-grass		*					x
<i>Hydrocotyle hirta</i>	Hairy Pennywort					x		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort			x				
<i>Hypericum gramineum</i> spp. agg.	Small St John's Wort					x		
<i>Hypochaeris glabra</i>	Smooth Cat's-ear		*					x



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<i>Hypochaeris radicata</i>	Flatweed		*	x		x	x	x
<b><i>Imperata cylindrica</i></b>	<b>Blady Grass</b>			x		x	x	
<i>Ipomoea indica</i>	Blue Morning-glory		*			x		x
<i>Isolepis</i> spp.	Club Sedge			x			x	
<i>Isopogon ceratophyllus</i>	Horny Cone-bush					x		
<i>Juncus bufonius</i>	Toad Rush		*					x
<i>Juncus kraussii</i>	Sea Rush					x		
<i>Juncus</i> spp.	Rush				x	x		
<i>Kennedia prostrata</i>	Running Postman					x		
<i>Kniphofia</i> spp.	Kniphofia		*				x	
<b><i>Lagenophora stipitata</i></b>	<b>Common Bottle-daisy</b>					x		
<i>Lagurus ovatus</i>	Hare's-tail Grass		*	x		x		x
<i>Lepidosperma elatius</i>	Tall Sword-sedge					x		
<b><i>Lepidosperma gladiatum</i></b>	<b>Coast Sword-sedge</b>					x	x	
<i>Leptospermum continentale</i>	Prickly Tea-tree							
<b><i>Leptospermum laevigatum</i></b>	<b>Coast Tea-tree</b>			x	x		x	
<i>Leptospermum myrsinoides</i>	Heath Tea-tree					x		
<i>Leucophyta brownii</i>	Cushion Bush				x			
<b><i>Leucopogon parviflorus</i></b>	<b>Coast Beard-heath</b>			x	x	x	x	
<i>Ligustrum</i> spp.	Privet		*					x
<i>Ligustrum vulgare</i>	European Privet		*				x	
<i>Limonium australe</i>	Yellow Sea-lavender	rare		x		x		
<i>Lindsaea linearis</i>	Screw Fern					x		
<i>Lobelia anceps</i>	Angled Lobelia			x				
<i>Lobularia maritima</i>	Sweet Alyssum		*				x	x
<i>Lolium loliaceum</i>	Stiff Rye-grass		*					x
<b><i>Lomandra longifolia</i></b>	<b>Spiny-headed Mat-rush</b>			x		x	x	
<i>Lonicera japonica</i>	Japanese Honeysuckle		*					x
<i>Lotus</i> spp.	Trefoil		*				x	
<i>Lotus subbiflorus</i>	Hairy Bird's-foot Trefoil		*					x
<i>Luzula meridionalis</i> var. <i>flaccida</i>	Common Woodrush					x		
<i>Lycium ferocissimum</i>	African Box-thorn		*			x		x
<i>Malus</i> spp.	Apple		*					x
<i>Malva</i> spp.	Mallow					x	x	x
<i>Medicago arabica</i>	Spotted Medic		*					x
<i>Medicago polymorpha</i>	Burr Medic		*			x		x
<b><i>Melaleuca ericifolia</i></b>	<b>Swamp Paperbark</b>			x	x	x	x	x
<i>Melaleuca incana</i> subsp. <i>incana</i>	Grey Honey-myrtle		*					x

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<i>Melaleuca squarrosa</i>	Scented Paperbark					x		x
<i>Melilotus indicus</i>	Sweet Melilot		*			x		x
<b><i>Microlaena stipoides</i> var. <i>stipoides</i></b>	<b>Weeping Grass</b>			x				
<b><i>Microtis</i> spp.</b>	<b>Onion Orchid</b>						x	
<i>Modiola caroliniana</i>	Red-flower Mallow		*				x	
<b><i>Muehlenbeckia adpressa</i></b>	<b>Climbing Lignum</b>				x	x	x	
<b><i>Myoporum insulare</i></b>	<b>Common Boobialla</b>			x	x	x	x	
<i>Myosotis arvensis</i>	Field Forget-me-knot		*				x	
<b><i>Myosotis australis</i></b>	<b>Austral Forget-me-knot</b>						x	
<i>Myosotis sylvatica</i>	Wood Forget-me-not		*			x		x
<i>Narcissus</i> spp.	Jonquil		*					x
<b><i>Olearia axillaris</i></b>	<b>Coast Daisy-bush</b>				x	x	x	
<b><i>Olearia glutinosa</i></b>	<b>Sticky Daisy-bush</b>				x			
<i>Olearia lirata</i>	Snowy Daisy-bush					x		
<i>Olearia phlogopappa</i> var. <i>phlogopappa</i>	Dusty Daisy-bush				x	x	x	
<i>Olearia ramulosa</i>	Twiggy Daisy-bush					x		
<i>Oxalis corniculata</i> s.l.	Yellow Wood-sorrel		*			x		
<i>Oxalis incarnata</i>	Pale Wood-sorrel		*	x			x	
<b><i>Oxalis perennans</i></b>	<b>Grassland Wood-sorrel</b>						x	
<i>Oxalis pes-caprae</i>	Soursob		*				x	x
<i>Oxalis</i> spp.	Oxalis		*					x
<b><i>Ozothamnus turbinatus</i></b>	<b>Coast Everlasting</b>				x			
<i>Paraserianthes lophantha</i> subsp. <i>lophantha</i>	Cape Wattle		*			x		x
<i>Paspalum dilatatum</i>	Paspalum		*	x				
<i>Passiflora tarminiana</i>	Banana Passion-fruit		*					x
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	Long Purple-flag					x		
<b><i>Pelargonium australe</i></b>	<b>Austral Stork's-bill</b>						x	
<i>Petrorhagia dubia</i>	Velvety Pink		*					x
<i>Petroselinum crispum</i>	Parsley		*				x	
<i>Phalaris aquatica</i>	Toowoomba Canary-grass		*					x
<i>Photinia glabra</i>	Red-lead Photinia		*				x	
<b><i>Phragmites australis</i></b>	<b>Common Reed</b>			x	x	x	x	
<i>Pinus radiata</i>	Radiata Pine		*		x	x		x
<i>Pittosporum undulatum</i>	Sweet Pittosporum		#	x	x	x	x	x
<i>Plantago coronopus</i>	Buck's-horn Plantain		*					x
<i>Plantago lanceolata</i>	Ribwort		*	x			x	x
<i>Plantago major</i>	Greater Plantain		*	x				
<i>Platylobium formosum</i> spp. agg.	Handsome Flat-pea					x		

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<i>Platylobium obtusangulum</i>	Common Flat-pea					x		
<i>Poa annua</i>	Annual Meadow-grass		*				x	x
<b><i>Poa billardierei</i></b>	<b>Coast Fescue</b>	rare			x	x		
<i>Poa ensiformis</i>	Sword Tussock-grass			x				
<b><i>Poa labillardierei</i> var. <i>labillardierei</i></b>	<b>Common Tussock-grass</b>						x	
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed		*					x
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		*			x	x	x
<i>Pomaderris aspera</i>	Hazel Pomaderris					x		
<b><i>Pomaderris oraria</i></b>	<b>Bassian Pomaderris</b>					x		
<i>Populus nigra</i> 'Italica'	Lombardy Poplar		*		x	x		
<i>Populus</i> spp.	Poplar		*					x
<i>Prunella vulgaris</i>	Self-heal		*			x		
<i>Prunus cerasifera</i> 'Nigra'	Purple-leaf Cherry-plum		*				x	x
<i>Prunus</i> spp.	Peach'		*					x
<i>Psoralea pinnata</i>	Blue Psoralea		*			x		
<b><i>Pteridium esculentum</i> subsp. <i>esculentum</i></b>	<b>Austral Bracken</b>			x		x	x	
<i>Pterostylis alveata</i>	Coastal Greenhood	vulnerable						
<i>Pterostylis nutans</i>	Nodding Greenhood					x		
<i>Pultenaea stricta</i>	Rigid Bush-pea					x		
<i>Pultenaea tenuifolia</i>	Slender Bush-pea						x	
<i>Ranunculus lappaceus</i>	Australian Buttercup					x		
<i>Ranunculus repens</i>	Creeping Buttercup		*			x		x
<i>Raphanus raphanistrum</i>	Wild Radish		*	x			x	
<b><i>Rhagodia candolleana</i> subsp. <i>candolleana</i></b>	<b>Seaberry Saltbush</b>			x	x	x	x	
<i>Romulea rosea</i>	Onion Grass		*				x	x
<i>Romulea rosea</i> var. <i>reflexa</i>	Large-flower Onion-grass		*				x	
<i>Rosa rubiginosa</i>	Sweet Briar		*					x
<i>Rubus fruticosus</i> spp. <i>agg.</i>	Blackberry		*	x		x	x	x
<i>Rubus idaeus</i>	Raspberry		*		x			
<b><i>Rubus parvifolius</i></b>	<b>Small-leaf Bramble</b>			x		x	x	
<i>Rubus</i> spp.	Bramble			x			x	x
<i>Rumex conglomeratus</i>	Clustered Dock		*	x				
<i>Rumex crispus</i>	Curled Dock		*					
<i>Rumex</i> spp.	Dock					x		
<b><i>Rytidosperma laeve</i></b>	<b>Smooth Wallaby-grass</b>						x	
<i>Rytidosperma</i> spp.	Wallaby-grass						x	
<i>Salix alba</i>	White Willow		*		x	x		
<i>Salix babylonica</i> s.l.	Weeping Willow		*		x	x		



## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA 2018	Monash Uni 1978	Monash Uni 1990	ID 2014	Blood 1992
<i>Salix caprea</i>	Goat Willow		*			x		
<i>Salix spp.</i>	Willow		*					x
<b><i>Sambucus gaudichaudiana</i></b>	<b>White Elderberry</b>				x	x		
<i>Samolus repens</i> var. <i>repens</i>	Creeping Brookweed			x		x		
<i>Sarcocornia quinqueflora</i>	Beaded Glasswort				x	x		
<i>Schinus molle</i>	Pepper Tree		*		x	x		
<i>Sedum dendroideum</i>	Tall Stonecrop		*		x	x		
<i>Selliera radicans</i>	Shiny Swamp-mat					x		
<i>Senecio angulatus</i>	Climbing Groundsel		*		x			
<b><i>Senecio biserratus</i></b>	<b>Jagged Fireweed</b>						x	
<b><i>Senecio elegans</i></b>	<b>Purple Groundsel</b>		*			x	x	x
<b><i>Senecio glomeratus</i></b>	<b>Annual Fireweed</b>						x	
<b><i>Senecio hispidulus s.l.</i></b>	<b>Rough Fireweed</b>						x	
<i>Senecio lautus</i> spp. <i>agg.</i>	Variable Groundsel					x		
<i>Senecio spp.</i>	Groundsel			x			x	
<i>Sisyrinchium sp. A</i>	Scour-weed		*					x
<b><i>Solanum aviculare</i></b>	<b>Kangaroo Apple</b>					x	x	
<i>Solanum nigrum s.l.</i>	Black Nightshade		*				x	x
<i>Solanum tuberosum</i>	Potato		*					x
<i>Solidago canadensis</i> var. <i>scabra</i>	Canadian Goldenrod		*					x
<i>Solidago chilensis</i>	Goldenrod		*	x				
<i>Sonchus asper s.l.</i>	Rough Sow-thistle		*	x				
<i>Sonchus oleraceus</i>	Common Sow-thistle		*			x	x	x
<i>Spartina anglica</i>	Common Cord-grass		*		x			
<i>Spartina x townsendii</i>	Townsend's cord-grass		*			x		x
<b><i>Spinifex sericeus</i></b>	<b>Hairy Spinifex</b>				x	x		
<i>Sporobolus africanus</i>	Rat-tail Grass		*				x	
<i>Stellaria media</i>	Chickweed		*	x				x
<i>Stenotaphrum secundatum</i>	Buffalo Grass		*				x	x
<i>Stylidium graminifolium s.l.</i>	Grass Triggerplant					x		
<i>Suaeda australis</i>	Austral Seablite				x			
<i>Suaeda maritima</i> subsp. <i>maritima</i>	Annual Seablite		*			x		
<b><i>Swainsona lessertifolia</i></b>	<b>Coast Swainson-pea</b>					x		
<i>Symphotrichum subulatum</i>	Aster-weed		*	x				
<i>Taraxacum bracteatum</i>	Dandelion		*				x	
<i>Taraxacum officinale</i> spp. <i>agg.</i>	Garden Dandelion		*			x		
<i>Taraxacum spp.</i>	Dandelion		*					x
<i>Tecticornia halocnemoides</i>	Grey Glasswort				x			

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA 2018	Monash Uni 1978	Monash Uni 1990	ID 2014	Blood 1992
<i>Tetragonia implexicoma</i>	Bower Spinach			x	x	x	x	
<i>Tetragonia spp.</i>	Native Spinach			x				
<i>Tetragonia tetragonioides</i>	New Zealand Spinach				x	x		
<i>Tetrarrhena juncea</i>	Forest Wire-grass					x		
<i>Themeda triandra</i>	Kangaroo Grass			x		x	x	
<i>Tradescantia fluminensis</i>	Wandering Jew		*					x
<i>Trifolium fragiferum var. fragiferum</i>	Strawberry Clover		*					x
<i>Trifolium repens var. repens</i>	White Clover		*				x	x
<i>Trifolium subterraneum</i>	Subterranean Clover		*					x
<i>Triglochin striata</i>	Streaked Arrowgrass					x		
<i>Tropaeolum majus</i>	Nasturtium		*					x
<i>Ulmus spp.</i>	Elm		*					x
<i>Utricularia dichotoma s.l.</i>	Fairies' Aprons					x		
<i>Vallisneria spp.</i>	Eel Grass					x		
<i>Verbascum spp.</i>	Mullein		*	x				
<i>Veronica persica</i>	Persian Speedwell		*					x
<i>Vicia hirsuta</i>	Tiny Vetch		*					x
<i>Vicia sativa subsp. sativa</i>	Common Vetch		*				x	x
<i>Vinca major</i>	Blue Periwinkle		*		x	x	x	x
<i>Viola hederacea sensu Willis (1972)</i>	Ivy-leaf Violet					x		
<i>Viola odorata</i>	Common Violet		*				x	x
<i>Virgilia divaricata</i>	Cape Lilac		*		x	x		x
<i>Wahlenbergia spp.</i>	Bluebell					x		
<i>Watsonia ?meriana</i>	Bugle Lily		*					x
<i>Watsonia spp.</i>	Watsonia		*			x		
<i>Yucca spp.</i>	Yucca		*	x				
<i>Zantedeschia aethiopica</i>	White Arum-lily		*	x				x
<i>Zingiber officinale</i>	Ginger		*					x
<i>Zinnia ?elegans</i>	Zinnia (purple)		*					x

**Appendix 4: List of Vascular Flora Species for Point Smythe Coastal Reserve/Venus Bay**
**Key to Codes Used within Table:**
**Status:**

The symbol '\*' preceding the scientific name of a species denotes that it is considered introduced in Victoria.

The symbol '#' preceding the scientific name of a species denotes that it is considered introduced within the study area, but indigenous within some other part of Victoria.

