

WESTERN COASTAL STUDY

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RESOURCE DOCUMENT

Prepared for the  
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One of the most common native mammals that occurs off the coast of the Study Area is the Australian Fur Seal. These seals spend most of the year at sea ranging along the coast from South Australia to New South Wales and return to their breeding islands from late October through to the beginning of January.

There are only four breeding colonies in Victoria, one of which occurs in the Study Area at Lady Julia Percy Island. The breeding animals are generally found on the exposed barren rock slopes and ledges which in the early summer, due to the moderately stable weather are generally unaffected by seas. The pups generally stay in the vicinity of the breeding colony for a year.

Seal populations declined rapidly with the advent of the sealing industry in the mid 1800's. However, since 1890, when the seals were first protected by law, the numbers have increased. They are still protected by the Wildlife Act 1975 as notable wildlife.

Other offshore mammals of interest are the whales. Right Whales were commonly seen scraping their barnacles off against Mills Reef. However, these and other whale species declined dramatically with the advent of the various whaling industries. Whale sightings appear to be increasing at present, notably of Right Whales at Logans Beach. Blue Whales have been stranded on the beach at the mouth of the Fitzroy River in 1957 (Wakefield 1967) and at Levy's Point (Isles 1981).

#### BEACH AND DUNE AREAS

##### Beach Areas

The dunes of the coastline are often fronted by wide sandy beaches, notably at Lady Bay and Port Fairy Bay. Vegetation on these mainly calcareous sands is sparse and mainly consists of strandline plants or colonizers on berms. Such plants include species of Sea Rocket as well as scattered Coast Saltbush. Runners of Hairy Spinifex or tussocks of Marram Grass may also be present.

These areas, especially in the inter-tidal zone, provide the habitat for large numbers of invertebrates such as sand crabs and beach worms. These provide the food base for a large variety of sea birds. Such birds commonly seen on the beaches are the Silver Gull, the Red-capped Dotteral, the Masked Plover, the Sharp-tailed Sandpiper, Sanderling and Red-necked Stint. Less common birds include the Hooded Dotteral and the Pied Oystercatcher. The Sanderling and the Turnstone are uncommon within Victoria and have their stronghold within the Study Area (R.A.O.U. 1981).

Of particular interest is the presence of the Hooded Dotteral. This species appears to be undergoing a Statewide decline. Over 90 percent of the existing Victorian population surveyed in the Australian Wader Survey (R.A.O.U. 1981) occurred within or adjacent to the Study Area. The Yambuk Lake to Port Fairy area appears to be one of its strongholds.



A number of the sedentary birds using the beaches use the area for nesting sites. Such nests are usually depressions in the sand above high tide level. Birds making use of the nesting sites include the Hooded and Red-capped Dotterals, Pied and Sooty Oystercatchers, Silver Gulls and Crested Terns. These are known to nest at Port Fairy but probably occur elsewhere (Emison et al 1975). Dotteral nests have also been observed at Killarney Beach and Rogers Bay.

Many of the birds using the beach areas are migratory and are only seen on the coast in the summer months. These include Sharp-tailed and Curlew Sandpipers which breed in Siberia.

Basalt outcrops on the beaches, notably between Rutledges Cutting and Lake Yambuk, attract large numbers of beach wading birds, probably in greater numbers than any other location in the Study Area. This may well be related to food found on the basalt formations. Both resident waders and migratory species use this area. The most prolific wader bird population both in terms of numbers and individuals is between Mills Reef and Gormans Lane (R.A.O.U. 1981).

Many of the species using the beaches of the Study Area are especially prone to recreational impact. In particular, many of the migratory species have an essentially rigid migration route, and disturbance of this could lead to a major dislocation of route and perhaps the absence of several species. Resident waders do not seem to be quite as susceptible to interference, however severe local reductions in their abundance is well correlated to areas of good public access. However, the three sedentary species that nest on the beaches are susceptible to trampling, especially during their summer nesting season.

There is a marked decline in a number of species. Long term observations have noted that accompanying the development of Killarney Beach the number of the Bar-tailed Godwits have decreased by over half in the past 10 years, the Turnstone are seen in flocks of 30 to 50 birds compared to several hundred previously, and the small flocks of Sanderlings and Whimbrel are rarely seen now if at all (Lands Department correspondence).

