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Jawbone Marine Sanctuary



Management Plan June 2007

**JAWBONE MARINE SANCTUARY
MANAGEMENT PLAN**

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Acknowledgement of *Country*. In their rich culture, Indigenous Australians are intrinsically connected to the continent, including the area now known as Victoria. Parks Victoria recognises that the sanctuary is part of *Country* of the Traditional Owners.

Parks Victoria is grateful to all those organisations and individuals who have contributed to this Draft Management Plan. Special thanks go to members of the Point Cooke Marine Sanctuary and Jawbone Marine Sanctuary Management Plan Advisory Group, Doug Evers-Buckland, Clare Johnston, Richard Leppitt, John McElvaney, Doug Osborn, Steve Riley, Kara Spence, Fiona Stevens, Dan Wade, Jeanette Watson, Bob Winters and Kevin Wood.

Note:

Technical terms used in this plan are explained in the **Glossary** at the end of the plan.

Disclaimers:

This plan is prepared without prejudice to any negotiated or litigated outcome of any native title determination applications covering land or waters within the plan's area. It is acknowledged that any future outcomes of native title determination applications may necessitate amendment of this plan; and the implementation of this plan may require further notifications under the procedures in Division 3 of Part 2 of the *Native Title Act 1993* (Cwlth).

The plan is also prepared without prejudice to any future negotiated outcomes between the Government/s and Victorian Indigenous communities. It is acknowledged that such negotiated outcomes may necessitate amendment of this plan.

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FOREWORD

Jawbone Marine Sanctuary protects a unique community of mangroves and saltmarsh considered unusual for their growth amongst basalt rocks. The marine flora and fauna are significant as a scientific reference area and have been protected for 110 years during the operation of the Merrett Rifle Range. The intertidal areas and coastal vegetation provide important habitat for migratory and local seabirds and shorebirds.

The sanctuary's tranquillity and wide variety of coastal habitats are enjoyed and cherished by the local community and visitors. The strong maritime history of Williamstown is evident through remnant shipwrecks in the sanctuary waters.

The care of Jawbone Marine Sanctuary is not a task for the government alone, nor only for those who live on the coast. It is a task for the whole Victorian community. This Management Plan sets out the ways in which we can work together to learn about, protect and sustain an important part of our marine environment.

I thank the Point Cooke and Jawbone Marine Sanctuaries Management Plan Advisory Group for its valuable contribution to the plan, and also those individuals and organisations who made submissions on the draft plan, and I look forward to the community's ongoing support for the management of Jawbone Marine Sanctuary.

JOHN THWAITES MP
Minister for Environment, Water and
Climate Change

APPROVED MANAGEMENT PLAN

This Management Plan has been prepared under section 17D of the *National Parks Act 1975* (Vic.) and is approved for implementation.

The plan provides the basis for the future management of Jawbone Marine Sanctuary. It was finalised following consideration of the 12 submissions received on the Draft Management Plan.

PETER HARRIS
Secretary to the
Department of Sustainability and Environment

MARK STONE
Chief Executive
Parks Victoria

INTRODUCTION TO THE MARINE ENVIRONMENT

Victorians are custodians of some of the most remarkable, diverse and culturally important marine environments on Earth. These include deep open water, shallow embayments, rocky reefs, canyons, seagrass meadows, tidal sandflats and mudflats, and estuaries, and they support more than 12 000 known species of flora and fauna. Around 90% of these marine species are found only in the waters of southern Australia.

Broadly speaking, Victoria has responsibility for the waters that extend offshore to three nautical miles and cover around 70 000 square kilometres. Marine National Parks and Marine Sanctuaries make up about 5% of this area, but protect a range of significant species and important habitats, as well as maritime artefacts and evidence of past Indigenous occupation and use.

The vast three-dimensional marine environment has characteristics that are very different from those of the land and atmosphere. The fundamental physical properties – pressure, temperature, salinity, density and availability of nutrients and gases – are all very different. There are also great differences in the types of substrates, and the physical and biological processes that occur, such as tides, currents, light penetration, erosion, sedimentation, oxygen uptake, life cycles and even the food chains.

The organisms that occupy the marine environment are different as well. On land vascular plants dominate, but in marine habitats there are a small number of species, occurring only in shallow water on sheltered coastlines. In most marine environments their ecological roles in photosynthesis and oxygen production are undertaken by algae, which range in size from giant kelps to minute single-celled species. Other single-celled organisms such as diatoms, cyanobacteria, dinoflagellates and forams, together with invertebrate larvae and marine fungi, make up most of the abundant marine plankton that is the basis of all marine food chains.

As on land, invertebrates, including molluscs (e.g. octopus, abalone, snails), crustaceans (e.g. crabs, lobsters, tiny amphipods) and echinoderms (e.g. sea cucumbers, sea stars, sea

urchins), dominate the marine fauna, but insects – the most abundant invertebrates on land – are almost absent. The dominant vertebrates are fish, although mammals and reptiles also inhabit the marine environment and many birds inhabit both realms.

Although they are very different physically and biologically, the land, atmosphere and marine environments are interconnected. Water and gases are transferred between oceans and the atmosphere. There are animals with both marine and freshwater life stages, and some species breed in estuaries where fresh water from the land mixes with oceanic salt water. Fresh water and sediments from catchments far inland are dispersed into coastal waters, bringing with them nutrients needed to maintain inshore marine ecosystems but also pollution from human activities.

The sea interconnects marine habitats over great distances. Tides and currents move sediments, plankton and organic matter into and through habitats, along with flotsam, jetsam, ballast water and oils from catchments or inshore waters, released from ships on the open seas or washed from the shores of other countries. Many marine animals migrate long distances, passing freely into and out of Victorian waters and spending much of their lives in the open ocean.

A vision for Victoria's system of Marine National Parks and Marine Sanctuaries

‘A world-class system of Marine National Parks and Marine Sanctuaries that conserves the diversity of Victoria's marine environments, protected and enjoyed by Victorians and visitors, forever.’

This vision is detailed in the *Marine National Parks and Marine Sanctuaries Management Strategy 2003–2010* (Parks Victoria 2003b). It is described in the following extract:

‘The vision for Victoria's system of Marine National Parks and Marine Sanctuaries is to maintain marine ecosystems in their natural state, enjoyed by visitors and protected from the effects of inappropriate activities. The system will safeguard representative examples of undisturbed natural marine habitats, respect cultural heritage values, and be a place of

inspiration, enjoyment and renewal for all people. The system will complement our world-class national parks system on land.

This vision aims to preserve the diversity of our marine environment, its flora and fauna, its natural beauty, and the diversity of activities that may be enjoyed there. It is a vision that invites all Victorians to become involved, to take pride in our Marine National Parks and Marine Sanctuaries, and to share in their stewardship.’

Contribution of Jawbone Marine Sanctuary to the statewide system

Jawbone Marine Sanctuary is significant in the statewide system for its contribution to the representation of Port Phillip Bay environments and for its significance as a scientific reference area.

Implications for management

The differences and connections in the marine environment mean that Victoria’s Marine National Parks and Marine Sanctuaries must be managed somewhat differently from land environments. Natural, recreational and cultural values may be affected by the use of both land and marine areas some distance away, over which sanctuary managers have no direct control. Impacts on one marine habitat can quickly affect another, and human activities and natural events on land and in the atmosphere can have widespread consequences for the marine environment. Boundaries in the ocean can be difficult to define, and the effects of human activities can be hidden from view.

Like the atmosphere, but in contrast to land, the marine environment is a common resource that is rarely in private ownership, and there are few natural or artificial barriers to movement. Many of the strategies used to concentrate the impacts of recreational activities in terrestrial parks (e.g. the creation of walking tracks and picnic areas) are not feasible in the marine context.

Conserving historic and cultural places and objects is also a challenge because it is difficult to identify an underwater place or monitor activities that take place on the open sea or under water. *Sea Country* and cultural association to, or past use of, underwater places that were exposed before the sea level rose must also be considered.

The long-term protection of the Marine National Parks and Marine Sanctuaries relies on the support and goodwill of the community, together with the help of coastal managers and government agencies. The plan seeks to foster a strong sense of custodianship of Jawbone Marine Sanctuary and to strengthen its protection while respecting cultural and community associations with the area.

SUMMARY

Jawbone Marine Sanctuary (30 ha), named after a small promontory known as ‘The Jawbone’, protects a variety of coastal and marine habitats.

The mangrove community among the basalt rocks is one of the few stands of mangroves in Port Phillip and is of State significance. Along with intertidal saltmarsh, mudflats and seagrass beds, the mangroves provide important habitat for many species including seabirds and shorebirds. Intertidal and subtidal basalt reefs support dense and diverse algae communities, numerous fish and invertebrate species.

The marine flora and fauna and coastal vegetation along with important habitat for migratory and local seabirds and shorebirds have largely been protected from human disturbance because public access was restricted for 110 years during the operation of the Merrett Rifle Range.

The sanctuary also provides opportunities for visitors to enjoy and appreciate natural and cultural values. The strong maritime history of Williamstown is evident through several remnant shipwrecks in the sanctuary waters.

Indigenous tradition indicates that the sanctuary is part of the *Country* of Boonwurrung¹ people.

Jawbone Marine Sanctuary was recommended by the former Environment Conservation Council for its ecological values, its contribution to representation of Port Phillip Bay environments, and for its significance as a scientific reference area.

Future management aims to protect sanctuary values while providing for limited but sustainable opportunities for visitor enjoyment and appreciation of the sanctuary.

¹ This management plan adopts the spellings used by the Native Title Unit, Department of Justice. Boonwurrung may also be spelt in a number of different ways, including ‘Boonerwung’ and ‘Bunurong’.

Major management directions for the sanctuary include the following:

- The intertidal reef, mudflat, mangrove, saltmarsh and seagrass communities will be protected as a scientific reference area by focusing shore-based access and educational use at Jawbone Bay.
- Protect natural processes to ensure an overall benefit to biodiversity and marine ecological communities.
- Undertake and encourage scientific research to improve the scientific basis for management.
- Minimise negative impacts of changes to water quality by seeking improvement to stormwater and waterway discharge quality through cooperation with stormwater and waterway managers.
- Minimise other identified threats to the sanctuary through ongoing risk assessment and complementary adjacent, coastal and catchment management.
- Reflect the Traditional Owners’ knowledge and interests in the area and aspirations for the sanctuary in the planning and management.
- Respect, promote and interpret Indigenous knowledge relating to *Country* in accordance with the views of the Traditional Owners.
- Manage recreational and educational activities in Jawbone Bay sustainably and with minimal impact on the sanctuary.
- Interpret and promote the sanctuary’s natural and cultural values and its recreational opportunities and foster community appreciation and awareness.
- Support and encourage Friends and volunteer groups and promote opportunities for the community to work together and with Parks Victoria to achieve common goals for the sanctuary.
- Work collaboratively with agencies, the community and other stakeholders to assist in the sanctuary’s management.

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1 INTRODUCTION

1.1 Location and planning area

Jawbone Marine Sanctuary is in northern Port Phillip at Williamstown, about 10 km south-west of the Melbourne CBD (figure 1).

The sanctuary (30 ha) begins at the onshore sign west of the fishing clubs in Bayview St, and runs west 1.9 km along the foreshore around the Jawbone to the onshore sign on the wader beach south of McGuire Crescent. The sanctuary extends from the high water mark seaward to a series of in-water boundary markers along the seaward boundary (section 6.1).

In this draft plan, the expression ‘Jawbone Bay’ refers to the bay east of the Jawbone promontory and ‘Compass Hill’ refers to the elevated area north of the board walk, pending the establishment of official names.

1.2 Creation of the sanctuary

Jawbone Marine Sanctuary forms part of the system of 13 Marine National Parks and 11 Marine Sanctuaries in Victorian waters. Selection of these areas was based on more than 10 years of research, investigation and community consultation by the former Land Conservation Council (LCC) and Environment Conservation Council (ECC), summarised in the Marine, Coastal and Estuarine Investigation Final Report (ECC 2000). The recommendations of the ECC accepted by government (Government of Victoria 2002) included reservation of the new parks and sanctuaries under the *National Parks Act 1975* (Vic.). Jawbone Marine Sanctuary was included on Schedule 8 of the National Parks Act on 16 November 2002 (appendix 1).

When created, much stronger penalties were applied for all forms of fishing, including shellfish collection in Marine National Parks or Marine Sanctuaries, than apply for taking or damaging fauna, plants or objects from these areas.

The sanctuary includes areas to high water mark that were formerly part of Jawbone Flora and Fauna Reserve. Jawbone Flora and Fauna Reserve was created in 1990 after the Merrett Rifle Range was decommissioned in 1986. For the 110 years during the operation of the rifle

range, public coastal access was prohibited for safety reasons, and the marine flora and fauna and coastal vegetation along with important habitat for migratory and local seabirds and shorebirds were fortuitously protected from human disturbance. Public access has been limited to walking tracks and the boardwalk since Jawbone Flora and Fauna Reserve was created. The *Jawbone Flora and Fauna Reserve Draft Management Plan* (CFL 1989) proposed the addition of the intertidal and much of the offshore area that is now the sanctuary to the reserve (section 7.2).