VROT codes (from DELWP Advisory List of Rare and Threatened Flora):

r Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.

v Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.

k Poorly known in Victoria and suspected, but not definitely known to, belong to the one of the categories Presumed Extinct, Endangered, Vulnerable or Rare in Victoria. At present, accurate distribution information is inadequate

**Source of information within Table:**

Vic. Advisory List: - Victorian Threatened Species Advisory List, (2013)

Taxon Status: (see above for description of symbols)

VBA: - Victorian Biodiversity Atlas (targeted database search)

DF 2018: - (Frood, 2018) *List of plant species for Point Smythe Coastal Reserve west of north-south firebreak track.*

MU 1978: (Barlow *et. al.* 1978). *A Management Plan for Coastal Crown Land at Inverloch and Venus Bay.*

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Acacia longifolia subsp. longifolia</i>	Sallow Wattle			x	x	
<i>Acacia longifolia subsp. sophorae</i>	Coast Wattle			x	x	x
<i>Acacia melanoxylon</i>	Blackwood			x	x	
<i>Acaena echinata</i>	Sheep's Burr				x	
<i>Acaena novae-zelandiae</i>	Bidgee-widgee			x	x	
<i>Acaena ovina</i>	Australian Sheep's Burr			x		
<i>Acetosella vulgaris</i>	Sheep Sorrel		*	x	x	
<i>Actites megalocarpus</i>	Dune Thistle			x	x	x
<i>Adriana quadripartita</i>	Coast Bitter-bush	vulnerable		x		
<i>Adriana quadripartita (pubescent form)</i>	Coast Bitter-bush			x		
<i>Agapanthus praecox subsp. orientalis</i>	Agapanthus		*	x		
<i>Aira caryophyllea subsp. caryophyllea</i>	Silvery Hair-grass				x	
<i>Aira cupaniana</i>	Quicksilver Grass		*	x		
<i>Aira elegantissima</i>	Delicate Hair-grass		*		x	
<i>Ajuga australis</i>	Austral Bugle				x	
<i>Allocasuarina verticillata</i>	Drooping Sheoak					x



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Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Ammophila arenaria</i>	Marram Grass		*		x	x
<i>Anthosachne scabra s.s.</i>	Common Wheat-grass				x	
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass		*	x	x	
<i>Aphanes inexpectata</i>	Small Piert		*	x	x	
<i>Apium prostratum subsp. prostratum</i>	Sea Celery			x		
<i>Apodasmia brownii</i>	Coarse Twine-rush			x		
<i>Arctotheca calendula</i>	Cape weed		*	x	x	
<i>Astroloma humifusum</i>	Cranberry Heath			x		
<i>Atriplex paludosa subsp. paludosa</i>	Marsh Saltbush	rare		x	x	
<i>Atriplex cinerea</i>	Coast Saltbush					x
<i>Atriplex prostrata</i>	Hastate Orache		*	x	x	
<i>Atriplex spp.</i>	Saltbush					x
<i>Austrostipa flavescens</i>	Coast Spear-grass			x	x	
<i>Austrostipa stipoides</i>	Prickly Spear-grass			x		x
<i>Avicennia marina subsp. australasica</i>	Grey Mangrove	rare		x		
<i>Banksia integrifolia subsp. integrifolia</i>	Coast Banksia			x	x	x
<i>Brachyscome graminea</i>	Grass Daisy			x		
<i>Briza minor</i>	Lesser Quaking-grass		*		x	
<i>Bromus hordeaceus</i>	Soft Brome		*		x	
<i>Bursaria spinosa subsp. spinosa</i>	Sweet Bursaria			x	x	
<i>Cakile maritima subsp. maritima</i>	Sea Rocket		*	x	x	x
<i>Cakile spp.</i>	Sea Rocket		*	x		
<i>Caladenia latifolia</i>	Pink Fairies				x	
<i>Cardamine hirsuta s.l.</i>	Common Bitter-cress		*	x		
<i>Cardamine hirsuta s.s.</i>	Common Bitter-cress		*	x	x	
<i>Carduus spp.</i>	Slender Thistle		*	x		
<i>Carex breviculmis</i>	Common Grass-sedge			x	x	
<i>Carpobrotus aequilaterus</i>	Angled Pigface				x	x
<i>Carpobrotus rossii</i>	Karkalla			x	x	
<i>Catapodium rigidum</i>	Fern Grass		*		x	
<i>Centaurium erythraea</i>	Common Centaury		*	x	x	
<i>Centaurium tenuiflorum</i>	Slender Centaury				x	
<i>Cerastium diffusum</i>	Sea Mouse-ear Chickweed		*		x	
<i>Cerastium glomeratum s.l.</i>	Common Mouse-ear Chickweed		*	x		
<i>Cerastium glomeratum s.s.</i>	Sticky Mouse-ear Chickweed		*	x	x	
<i>Chenopodiaceae spp.</i>	Chenopod			x		
<i>Cirsium vulgare</i>	Spear Thistle		*	x	x	
<i>Clematis microphylla s.l.</i>	Small-leaved Clematis			x		
<i>Clematis microphylla s.s.</i>	Small-leaved Clematis				x	

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Comesperma volubile</i>	Love Creeper			x	x	
<i>Coprosma repens</i>	Mirror Bush		*	x	x	
<i>Correa alba</i>	White Correa			x	x	x
<i>Corybas fimbriatus</i>	Fringed Helmet-orchid	rare		x		
<i>Corybas spp.</i>	Helmet Orchid				x	
<i>Cotula australis</i>	Common Cotula			x		
<i>Cotula coronopifolia</i>	Water Buttons		*		x	
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula			x		
<i>Crassula sieberiana s.l.</i>	Sieber Crassula			x		
<i>Crassula sieberiana s.s.</i>	Sieber Crassula				x	
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch		*		x	
<i>Cynoglossum australe</i>	Australian Hound's-tongue			x	x	
<i>Daucus glochidiatus</i>	Australian Carrot				x	
<i>Dianella sp. aff. revoluta</i> (Coastal)	Coast Flax-lily			x	x	
<i>Dichelachne crinita</i>	Long-hair Plume-grass				x	
<i>Dichondra repens</i>	Kidney-weed			x	x	
<i>Dipogon lignosus</i>	Common Dipogon		*		x	
<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>	Rounded Noon-flower			x		x
<i>Distichlis distichophylla</i>	Australian Salt-grass			x	x	x
<i>Ehrharta erecta</i>	Panic Veldt-grass		*	x	x	
<i>Erigeron spp.</i>	Fleabane		*	x	x	
<i>Erigeron sumatrensis</i>	Tall Fleabane		*		x	
<i>Eucalyptus viminalis</i> subsp. <i>pyoriana</i>	Coast Manna-gum			x		x
<i>Euchiton japonicus s.s.</i>	Creeping Cudweed			x	x	
<i>Euphorbia peplus</i>	Petty Spurge		*	x	x	
<i>Exocarpos strictus</i>	Pale-fruit Ballart				x	
<i>Ficinia nodosa</i>	Knobby Club-sedge			x	x	x
<i>Gahnia trifida</i>	Coast Saw-sedge			x		
<i>Galium aparine</i>	Cleavers		*	x	x	
<i>Galium australe s.l.</i>	Tangled Bedstraw			x		
<i>Galium australe s.s.</i>	Tangled Bedstraw				x	
<i>Galium gaudichaudii</i>	Rough Bedstraw				x	
<i>Galium murale</i>	Small Goosegrass		*	x	x	
<i>Gamochoeta americana</i>	Spiked Cudweed		*		x	
<i>Geranium gardneri</i>	Rough Crane's-bill				x	
<i>Geranium homeanum</i>	Rainforest Crane's-bill			x		
<i>Geranium molle</i>	Dove's Foot		*	x	x	
<i>Geranium sp. 2</i>	Variable Crane's-bill				x	
<i>Geranium sp. 5</i>	Naked Crane's-bill				x	

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Geranium spp.</i>	Crane's Bill			x		
<i>Glycine spp.</i>	Glycine			x		
<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass			x		
<i>Hemichroa pentandra</i>	Trailing Hemichroa			x	x	
<i>Hibbertia sericea s.l.</i>	Silky Guinea-flower			x		
<i>Hibbertia sericea s.s.</i>	Silky Guinea-flower				x	
<i>Holcus lanatus</i>	Yorkshire Fog		*	x		
<i>Hypochaeris glabra</i>	Smooth Cat's-ear		*	x	x	
<i>Hypochaeris radicata</i>	Flatweed		*	x	x	
<i>Isolepis cernua</i> var. <i>cernua</i>	Nodding Club-sedge				x	
<i>Isolepis marginata</i>	Little Club-sedge				x	
<i>Juncus bufonius</i>	Toad Rush			x	x	
<i>Juncus caespiticus</i>	Grassy Rush			x		
<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush			x	x	x
<i>Juncus revolutus</i>	Creeping Rush	rare		x	x	
<i>Kennedia prostrata</i>	Running Postman			x		
<i>Lagenophora gracilis</i>	Slender Bottle-daisy			x		
<i>Lagenophora stipitata</i>	Common Bottle-daisy			x	x	
<i>Lagurus ovatus</i>	Hare's-tail Grass		*	x	x	
<i>Laphangium luteoalbum</i>	Jersey Cudweed				x	
<i>Lasiopetalum ferrugineum</i>	Rusty Velvet-bush			x		
<i>Leontodon saxatilis</i> subsp. <i>saxatilis</i>	Hairy Hawkbit		*		x	
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge			x	x	x
<i>Leptinella longipes</i>	Coast Cotula			x		
<i>Leptospermum laevigatum</i>	Coast Tea-tree			x	x	x
<i>Leucophyta brownii</i>	Cushion Bush			x		
<i>Leucopogon parviflorus</i>	Coast Beard-heath			x	x	x
<i>Limonium australe</i> var. <i>australe</i>	Yellow Sea-lavender	rare		x		
<i>Lobelia anceps</i>	Angled Lobelia			x	x	
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush			x	x	
<i>Luzula meridionalis</i> var. <i>flaccida</i>	Common Woodrush			x	x	
<i>Luzula spp.</i>	Woodrush			x		
<i>Lysimachia arvensis</i>	Pimpernel		*	x	x	
<i>Lythrum hyssopifolia</i>	Small Loosestrife			x	x	
<i>Melaleuca ericifolia</i>	Swamp Paperbark			x	x	x
<i>Melilotus indicus</i>	Sweet Melilot		*	x	x	
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass			x	x	
<i>Microtis spp.</i>	Onion Orchid				x	
<i>Minuartia mediterranea</i>	Fine-leaved Sandwort				x	



## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Muehlenbeckia adpressa</i>	Climbing Lignum			x		x
<i>Myoporum insulare</i>	Common Boobiolla					x
<i>Myosotis arvensis</i>	Field Forget-me-not		*		x	
<i>Myosotis laxa subsp. caespitosa</i>	Water Forget-me-not		*	x		
<i>Myosotis sylvatica</i>	Wood Forget-me-not		*	x		
<i>Olearia axillaris</i>	Coast Daisy-Bush			x	x	x
<i>Olearia glutinosa</i>	Sticky Daisy-bush			x		
<i>Olearia phlogopappa</i>	Dusty Daisy-bush			x		
<i>Oxalis exilis</i>	Shade Wood-sorrel			x		
<i>Oxalis perennans</i>	Grassland Wood-sorrel			x		
<i>Oxalis rubens</i>	Dune Wood-sorrel	rare		x	x	
<i>Oxalis spp. (naturalised)</i>	Wood Sorrel		*	x		
<i>Ozothamnus turbinatus</i>	Coast Everlasting			x	x	x
<i>Parapholis incurva</i>	Coast Barb-grass		*	x	x	
<i>Parietaria debilis s.s.</i>	Shade Pellitory				x	
<i>Pelargonium australe</i>	Austral Stork's-bill			x	x	
<i>Phragmites australis</i>	Common Reed					x
<i>Phytolacca octandra</i>	Red-ink Weed		*	x		
<i>Pittosporum undulatum</i>	Sweet Pittosporum		#		x	
<i>Plantago coronopus</i>	Buck's-horn Plantain		*	x	x	
<i>Plantago lanceolata</i>	Ribwort				x	
<i>Poa annua</i>	Annual Meadow-grass		*	x	x	
<i>Poa bulbosa</i>	Bulbous Meadow-grass		*		x	
<i>Poa pratensis</i>	Kentucky Blue-grass		*		x	
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed		*	x	x	
<i>Pomaderris oraria subsp. oraria</i>	Bassian Pomaderris	rare		x	x	
<i>Pomaderris paniculosa subsp. paralia</i>	Coast Pomaderris			x		
<i>Pteridium esculentum subsp. esculentum</i>	Austral Bracken			x	x	x
<i>Ranunculus pumilio var. pumilio</i>	Ferny Small-flower Buttercup				x	
<i>Ranunculus sessiliflorus var. sessiliflorus</i>	Annual Buttercup			x		
<i>Rhagodia candolleana subsp. candolleana</i>	Seaberry Saltbush			x	x	x
<i>Rumex brownii</i>	Slender Dock			x	x	
<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass			x	x	
<i>Sagina procumbens</i>	Spreading Pearlwort		*	x		
<i>Sambucus gaudichaudiana</i>	White Elderberry			x	x	
<i>Samolus repens var. repens</i>	Creeping Brookweed			x	x	
<i>Sarcocornia quinqueflora</i>	Beaded Glasswort			x	x	x
<i>Schoenoplectus tabernaemontani</i>	River Club-sedge			x		
<i>Schoenus nitens</i>	Shiny Bog-sedge				x	

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Selliera radicans</i>	Shiny Swamp-mat				x	x
<i>Senecio biserratus</i>	Jagged Fireweed			x	x	
<i>Senecio elegans</i>	Purple Groundsel		*	x	x	
<i>Senecio glomeratus</i>	Annual Fireweed			x		
<i>Senecio hispidulus s.s.</i>	Rough Fireweed				x	
<i>Senecio jacobaea</i>	Ragwort		*	x		
<i>Senecio minimus</i>	Shrubby Fireweed			x	x	
<i>Senecio odoratus</i>	Scented Groundsel			x		
<i>Senecio pinnatifolius var. lanceolatus</i>	Lance-leaf Groundsel				x	
<i>Senecio pinnatifolius var. maritimus</i>	Coast Groundsel			x		
<i>Solanum aviculare</i>	Kangaroo Apple			x	x	x
<i>Solanum vescum</i>	Gunyang			x	x	
<i>Sonchus asper s.l.</i>	Rough Sow-thistle		*	x	x	
<i>Sonchus oleraceus</i>	Common Sow-thistle		*	x	x	
<i>Spartina anglica</i>	Common Cord-grass					x
<i>Spergularia tasmanica</i>	Native Sea-spurrey			x	x	
<i>Spinifex sericeus</i>	Hairy Spinifex			x	x	x
<i>Stackhousia spathulata</i>	Coast Stackhousia	poorly known		x	x	
<i>Stellaria flaccida</i>	Forest Starwort			x		
<i>Stellaria media</i>	Chickweed		*	x		
<i>Suaeda australis</i>	Austral Seablite			x	x	x
<i>Swainsona lessertiifolia</i>	Coast Swainson-pea			x	x	x
<i>Symphotrichum subulatum</i>	Aster-weed		*	x		
<i>Tecticornia arbuscula</i>	Shrubby Glasswort			x		
<i>Tecticornia halocnemoides subsp. halocnemoides</i>	Grey Glasswort					x
<i>Tetragonia implexicoma</i>	Bower Spinach			x	x	x
<i>Tetragonia tetragonioides</i>	New Zealand Spinach				x	
<i>Thelymitra spp.</i>	Sun Orchid				x	
<i>Themeda triandra</i>	Kangaroo Grass			x		
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		*		x	
<i>Thyridia repens</i>	Creeping Monkey-flower			x		
<i>Trifolium arvense var. arvense</i>	Hare's-foot Clover		*		x	
<i>Trifolium campestre var. campestre</i>	Hop Clover		*		x	
<i>Trifolium cernuum</i>	Drooping-flower Clover		*		x	
<i>Trifolium dubium</i>	Suckling Clover		*		x	
<i>Trifolium glomeratum</i>	Cluster Clover		*		x	
<i>Trifolium ornithopodioides</i>	Birdsfoot Clover		*		x	
<i>Trifolium spp.</i>	Clover		*	x		
<i>Triglochin striata</i>	Streaked Arrowgrass				x	

Ecological Values of Inverloch and Point Smythe Coastal Dune System

Scientific Name	Common Name	Vic. Advisory List	Taxon status	VBA	DF 2018	MU 1978
<i>Urtica incisa</i>	Scrub Nettle			x	x	
<i>Veronica calycina</i>	Hairy Speedwell				x	
<i>Vicia sativa subsp. nigra</i>	Narrow-leaf Vetch		*		x	
<i>Viola hederacea sensu Entwisle (1996)</i>	Ivy-leaf Violet			x	x	
<i>Vulpia fasciculata</i>	Dune Fescue		*		x	
<i>Vulpia myuros f. myuros</i>	Rat's-tail Fescue		*		x	
<i>Vulpia spp.</i>	Fescue		*	x	x	
<i>Zostera muelleri</i>	Dwarf Grass Wrack				x	
<i>Zoysia macrantha subsp. walshii</i>	Walsh's Couch	rare			x	