#### Dune Areas

Most of the dunes of the Study Area are covered with the introduced Marram Grass. This forms a closed to open grassland over comparatively recently formed dunes, such as those where there is an increasing or fluctuating sand supply. Many of these areas have been planted by hand.

Marram Grass was first introduced into Victoria by Baron von Mueller in 1883 in response to the "then troublous barren shifting Sand Hummocks, fronting the shores of Port Fairy" (then Belfast). The plantings were very successful and large areas of the eastern and southern foreshores were reclaimed. The Borough Council then encouraged the export of this grass all over Victoria and Australia, as well as Great Britain, New Zealand, South Africa, India and Brazil. It was referred to as the "wonder grass".

The introduction of this grass has had a major impact on the environment. Most of the shifting sands in the Port Fairy area, which threatened arable land, had within ten years of its introduction been stabilized. A broadsheet produced by the Borough of Port Fairy at the time noted that Marram Grass was practically indestructible and referred to it as the "wonder grass". See Figure 24.

Large areas of sand dune have a mono specific community of Marram Grass although the alliance of native Hairy Spinifex and Sea Rocket may be integrated with it, or in a few localities be present in its own right, however generally Marram is dominant.

Marram Grass thrives best on accreting areas of sand as the overburden of sand over its grown nodes accentuates its growth, whereas the suckers of Hairy Spinifex have a horizontal growth habit which cannot cope as readily with large moving areas of sand compared to the more vertical growth of the Marram Grass.

The Marram Grass alliance is particularly susceptible to trampling and studies have shown that it may be affected by trampling pressures as low as 5 to 6 passes per week (Wilcock and Carter 1977). Continuance of such pressures could lead to dieback of the vegetation resulting in a re-initiation of sand movement.

The alliance is also susceptible to damage from firing, from which it takes three to five years to recover. It may also be susceptible to rabbit grazing.

Once a sandy area has been more or less stabilized by the binding effect of the root system of the grasses and by resultant reduction of wind velocity against the sand, other plant species can encroach. In fact there appears to be three zones of tussock formation correlated with mobile, semi fixed and fixed dunes and there seems to be a gap in the production of Marram Grass (which theoretically ceases after 29 years) and the increase of other species (Deshmukh 1979).

There is generally no understorey in this alliance although occasional specimens of Coast Spear Grass, Coast Saltbush, Cushion-bush, Variable Groundsel, Austral Stork-bill, Knobby Club-rush, Coast Sword-sedge and Pigface may occur. However, relatively few species can survive on these deep often unstable infertile sand (Willis 1971). The alliance occurs on both siliceous and calcareous sands.

Few mammals are observed in this alliance apart from introduced species such as the rabbit. A number of reptiles occur, including Whites Skink, which is found on bare sand dunes, and the uncommon White-lipped Snake, which is restricted to such coastal tussock grassland. The Bearded Dragon has been recorded on grassy sand dunes near Port Fairy (Emison et al 1975). A number of birds use the alliance although for most it is only a subsidiary habitat, although two species of significance, the Singing Honeyeater and the rare Orange-bellied Parrot use it.



# PORT FAIRY BOROUGH COUNCIL.

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# MARRAM GRASS.

## A WONDERFUL SAND STAY.

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**B**ARON VON MUELLER, the late eminent Government Botanist, first introduced into the Colony of Victoria in 1883 the seed of the Marram Grass, and forwarded it to the Borough Council of Port Fairy to test on the then troublesome barren shifting Sand Hummocks, fronting the shores of Port Fairy. Great pains were taken to propagate the seed, and the results have been astounding. Its value is demonstrated by the miles of sand dunes, entirely reclaimed by the Marram Grass on both the Eastern and Southern foreshores. The methods of planting the grass by Mr S. T. Avery were adopted after close observation of the habit of the Marram, and nowhere in the world has it attained such luxuriance, as under Mr Avery's cultivation; and in recognition of his service in this branch of economic science, he has been honored by the right to use the letters, F.R.H.S., Eng., after his name. So complete has been the reclamation of the lands, and where for years, nothing but pure shifting sands prevailed, there now thrives an area of magnificent grass, growing as thick as a cornfield, to the height of four feet. Marram Grass is practically indestructible—burning, cutting, or eating-off by cattle, making it thrive—and in most exposed shifting sands grows as strongly as in a sheltered corner. The grass for transplanting has been supplied by the Port Fairy Council, not only to the Governments of the five Australian Colonies, but to Great Britain, New Zealand, Tasmania, Cape Colony, India, Brazil, and under all the varied climatic conditions of these countries it has never failed to thrive when planted as directed by Mr Avery.