1.3 Plan development

This first management plan for the sanctuary was prepared by Parks Victoria, with significant input from the Point Cooke and Jawbone Marine Sanctuaries Management Plan Advisory Group and other stakeholders. It takes into account existing information, reports and research findings that relate to the sanctuary and is informed and supported by a range of best practice management systems.

The strategies outlined in this plan have been guided by the statewide *Marine National Parks and Marine Sanctuaries Management Strategy 2003–2010* (Parks Victoria 2003d).

The plan is a strategic guide for future management of the sanctuary. As a public document, the plan establishes how Parks Victoria will protect the natural and cultural values of the sanctuary, and describes the services and facilities that will be provided to help visitors to enjoy, appreciate and understand the sanctuary in ways that are consistent with this. The plan also serves to inform and encourage cooperative land management and participation in community-based programs between Parks Victoria and the managers of areas adjacent to the sanctuary.

As a working document for the sanctuary, the plan informs Parks Victoria’s development of Corporate Plans, serves as a framework for subsequent detailed planning and governs management activities.

This plan was published as a Draft Plan for public comment in 2006, and 12 submissions were received (appendix 2). Where necessary,

further consultation with the community and stakeholders was undertaken.

Key changes made to the Draft Plan in preparing this Final Management Plan included:

- clarification of the types of vessels that may be launched by hand in the sanctuary (i.e. canoes, kayaks), and inclusion of information about better launching opportunities outside the sanctuary

- inclusion of detection of marine pests as part of community monitoring programs and friends group activities
- use of a more generic name for the bay east of the Jawbone promontory, and clarification of purpose of the name.

This final management plan will direct future management of the Jawbone Marine Sanctuary, until reviewed.

2.1 Regional context

Jawbone Marine Sanctuary forms part of a representative system of 13 Marine National Parks and 11 Marine Sanctuaries in Victoria, established within the broader context of a National Representative System of Marine Protected Areas (NRSMPA). The establishment of an NRSMPA contributes to the establishment of a global representative system of marine protected areas (ANZECC TFMPA 1999).

Jawbone Marine Sanctuary is one of eight Marine National Parks and Marine Sanctuaries in the Victorian Embayments marine bioregion, as identified by the Interim Marine and Coastal Regionalisation for Australia (IMCRA). This regionalisation identified 60 marine bioregions, five of which apply to Victorian waters (IMCRA Technical Group 1998). Jawbone Marine Sanctuary protects approximately 0.01% of the Victorian Embayments marine bioregion.

The bioregion encompasses the larger bays and inlets of Port Phillip, Western Port, Corner Inlet–Nooramunga, Gippsland Lakes and Mallacoota Inlet. The bioregion is characterised by sheltered waters with extensive areas of subtidal and intertidal sediments.

Indigenous tradition indicates that the sanctuary is part of *Country* of Boonwurrung (section 5.1).

Jawbone Marine Sanctuary is within the Werribee Basin of the Werribee Catchment of the Port Phillip and Western Port Catchment Region. The sanctuary is strongly influenced by activities within the catchment, within the Port Phillip and Western Port Catchment Management Authority's area of responsibility. The area abutting Jawbone Marine Sanctuary is typified by coastal vegetation, wetlands and open grasslands.

The catchment is highly urbanised along the coast and is significant for farming inland supporting over 100 000 ha of mainly broad acre cropping and grazing. Irrigated areas around Bacchus Marsh and Werribee support intensive farming including market gardens and orchards. Indigenous vegetation covers

25% of the catchment and is protected by a number of State and Regional Parks. Kororoit Creek, Laverton Creek, Skeleton Creek, Werribee River, and Little River are the major rivers and creeks that flow through the catchment into Port Phillip.

The foreshore adjacent to Jawbone Marine Sanctuary is within the City of Hobsons Bay (section 7.2). The sanctuary is in Tourism Victoria's Melbourne product region. The Melbourne product region receives 40% of all tourist visits to Victoria, comprising 6.7 million domestic overnight visitors, 15 million domestic day visitors, and 1.1 million international overnight visitors (Tourism Victoria 2003).

Port Phillip is Melbourne's most important recreational area and also provides shipping access to one of Australia's busiest seaports. In an area of metropolitan Melbourne that is almost entirely urbanised, and where coastal recreation is popular, the sanctuary is significant for its capacity to protect a range of habitats and associated flora and fauna.

Jawbone Marine Sanctuary protects 1.9 km of the coastline and adjacent waters from west of Bayview St to south of McGuire Cr. The sanctuary is adjoined by Jawbone Flora and Fauna Reserve and is complemented by Jawbone Reserve (figure 2) and other reserves and Marine Sanctuaries in Port Phillip (figure 1), including:

- Jawbone Flora and Fauna Reserve, adjoining the sanctuary, protects open grasslands, wetland, and saltmarsh areas that provide habitat for water birds and other wildlife.
- Jawbone Reserve, adjoining the Jawbone Flora and Fauna Reserve, provides open grasslands and pathways for recreation.
- Point Cooke Marine Sanctuary, approximately 15 km west of Melbourne, represents and protects typical examples of the western shoreline and marine environments of Port Phillip.
- Point Cook Coastal Park, located 20 km south-west of Melbourne, is a popular destination for birdwatchers, nature lovers

and family groups. The park protects abundant birdlife, a historic bluestone homestead and forms part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site.

- Cheetham Wetlands adjacent to Point Cook Coastal Park consists of saltmarsh lagoons of varying salinity levels, which are an important habitat for wader birds and other wildlife. The wetlands also form part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site.
- Ricketts Point Marine Sanctuary at Beaumaris, 20 km south of the centre of Melbourne, represents and protects typical examples of the eastern shoreline and marine environments of Port Phillip Bay.

2.2 Sanctuary significance and values

Jawbone Marine Sanctuary makes a valuable contribution to Victoria's parks system, which aims to protect viable representative samples of the State's natural marine and terrestrial environments. Parks also provide opportunities for visitors to enjoy and appreciate natural and cultural values, and many make important contributions to tourism.

The sanctuary is assigned the International Union for the Conservation of Nature and Natural Resources (IUCN) Category III (Natural Monument) of the United Nation's List of National Parks and Protected Areas. Category III areas are managed primarily for conservation of specific natural features.

The area included in the sanctuary is significant to many people in the community, especially the Traditional Owners. A number of local environmental groups, including Friends of Williamstown Wetlands, other community groups, individuals, residents of the Williamstown area and the education and research community, have strong historical associations with the sanctuary area. Parks Victoria respects the community's traditional and historical associations with the sanctuary area.

The sanctuary is a significant feature on the western shoreline of Port Phillip and constitutes an important natural attraction encompassing diverse and unusual habitats and

associated flora and fauna in a highly urbanised setting.

Important values of the sanctuary are listed below.

Natural

- Remnant mangrove communities, which are unique for their growth among basalt boulders and are one of the few stands of mangrove in Port Phillip.
- Dynamic coastal landforms and saltmarsh communities, which provide habitat for local and migratory seabirds and shorebirds and are of State significance.
- Basalt reefs, shallow inshore waters, mudflats and seagrass beds that provide foraging and roosting area for local and migratory seabirds and shorebirds.
- Seagrass beds that provide habitat for invertebrates and a nursery for juvenile fish species.
- Intertidal and subtidal basalt reef system that supports diverse algae, invertebrate and fish communities.
- Ecological values that have been protected from human disturbance for over 110 years, which are of value for scientific reference.

Cultural

- Coastal area of high significance to Indigenous people.
- Five shipwrecks listed on the Victorian Heritage Register and a ship scuttling ground.
- Remnants of a slaughterhouse at the sanctuary's western end.
- Remnants of an adjacent rifle range used in the 1956 Olympics.

Recreational

- Leisure opportunities such as swimming, bird watching and nature observation.
- Snorkelling and diving at easily accessible subtidal reefs.
- Recreational boating opportunities particularly for kayaking and canoeing.

- Opportunities for guided marine education and nature-based tourism.
- Scenic landscapes that provide for photography and artistic pursuits.

2.3 Evidence of past use

Indigenous communities have been associated with the Port Phillip region for around 40 000 years. Middens along the coast indicate that the Kulin Nation have inhabited the area for at least 6000 years.

The ancestors of the Boonwurrung and Woiwurrung frequented the coastal area of Williamstown to catch fish and gather shellfish from the reefs. A midden on the Jawbone indicates that the area was an important site.

In the 1850s, the intertidal area of the sanctuary was used to offload livestock from ships directly into the adjacent slaughterhouse yards. This use continued until 1877 when the land was sold to the government to be used as a rifle range. For more than 100 years while in operation, public access to the coastline and waters surrounding the rifle range was prohibited. After the rifle range was decommissioned in 1986, important baseline studies of the intertidal marine environment were undertaken.

During the mid-1900s, the sanctuary was used as a scuttling ground for ships that had outlived their usefulness. Fishing has been a popular pastime in the sanctuary, both commercially and recreationally, in particular the collection of abalone.

In recent times the sanctuary was used for recreational activities including snorkelling, diving, canoeing, marine education and bird watching.

2.4 The sanctuary visitor

The mudflats, thick coastal vegetation and adjacent wetlands seclude and separate the sanctuary from the adjacent urban area.

Shore-based activities within the sanctuary are limited due to the nature of the sensitive intertidal vegetation and rocky boulder substrate. Residents enjoy walking and swimming from the beach in Jawbone Bay. Local school children also visit Jawbone Bay to learn about the marine environment and its conservation.

Visitors can enjoy the sanctuary's shallow waters by canoe and the subtidal reefs within the sanctuary are explored by snorkellers and divers.

The remote feel of the sanctuary attracts visitors interested in observing nature and bird watching or sightseeing via the adjacent boardwalk and reserves. The adjacent reserves are also popular with local residents for walking, cycling and outdoor recreation.

There are no visitor services other than ranger patrols within the sanctuary and facilities consist only of boundary markers (section 7.2) and signage (section 6.1). The sanctuary is accessible from Williamstown by private and public transport and is close to the Melbourne's western suburbs.

2.5 Legislation and ECC recommendations

Legislation

Jawbone Marine Sanctuary is reserved and managed under the provisions of the National Parks Act. The Act requires the Secretary to the Department of Sustainability and Environment to preserve and protect the natural condition of the sanctuary and its natural and other features and, subject to this, to provide for the use of the sanctuary by the public for enjoyment, recreation, and education. Appropriate research activities are also provided for under the Act.

The National Parks (Park) Regulations 2003 apply to the sanctuary. All forms of extraction, including recreational and commercial fishing and shellfish collection are prohibited within the sanctuary under the National Parks Act. A Statewide Compliance Strategy and a Regional Compliance Plan (Parks Victoria 2003a) have been developed in partnership with Department of Primary Industries (DPI) – Fisheries Victoria to manage compliance with the no-fishing provisions within the sanctuary (section 8.3).

The objects and provisions of the National Parks Act set the framework for the management of Jawbone Marine Sanctuary (appendix 1). Specific legislation and ECC recommendations accepted by government also govern particular aspects of the management of the sanctuary, as described below and in subsequent sections of the plan.

The *Aboriginal Heritage Act 2006* (Vic.) applies to the sanctuary and protects all Aboriginal places, objects and Aboriginal human remains (section 5.1).

The *Coastal Management Act 1995* (Vic.) applies to use and any development of the whole of the sanctuary.

The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) applies to the whole of the sanctuary with respect to actions that have, will have, or are likely to have, a significant impact on matters of national environmental significance, including listed threatened species and communities and listed migratory species in the sanctuary.

The *Native Title Act 1993* (Cwlth) applies to the management of the sanctuary.

The *Parks Victoria Act 1998* (Vic.) enables management services for Jawbone Marine Sanctuary to be provided by Parks Victoria on behalf of the Secretary to DSE.

Other legislation, and policies and guidelines (section 2.6) at both the Commonwealth and State levels apply to management of the sanctuary and specific activities and uses.

ECC recommendations

The former Environment Conservation Council (ECC) in its *Marine, Coastal and Estuarine Investigation Final Report* (ECC 2000), recommended the creation of Jawbone Marine Sanctuary for its ecological values, its contribution to the representation of Port Phillip Bay environments, and for its significance as a scientific reference area (ECC 2000).

The ECC recommended that existing land access restrictions be maintained to reduce the significant damage to sensitive mangrove and saltmarsh areas that has occurred since the opening of the area after the decommissioning of the Merrett Rifle Range.

The ECC also made a number of recommendations that relate to the sanctuary. The recommendations included:

- B8 Use of Jawbone Marine Sanctuary in accordance with the general recommendations for Marine Sanctuaries.
- R3 Planning and management relating to traditional interests and uses in coastal

marine areas to be based on recognition and respect for the traditional relationship of Aboriginal people with the land and sea.