**Appendix 5: List of Fauna Species for the Inverloch foreshore**
**Key to Codes Used within Table:**

FFG Act: - Victorian Flora and Fauna Guarantee (FFG) Act 1988

EPBC Act - Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

Vic. Adv. List: - Victorian Threatened Species Advisory List, (2013)

Taxon Origin: - Introduced species

VBA: - Victorian Biodiversity Atlas (targeted database search)

BLA: - BirdLife Australia (targeted database search)

 SGCS (1999): - South Gippsland Conservation Society. *Anderson Inlet Waders and Waterbirds and Birds of the Bunurong Coast*

 Monash Uni 1990: - (Harrison *et. al.*) *Andersons Inlet: Resources, Issues and Options for Management.*

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Arctic Jaeger	<i>Stercorarius parasiticus</i>						x		
Australian Fur Seal	<i>Arctocephalus pusillus doriferus</i>	Rejected				x		x	x
Australasian Gannet	<i>Morus serrator</i>						x	x	x
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>							x	
Australasian Pipit	<i>Anthus novaeseelandiae</i>							x	
Australasian Shoveller	<i>Anas rhynchotis</i>					x		x	
Australasian Swampphen	<i>Porphyrio melanotus</i>							x	
Australian Hobby	<i>Falco longipennis</i>						x		
Australian Magpie	<i>Cracticus tibicen</i>					x	x		x
Australian Pelican	<i>Pelecanus conspicillatus</i>						x	x	x
Australian Raven	<i>Corvus coronoides</i>						x	x	x
Australian Shelduck	<i>Tadorna tadornoides</i>						x	x	x
Australian White Ibis	<i>Threskiornis molucca</i>					x	x	x	x
Australian Wood Duck	<i>Chenonetta jubata</i>						x	x	
Azure Kingfisher	<i>Alcedo azurea</i>			Near threatened		x		x	
Banded Lapwing	<i>Vanellus tricolor</i>							x	
Bare-nosed Wombat	<i>Vombatus ursinus</i>							x	x
Barn Owl	<i>Tyto alba</i>							x	
Bar-tailed Godwit	<i>Limosa lapponica</i>		Vulnerable			x	x	x	x
Bassian Thrush	<i>Zoothera lunulata</i>							x	
Beautiful Firetail	<i>Stagonopleura bella</i>							x	x
Black Falcon	<i>Falco subniger</i>	Nominated		Vulnerable					x
Black Rat	<i>Rattus rattus</i>							x	
Black Swan	<i>Cygnus atratus</i>						x	x	x
Black-browed Albatross	<i>Thalassarche melanophris melanophris</i>		Vulnerable	Vulnerable		x		x	

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Black-eared Cuckoo	<i>Chrysococcyx osculans</i>							x	
Black-faced Cormorant	<i>Phalacrocorax fuscescens</i>			Near threatened		x		x	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>					x	x	x	x
Black-fronted Dotterel	<i>Euseyornis melanops</i>							x	
Black-shouldered Kite	<i>Elanus axillaris</i>						x	x	x
Black-tailed Godwit	<i>Limosa limosa</i>			Vulnerable				x	
Black-tailed Wallaby	<i>Wallabia bicolor</i>							x	x
Black-winged Stilt	<i>Himantopus himantopus</i>					x		x	x
Blotched Blue-tongued Lizard	<i>Tiliqua nigrolutea</i>							x	x
Blue-billed Duck	<i>Oxyura australis</i>	Listed		Endangered		x			
Blue-winged Parrot	<i>Neophema chrysostoma</i>							x	x
Broad-billed Sandpiper	<i>Limicola falcinellus</i>							x	
Brown Falcon	<i>Falco berigora</i>							x	x
Brown Goshawk	<i>Accipiter fasciatus</i>							x	x
Brown Songlark	<i>Cincloramphus cruralis</i>							x	
Brown Thornbill	<i>Acanthiza pusilla</i>					x	x	x	x
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>							x	
Brush Bronzewing	<i>Phaps elegans</i>							x	x
Buff-banded Rail	<i>Gallirallus philippensis</i>							x	x
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>							x	x
Bush Rat	<i>Rattus fuscipes</i>								x
Cape Barren Goose	<i>Cereopsis novaehollandiae</i>							x	
Caspian Tern	<i>Hydroprogne caspia</i>	Listed		Near threatened		x		x	x
Chestnut Teal	<i>Anas castanea</i>						x	x	
Common Blackbird	<i>Turdus merula</i>				Introduced	x	x	x	x
Common Bronze-wing	<i>Phaps chalcoptera</i>							x	x
Common Dolphin	<i>Delphinus delphis</i>					x			
Common Froglet	<i>Crinia signifera</i>								x
Common Greenshank	<i>Tringa nebularia</i>			Vulnerable			x	x	
Common Myna	<i>Acridotheres tristis</i>				Introduced		x	x	x
Common Sandpiper	<i>Actitis hypoleucos</i>					x		x	
Common Starling	<i>Sturnus vulgaris</i>				Introduced	x	x	x	x
Crescent Honeyeater	<i>Phylidonyris pyrrhoptera</i>							x	x
Crested Tern	<i>Thalasseus bergii</i>					x	x	x	x
Crimson Rosella	<i>Platycercus elegans</i>							x	x
Curlew Sandpiper	<i>Calidris ferruginea</i>		Critically Endangered	Endangered		x		x	x
Domestic Cat (feral)	<i>Felis catis</i>				Introduced			x	x

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Double-banded Plover	<i>Charadrius bicinctus</i>					x		x	x
Dusky Moorhen	<i>Gallinula tenebrosa</i>							x	
Dusky Woodswallow	<i>Artamus cyanopterus</i>							x	
Eastern Cattle Egret	<i>Bubulcus coromandus</i>					x		x	
Eastern Curlew	<i>Numenius madagascariensis</i>		Critically Endangered	Vulnerable		x	x	x	x
Eastern Grey Kangaroo	<i>Macropus giganteus</i>					x		x	x
Eastern Ring-tailed Possum	<i>Pseudocheirus peregrinus</i>							x	x
Eastern Rosella	<i>Platycercus eximius</i>					x	x	x	x
Eastern Shrike-tit	<i>Falcunculus frontatus</i>							x	
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>						x	x	x
Eastern Three-lined Skink	<i>Acritoscincus duperreyi</i>							x	x
Eastern Whipbird	<i>Psophodes olivaceus</i>							x	x
Eastern Yellow Robin	<i>Eopsaltria australis</i>					x	x	x	x
Eurasian Coot	<i>Fulica atra</i>							x	
Eurasian Tree Sparrow	<i>Passer montanus</i>				Introduced		x		
European Brown Hare	<i>Lepus europeaus</i>				Introduced			x	
European Goldfinch	<i>Carduelis carduelis</i>				Introduced		x	x	x
European Greenfinch	<i>Chloris chloris</i>				Introduced			x	x
European Rabbit	<i>Oryctolagus cuniculus</i>				Introduced			x	x
European Skylark	<i>Alauda arvensis</i>				Introduced			x	x
Fairy Martin	<i>Petrochelidon ariel</i>							x	
Fairy Prion	<i>Pachyptila turtur</i>		Vulnerable	Vulnerable			x		
Fairy Tern	<i>Sternula nereis nereis</i>	Listed	Vulnerable	Endangered			x	x	
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>							x	x
Flame Robin	<i>Petroica phoenicea</i>							x	x
Fluttering Shearwater	<i>Puffinus gavia</i>						x	x	x
Fork-tailed Swift	<i>Apus pacificus</i>						x	x	
Galah	<i>Eolophus roseicapilla</i>						x	x	
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>							x	
Garden Skink	<i>Lampropholis guichenoti</i>							x	x
Golden Whistler	<i>Pachycephala pectoralis</i>						x	x	x
Golden-headed Cisticola	<i>Cisticola exilis</i>							x	
Great Cormorant	<i>Phalacrocorax carbo</i>					x	x	x	x
Great Egret	<i>Ardea alba</i>	Listed		Vulnerable			x	x	x
Great Knot	<i>Calidris tenuirostris</i>	Listed	Critically Endangered	Endangered				x	
Grey Butcherbird	<i>Cracticus torquatus</i>					x	x	x	x



## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Grey Fantail	<i>Rhipidura albiscapa</i>					x		x	x
Grey Plover	<i>Pluvialis squatarola</i>			Endangered		x			
Grey Shrike-thrush	<i>Colluricincla harmonica</i>						x	x	x
Grey Teal	<i>Anas gracilis</i>							x	
Grey-tailed Tattler	<i>Tringa brevipes</i>	Listed		Critically endangered				x	
Gull-billed Tern	<i>Gelochelidon nilotica affinis</i>							x	
Hardhead	<i>Aythya australis</i>			Vulnerable		x		x	
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>							x	
Hog Deer	<i>Axis porcinus</i>				Introduced			x	x
Hooded Plover	<i>Thinornis cucullatus</i>	Listed	Vulnerable	Vulnerable		x	x	x	x
Hooded Robin	<i>Melanodryas cucullata</i>	Listed		Near threatened				x	
Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>							x	x
House Mouse	<i>Mus musculus</i>				Introduced			x	x
House Sparrow	<i>Passer domesticus</i>				Introduced		x	x	
Indian Yellow-nosed Albatross	<i>Thalassarche carteri</i>	Listed	Vulnerable	Vulnerable		x			
Intermediate Egret	<i>Ardea intermedia</i>			Threatened		x			
Jacky Winter	<i>Microeca fascians</i>							x	x
Kelp Gull	<i>Larus dominicanus</i>					x	x		
Koala	<i>Phascolarctos cinereus</i>							x	x
Latham's Snipe	<i>Gallinago hardwickii</i>			Near threatened		x		x	
Laughing Kookaburra	<i>Dacelo novaeguineae</i>						x	x	x
Leopard Seal	<i>Hydrurga leptonyx</i>					x			
Leatherback Turtle	<i>Dermochelys coriacea</i>	Listed	Endangered	Critically endangered		x			
Lesser Sand Plover	<i>Charadrius mongolus</i>		Endangered	Critically endangered				x	x
Light-mantled Sooty Albatross	<i>Phoebastria palpebrata</i>	Listed				x			
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>						x	x	x
Little Eagle	<i>Hieraetus morphnoides</i>							x	
Little Egret	<i>Egretta garzetta</i>	Listed		Endangered			x	x	
Little Grassbird	<i>Poodytes gramineus</i>								x
Little Lorikeet	<i>Glossopsitta pusilla</i>							x	
Little Penguin	<i>Eudyptula minor</i>							x	x
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>						x	x	
Little Raven	<i>Corvus mellori</i>						x	x	x
Little Stint	<i>Calidris minuta</i>							x	
Little Tern	<i>Sternula albifrons sinensis</i>	Listed		Vulnerable				x	
Little Wattlebird	<i>Anthochaera chrysoptera</i>					x	x	x	x

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Lowland Copperhead	<i>Austrelaps superbus</i>								x
Magpie-lark	<i>Grallina cyanoleuca</i>					x	x	x	x
Marsh Sandpiper	<i>Tringa stagnatilis</i>			Vulnerable				x	
Masked Lapwing	<i>Vanellus miles</i>					x	x	x	x
Metallic Skink	<i>Niveoscincus metallicus</i>							x	
Mistletoe Bird	<i>Dicaeum hirundinaceum</i>							x	
Mountain Brush-tailed Possum	<i>Trichosurus cunninghami</i>					x		x	
Musk Duck	<i>Biziura lobata</i>			Vulnerable		x			
Musk Lorikeet	<i>Glossopsitta concinna</i>							x	
Nankeen Kestrel	<i>Falco cenchroides</i>							x	x
Nankeen Night-heron	<i>Nycticorax caledonicus</i>			Near threatened				x	
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>					x	x	x	x
Noisy Miner	<i>Manorina melanocephala</i>						x	x	
Northern Giant-Petrel	<i>Macronectes halli</i>	Listed	Vulnerable	Near threatened		x			
Olive Whistler	<i>Pachycephala olivacea</i>							x	x
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	Listed	Critically Endangered	Critically endangered		x		x	
Pacific Black Duck	<i>Anas superciliosa</i>					x		x	x
Pacific Golden Plover	<i>Pluvialis fulva</i>			Vulnerable				x	x
Pacific Gull	<i>Larus pacificus pacificus</i>			Near threatened		x		x	x
Pallid Cuckoo	<i>Heteroscenus pallidus</i>							x	
Peregrine falcon	<i>Falco peregrinus</i>								x
Pied Cormorant	<i>Phalacrocorax varius</i>			Near threatened			x	x	x
Pied Currawong	<i>Strepera graculina</i>						x	x	
Pied Oystercatcher	<i>Haematopus longirostris</i>					x	x	x	x
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>							x	
Rainbow Lorikeet	<i>Trichoglossus moluccanus</i>						x	x	
Red Fox	<i>Vulpes vulpes</i>				Introduced			x	x
Red Knot	<i>Calidris canutus</i>		Endangered	Endangered		x		x	
Red Wattlebird	<i>Anthochaera carunculata</i>					x	x	x	x
Red-browed Finch	<i>Neochmia temporalis</i>						x	x	
Red-capped Plover	<i>Charadrius ruficapillus</i>					x	x	x	x
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>								x
Red-necked Stint	<i>Calidris ruficollis</i>					x	x	x	x
Restless Flycatcher	<i>Myiagra inquieta</i>							x	
Rock Dove	<i>Columba livia</i>				Introduced			x	
Royal Spoonbill	<i>Platalea regia</i>			Near threatened		x	x	x	x

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Ruddy Turnstone	<i>Arenaria interpres</i>			Vulnerable		x	x	x	
Rufous Fantail	<i>Rhipidura rufifrons</i>							x	
Rufous Whistler	<i>Pachycephala rufiventris</i>					x	x	x	x
Sacred Kingfisher	<i>Todiramphus sanctus</i>							x	x
Sanderling	<i>Calidris alba</i>			Near threatened		x	x	x	
Satin Flycatcher	<i>Myiagra cyanoleuca</i>							x	
Scarlet Robin	<i>Petroica boodang</i>							x	x
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>					x	x	x	x
Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>							x	x
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>							x	x
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>						x	x	x
Shy Albatross	<i>Thalassarche cauta</i>	Listed	Vulnerable	Vulnerable		x		x	
Silver Gull	<i>Chroicocephalus novaehollandiae</i>					x	x	x	x
Silvereye	<i>Zosterops lateralis</i>					x	x	x	x
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>			Near threatened		x	x	x	x
Southern Boobook	<i>Ninox novaeseelandiae</i>					x	x	x	
Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	Listed	Endangered	Near threatened				x	
Southern Brown Tree Frog	<i>Litoria ewingii</i>					x			x
Southern Bullfrog (ssp. unknown)	<i>Limnodynastes dumerilii</i>								x
Southern Emu-wren	<i>Stipiturus malachurus</i>							x	x
Southern Right Whale	<i>Eubalaena australis</i>	Listed	Endangered	Critically endangered		x			
Southern Toadlet	<i>Pseudophryne semimarmorata</i>			Vulnerable					x
Spot-tailed Quoll	<i>Dasyurus maculatus maculatus</i>	Listed	Endangered	Endangered					
Spotted Dove	<i>Streptopelia chinensis</i>				Introduced	x	x	x	x
Spotted Harrier	<i>Circus assimilis</i>			Near threatened				x	
Spotted Marsh Frog (race unknown)	<i>Limnodynastes tasmaniensis</i>								x
Spotted Pardalote	<i>Pardalotus punctatus punctatus</i>					x	x	x	x
Straw-necked Ibis	<i>Threskiornis spinicollis</i>					x	x	x	x
Striated Fieldwren	<i>Calamanthus fuliginosus</i>							x	x
Striated Pardalote	<i>Pardalotus striatus</i>							x	
Striated Thornbill	<i>Acanthiza lineata</i>						x	x	x
Striped Marsh Frog	<i>Limnodynastes peronii</i>								x
Stubble Quail	<i>Coturnix pectoralis</i>							x	x
Superb Fairy-wren	<i>Malurus cyaneus</i>					x	x	x	x