The grass is supplied at the actual Cost of Digging, Packing and Carting to the Wharf or Railway Station, which does not exceed 40s per ton.

### DIRECTIONS FOR PLANTING.

The Grass to be planted in rows at a distance of 6ft apart, the space between the plants to be at least 2 feet. The depth to which each plant is put into the sand depends upon the nature of the sand.

If in sand not likely to drift for two or three months, 9 inches will be deep enough; but if very loose and shifting, the grass should be placed from 12 to 15 inches deep.

A "plant" consists of as much grass as a man can conveniently hold in his hand, and care should be taken to have the roots regular. The system that is adopted in planting is for one man to dig the hole,



Photograph of Marram Grass on South Beach, Port Fairy, first year of Transplanting.

and another puts in the "plant," and well treads it round the same.

After 12 months' growth the plants are ready for thinning out and transplanting.

Cattle should not be allowed to graze on the grass until the roots become thoroughly established. It takes 3,630 "plants" to the acre; and there are 2,800 "plants" to the ton, thus 1 ton 6 cwt will cover one acre.

The most favorable time for planting is from 1st May to end of July.

The grass will retain its vitality and strike root after being out of its sand-bed for three months or more.

In a year or two the roots form a matting in the sand preventing any possible drift.

BARON VON MUELLER visited Port Fairy, 12th April, 1895, (by invitation of the Borough Council), in order personally to inspect the Marram Grass Plantations on the South and Eastern coast-lines.

He was accompanied by the Mayor and Councillors, the ranger, and the Hon. Thos. Bent, on his visit to the Plantations, and the extent of the reclamation of the once-shifting sand hills along the coast of the Port Fairy Bay, was a matter of surprise to the Baron. He had received written reports as to the success of the planting of the seed of the grass, which he had originally supplied to the Borough Council, and had frequently obtained specimens of the growth, but what he saw entirely surprised him, and, in his own words, "he clapped his hands with joy" on witnessing what he destined to be a work of world-wide benefit.

The method adopted by ranger Avery in transplanting the grass was new to the Baron, for wherever he had known it to be used as a sand-stay, the suckers or runners of the roots were placed in the ground and allowed to vegetate, but the systematic planting of the grass itself in parallel rows, and in such directions as to check the wind in disturbing the sand, was left to Mr Avery to introduce, and the success of the method is so apparent, that everywhere now, where Marram Grass is planted the directions supplied by our Ranger (if followed) will give certain results.

The Baron was also shown over the town and surroundings, and on Saturday morning, prior to his departure by train, he was met at the Town Hall, by several councillors and townsmen, the Mayor taking the opportunity of thanking him for the interest he had taken in connection with the cultivation of the grass, and also referred to his highly valuable services in the cause of science generally, but especially as a botanist and geographer. As a result of the Baron's forethought in connection with the prevention of sand-drifts on the Victorian coasts, he had been instrumental in extending the benefits secured by the introduction of the Marram Grass at Port Fairy, and enabling the people of all the Australian colonies, New Zealand, Tasmania, Africa and more recently the southern parts of Asia, to participate in the splendid benefit of this wonderful grass; and among the many public benefactions provided by the Baron's energy, learning and investigations, that which enabled valuable lands to be saved from sand devastation, would never be undervalued.

Baron Von Mueller responded in a lengthy speech, disclaiming the main credit for the success which had followed his directions with regard to the experiments with the Marram Grass, and complimented the ranger on his great common sense and energy in its cultivation. He referred to the efforts he had long put forth in connection with rural science, and the pleasure his visit to Port Fairy had given him, especially to witness the wonderful alteration effected to the original sand wastes of this southern coast. Not even in Belgium or France, where the Marram Grass had been used for many years to prevent sand encroachment, had he seen or read of so much success, and Port Fairy would remain entitled to the great credit of introducing to the Southern Hemisphere one of the most valuable products which Divine Providence had granted for this purpose.