R13 Further research to be undertaken on biological community composition and structure, both within and external to marine protected areas, with an emphasis on assessing the impacts of harvesting marine fauna.

R14 Assessments to be made and strategies developed for protection of vulnerable or threatened marine species and communities, using the provisions of the *Flora and Fauna Guarantee Act 1988* (Vic.) (FFG) as appropriate.

R18 Measures to be implemented by responsible agencies to reduce the risk of marine pest species arriving in Victoria, and to ensure a rapid and effective response in the event of an introduction.

R26 Public land and waters continue to be available for a wide range of tourism and recreational uses. Development should not preclude public access to foreshore and offshore areas, other than to meet safety and security requirements that cannot be achieved in other ways.

R34 Priority will be given to establishing monitoring programs for Marine National Parks to determine the extent to which these areas are meeting their objectives.

All of these recommendations were accepted by the State Government in 2002 (Government of Victoria 2002).

2.6 Policies and guidelines

The sanctuary is managed in accordance with Parks Victoria's operational policies and as appropriate with other relevant policies and guidelines, including:

- *Victoria's System of Marine National Parks and Marine Sanctuaries Management Strategy 2003–2010* (Parks Victoria 2003b)
- *Indigenous Partnerships Strategy and Action Plan* (Parks Victoria 2005a)
- *Guidelines for Working with Aboriginal Communities and Protection of Cultural Sites* (Parks Victoria 2002)

-
- *Victoria's Biodiversity Strategy* (NRE 1997b)
 - *National Strategy for the Conservation of Australia's Biological Diversity* (ANZECC 2001)
 - *Heritage Management Strategy* (Parks Victoria 2003c)
 - *Victoria's Heritage — Strengthening our Communities* (Heritage Victoria 2006).
 - *National Strategy for Ecologically Sustainable Development* (COAG 1992).
- Jawbone Marine Sanctuary is also managed within a broader context of a number of other plans and strategies, including:
- *Nature Based Tourism – Directions and Opportunities for Victoria 2000–2003* (Tourism Victoria 2000)
 - *Policy for Sustainable Recreation and Tourism on Victoria's Public Land* (NRE 2002a)
 - *Port Phillip and Western Port Regional Catchment Strategy 2004–2009* (PPWPCMA 2004)
 - *Port Phillip Bay Environmental Management Plan* (NRE 2002b)
 - *Port Phillip Coastal and Marine Planning Program 2000* (ABM 2000)
 - *State Environment Protection Policy (Waters of Victoria)*
 - *Victorian Coastal Strategy* (VCC 2002).

3 STRATEGIC DIRECTIONS

3.1 Sanctuary vision

A future visitor to Jawbone Marine Sanctuary finds a highly protected sanctuary renowned for its biodiversity and picturesque scenery. The flourishing saltmarsh and mangrove community and intertidal mudflats support numerous local and migratory, sea and shorebirds. The intertidal and subtidal basalt reefs are covered with an abundance of flora and fauna.

The sanctuary is a reference for biodiversity in northern Port Phillip. Research has highlighted the benefits of conservation of the sanctuary's natural values.

The local community take pleasure in visiting the sanctuary, which provides a tranquil setting for watching birds and observing nature. The sanctuary's protected waters are a favourite spot for canoeists and a treasured destination among divers and snorkellers.

The sanctuary's natural values, and Indigenous, European and maritime cultural history are communicated to visitors by informative interpretive signage. Marine education is conveyed to the community through sustainable guided tours and activities.

The community plays an active role in an integrated management approach inclusive of the adjacent reserves. The sanctuary is cherished and respected by the community and is protected from catchment activities, marine pests and poaching, and the negative impacts of pollution have been reduced.

The sanctuary is a prized example of biodiversity in the highly urbanised northern Port Phillip area.

3.2 Zoning

A park management zoning scheme is normally used to define areas where various types and levels of use are appropriate. However, management zones do not need to be defined in Marine National Parks and Marine Sanctuaries because the management aims for these areas are clearly outlined in the National Parks Act and are consistent across all Marine National Parks and Marine Sanctuaries (section 2.5 and appendix 1).

In this sanctuary an overlay is used to identify areas with special management requirements. These requirements are summarised in table 1, and the boundaries are shown in figure 2.

3.3 Management directions

The Traditional Owners' knowledge and interests in the area and aspirations for Country, will be reflected in planning and management, in accordance with legislation and policies (Parks Victoria 2005).

Other major management directions for the sanctuary are outlined below.

Natural values conservation

- The intertidal reef, mudflat, mangrove, saltmarsh and seagrass communities will be protected as a scientific reference area by focusing shore-based access and educational use at Jawbone Bay.
- Natural processes, including competition, predation, recruitment and disturbance, will be protected to ensure an overall benefit to biodiversity and variety of marine ecological communities in the sanctuary.
- Compliance with legislated provisions that prohibit all extractive activities, including fishing, and shellfish collection, will be ensured through education, information, community support, and improved surveillance and enforcement.
- Research and monitoring to improve the scientific basis for management, including baseline data collection, marine habitat mapping and threat assessment, will be undertaken as outlined in the statewide Management Strategy (Parks Victoria 2003b) and through collaborative research links.
- Negative impacts of changes to water quality will be minimised by seeking improvement to stormwater and waterway discharge quality through cooperation with stormwater and waterway managers.

TABLE 1 MANAGEMENT OVERLAY

OVERLAYS	AREA/LOCATION	VALUES	GENERAL MANAGEMENT AIM	ACCESS
Special Protection Area – Natural Values	7 ha, 24% of the sanctuary. The intertidal area from the western boundary to fence line east of Compass Hill, extending 50 m seaward from high water mark (figure 2)	Sensitive intertidal reef, mangrove, saltmarsh and seagrass areas of value for scientific reference and feeding areas for wading birds	Protect the sanctuary’s sensitive communities from physical disturbance from visitors and vessels and protect sensitive habitats	Prohibit the landing and launching of vessels on, shore-based public access to, and walking in, the intertidal area of the sanctuary to the high water mark

- Identified threats to the sanctuary will be minimised through addressing the outcomes of ongoing monitoring, risk assessment and, where feasible, complementary adjacent, coastal and catchment management.

Cultural values conservation

- Aboriginal places and objects will be protected from interference or damaging activities.
- Indigenous cultural obligations relating to *Country* will be respected, and the Traditional Owners’ knowledge will be promoted and interpreted in accordance with their views.
- Research into the Indigenous and historic cultural heritage of the sanctuary will be encouraged and supported as appropriate, in consultation with the Indigenous and wider communities.
- Shipwrecks, historic relics and places will be conserved by protecting them from damaging or inappropriate activities.

The sanctuary visit

- Sustainable use by school and community groups for education about the sanctuary and marine values will be promoted at Jawbone Bay.
- Visitor enjoyment will be enhanced by appropriate management of recreational activities in accordance with table 2.
- Visitor understanding and appreciation of the sanctuary’s natural and cultural values will be enhanced by the implementation of information, interpretation and education programs.

- Visitors will be encouraged to adopt minimal impact techniques and to adhere to industry-developed standards appropriate to their activity.
- Visitors will have opportunities to observe marine life, enjoy water sports and participate in other recreational activities compatible with management objectives.

Community awareness and involvement

- Strong collaborative partnerships will be developed with the relevant Registered Aboriginal Party to facilitate the reflection of Indigenous knowledge, and interests and aspirations in the sanctuary’s planning and management.
- Friends, volunteers, Indigenous and other community groups will be encouraged and supported to participate in areas of sanctuary management that relate to their interests.
- An awareness and understanding of the sanctuary and its management, and a sense of custodianship, will be encouraged among neighbours, local communities and visitors.
- Strong relationships will be further developed and maintained with people, groups and communities with strong connections with or interests in the sanctuary, to encourage their participation in the sanctuary’s management.
- Collaborative partnerships will be established with relevant agencies and local schools to progress areas of mutual interest that strengthen protection of the sanctuary.

TABLE 2 SUMMARY OF RECREATIONAL OPPORTUNITIES

ACTIVITY	OVERLAY	
	SANCTUARY (PERCENTAGE OF SANCTUARY) (100%)	SPECIAL PROTECTION AREA (24%)
Aircraft landing / launching (including sea planes, hang gliding, paragliding)	N	N
Beachcombing (no collecting)	Y	N
Bait collection	N	N
Bird watching	Y	N
Boating (section 6.3)		
Hovercraft	N	N
Kite-boarding / wind-surfing	NA	NA
Motorised boating	Y	Y
Non-motorised boating (canoe, kayak, surf-ski)	Y	Y
Personal watercraft (PWC)	Y	Y
Sailing	Y	Y
Boat operation (sections 6.2 & 6.3)		
Anchoring	Y	Y
Landing	Y	N
Launching motorised vessels (no facilities)	N	N
Launching non-motorised vessels (no facilities, no trailers)	Y	N
Mooring (private)	N	N
Camping	N	N
Collection of animals, seaweed, shells and driftwood	N	N
Cycling	N	N
Diving and snorkelling (sections 6.2 & 6.4)	Y	Y
Dog walking (section 6.6)	N	N
Driving on beaches	N	N
Educational / guided activities (sections 6.1 & 6.7)	Y	N
Feeding wildlife	N	N
Filming & photography	Y	N
Fires on beaches	N	N
Fishing (all forms)	N	N
Fossil / artefact collection	N	N
Horse riding (section 6.6)	N	N
Licensed tours (section 6.7)	Y	N
Nature photography, painting,	Y	N
Picnicking (excludes on a vessel)	Y	N
Prospecting and metal detecting	N	N

Table 2 (cont'd.)

ACTIVITY	OVERLAY	
	SANCTUARY	SPECIAL PROTECTION AREA
(PERCENTAGE OF SANCTUARY)	(100%)	(24%)
Rock climbing / abseiling	NA	NA
Rockpool rambling	Y	N
Scenic viewing	Y	N
Shell collecting	N	N
Surfing / boogie boarding	NA	NA
Swimming (section 6.5)	Y	Y
Wake boarding / water skiing (section 6.3)	NA	NA
Walking (intertidal zone – soft)	Y	N
Walking (intertidal zone – rocky)	Y	N
Whale / dolphin / seal watching (section 4.4)	Y	N
Wreck diving (sections 6.2 & 6.4)	Y	Y

Note: The use of chainsaws and generators is prohibited within the sanctuary.

Key:

- Y Permitted, subject to overlay prescriptions and conditions prescribed by legislation, permits or elsewhere in the plan as indicated.
- N Not permitted.
- NA Not applicable.

4 STRATEGIES FOR NATURAL VALUES CONSERVATION

4.1 Geological and geomorphological features

Fluctuating sea levels associated with glacial and interglacial phases have altered the coastline of Port Phillip during different times in geological history. During the last interglacial phase about 4000 years ago, the sea was 1 to 2 m above its present level. Evidence that suggests a shoreline from a higher sea level around 4000 years ago can be seen in an inland break eroded into shell deposits in the Jawbone area. The break (1.5 m) is parallel to the current shoreline and adjacent to the sanctuary behind the Jawbone platform (Rosengren 1988).

The 'Jawbone' is a shore platform of Newer Volcanics basalt that has been jointed and broken through weathering and wave action into a series of large blocks. The large blocks over 2 m in diameter are attached to the basalt base. Among the large blocks are loose boulders and the occasional patch of gravel.

Although the surface of the platform is uneven it has a distinct upper level approximately 1 m above the present high water mark. This upper level slopes landward where it is buried by sand, silt and shells. It is covered in some areas by an irregular area of White Mangroves (*Avicennia marina*), which extends around into a shallow lagoon behind the platform. Many of these mangroves have established their roots in pockets of sediment lodged in fissures in the fractured basalt. The formation of the basalt platform, emerged upper platform and mangrove growth backed by features suggestive of higher sea levels are highly unusual and of State significance.

West of the Jawbone, hummocks of circular mounds of saltmarsh (*Sarcocornia quinqueflora*) exist in the intertidal area. Sediment accreted around the hummocks and began enclosing a former open intertidal area gradually stabilising and prograding the coast. Coastal accretion through saltmarsh vegetation is unusual. Altered coastal processes are thought to have eroded most of the hummocks.

The only beach within the sanctuary is at Jawbone Bay. Seasonal wave conditions, current patterns, and storm energy create a

dynamic environment in which there is natural accretion and attrition of beaches, causing sand to cover and uncover the reefs and other habitats. Events such as storms and regular sand accretion and attrition are considered to be ongoing natural processes.

The mouth of the Kororoit Creek, to the west of the sanctuary, has changed significantly due to siltation. The siltation is thought to be caused by prolonged low flows in Kororoit Creek along with coastal sand movement from coastal erosion in Kororoit Bay and the building of a tyre groyne at the mouth of Kororoit Creek (WMB Oceanics Australia 1997) (sections 4.2 and 7.2).

Coastal modification, including the construction of harbours, sea walls and groynes and beach renourishment and dredging in or near the sanctuary, has the potential to adversely affect the geological values of the sanctuary through longshore drift, deposition and erosion (section 7.2). There are remnants of a stone wall from the former Merrett Rifle Range along the shoreline of Jawbone Bay.