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1990
Swamp Antechinus	<i>Antechinus minimus maritimus</i>	Listed	Vulnerable	Near threatened				x	
Swamp Harrier	<i>Circus approximans</i>							x	x
Swamp Rat	<i>Rattus lutreolus</i>							x	x
Terek Sandpiper	<i>Xenus cinereus</i>	Listed		Endangered		x		x	
Tiger Snake	<i>Notechis scutatus</i>							x	x
Tree Martin	<i>Petrochelidon nigricans</i>					x	x	x	
Varied Sittella	<i>Daphoenositta chrysoptera</i>							x	
Verreaux's Tree Frog	<i>Litoria verreauxii verreauxii</i>								x
Weasel Skink	<i>Saproscincus mustelinus</i>							x	x
Wedge-tailed Eagle	<i>Aquila audax</i>							x	x
Weebill	<i>Smicrornis brevirostris</i>						x		
Welcome Swallow	<i>Hirundo neoxena</i>					x	x	x	x
Whimbrel	<i>Numenius phaeopus</i>			Vulnerable				x	
Whistling Kite	<i>Haliastur sphenurus</i>						x	x	
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Listed		Vulnerable		x		x	x
White-browed Scrubwren	<i>Sericornis frontalis</i>					x	x	x	x
White-eared Honeyeater	<i>Nesoptilotis leucotis</i>						x	x	x
White-faced Heron	<i>Egretta novaehollandiae</i>					x		x	x
White-fronted Chat	<i>Ephianura albifrons</i>						x	x	x
White-lipped Snake	<i>Drysdalia coronoides</i>							x	
White-naped Honeyeater	<i>Melithreptus lunatus</i>						x	x	
White-necked Heron	<i>Ardea pacifica</i>							x	
White-plumed Honeyeater	<i>Ptilotula penicillatus</i>					x	x		x
White-striped Freetail Bat	<i>Tadarida australis</i>					x			
White-throated Needle-tail	<i>Hirundapus caudacutus</i>			Vulnerable		x		x	
White-throated Treecreeper	<i>Cormobates leucophaeus</i>							x	
White-winged Triller	<i>Lalage sueurii</i>							x	
Willie Wagtail	<i>Rhipidura leucophrys</i>					x	x	x	x
Yellow-faced Honeyeater	<i>Caligavis chrysops</i>							x	x
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>					x		x	x
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>							x	x
Yellow Spoonbill	<i>Platalea flavipes</i>					x		x	x



**Appendix 6: List of Fauna Species for Point Smythe Coastal Reserve, Venus Bay**
**Key to Codes Used within Table:**

FFG Act: - Victorian Flora and Fauna Guarantee (FFG) Act 1988

EPBC Act - Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

Vic. Adv. List: - Victorian Threatened Species Advisory List, (2013)

Taxon Origin: - Introduced species

VBA: - Victorian Biodiversity Atlas (targeted database search)

BLA: - BirdLife Australia (targeted database search)

 SGCS (1999): - South Gippsland Conservation Society. *Anderson Inlet Waders and Waterbirds and Birds of the Bunurong Coast*

 Monash Uni 1978: - Barlow et al., *A Management Plan for Coastal Crown Land at Inverloch and Venus Bay* (including Point Smythe).

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1978
Australasian Gannet	<i>Morus serrator</i>						x		
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>						x		
Australasian Pipit	<i>Anthus novaeseelandiae</i>					x	x		
Australasian Shoveller	<i>Anas rhynchotis</i>						x		
Australasian Swamphen	<i>Porphyrio melanotus</i>						x		
Australian Fur Seal	<i>Arctocephalus pusillus doriferus</i>	Rejected				x			
Australian Hobby	<i>Falco longipennis</i>					x	x		
Australian Magpie	<i>Cracticus tibicen</i>					x	x		x
Australian Pelican	<i>Pelecanus conspicillatus</i>					x	x		x
Australian Raven	<i>Corvus coronoides</i>					x	x		
Australian Shelduck	<i>Tadorna tadornoides</i>						x		
Australian White Ibis	<i>Threskiornis molucca</i>					x	x		x
Australian Wood Duck	<i>Chenonetta jubata</i>						x		
Bar-tailed Godwit	<i>Limosa lapponica</i>		Vulnerable				x	x	x
Bassian Thrush	<i>Zoothera lunulata</i>					x			
Beach Stone-curlew	<i>Esacus neglectus</i>						x		
Beautiful Firetail	<i>Stagonopleura bella</i>					x			x
Black Rat	<i>Rattus rattus</i>				Introduced	x			
Black Swan	<i>Cygnus atratus</i>					x	x		x
Black-browed Albatross	<i>Thalassarche melanophris melanophris</i>		Vulnerable	Vulnerable			x		
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>						x		x
Black-fronted Dotterel	<i>Euseiornis melanops</i>						x		
Black-shouldered Kite	<i>Elanus axillaris</i>					x	x		
Blotched Blue-tongued Lizard	<i>Tiliqua nigrolutea</i>							x	x
Blue-winged Parrot	<i>Neophema chrysostoma</i>					x	x		
Brown Falcon	<i>Falco berigora</i>					x	x		x
Brown Goshawk	<i>Accipiter fasciatus</i>					x	x		x

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1978
Brown Rat	<i>Rattus norvegicus</i>				Introduced	x			
Brown Thornbill	<i>Acanthiza pusilla</i>					x	x		x
Brush Bronzewing	<i>Phaps elegans</i>					x			x
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>								x
Bush Rat	<i>Rattus fuscipes</i>					x			x
Cape Barren Goose	<i>Cereopsis novaehollandiae</i>						x		
Caspian Tern	<i>Hydroprogne caspia</i>	Listed		Near threatened			x	x	
Chestnut Teal	<i>Anas castanea</i>					x	x		
Chinstrap Penguin	<i>Pygoscelis antarcticus</i>					x			
Common Blackbird	<i>Turdus merula</i>				Introduced	x	x		x
Common Bronze-wing	<i>Phaps chalcoptera</i>								x
Common Brushtail Possum	<i>Trichosurus vulpecula</i>					x			
Common Dolphin	<i>Delphinus delphis</i>					x			
Common Greenshank	<i>Tringa nebularia</i>			Vulnerable			x		
Common Myna	<i>Acridotheres tristis</i>				Introduced		x		
Common Sandpiper	<i>Actitis hypoleucos</i>						x		
Common Starling	<i>Sturnus vulgaris</i>				Introduced	x	x		x
Common Wombat	<i>Vombatus ursinus</i>								x
Crescent Honeyeater	<i>Phylidonyris pyrrhoptera</i>					x	x		x
Crested Tern	<i>Thalasseus bergii</i>					x	x		x
Crimson Rosella	<i>Platycercus elegans</i>					x	x		x
Curlew Sandpiper	<i>Calidris ferruginea</i>		Critically Endangered	Endangered		x	x		x
Double-banded Plover	<i>Charadrius bicinctus</i>					x	x		x
Dusky Woodswallow	<i>Artamus cyanopterus</i>					x			
Eastern Cattle Egret	<i>Bubulcus coromandus</i>						x		
Eastern Curlew	<i>Numenius madagascariensis</i>		Critically Endangered	Vulnerable			x	x	
Eastern Grey Kangaroo	<i>Macropus giganteus</i>					x			x
Eastern Ring-tailed Possum	<i>Pseudocheirus peregrinus</i>							x	x
Eastern Rosella	<i>Platycercus eximius</i>					x	x		x
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>						x		
Eastern Three-lined Skink	<i>Acritoscincus duperreyi</i>								x
Eastern Whipbird	<i>Psophodes olivaceus</i>					x	x		x
Eastern Yellow Robin	<i>Eopsaltria australis</i>					x	x		x
European Goldfinch	<i>Carduelis carduelis</i>				Introduced	x			x
European Rabbit	<i>Oryctolagus cuniculus</i>				Introduced	x		x	x
European Skylark	<i>Alauda arvensis</i>				Introduced	x	x		