He thanked the council for having carried out his suggestions in such a liberal spirit, and he considered them entitled to the highest degree of praise for their exertions. The whole Southern Hemisphere would have reason to compliment the Port Fairy Borough Council for their supply of this most wonderful plant, and the members of the Corporation would always have the satisfaction of feeling that they had been instrumental in doing much good to their fellow creatures.

When the first consignment of Marram Grass was sent to Newcastle, N.S.W., some delay occurred in its delivery, and it reached Mr. Zerwonki, the engineer who had a commission to deal with the sand-drifts along the coasts, in a very dry looking condition. The town clerk received a telegram reading thus:—"Grass arrived; totally useless, nothing but straw." To which the clerk confidently replied:—"Plant out straw, as directed." Mons. Zerwonki did so; and when reporting the grand results of the experiment, presented the town clerk (the late Mr Fred. A. Mandeville) with a gold pencil case, and the ranger (Mr Avery) with a set of studs.

The Marram is without doubt or misnomer a "wonder grass," and deserves that its value should be known world-wide.

The Borough Council of PORT FAIRY will gladly give necessary information to all desirous of testing its sand-staying qualities and prolific character. The Council supplies the Roots for transplanting at the actual cost of digging, packing, carting and forwarding, and all orders will be carefully fulfilled. There being daily communication with Port Fairy by rail or sea, no delay need occur in forwarding.

Read the directions for Planting carefully before commencing operations, and you can't go wrong.

## FIGURE 24: MARRAM GRASS BROADSHEET



Marram Grass covered dune areas form the habitat of the mainland breeding areas of the Short-tailed Shearwater, more commonly known as the Mutton Bird, within the Study Area. The rookeries at South Beach at Port Fairy are the only mainland breeding areas in Victoria other than one rookery at Port Campbell. The largest rookery in the area is on Griffiths Island.

The Mutton Birds are migratory and migrate to the Northern Hemisphere during Victoria's winter. They return to their breeding areas at the end of September. See Figure 25. They usually return to their original burrows.

The mature birds feed at sea in the day and return to the rookeries at dusk. Mating takes place in early November and the birds vacate the rookery for about three weeks. The eggs are laid on the adults return and generally hatch in mid January. Only one egg is laid by each mating pair. The chicks and parents usually leave the colony at the end of April.

The birds are presently very populous but like all migratory birds are dependant on the maintenance of habitat throughout their migratory route. Within the rookeries the birds natural enemies are the Silver and Pacific Gulls and Tiger Snakes. The trampling of burrows, firing of the areas, predation by cats, dogs and foxes, or the levelling of burrow areas all have direct impact on the population.

The displacement of young birds is also a problem as the birds do not reach breeding age until they are six to eight years old for females and males respectively.

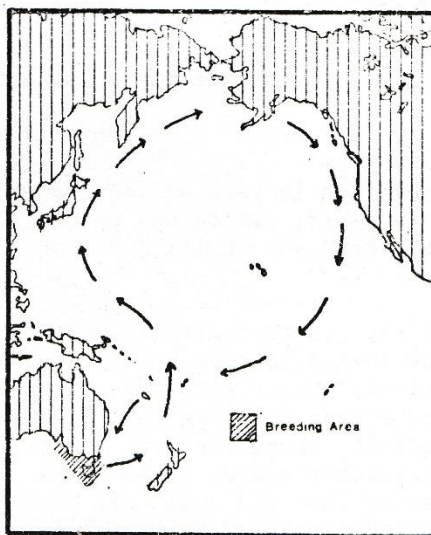


FIGURE 25: MUTTON BIRD MIGRATION

A group of Coast Wattle and Coast Beard-heath alliances grade into the Marram Grass and Hairy Spinifex alliance. These are generally found landward downslope of the foredunes crest. It is a very widespread alliance that has a sparse to very sparse understorey of largely annual herbs and mosses.

The four structural alliances range from closed scrub, which generally grades into the Hairy Spinifex grassland alliance, through to open scrub to tall open shrubland to a tall open shrubland of entirely Coast Beard-heath. There are few remaining areas of this last alliance and it is inadequately conserved.