Aim

- Protect features of geological and geomorphological significance from impacts of human activity.

Management strategies

- *Minimise visitor and management impacts on the mudflats, basalt platform and associated mangrove and saltmarsh communities.*
- *Protect geological and landform features by prohibiting beach renourishment and the construction of sea walls and groynes within the sanctuary.*
- *Assess remnant sea walls for cultural heritage and coastal function before authorising maintenance works on sea walls in the sanctuary.*
- *Encourage research into changes to the mouth of the Kororoit Creek and coastal erosion in Kororoit Bay to protect geological and landform features within the sanctuary.*

- *Encourage research into the causes of the loss of saltmarsh hummocks and geological and landform features within the sanctuary.*
- *Encourage research to identify geomorphological features of special significance to the Traditional Owners and protect them from damaging or inappropriate activities (sections 5.1 and 8.2).*
- *Consider the significance of landforms to in interpreting the sanctuary and implementing management actions (sections 4.5, 5.1, 6.1 and 8.2).*

4.2 Catchment and water quality

The sanctuary is within the Werribee basin of the Werribee Catchment of the Port Phillip and Western Port Catchment Region under the jurisdiction of the Port Phillip and Westernport Catchment Management Authority (section 8.3). The catchment is 270 000 ha with a population of approximately 315 000 people. The Werribee catchment landscape is characteristically flat and has low rainfall. Rainfall varies from 1000 mm annually in the forested hills to 500 mm annually in the southern plains and coastal areas. The catchment is significant for farming and supports over 100 000 ha of mainly broad acre cropping and grazing. Irrigated areas around Bacchus Marsh and Werribee support intensive farming including market gardens and orchards. The Wombat State Forest provides timber for the construction industry and pulp wood for the manufacture of paper.

Remnant indigenous vegetation covers 25% of the catchment and much is protected in a number of parks including Brisbane Ranges National Park, You Yangs Regional Park, Point Cook Coastal Park, and Lerderderg State Park, and Wombat State Forest. The Laverton North and Derrimut Grassland reserves are two of the largest areas of protected native grasslands in the State. The coastal wetlands and mudflats of the catchment support coastal native plant communities and an extensive range of migratory bird species including the endangered Orange-bellied Parrot. The coastal wetlands and mudflats of Cheetham Wetlands, Point Cooke Marine Sanctuary and Point Cook Coastal Park to the south-west of Skeleton Creek are Ramsar listed.

The major rivers and creeks in the catchment that flow into Port Phillip are Kororoit Creek, Laverton Creek, Skeleton Creek, Werribee River, and Little River. Port Phillip also receives water from a number of significant rivers, including the Yarra and Maribyrnong Rivers, which drain agricultural, urban, and industrial land uses in the Yarra and Maribyrnong Catchments. Melbourne Water manages all of the major rivers and creeks in these catchments.

The catchment has been vastly altered through the clearing of large sections of the catchment and the use of land for agriculture and subsequent increasing urbanisation. These activities have resulted in erosion, increases in nutrient and salinity levels and loss of habitat, lowering the quality of waterway discharge into the northern section of Port Phillip and, consequently, the natural values of the sanctuary.

Fifty per cent of nitrogen loads in the Port Phillip are from catchment-based sources. Port Phillip also receives water from the Western Treatment Plant (WTP) which is managed by Melbourne Water. The Western Treatment Plant treats a flow of approximately 485 million litres a day (52% of Melbourne's sewage). Increased nitrogen loads from this water may affect the sanctuary, although the WTP was upgraded in 2005 to reduce nitrogen loads. The Altona Treatment Plant, managed by City West Water, treats a flow of approximately 15 million litres a day. The effluent from the plant is treated to State Environment Protection Policy (Waters of Victoria) – Schedule F6 Waters of Port Phillip Bay standards before being discharged, by an underground pipeline, near Laverton Creek to Port Phillip 400 metres offshore.

There are no rivers or creeks that flow directly into the sanctuary although the sanctuary may be indirectly affected by discharge from Kororoit Creek, Cherry Creek / Melbourne Water Drainage Easement and Laverton Creek.

Potential impacts from Kororoit Creek in particular are a concern. Although Kororoit Creek enters Port Phillip west of the sanctuary and does not flow directly into the sanctuary it could have a significant impact on the sanctuary. The upper reaches of Kororoit Creek flow through a predominantly rural catchment around Gisborne and Bulla into an

urban region at Caroline Springs and Deer Park, before passing through industrial areas near its mouth at Altona. The creek has been heavily polluted in the past from stormwater and industrial discharge. Toxic chemicals and heavy metals from the pollution have accumulated in the sediments. The sediments in Lower Kororoit Creek have a high level of mercury contamination and petroleum hydrocarbons with elevated levels of other heavy metals. At some sites cadmium, copper and lead are significantly above background levels. Mercury is the main contaminant of concern with other metals elevated but comparable to other urban streams (EPA 1991). Any disturbance to the sediments would release the toxicants into the water column and potentially impact on the sanctuary's values (section 7.2). Water quality in Lower Kororoit Creek is poor with high levels of both total phosphorous and nitrogen levels recorded (EPA 2000).

The condition of Lower Kororoit Creek was rated as poor with an IRC score of 21 (Melbourne Water 2004). Melbourne Water has ongoing weed control and maintenance programs on Kororoit Creek. Together with the Friends of Lower Kororoit Creek, Melbourne Water supports a proposal by Hobsons Bay City Council to develop a landscape master plan to direct the rehabilitation of the open space along the banks of Kororoit Creek into parkland. DSE and Hobsons Bay City Council are working together to develop a regional strategy for Kororoit Creek to improve water quality further.

Boatsheds at the three fishing clubs, the Victorian Deaf Anglers Club, the Brunswick City Anglers Club and the Kororoit Creek Anglers Club west of the sanctuary in Maddox Road, Williamstown, are un-sewered; untreated sewage has been discharged into Kororoit Creek. Hobsons Bay City Council is formalising occupation arrangements of the boat sheds that will prevent the discharge of untreated sewage and grey water into Kororoit Creek. Untreated sewage and other potential pollution from the fishing clubs, including rubbish, oil and petrol spills from vessels, have the potential to impact on the sanctuary (section 7.2).

State Environment Protection Policy (Waters of Victoria) — Schedule F6 Waters of Port

Phillip Bay requires operators of vessels to install effective waste-containment facilities on board the vessel to avoid the disposal of wastes or sewage from vessels. EPA Victoria monitors water quality in Port Phillip; however, there are no testing sites within the sanctuary. The 2004–05 results, available on its website, suggest that contaminated stormwater remains the main cause of bacteriological pollution at Port Phillip Bay beaches (EPA 2005).

Urbanised areas are extensively covered by impervious surfaces, creating an unnatural amount of runoff. Stormwater systems have been developed to channel the runoff into waterways and the marine environment to minimise the risk of flooding. Stormwater has the potential to negatively impact on the water quality and subsequently the natural values of the sanctuary by delivering excess freshwater and pollutants, including sediments and nutrients, micro-organisms, toxic organics, heavy metals, oils and surfactants, as well as litter and debris. Pollutants may also enter the sanctuary from onshore and offshore activities in and around the sanctuary.

One stormwater drain near Bayview Street at the rear of the Williamstown High School discharges into the eastern end of the sanctuary. The drain managed by the Hobsons Bay City Council receives runoff from 14 ha including residential areas and the Williamstown Campus of Bayside Secondary College and the Bayview Campus of Williamstown High School. Stormwater entering the sanctuary is untreated; litter or gross pollutant traps are absent. As part of its redevelopment, the Bayview Campus of the Williamstown High School is proposing to install a stormwater harvesting and reuse system, which has the potential to recycle stormwater from the school and the adjoining residential areas within the catchment and reduce stormwater inputs into the sanctuary.

Stormwater from The Range Estate, a nearby residential area (60 ha), discharges into a twin lake system in Jawbone Reserve. Runoff from adjacent parklands (5 ha) and Jawbone Reserve (25 ha) also discharges into the lakes. The two lakes, which were completed in 1995 at the foot of Rifle Range Drive, are designed to filter the stormwater from the residential estate through gross pollutant traps, oil and

grease separators and reed beds or 'swales' to improve its water quality before evaporating back into the atmosphere or discharging as overflow into Port Phillip west of the sanctuary. Water quality in the lakes system can be influenced by a number of factors including rainfall, bird droppings, and a high level of pollutants in stormwater inputs. Water-quality testing of the lakes has indicated generally good water quality in the lakes although nutrient levels can exceed SEPP guideline values (Condina and Associates 2001). Discharge of poor quality water from the lakes has the potential to impact on the natural values of the sanctuary.

Further west of the sanctuary the Challis and Paisley stormwater drains discharge stormwater into the Paisley Challis Wetlands. These stormwater drains are managed by Melbourne Water and drain a catchment area of 855 ha from the Altona and Williamstown North areas. The Paisley Challis Wetlands is a series of wetland ponds designed to filter the stormwater of the Challis and Paisley drains to improve its water quality before it enters Port Phillip. The Paisley Challis Wetlands are managed by Hobsons Bay City Council for Melbourne Water under a 10-year agreement. Hobsons Bay Stormwater Management Plan (HBCC 2006b) sets out the implementation of the environmental objectives outlined in the SEPP for the waters of Port Phillip.

Under the *Environment Protection Act 1970* (Vic.), littering and the discharge of wastes from a vessel are illegal. Litter in the sanctuary may originate from urban areas and be transported through stormwater systems and waterways, discarded from vessels within or near the sanctuary, discarded by visitors to beaches and adjacent areas, or discarded by recreational fishers from vessels or piers nearby. Volumes of litter accumulate at Wader Beach within the sanctuary and the adjoining intertidal area. Stormwater carrying litter is discharged into Kororoit Creek just west of Wader Beach at the western end of the sanctuary and is contributing to the volumes of litter accumulating at Wader Beach. More information about the sources of litter is required to develop targeted preventative programs. Litter accumulating in the sanctuary may injure visitors and recirculate into the marine environment.

The health of local environments can be improved through the implementation of Neighbourhood Environment Improvement Plans (NEIPs). NEIPs are action plans developed in partnership by all parts of the community and administered by EPA Victoria under the Environment Protection Act and are designed to address environmental issues of importance to the community at a local scale and build on and support other efforts to protect Victoria's environment (section 8.3).

The sanctuary is close to Mobil's Altona refinery on Kororoit Creek. There is potential for oil and chemical leakages from the refinery to impact on the sanctuary through contaminated ground water and direct oil and chemical spills (section 7.2).

The proximity of the sanctuary to shipping lanes for commercial vessels that access the Port of Melbourne make it vulnerable to potential impacts from channel dredging and oil or chemical spills. Responses to marine pollution incidents often require a diverse range of skills and resources involving coordination between multiple agencies.

As the manager of 70% of Victoria's coastal areas, Parks Victoria plays a significant support role in responses to marine pollution incidents. The responsibilities for responding to emergency incidents in Victoria and Victorian waters is outlined in the *Emergency Management Act 1986* (Vic.). In Victorian waters the Victorian Marine Pollution Contingency Plan (VICPLAN) (MSV 2002) outlines broad response arrangements to a potential oil or chemical spill (section 8.3).

Aims

- Minimise the negative impacts of changes to water quality on sanctuary values.
- Minimise the impact of threatening processes from catchment-sourced activities.

Management strategies

- *Liaise with Hobsons Bay City Council, Melbourne Water and EPA Victoria to minimise the impacts of stormwater from the Paisley Challis Wetlands, the Range Estate Lakes and other stormwater drains to achieve water quality levels consistent with SEPP objectives.*

- *Liaise with Hobsons Bay City Council, Melbourne Water and EPA Victoria to seek removal of the stormwater drain emptying into the sanctuary and, in the interim, ensure that there is no increase in stormwater inputs and the installation of a litter trap.*
- *Support proposals to reduce stormwater inputs into the sanctuary such as the installation of a stormwater harvesting and reuse system at the Bayview Campus of Williamstown High School.*
- *Seek amendment to Hobsons Bay City Council's and Melbourne Water's stormwater management plans to acknowledge the sanctuary and incorporate strategies to protect sanctuary values.*
- *Liaise with Hobsons Bay City Council to minimise litter within the sanctuary.*
- *Seek the installation of litter and oil traps on nearby stormwater drains and stormwater drains entering Kororoit Creek.*
- *Remove accumulated litter from accessible intertidal areas within the sanctuary where necessary to ensure public safety and to protect sanctuary values or as part of an emergency response such as to oil or chemical spills (section 7.1).*
- *Investigate the sources of litter affecting the sanctuary and encourage the involvement of community groups. Implement education and collection programs in the sanctuary, including participation in Clean Up Australia Day subject to safety considerations.*
- *Liaise with the Port Phillip and Westernport CMA, Melbourne Water and other relevant organisations on the management of Kororoit Creek, Cherry Creek/Melbourne Water Drainage Easement and Laverton Creek and catchment issues that may indirectly influence the water quality of the sanctuary.*
- *Support Hobsons Bay City Council, Melbourne Water and DSE to eliminate the discharge of untreated sewage from nearby fishing clubs into Port Phillip.*
- *Incorporate water quality and catchment issues in interpretation and education programs and liaise with relevant agencies to communicate benefits to the sanctuary in wider community education programs.*
- *Support the development of a Neighbourhood Environment Improvement Plan for Kororoit Creek and adjacent neighbourhood.*
- *Respond to marine incidents within the sanctuary in accordance with the Emergency Management Act and the Victorian Marine Pollution Contingency Plan (VICPLAN) (MSV 2002).*

4.3 Hydrodynamics

Port Phillip is a very shallow embayment (maximum depth 24 m); the circulation of water is dominated by wind and tidal forces. Despite having a maximum depth of only 2–3 m, Jawbone Marine Sanctuary is exposed to the active and fluctuating hydrodynamic processes of the northern end of Port Phillip.