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1978
Fairy Martin	<i>Petrochelidon ariel</i>						x		
Fairy Tern	<i>Sternula nereis nereis</i>	Listed	Vulnerable	Endangered			x		
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>						x		x
Feral Cat	<i>Felis catus</i>				Introduced			x	
Flame Robin	<i>Petroica phoenicea</i>					x	x		
Fluttering Shearwater	<i>Puffinus gavia</i>								x
Galah	<i>Eolophus roseicapilla</i>						x		
Garden Skink	<i>Lampropholis guichenoti</i>							x	x
Golden Whistler	<i>Pachycephala pectoralis</i>					x	x		x
Great Cormorant	<i>Phalacrocorax carbo</i>					x	x		x
Great Egret	<i>Ardea alba</i>	Listed		Vulnerable		x	x		
Great Knot	<i>Calidris tenuirostris</i>	Listed	Critically Endangered	Endangered			x		
Grey Butcherbird	<i>Cracticus torquatus</i>					x	x		x
Grey Fantail	<i>Rhipidura albiscapa</i>					x	x		x
Grey Shrike-thrush	<i>Colluricincla harmonica</i>					x	x		x
Grey Teal	<i>Anas gracilis</i>						x		
Hare	<i>Lepus capensis</i>				Introduced			x	
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>						x		
Hog Deer	<i>Axis porcinus</i>				Introduced			x	x
Hooded Plover	<i>Thinornis cucullatus</i>	Listed	Vulnerable	Vulnerable		x	x		x
Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>					x	x		x
House Mouse	<i>Mus musculus</i>				Introduced	x			x
House Sparrow	<i>Passer domesticus</i>				Introduced		x		
Indian Yellow-nosed Albatross	<i>Thalassarche carteri</i>	Listed	Vulnerable	Vulnerable			x		
Intermediate Egret	<i>Ardea intermedia</i>			Threatened			x		
Jacky Winter	<i>Microeca fascinans</i>								x
Koala	<i>Phascolarctos cinereus</i>					x			
Laughing Kookaburra	<i>Dacelo novaeguineae</i>						x		x
Leopard Seal	<i>Hydrurga leptonyx</i>					x			
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>					x	x		
Little Eagle	<i>Hieraaetus morphnoides</i>						x		
Little Egret	<i>Egretta garzetta</i>	Listed		Endangered			x		
Little Grassbird	<i>Poodytes gramineus</i>						x		x
Little Penguin	<i>Eudyptula minor</i>						x		
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>					x	x		
Little Raven	<i>Corvus mellori</i>						x		x

## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1978
Little Tern	<i>Sternula albifrons sinensis</i>	Listed		Vulnerable			x		
Little Wattlebird	<i>Anthochaera chrysoptera</i>					x	x		x
Loggerhead Turtle	<i>Caretta caretta</i>		Endangered			x			
Lowland Copperhead	<i>Austrelaps superba</i>							x	x
Magpie-lark	<i>Grallina cyanoleuca</i>					x	x		x
Masked Lapwing	<i>Vanellus miles</i>					x	x		x
Metallic Skink	<i>Niveoscincus metallicus</i>							x	
Nankeen Kestrel	<i>Falco cenchroides</i>					x	x		x
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>					x	x		x
Noisy Miner	<i>Manorina melanocephala</i>						x		
Olive Whistler	<i>Pachycephala olivacea</i>					x	x		
Oriental Plover	<i>Charadrius veredus</i>						x		
Osprey	<i>Pandion haliaetus</i>						x		
Pacific Black Duck	<i>Anas superciliosa</i>					x	x		
Pacific Golden Plover	<i>Pluvialis fulva</i>			Vulnerable			x		
Pacific Gull	<i>Larus pacificus pacificus</i>			Near threatened		x	x		x
Pectoral Sandpiper	<i>Calidris melanotos</i>			Near threatened			x		
Peregrine falcon	<i>Falco peregrinus</i>						x		
Pied Cormorant	<i>Phalacrocorax varius</i>			Near threatened			x	x	x
Pied Currawong	<i>Strepera graculina</i>						x		
Pied Oystercatcher	<i>Haematopus longirostris</i>					x	x		x
Rainbow Lorikeet	<i>Trichoglossus moluccanus</i>						x		
Red Fox	<i>Vulpes vulpes</i>				Introduced			x	x
Red Knot	<i>Calidris canutus</i>		Endangered	Endangered			x		
Red Wattlebird	<i>Anthochaera carunculata</i>					x	x		x
Red-browed Finch	<i>Neochmia temporalis</i>						x		
Red-capped Plover	<i>Charadrius ruficapillus</i>							x	x
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>						x		x
Red-necked Stint	<i>Calidris ruficollis</i>						x		
Restless Flycatcher	<i>Myiagra inquieta</i>						x		
Royal Spoonbill	<i>Platalea regia</i>			Near threatened		x	x		x
Rufous Whistler	<i>Pachycephala rufiventris</i>						x		x
Sacred Kingfisher	<i>Todiramphus sanctus</i>								x
Sanderling	<i>Calidris alba</i>			Near threatened			x		
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>						x		x
Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>								x



## Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1978
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>							x	x
Short-nosed Bandicoot	<i>Isodon obesulus obesulus</i>	Listed	Endangered	Near threatened				x	
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>						x		x
Shy Albatross	<i>Thalassarche cauta</i>	Listed	Vulnerable	Vulnerable			x		
Silver Gull	<i>Chroicocephalus novaehollandiae</i>					x	x		x
Silveryeye	<i>Zosterops lateralis</i>					x	x		x
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>			Near threatened		x	x		
Sooty Shearwater	<i>Puffinus grisea</i>						x		
Southern Emu-wren	<i>Stipiturus malachurus</i>					x			x
Sperm Whale	<i>Physeter macrocephalus</i>					x			
Spotted Pardalote	<i>Pardalotus punctatus punctatus</i>						x		
Spotted Turtle-Dove	<i>Streptopelia chinensis</i>				Introduced	x	x		
Straw-necked Ibis	<i>Threskiornis spinicollis</i>					x	x		x
Striated Fieldwren	<i>Calamanthus fuliginosus</i>					x	x		x
Striated Pardalote	<i>Pardalotus striatus</i>					x	x		
Striated Thornbill	<i>Acanthiza lineata</i>					x	x		x
Superb Fairy-wren	<i>Malurus cyaneus</i>					x	x		x
Swamp Antechinus	<i>Antechinus minimus maritimus</i>	Listed	Vulnerable	Near threatened				x	
Swamp Harrier	<i>Circus approximans</i>					x	x		x
Swamp Rat	<i>Rattus lutreolus</i>							x	x
Swamp Wallaby	<i>Wallabia bicolor</i>							x	x
Terek Sandpiper	<i>Xenus cinereus</i>	Listed		Endangered			x		
Tiger Snake	<i>Notechis scutatus</i>							x	
Tree Martin	<i>Petrochelidon nigricans</i>						x		
Weasel Skink	<i>Saproscincus mustelinus</i>							x	
Wedge-tailed Eagle	<i>Aquila audax</i>						x		
Welcome Swallow	<i>Hirundo neoxena</i>					x	x		x
Whimbrel	<i>Numenius phaeopus</i>			Vulnerable			x		
Whistling Kite	<i>Haliastur sphenurus</i>						x		
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Listed		Vulnerable			x		x
White-browed Scrubwren	<i>Sericornis frontalis</i>					x	x		x
White-capped Albatross	<i>Thalassarche steadi</i>						x		
White-eared Honeyeater	<i>Lichenostomus leucotis</i>					x	x		x
White-faced Heron	<i>Egretta novaehollandiae</i>					x	x		x
White-footed Dunnart	<i>Sminthopsis leucopus</i>	Listed		Near threatened		x			

Ecological Values of Inverloch and Point Smythe Coastal Dune System

Common Name	Scientific Name	FFG Act	EPBC Act	Vic. Adv. List	Taxon Origin	VBA	BLA	SGCS	Monash Uni 1978
White-fronted Chat	<i>Epthianura albifrons</i>					x	x		x
White-lipped Snake	<i>Drysdalia coronoides</i>							x	
White-naped Honeyeater	<i>Melithreptus lunatus</i>						x		
White-necked Heron	<i>Ardea pacifica</i>						x		
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>					x	x		
White-throated Needletail	<i>Hirundapus caudacutus</i>			Vulnerable			x		
Willie Wagtail	<i>Rhipidura leucophrys</i>					x	x		
Yellow-billed Spoonbill	<i>Platalea flavipes</i>						x		
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>					x	x		x
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>						x	x	x
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>						x		x