Other associate species include White (Coast) Correa, Seaberry Saltbush, Moonah, Coast Everlasting, Coast Daisy-bush and Common Boobialla. Coast Tea-tree, which is the very common dominant shrub and tree of eastern Victoria, is virtually absent, although there have been a number of areas at Port Fairy and Warrnambool that have been planted. A number of senescing trees at some of the townships are thought to be a result of early plantings. An alliance of Drooping She-oak may also be present, although this is generally more common in sea cliff areas.

These alliances form a seral sequence. Low prostrate shrubs of Coast Wattle merge with the Marram Grass grasslands and Coast Beard-heath grows within the shelter and build up a wind profile gradient. With time the higher longevity of Coast Beard-heath means that the Coast Wattle is out competed and dies out. The Tall Open Shrubland consists mainly of older, stunted Coast Bear-heath. See Figure 26.

Fires also play a part in the composition of these communities as they are very susceptible to fire. A fire would destroy much of the community. It would take about 25 years for full recovery. However, the Coast Beard-heath may recover from a fire from a mallee like rootstock and as a result of this may be able to withstand repeated burning.

Bird life in these areas is both varied and prolific. It includes wrens, fantails, thrushes, swifts and parrots. Of particular interest is the presence of the Orange-bellied Parrot in this habitat.

Recent surveys of the Orange-bellied Parrot indicate that the whole population may now number between 80 and 100 birds. The birds breed in Tasmania and winter across west Victoria and far east South Australia. Sites that they have been observed at include the south west edge of Curdies Inlet, Belfast Lough, and Port Fairy. They are mainly present between June to September and occur in Beaded Glasswort saltmarsh and rushes and grasses on lake sides as well as in dune areas. They are often associated with flocks of the more common Blue-winged Parrot. (Loyn and Kinhill Planners 1979).

The coastal area near Port Fairy formerly supported substantial numbers of this species, especially at Little River, but in recent years reports suggest that its numbers are decreasing (L.C.C. 1976).





The most widespread vegetation community is the coastal scrub. Typical species include Coast Wattle (left foreground), Coast Beard-heath (background) and Coast Everlasting (right foreground).



The areas of coast retaining vegetation provide habitat for a number of mammals. Most of these are nocturnal and rarely seen, and can be traced only by their tracks.



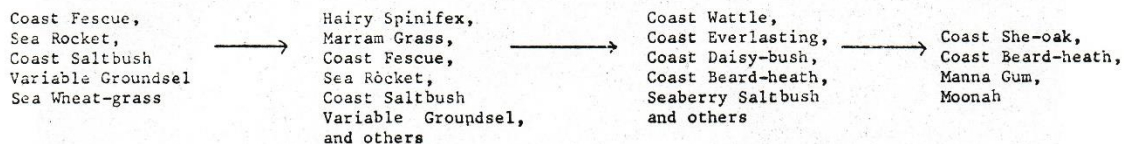


FIGURE 26: GENERALIZED CHANGES IN DUNE SUCCESSION

On older established dunes a community of Coast Banksia occurred. This may form low or low open woodlands. These alliances have a herbaceous understorey. Austral Bracken is often dominant in this understorey. Bracken becomes more dominant following frequent firing. Fires have a significant effect on the community. It takes about 10 years to recover from a ground fire and 40 to 80 years to fully recover from a crown fire. This community now only occurs at Glenelg, the Grampians and east of Port Phillip Bay.

This community was previously much more widespread. In 1895 it was noted that "in the early days the now sandy tract to the west of Belfast was clothed with Banksias (honey suckle) and Casuarina (She oaks), the timber gradually disappeared and left nothing to prevent the encroachment of the sand" (Pritchard 1895). The communities in these areas now are apparently a disclimax.

#### CLIFF AND CLIFF TOP AREAS

The vegetation of the cliff areas relates fairly closely to the two main coastal geological formations - the Tertiary limestone areas to the east, and the Pleistocene Dune Calcarene areas to the west. The plants growing on the cliffs themselves grow in skeletal soils and are commonly anchored in rock crevices. The cliff top vegetation is very susceptible to change. See Figure 27.