There is little background swell in this part of Port Phillip; the water is calm when the wind is still. In moderate winds the waves are choppy and under 0.5 m, but in strong westerly conditions waves can reach heights of 2 m.

Wave energy is driven by westerly winds, coming from the north-west in summer and south-west in winter. Wind and wave action also influence the beaches, affecting grain size, deposition and erosion. Natural hydrodynamic events such as storm surges displace seaweed and kelp communities, erode beaches and deposit sand over the reefs. The sanctuary has an unequal semidiurnal tidal pattern, with a higher and lower flooding and ebbing event daily. The tidal range is less than 1 m and the water in the sanctuary is exchanged every 28–50 tidal cycles.

Although Port Phillip is very shallow the temperature is very constant, with very little day-to-day variation. The average surface water temperature in the bay is 21°C in summer and 11°C in winter (Harris et al. 1996).

Potentially threatening processes to the hydrodynamic of the sanctuary include sea-level rise and altered current flows. Because human-induced changes to local hydrodynamic

processes could affect the values of the sanctuary, any proposals for new infrastructure, including artificial reefs, will generally be inappropriate in Marine National Parks or Marine Sanctuaries. Natural hydrodynamic events such as storm surges and regular sand erosion or deposition are considered to be ongoing natural processes (section 4.1).

Aim

- Minimise impacts on sanctuary values from human-induced changes to local hydrodynamic processes.

Management strategies

- *Provide advice on planning applications for developments that could affect sanctuary hydrodynamic processes, where appropriate (section 7.2).*
- *Encourage research into natural and unnatural hydrodynamic processes to increase knowledge and understanding and direct future management of the sanctuary.*

4.4 Habitats and communities

Victoria's system of Marine National Parks and Marine Sanctuaries has been established to protect a representative example of marine habitats within Victorian waters. Although Jawbone Marine Sanctuary is small, it supports a considerable diversity of communities and habitats including extensive rocky basalt reef, seagrass beds, intertidal flats, sandy beaches, subtidal soft sediments and one of the few stands of mangroves occurring in Port Phillip Bay (LCC 1987).

The biodiversity of marine habitats and associated communities of the sanctuary and their lack of disturbance are considered unique (CFL 1989). The area was protected from human disturbance and urban development by the existence of the Merrett Rifle Range for 110 years until 1987. Since then, public access has not been permitted to the coastal and intertidal areas of the western side of Jawbone Flora and Fauna Reserve. The benefits of this protection are evident in the delicate mangrove and saltmarsh communities living between the boulders. The sanctuary protects one of the few stands of mangroves remaining in Port

Phillip and the only example of mangroves living between the boulders in Victoria.

This extended period of protection has made the sanctuary a valuable reference area for marine ecologists studying correlations between human disturbance and intertidal invertebrate populations.

Indigenous people recognise natural values as an intrinsic element of *Country*. The diversity and abundance of birds and marine species in the sanctuary provided an important food source for the Traditional Owners.

Sandy beach communities

The only intertidal sandy beach in the sanctuary is at Jawbone Bay. In addition to its recreational and scenic values, the intertidal sandy beach is an important habitat for meiofauna, invertebrates such as amphipods, isopods, molluscs and polychaetes, and is also feeding ground for fish and seabirds (Plummer et al. 2003). Physical factors greatly affect the distribution and composition of organisms found in sandy beaches. The beach has natural sea wrack, in the form of seaweed, and other organic material, which is a habitat for invertebrates and a food source for seabirds. It is an intrinsic part of the beach ecosystem, and should not be disturbed or removed in the necessary and desirable process of removing artificial litter or waste from the beach. Beach cleaning that removes kelp and invertebrates from intertidal sandy beach areas can affect ecological processes and biodiversity (Brown & Lachlan 2002) (section 4.2).

Key threatening processes for sandy beaches include bait collection, litter, pollution, oil and chemical spills, beach cleaning and removal of vegetation and wrack, and unnatural hydrodynamic changes.

Soft sediment communities

The subtidal and intertidal soft sediments of the sanctuary comprise approximately 7 ha of the sanctuary. The intertidal soft sediments are at the western end of the sanctuary, and are inhabited by micro-algae, polychaete worms, bivalves and amphipods. The mudflats are feeding areas for fish including stingarees, globefish, flounder, flathead and whiting.

Subtidal soft sediments are diverse and nutrient-rich habitats. Species composition

often depends on the grain size and physical structure of the sediment. The spaces between the sand grains provide a habitat for numerous species of small organisms such as nematodes and copepods. Invertebrates such as bivalve molluscs, amphipods, echinoderms and polychaetes are associated with the upper layers of the sediment, while large animals such as benthic fish, crabs and seastars are associated with the sediment surface.

Key threatening processes for intertidal and subtidal soft sediments include mechanical disturbance, changes in sediment deposition patterns including sedimentation from dredging, pollution, stormwater and changes to water quality and flow.

The subtidal and intertidal soft sediments of the sanctuary also support two hectares of seagrass beds mainly in Jawbone Bay and Wader Beach. The seagrass beds are composed of *Zostera* and *Heterozostera* spp. (Blake & Ball 2001; Plumber et al. 2003). Seagrass beds are complex and productive environments that provide habitat, nursery and feeding grounds for a wide range of organisms including some commercially important species. They provide habitat for epiphytic algae and diatoms, grazing invertebrates such as gastropod molluscs and amphipod crustaceans, and other animals such as juvenile fish, pipefish and crabs.

Visitors may be unaware of and unable to recognise exposed seagrass beds as vulnerable habitat. Key threatening processes for seagrass communities are trampling and disturbance by visitors, dogs and boats, and anchoring, propeller scour, changes in sediment deposition patterns including sedimentation from dredging, pollution, and changes to water quality and flow.

Mangrove and saltmarsh communities

The intertidal reefs of the sanctuary along the Jawbone promontory support a unique White Mangrove (*Avicennia marina*) community, one of the few stands of mangrove in Port Phillip. The mangroves have established their roots in pockets of sediment lodged in fissures in the fractured basalt rather than on mudflats. This is unique in Victoria and combined with the associated saltmarsh vegetation is considered to be of State significance. The mangroves are behind a wide band of intertidal boulders and

provide important habitat for a number of bird and fish species as well as crustaceans and molluscs. They are highly productive environments that provide a good food source for many species while the 'peg roots' or pneumatophores provide shelter. Mangroves are sensitive to disturbance including trampling and take a long time to recover. Mangroves at the mouth of Kororoit Creek were almost completely destroyed in 1950 by oil discharged by a vessel in the bay (Willis 1951; Fawcett 1951). Visitors may be unaware of the sensitivity of this habitat (section 6.5).

Saltmarsh plant communities are generally found landward of mangroves above and around the mean high water mark, preferring to be occasionally submerged. The saltmarsh community within the sanctuary is found among the basalt boulders and soft sediment and occasionally seaward of the mangroves. The upper saltmarsh area is characterised by glasswort and the lower or intertidal saltmarsh area is characterised by austral seablite, beaded and shrubby glasswort. The fauna of the saltmarsh community is characterised by air-breathing gastropods and the littorinid *Bembicium melanostomum*. The saltmarsh is also potential habitat for the endangered Orange-bellied Parrot.

Key threatening processes for mangrove and saltmarsh communities include changes in tidal patterns, freshwater inputs, pollution (section 4.2) and trampling (section 6.1).

Rocky reef communities

Extensive intertidal and subtidal reefs in the sanctuary occupy half of the sanctuary (15 ha) and are formed by a wide band of fractured basalt and boulders up to 30 m wide, extending for several hundred metres along the shoreline.

Resident species are adapted to environmental extremes and high wave energy. The composition of species depends on the dynamic processes of competition, predation, recruitment, disturbance and frequency of tidal submergence. Macro-algae are generally absent from the upper intertidal area; the algal assemblage on the lower intertidal reef is composed principally of turfing algae, coralline algae and *Ulva* spp. The intertidal reef is characterised by molluscs, in particular herbivorous gastropods including the Variegated Limpet, Blue Mussel, Scaled

Nerite, Striped-mouth Conniwink, Ribbed and Zebra top shells (Hart et al. 2003). Carnivorous molluscs, including Wine-mouthed *Lepsiella*, and the encrusting tubeworm *Galeolaria*, occur in the lower intertidal area.

Key threatening processes for the intertidal reefs and associated communities include changes in tidal patterns, marine pests (section 4.6), pollution (section 4.2), trampling (section 6.1), and illegal removal of biota, in particular shellfish for food or bait (Keough & Quinn 2000).

The subtidal reef consists of large basalt boulders providing a complex habitat. The algal assemblage is characterised by low abundance of large algal species and is instead dominated by low turfs of the filamentous brown algae *Ectocarpales* spp. The presence of *Ectocarpales* spp. in high abundance is often an indicator of high nutrient concentrations and may reflect a large estuarine influence of nearby Kororoit Creek (Hart et al. 2003) (section 4.2). A variety of other algal species cover the reef including the iridescent *Dictyota dichotoma*, *Ulva* spp. and red algal species.

The subtidal reef is also covered by sponges, encrusting coralline algae and large areas of the temperate hard coral *Plesiastrea versipora* (Hart et al. 2003). These provide habitat for many sessile invertebrates, including the very abundant Common Sea Urchin and Black-lip Abalone as well as many crustaceans, seastars, molluscs and nudibranchs (Riley & Riley 2003). Common fish species include the Southern Hulafish, Zebra Fish, Dusky Morwong and Six-spined Leatherjacket (Plumber et al. 2003, R. Leppitt pers. comm.).

Key threatening processes for the subtidal reefs and associated communities include altered tidal patterns (section 4.3), marine pests (section 4.6), pollution and stormwater (section 4.2), sedimentation from dredging, diver damage (section 6.2), and illegal removal of biota for collection, bait or food.

Water column communities

The water column of the sanctuary has both planktonic and free-swimming species. Planktonic species are poor swimmers and are largely dependent on currents for movement, nutrients and food. Plankton primarily consists of microscopic animals, such as copepods, and plants, such as diatoms. Larger animals, such

as jellyfish and ctenophores, also form part of the plankton. Many organisms spend the early stage of their life in the plankton before returning as recruits to the adult habitat. Common free-swimming animals include squid, sharks, rays and bony fish such as whiting, garfish and mullet.

Marine mammals such as Bottlenose Dolphins and seals are commonly seen in Port Phillip and potentially use the sanctuary or nearby waters; other large mammals may pass close to the sanctuary. All whales and dolphins are protected under the *Wildlife Act 1975* (Vic.) and the *Wildlife (Whale) Regulations 1998* (Vic.). Under this legislation the minimum approach distances for whales and dolphins are 30 m for swimmers and divers, 50 m for surfers and 100 m for recreational and commercial vessels, including personal water craft and motorised swimming aids.

The *Victorian Cetacean Contingency Plan* (NRE 1999c) specifies arrangements for dealing with marine mammals that become stranded, entrapped, entangled or wounded. The *Wildlife Response Plan for Oil Spills* (NRE 1997a) guides the rescue and treatment of injured or oiled wildlife.

Seabirds and shorebirds

The sanctuary encompasses the eastern end of a nationally significant shorebird feeding area that extends from Williamstown to Altona (Garnett et al. 1986; Plummer et al. 2003). The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site extends south from Altona to Limeburners Bay. The combination of the geomorphological landform and vegetation of the rocky reef, mangroves and saltmarsh as well as the other diverse intertidal habitats including seagrass beds, mudflats, and sandy beach of the sanctuary form an important feeding and roosting area for local and migratory seabirds and shorebirds.

Over 120 bird species were recorded within the Jawbone area in 1989 (CFL 1989) and over 140 by the Friends of Williamstown Wetlands in 2003 (R. Leppitt pers. comm.). Many of these birds are migratory waders including Red-necked Stint, Curlew, and Sharp-tailed Sandpiper, which feed on the intertidal mudflats at Wader Beach and roost on the beach or nearby rocks. The large basalt

boulders have many horizontal and vertical faces, which are important intertidal roosting sites for a large numbers of seabirds and shorebirds including cormorants, pelicans, gulls and terns.

The endangered Orange-bellied Parrot, listed under the EPBC and FFG Acts, migrates annually to coastal Victoria between March and October. The most recent sighting of an Orange-bellied Parrot in the Jawbone area was in the intertidal saltmarsh in 1988. The species is threatened by loss of habitat, in particular saltmarsh feeding grounds, urban development, agricultural practices and recreation.

Birds are vulnerable to habitat loss and disturbance from human activities, including annoyance from dogs (section 6.6), wandering domestic cats (section 4.6), boating activities (section 6.3) and rockpool rambling (section 6.5). Disturbance to birds can result in species no longer visiting a site, a decline in species numbers and low body weight in migratory birds.

All species that are recorded within the sanctuary listed as threatened or protected by international agreements or other legislation (e.g. JAMBA, CAMBA) are either birds or large marine mammals. This reflects the current vertebrate focus of threatened species management. Environmental management within the sanctuary takes a habitat-based rather than a species-based approach. Management of marine ecological communities within the sanctuary, rather than threatened species, is also likely to protect and enhance threatened species populations. Whole-of-habitat management may also result in the protection of species not yet identified because of their rarity, cryptic nature, or lack of search effort.

All forms of extraction, including shellfish removal, recreational and commercial fishing, are prohibited within the sanctuary. Aquaculture and the feeding of animals, including fish and birds, are also not permitted in the sanctuary.

The access restrictions associated with the operation of Merrett Rifle Range may have limited opportunities for research of the marine and coastal areas of the Jawbone but also prevented disturbance. Its lack of disturbance

makes the sanctuary a valuable scientific reference area for marine ecologists studying the correlation between human disturbance and intertidal invertebrate populations (Sharpe & Keough 1998; Keough et al. 1993), interactions and competition between limpets (Marshall & Keough 1994; Keough et al. 1997) and competition and variation in algal communities (O'Brien 1975).

Current research and ongoing monitoring is directed by the Statewide Strategy (Parks Victoria 2003b) and is targeted at collecting baseline biological information for the sanctuary that will be used to build knowledge, identify threats, understand long-term changes in population abundances, community structure and ecological processes in the life of this plan. Long-term intertidal and subtidal reef monitoring sites are established within the sanctuary (Hart et al. 2003; Edmunds et al. 2004; Hart et al. 2005). To understand the sanctuary within a broader context, monitoring compares these with sites outside the sanctuary boundaries. This work will assist in identifying indicator species and habitats. The results, available on Parks Victoria's website, will enable an assessment of the ecological condition of the sanctuary to be made.

Volunteers and community groups can make a valuable contribution to the monitoring of the sanctuary and other management programs (section 8.2).

Aims

- Protect marine ecological communities and indigenous flora and fauna, and allow natural processes to continue.
- Improve knowledge of marine ecological communities, flora and fauna and threatening processes to improve management, protection and appreciation.

Management strategies

- *Maintain the sanctuary's value as a scientific reference area and a migratory seabird and shorebird roosting and feeding habitat by continuing to restrict public access to the sensitive intertidal areas (sections 3.2, 6.2, 6.3 and 6.5).*
- *Focus visitor activities, including boating activities and shore-based activities, at Jawbone Bay to minimise impacts on flora*

and fauna and communities, particularly in relation to impacts from trampling and non-compliance with no-fishing provisions (sections 6.1, 6.3, 6.5 and 8.3).

- *Implement priority actions from approved action statements or recovery plans to address threats to the Orange-bellied Parrot and other listed species.*
- *Ensure sightings of marine flora and fauna are recorded on the Parks Victoria Environmental Information System and, DSE statewide databases (section 8.3).*
- *Identify and support research into key threatening processes and major knowledge gaps.*
- *Map habitats at scales suitable for management purposes and maintain and support appropriate long-term habitat monitoring program as part of relevant statewide marine habitat mapping and monitoring programs.*
- *Work with seabird and shorebird conservation organisations to support bird monitoring programs within the sanctuary.*
- *Undertake regular risk assessment and assess the major threats to habitats and communities, and review management programs as appropriate.*
- *Promote and support opportunities for community participation in monitoring programs within the sanctuary (section 8.2).*
- *Encourage research to identify Indigenous knowledge relating to communities and species (sections 5.1 and 8.2).*
- *Reflect Indigenous knowledge of marine life in management practices as appropriate.*
- *Reflect Indigenous knowledge of communities and species in management practices as appropriate, and ensure that their significance to the Traditional Owners is respected in all management and visitor activities.*
- *Respond to cetacean incidents in accordance with the Victorian Cetacean Contingency Plan (section 8.3).*

4.5 Landscape and seascape

The seascape of Jawbone Marine Sanctuary has been protected by the Merrett Rifle Range and is largely unaltered. The landscape around the sanctuary features grassy plains, gently sloping towards saltmarsh and shallow sandy flats and a low rocky basalt platform. While the landscape has been modified, there remain important geological features that illustrate the natural terrain features and processes (section 4.1).

The seascape from the sanctuary and the adjacent lookout at Compass Hill includes Point Cook, Altona and the You Yangs, and as far as Arthurs Seat and the Bellarine Peninsula on clear days.

The landscape and seascape of the sanctuary are an intrinsic element of *Country* of the Traditional Owners. The natural beauty of this protected area and surrounds are the basis of a treasured lifestyle for local residents and an integral part of its attraction for visitors.

Landscape character types are used to broadly characterise different landscape types outside urban settlements (DSE 2006). The landscape character of the urban area around the sanctuary was not assessed. Details about landscape management objectives and guidelines are provided in the Municipal Reference Document for the area.

Siting and Design Guidelines for the Victorian Coast (VCC 1998) provides guidelines to assist in the protection of coastal landscape values (section 7.2).

Hobsons Bay Planning Scheme (HBCC 2006a) regulates developments on the adjacent foreshore to protect the sanctuary's landscapes (section 7.2). Coastal developments on the adjacent Jawbone Reserve also require permission under the Coastal Management Act (section 8.3).

Aims

- Protect landscape and seascape values within the sanctuary including the natural beauty and character.
- Minimise visual impacts on the seascape and landscape of management activities and any future developments.

Management strategies

- *Ensure that external agencies that have potential to affect the sanctuary's landscape values consider their importance in planning and managing their activities (section 7.2).*
- *Consider the significance of landscape to the Traditional Owners in planning and implementing management activities, interpretation and education programs (sections 4.1, 5.1, 6.1 and 8.2).*

4.6 Marine and other pests

Over 100 exotic marine species are known to have become established in Victorian marine waters (Hewitt et al. 1999). Some have become marine pests. Those recorded within the sanctuary include the Northern Pacific Seastar, European Fan Worm, Japanese Seaweed (*Undaria*) and European Green Crab. The potential for further invasions is high.

Marine pests can have a devastating impact on Marine National Parks and Marine Sanctuaries. The introduction of marine pests into Victorian waters is listed as a potentially threatening process on Schedule 3 of the Flora and Fauna Guarantee Act (FFG). Victoria's management priorities in relation to marine pests are set out in an FFG Action Statement (NRE 1999a).

Prevention of marine pest invasions is the most effective management option. Prevention involves reducing the risk that a pest will be introduced to the sanctuary. In a very limited number of cases, with specific criteria, control measures may be attempted for established pest populations generally as part of a coordinated regional or national response. However, experience elsewhere has shown that proposals to control established marine pests need to consider fully their likely effectiveness.

The interconnectedness of the marine environment and the ability of many marine pests to migrate over long distances mean that control measures may be feasible only in limited circumstances. For example, using techniques that are successful on land, such as physical removal by hand, might make the situation worse, as some marine pests regenerate fully from fragments dislodged during removal. Where implemented, control

measures will meet national guidelines for managing marine pests. Because of the possibility of misidentifications or exacerbation of the pest problem, control measures will need to be part of authorised programs. In some cases, further nationally coordinated research is required into control measures.

Victorian marine pest emergency management arrangements (*Interim Victorian Protocol for Managing Exotic Marine Organism Incursions*) (NRE 1999b) will form the basis for responding to new introductions and existing incursions of marine pests. Adopting the *Waste Management Policy (Ships' Ballast Water)* (EPA 2004) for Victorian waters will help reduce the risk of marine pest incursions from ships' ballast water. Emergency responses to marine pest outbreaks in Victoria are managed as part of agreed national arrangements for marine pest emergencies. The Consultative Committee for Introduced Marine Pest Emergencies provides national oversight. Parks Victoria actively supports the protocol by adopting best practice within the organisation and educating and informing the community about prevention measures.

Vessel cleaning and maintenance guidelines to help prevent the spread of marine pests (DSE 2004) aim to reduce the risk of spreading marine introduced pests by providing practical solutions for vessel operators for cleaning gear and hulls. Supporting initiatives include *Cleaner Marinas: EPA Guidelines for Protecting Victoria's Marinas* (EPA 1998).

Parks Victoria Rangers, Fisheries Victoria Officers, community-based organisations (e.g. dive clubs), and visitors play an important role in the monitoring and early detection of marine introduced pests in the planning area (section 8.2).

Wandering domestic cats and dogs (section 6.6) from residential properties near the sanctuary, and feral cats can kill birds and other native animals that use the intertidal areas.

Aims

- Minimise the risk of introduction of marine and other pests by human activities, and their subsequent establishment in the sanctuary.

- Establish arrangements for the detection of new incursions within the sanctuary in support of Victorian marine pest management arrangements.
- Implement national or Victoria-wide pest species control arrangements as they relate to the sanctuary.

Management strategies

- *Support DSE in educating Parks Victoria staff, Fisheries Victoria Officers and the community to identify marine pests and methods of preventing their spread.*
- *Encourage and support the Friends and community groups such as Reef Watch, researchers, licensed tour operators and contractors to integrate the identification of marine pests into their activities and to monitor for and report marine pests in the sanctuary.*
- *Ensure that the detection of marine pests is reported in accordance with Victorian pest management arrangements and recorded on Parks Victoria's Environmental Information System and other relevant databases.*
- *Manage all pest incursions in accordance with the Interim Victorian Protocol (NRE 1999b) (section 8.3).*
- *Establish an ongoing program to minimise the risk of marine pest introduction and subsequent spread that addresses improving the understanding of the potential means of introduction and spread and formalising arrangements for prevention, reporting, monitoring and response.*
- *Undertake pest programs only where research indicates that control or eradication is feasible and likely to be effective or as part of a coordinated regional or national response.*
- *Avoid translocation or new introductions by promoting boat-cleaning protocols for all recreational boats and contractors (section 6.3) in accordance with the DSE brochure 'Aquatic Pests: Treat 'em mean – keep your boat clean'.*
- *Ensure that management vessels operating in the sanctuary are maintained according to Victorian Government boat-cleaning protocols (DSE 2004).*
- *Include boat-cleaning protocols in contracts, licences or permits of contracted vessels, research vessels, and licensed tour operator vessels operating in the sanctuary.*
- *Encourage recreational divers to adopt protocols to ensure that diving equipment is clean (section 6.4).*
- *Ensure that any new marine infrastructure within the sanctuary is treated to remove any marine pests.*
- *Work with Hobsons Bay City Council to seek the introduction of cat curfew by-laws in residential areas near by the sanctuary.*

5 STRATEGIES FOR CULTURAL VALUES CONSERVATION

5.1 Indigenous cultural heritage

The coast and sea are culturally significant to Indigenous communities, which have a long association with the Williamstown coastline. Indigenous people have inhabited the Port Phillip region for around 40 000 years, and middens along the coast indicate that the Kulin Nation have inhabited the area for at least 6000 years. At the end of the last glacial phase, about 6000 years ago, the sea level rose to flood the large plains of Port Phillip, which provided prosperous grounds for hunting kangaroo and the cultivation of Yam Daisy.

The Boonwurrung, Woiwurrung and three other wurrungs (language groups) form the federation group, Kulin Nation, which occupies an area covering most of central Victoria. The Kulin people lived as hunters and gatherers for many generations. Seasonal changes in the weather and availability of foods would determine where campsites were located.

The Boonwurrung occupied the Port Phillip and Western Port area, from the Werribee River in the west to the Tarwin River in South Gippsland. The ancestors of the Yalukit Willam clan, one of six clans that make up the Boonwurrung language group, were inhabitants of a small strip of coastline north of the Mordialloc Creek following around to the Werribee River. The Yalukit Willam clan frequented the coastal area around Jawbone to catch fish and gather shellfish from the reefs and to travel and communicate with other clans. A midden in the Jawbone Reserve area (Presland 1983) indicates that the area was a significant site to the Yalukit Willam clan.

The ancestors of the Woiwurrung would have also visited the coastal area around Jawbone to travel and communicate with other clans and to collect food from the reefs. The Woiwurrung—the Wurundjeri people occupied the area that is now Melbourne, extending north of the Great Dividing Ranges, east to Mt Baw Baw, south to Mordialloc Creek and west to the Werribee River. European settlement and the resulting conflicts, reduction in food resources and introduction of new diseases dramatically reduced the Boonwurrung and Woiwurrung. Clans found it difficult to maintain their way

of life and in many places were evicted from their land. Nevertheless the Boonwurrung and Woiwurrung have strong connections with the sanctuary area today.

Indigenous tradition indicates that the sanctuary is part of *Country* of Boonwurrung (section 5.1).

All Aboriginal places, objects and Aboriginal human remains are protected under the Aboriginal Heritage Act (section 2.5). It is an offence to damage, interfere with or endanger an Aboriginal place, object or human remains except in accordance with a Cultural Heritage Management Plan developed with the relevant Registered Aboriginal Party(s) or where there is no Registered Aboriginal Party with the Department of Victorian Communities.

Issues relating to the protection of Aboriginal cultural heritage are approached in accordance with this Act. Issues relating to native title are dealt with according to the Native Title Act (section 2.5).

There are no known Indigenous places or objects within the sanctuary but it is yet to be surveyed.

Aims

- Protect Aboriginal places and objects from interference or damaging activities.
- Support the views of the Traditional Owners in managing the sanctuary.

Management strategies

- *Protect Aboriginal places and objects from disturbance and damage in partnership with the relevant Registered Aboriginal Party and DVC (section 8.3), and in accordance with:*
 - *relevant legislation including the Aboriginal Heritage Act*
 - *relevant cooperative management agreements*
 - *Parks Victoria's Guidelines for Working with Aboriginal Communities and Protection of Cultural Sites (Parks Victoria 2002).*

- *Respect the views of the Traditional Owners and the cultural obligations of Indigenous communities.*
- *Assess annual sanctuary programs to integrate relevant Indigenous practices and minimise the potential for impact of sanctuary management activities on Aboriginal cultural heritage, in consultation relevant Registered Aboriginal Party.*
- *Maintain confidentiality in respect of Indigenous cultural obligations, knowledge, places, objects and aspirations, in accordance with the views of the relevant Registered Aboriginal Party (sections 6.1 and 8.2).*
- *Where appropriate, encourage research into the Indigenous cultural heritage relating to the sanctuary in collaboration with the relevant Registered Aboriginal Party and in liaison with AAV (section 8.3). Use results to target protection and other management activities (sections 6.1, 6.2, 7.1 and 7.2).*
- *Work with the relevant Registered Aboriginal Party to assess and identify Indigenous cultural heritage suitable for promotion and interpretation (sections 6.1 and 8.2).*

5.2 Maritime and other cultural heritage

When settled in 1835, Williamstown was intended to be the main settlement for the Port Phillip region. Named after King William IV, Williamstown prospered as a port because of the safe anchorage in Hobsons Bay and its convenience as the first point of call for Melbourne. By 1870 Williamstown was the major cargo port of Victoria.

The sanctuary was used as a scuttling ground for ships that had outlived their usefulness. The exposed location, rocky bottom, proximity to Williamstown and restricted public access made it an ideal place to scuttle wrecks. The locations of two wrecks, the *Macedon* and *Carmen*, have been identified in the sanctuary. Three other wrecks, the *Agnes*, *Baldrack* and *Ester*, are known to be in the sanctuary and it is possible that more wrecks will be found (appendix 3).

Sheep and cattle were grazed on the areas adjacent to the sanctuary for a short time before overstocking led to the failure of grazing in Williamstown. In the 1850s, the area that is now Jawbone Flora and Fauna Reserve, Jawbone Reserve and adjacent residential area was purchased by Thomas Wilsmore, a local butcher. Livestock was offloaded from ships directly into slaughterhouse yards established on the property adjacent to the western end of the sanctuary. Remnants of the slaughterhouse may remain within the sanctuary.

The Wilsmore Estate was purchased by the Victorian Government in 1877 for use as a rifle range for metropolitan riflemen. Originally called the Victoria Rangers, ownership of the rifle range was transferred to the Commonwealth Government in 1904 with the passage of the Constitution Act at Federation. The Rifle Range was used for military training during World War II and renamed Merrett Rifle Range after Colonel Merrett in 1954. In 1956 it was the venue for the rifle shooting events of the Melbourne Olympic Games. Remains of the rifle range in the sanctuary include collapsed markers and navigation poles, ammunition, and remnants of a stone wall running east–west along the shoreline of Jawbone Bay (CFL 1989) (figure 2).

Pressure had been growing to decommission the range since the early 1980s and in 1986 the Commonwealth announced that the Rifle Range was to be sold. The Williamstown Rifle Range Working Group, set up to develop a concept plan for the development of the site, recommended that the site be used for private and public housing, conservation, open space and recreation.

The Urban Land Authority purchased the Rifle Range in 1987. However, the Rifle Range was still used until 1990 when in accordance with the contract of sale the Urban Land Authority transferred approximately 50 ha of coastal land to the then Department of Conservation, Forests and Land for conservation, recreation and open space purposes and developed the remaining land for housing (CFL 1989).

Fishers have had a long association with the Jawbone area. The remains of a structure thought to have been built and used by them, can still be found on the Jawbone above the

sanctuary. The sanctuary's waters were used for commercial and recreational fishing, in particular the collection of abalone. A stone-walled boat harbour abuts the south-eastern corner of the sanctuary. The harbour was built in the late 1920s and is currently used by fishing clubs. Fishing clubs were also established at the mouth of the Kororoit Creek at the turn of the twentieth century.

Heritage Victoria has primary responsibility for the management of shipwrecks and other maritime artefacts within the sanctuary. Parks Victoria has established a Memorandum of Understanding with Heritage Victoria, which identifies respective roles and responsibilities with regard to protection and interpretation of shipwrecks, shipwreck artefacts and other archaeological sites within the boundaries of Marine National Parks and Marine Sanctuaries.

Aims

- Conserve and protect places and values of historic and cultural significance.
- Encourage learning and understanding about maritime and other historic heritage of the sanctuary.

Management strategies

- *Manage places and values of historic and cultural significance in accordance with the Burra Charter of Australia ICOMOS, the provisions of the Heritage Act 1995*

(Vic.) and the Historic Shipwrecks Act 1976 (Cwlth), Parks Victoria's Heritage Management Strategy (Parks Victoria 2003b) and Heritage Victoria's Memorandum of Understanding (MOU).

- *Encourage documentation of the history of past use and activity in the sanctuary and adjoining coastal area by local historical groups, and protect any historic places and objects that may be discovered from damaging or inappropriate activities.*
- *In accordance with the MOU, monitor shipwrecks and support Heritage Victoria's maritime heritage protection and research programs. Consult Heritage Victoria about management activities that might affect known wrecks.*
- *Report concerns of shipwreck or relic damage by the environment or by human interference to Heritage Victoria's Maritime Heritage Unit.*
- *Support dive clubs in locating, photographing and reporting the condition of historic shipwrecks, and record this and other information about heritage values in Parks Victoria's Asset Management System to help monitor shipwrecks.*
- *Include historic heritage information in education, information and interpretation programs for the sanctuary and the adjoining Jawbone Flora and Fauna Reserve (section 6.1).*

6 STRATEGIES FOR VISITORS

6.1 Information, interpretation and education

Providing information, interpretation and education can help orientate and inform visitors, increase visitor enjoyment and satisfaction, foster an understanding and appreciation of the sanctuary's special natural and cultural values, build understanding of management activities, and help visitors to experience the sanctuary in a safe and appropriate manner. Parks Victoria delivers information, interpretation and education to visitors by various means, including its website, ranger patrols, Marine Notes, signage, tourism brochures and other publications, displays, and licensed tour operators. These services may be developed and provided in collaboration with other agencies.

Having a representative system of Marine National Parks and Marine Sanctuaries in Victoria presents a unique opportunity to educate visitors and the broader community about the features and benefits of a statewide system of protected areas. At the same time, a range of information, interpretation and education products that are specific to the sanctuary are or will be provided.

Pre-visit information and Park Notes for the sanctuary are available from Parks Victoria offices, the Parks Victoria Information Centre and website, and accredited information centres.

Orientation, information and regulatory signs and interpretation infrastructure, including regulatory totems, are outside the sanctuary on adjacent foreshore reserves and boat ramps, which are mostly managed by Hobsons Bay City Council (section 7.2). Signs and interpretation infrastructure outside the sanctuary are located at:

- the main access point from Rifle Range Drive in Jawbone Reserve (figure 2)
- local boat ramps at Newport (the Warmies), Werribee and Altona.

The small size and geographical prominence of the sanctuary make it relatively easy to identify. Yellow onshore triangles mark where the sanctuary boundary intersects with the

coast; the triangles point toward the sanctuary. In-water piles with a yellow cross and yellow buoys 'Special Marks' define the water boundary of the sanctuary. Special Marks are also used to indicate a special area or feature, the nature of which may be found by consulting a navigational chart; some examples include spoil grounds, pipelines and recreation (section 7.2). Sanctuary boundaries can be identified by using a global positioning system (GPS) (section 7.2).

Existing interpretation and education for the sanctuary convey information on the sanctuary location, boundaries, natural values, recreational activities, safety and compliance. Key themes for the sanctuary focus on natural values and history of scientific study, cultural heritage, minimal impact practices and visitor access, sanctuary health and catchment issues. Providing further information about key themes for the sanctuary would assist visitor appreciation and an understanding of the sanctuary's values.

The accessible intertidal beach area and the intertidal reefs at low tide in Jawbone Bay are used for walking and nature observation including marine education tours by licensed tour operators (section 6.7). Off-site interpretation signage at adjacent locations, including the shelter in Jawbone Reserve, the boardwalk in Jawbone Flora and Fauna Reserve, and interpretive material help visitors to enjoy and appreciate the sanctuary and avoid the inaccessible areas (sections 6.2 and 6.5).

Rangers organise interpretive activities for community and school groups on request. Coast Action / Coastcare offers school holiday, community and summer activity programs within the sanctuary.

Trampling from rockpool rambling and intertidal activities has the potential to threaten sensitive intertidal communities and vegetation if visitor numbers, access and activities are not carefully managed (section 6.5). To minimise visitor impacts, Parks Victoria (Parks Victoria 2003d) has developed minimal impact guidelines (available on the Parks Victoria website, www.parkweb.vic.gov.au) in partnership with providers of education to help

manage these activities. Parks Victoria is working with the Department of Education to encourage schools to notify Parks Victoria (tel: 13 1963) of intended school group visits. Prior notification will allow teachers to obtain relevant education materials and advice on suitable sites, and help Parks Victoria to monitor the number and timing of visits.

Aims

- Promote and encourage visitors to discover, enjoy and appreciate the sanctuary's natural and cultural values in a safe and appropriate manner through information, interpretation and education.
- Encourage public support for the sanctuary and sanctuary management practices.

Management strategies

- *Maintain visitor information, interpretation and educational material appropriate to the sanctuary and raise the awareness of the significance of the sanctuary among the local and wider community (section 8.1).*
- *Liaise with Hobsons Bay City Council in the development of integrated signage, visitor information, interpretation, and educational material for the sanctuary and adjacent Jawbone reserves.*
- *Develop and deliver off-site interpretation signage of the sanctuary's key themes at Compass Hill and other interpretive material to promote protection and foster appreciation by visitors (sections 4.1, 4.2, 4.4, 5.1 and 5.2).*
- *Continue to allow sustainable educational use by school and community groups and liaise with schools, educational organisations, other agencies, community and Friends groups and licensed tour operators to:*
 - *coordinate educational activities*
 - *ensure delivery of coordinated and consistent messages about key management strategies and interpretive themes*
 - *actively encourage use of areas outside the sanctuary for off-site marine education and interpretation*

- *promote the need for school groups to notify Parks Victoria on 13 1963) of intended group visits.*
- *Promote greater public understanding and appreciation of, and respect for, Indigenous culture by incorporating information about Indigenous culture, places and objects in information, interpretation and education programs, in collaboration and accordance with the views of the Traditional Owners (sections 5.1 and 8.2).*
- *Provide appropriate opportunities and encourage and support Indigenous communities to participate in the interpretation of Indigenous cultural heritage relating to the sanctuary with the agreement of the relevant Registered Aboriginal Party (section 8.2).*
- *Where appropriate, use Indigenous language for natural features, plants and animals in interpretive material and signs.*
- *Promote opportunities for education and interpretation programs through facilitating partnership arrangements with providers of marine education programs such as local schools.*
- *Regularly evaluate information and interpretive programs and success in communicating key themes and management practices.*

6.2 Access

Access to the sanctuary is via Jawbone Reserve and Jawbone Flora and Fauna Reserve. Jawbone Reserve can be accessed from various streets and the Bay Trail. Designated walking tracks and a boardwalk in the eastern end of Jawbone Flora and Fauna Reserve facilitate visitor access from the Bay Trail (figure 2). Off-track access is not permitted. The thick vegetation, mangroves and rocky areas make the western end of the Jawbone Flora and Fauna Reserve inaccessible. Consistent with the former ECC recommendations the existing land access restrictions will be maintained in the sanctuary to minimise damage to sensitive mangrove and saltmarsh areas (ECC 2000).

The intertidal mangrove and saltmarsh areas of the sanctuary are not suitable for walking

because of the nature of the vegetation, unstable rocky substrate (section 6.8) and roosting bird colonies (section 4.4). Visitor access would damage and destroy sensitive saltmarsh and mangrove vegetation and create unformed tracks and erosion, and disturb roosting bird colonies. Shore-based and water-based access to the intertidal area of the sanctuary is directed to Jawbone Bay to ensure visitor safety and to protect the intertidal vegetation in other parts of the reserve and sanctuary. Access to the intertidal reef platforms in Jawbone Bay is dependent on the tides (section 6.8).

The management of access points requires a coordinated approach between the Hobsons Bay City Council and Parks Victoria (sections 7.2 and 8.3). Limited car parking facilities exist at Rifle Range Drive and Crofton Drive, Williamstown, and are managed by Hobsons Bay City Council (section 7.2).

The sanctuary is accessible by boat; however, its shallow waters and subtidal reef systems limit access for vessels (section 6.3). The shallow rocky intertidal shoreline and reefs outside Jawbone Bay make the landing (and launching) of vessels hazardous and disembarking visitors would damage the intertidal vegetation and disturb shorebirds (figure 2). If conditions are favourable canoes and sea kayaks may be landed on the beach in Jawbone Bay.

There are no boat-launching facilities within the sanctuary. Boat access is from nearby boat ramps at Newport (the Warmies), Werribee and Altona and many other locations on the eastern side of Port Phillip. Canoes and sea kayaks may be launched by hand from beach in Jawbone Bay at high tide (figure 2). The walk between the carpark and sanctuary shoreline is around 600 m, easier access for launching small vessels by hand and convenient car parking facilities are nearby at Gloucester Reserve.

Aim

- Ensure that access to the sanctuary is appropriate and safe.

Management strategies

- *Continue to prohibit shore-based public access to, and walking in the Special Protection Area (section 3.2 and figure 2).*

- *Promote the need for visitors undertaking shore-based activities in the sanctuary to access Jawbone Bay via the designated tracks (section 6.1).*
- *Prohibit the landing and launching of all vessels, including canoes, across the sensitive intertidal areas included in the Special Protection Area and encourage vessel operators to launch vessels at Gloucester Reserve (section 3.2 and figure 2).*
- *Develop and implement ongoing education about the benefits of managing public access to protect the intertidal area of sanctuary through Marine Notes, ranger patrols and regulatory signs at the main entrance and the western end of the sanctuary (section 6.1).*
- *Liaise with Hobsons Bay City Council in the management of access points and the bay trail in Jawbone Reserve and nearby car parking areas to integrate access, present consistent messages, and minimise the impact of access on the natural and cultural values of the sanctuary.*
- *Liaise with the managers of local boat-launching facilities to ensure appropriate access to the sanctuary.*

6.3 Recreational boating and surface water sports

A number of motorised and non-motorised boating activities occur within the sanctuary. Sea kayaking and canoeing are becoming more popular and are seen in the sanctuary in low numbers. The sanctuary's waters can be used for gentle sailing but are too shallow with submerged reefs for fast moving vessels including windsurfing and kite boarding. More suitable locations for boating exist outside the sanctuary waters in the Williamstown/Altona area. The intertidal area of the sanctuary is too rocky and inaccessible to be suitable for motorised boats and the launching and landing of boats (section 6.2). Scuba diving also brings motorised boats into the sanctuary (section 6.4).

Marine Safety Victoria determines boating safety rules to establish speed limits, operating zones and conditions, which are gazetted in the 'Vessel Operating and Zoning Rules for Victorian Waters'. Parks Victoria is

responsible for the management of port infrastructure and recreational boating, including navigational aids in Port Phillip, under the *Port Services Act 1995* (Vic.) (section 7.2). All boating activities, including kayaking and canoeing, are subject to the Marine Act. Although the sanctuary is suitable for recreational boating, weather conditions can change quickly and create a safety hazard (section 6.8).

Where water depths are suitable for boating, vessels generally have minimal impact on the sanctuary's values, but vessels operated in the sanctuary's shallow waters, particularly around the submerged rocks, reef areas and seagrass beds, can damage the seabed through vessel groundings and propeller scarring. The shallow reefs of the sanctuary are not indicated by navigational marks and may pose a hazard to recreational vessel operators (section 6.8). Propeller scarring has the potential to damage encrusting communities on reefs and fragment seagrass beds, resulting in habitat loss, decreased productivity, and the possibility for further erosion and degradation (section 4.4).

The speed limit of 5-knots that applies in all Victorian enclosed waters within 200 metres of the shoreline (MSV 2005) includes, for practical purposes, the entire sanctuary.

Vessels can also pose risks to, and conflict with, other users of the sanctuary, including snorkellers and divers (section 6.8), and swimmers in the intertidal area (section 6.5).

Anchoring also has the potential to damage the reef and other habitats, especially sensitive intertidal seagrass areas. To minimise damage vessel operators will be encouraged to avoid anchoring over seagrass and reef areas. Private moorings within the sanctuary will not be permitted.

Motorised and wind-powered vessels can disturb roosting and feeding birds and marine mammals (section 4.4) through excessive vessel noise and fast movement. Hovercrafts by their design are able to access the shore line and shallow intertidal areas that are inaccessible to other vessels. When operating as vessels hovercraft can pose a serious threat to seabirds and shorebirds, especially if travelling over exposed intertidal flats. On land they are classed as vehicles that are prohibited from travelling off-road.

Boats can introduce marine pests if boat-cleaning protocols are not followed (section 4.6), and fuel leaks, oil spills and the disposal of wastes or sewage could have a significant impact on water quality (section 4.2) and flora and fauna (section 4.4). State Environment Protection Policies (SEPP) prohibit vessel operators from discharging sewage, oil, garbage, sediment, litter or other wastes to surface waters in any Victorian State waters. While EPA Victoria has primary responsibility for pollution management, Parks Victoria supports the provision of waste-receiving and pump-out facilities at marinas, ports and other suitable sites (section 4.2).

Parks Victoria, Victoria Police and the Fisheries Victoria Officers undertake regular water-based patrols and have contact with recreational boat users. Patrols offer an opportunity for boat users to learn about the sanctuary.

Aim

- Provide for a range of boating and water sport activities while minimising impacts on the sanctuary's natural values.

Management strategies

- *Permit boating and surface water sports in the sanctuary in accordance with table 2 and subject to the 5-knot speed limit.*
- *Promote the need for larger vessels to avoid the Special Protection Area (figure 2).*
- *Prohibit the use of hovercraft within the sanctuary.*
- *Encourage vessel operators to avoid anchoring over seagrass and reef areas and in the Special Protection Area in the sanctuary to minimise damage to these areas.*
- *Monitor impacts of anchoring and if necessary take appropriate action to reduce any impacts on natural values.*
- *Do not permit private moorings within the sanctuary.*
- *Monitor boating interactions with sensitive values such as bird and seagrass populations to ensure that they do not impact adversely on those values. If*

necessary take appropriate action to minimise impacts.

- *Investigate the need for navigation aids to provide for the safe navigation of the sanctuary by all vessels.*
- *Liaise with recreational vessel operators, particularly during patrols, to promote safe and sustainable use and raise awareness of boat-cleaning protocols (section 4.6).*

6.4 Diving and snorkelling

Snorkelling and scuba diving enable visitors to experience the underwater habitats and view species and habitats that are difficult to observe from above the surface, particularly smaller or cryptic animals such as seahorses, pipefish, sea urchins, nudibranchs, sponges, octopus and cuttlefish. The subtidal reefs in the sanctuary provide several picturesque diving sites that can be accessed from the shore in Jawbone Bay (section 6.2) or by boat. The intertidal reefs around Jawbone are suitable for snorkelling at high tide.

There is some distance between the carpark and shoreline in the sanctuary for diving and snorkelling activities from the shore in Jawbone Bay. Scuba diving and snorkelling in the sanctuary is more accessible by boat and can also be undertaken with licensed tour operators. Scuba diving and snorkelling tours are managed by operator permit conditions that specify access, safety regulations, permitted activities and site-specific restrictions (section 6.7).

The provision of off-site information can guide and enhance diver experiences (section 6.1). The potential for repetitive long-term damage to sensitive natural values and maintenance issues make the sanctuary an unsuitable site for development of an underwater diving or snorkelling trail.

Current levels of diving and snorkelling are moderate, but are likely to increase as the sanctuary becomes more widely known. Potential impacts from diving include intertidal trampling, wildlife disturbance and illegal removal of flora and fauna, and anchor damage (section 6.3). Educating divers and snorkellers about minimal impact practices and encouraging compliance codes of practice will

minimise adverse impacts and assist with sanctuary management.

Divers and snorkellers need to be aware of potential dangers, particularly from vessels passing through the sanctuary near dive sites (section 6.8). To ensure diver safety, divers should refer to the Scuba Divers Federation of Victoria (SDFV) *Codes of Practice, General operating guidelines for recreational scuba diving and related activities* (SDFV 2005).

Divers and snorkellers need to be aware of the no-take provisions in the sanctuary and can assist in the early detection of marine pests in the sanctuary (sections 4.6 and 8.2), and the detection of unrecorded cultural places and objects (sections 5.1 and 5.2).

Aim

- Provide opportunities for diving and snorkelling at dispersed locations in the sanctuary.

Management strategies

- *Permit recreational, educational and licensed tour operator diving and snorkelling activities in the sanctuary in accordance with table 2.*
- *Promote the requirement for snorkellers and divers to use water based-access to dive sites in the Special Protection Area (figure 2).*
- *Review impacts from diving and snorkelling and the effectiveness of management measures and take appropriate action to reduce impacts.*
- *Integrate minimal impact messages into existing information, interpretation and education programs (section 6.1).*
- *Provide off-site information and signage to guide divers and snorkellers to suitable areas/underwater routes in the sanctuary.*
- *Do not install fixed structures that define an underwater trail within the sanctuary.*
- *Promote the use of clean diving equipment to prevent the translocation of marine pests (section 4.6).*
- *Promote compliance of snorkellers and recreational scuba divers with relevant*

codes of practice and Adventure Activity Standards.

- *Support dive clubs and industry representatives to promote environmentally responsible diving practices.*

6.5 Swimming and shore-based activities

Visitors enjoy the waters and intertidal area of Jawbone Bay for swimming, walking, artistic activities and nature observation including bird watching and marine education tours. At low tide the intertidal reefs in Jawbone Bay are accessible for rockpool rambles and general nature observation. Consistent with the former ECC recommendations, land access to the intertidal area is not permitted elsewhere in the sanctuary to minimise damage to sensitive mangrove and saltmarsh vegetation (ECC 2000).

Visitors need to be aware of safety risks from the natural environment and other users to ensure that they enjoy a safe visit. There are no patrolled swimming areas within the sanctuary; however, nearby Williamstown Beach is patrolled and is the more suitable swimming beach in the vicinity. Visitors need to be aware of any hazardous conditions for swimming (section 6.8).

The sanctuary provides opportunities to educate visitors about the marine environment and the need for its protection. The intertidal beaches and rockpools are visited by marine education tours independently led by school and community groups, or by licensed tour operators. Two licensed tour operators offer guided bird-watching activities within the accessible area of the sanctuary (section 6.7).

Intensive trampling of the intertidal areas from a large number of visitors and groups walking on the rocks and vegetation and undertaking rockpool rambles could lead to significant damage to fauna and flora, and in some sites a reduction in biodiversity and habitat (Povey & Keogh 1991) (section 4.4). Visitors to the intertidal areas also have the potential to disturb roosting and feeding migratory, seabirds and shorebirds (section 6.2).

Visitors, groups, schools and educational marine tours can help protect the sanctuary by adopting sustainable/minimal impact practices

while walking on the intertidal areas and when undertaking rockpool rambles. Minimal Impact Guidelines developed by Parks Victoria (Parks Victoria 2003d) (available on its website) provide information on minimal impact practices for visitors and school groups. Off-site interpretation could also help to minimise the impact of large groups on the sanctuary values.

When required the accessible intertidal areas of the sanctuary will be cleaned and accumulated rubbish will be removed (section 4.2). The intertidal collection of living or dead organisms, rocks and natural driftwood is prohibited within the sanctuary (section 4.4).

The lighting of fires within Marine National Parks and Marine Sanctuaries, including any beaches or islands, is not permitted except on board a vessel that is seaward of the mean high water mark.

Aim

- Provide opportunities for appropriate shore-based recreation within the sanctuary while minimising impacts on the natural values.

Management strategies

- *Permit shore-based recreational activities in accordance with table 2. Promote the need for swimmers to use Jawbone Bay or water based access in the Special Protection Area (figure 2).*
- *Manage shore-based activities to reduce impacts on the natural values and minimise damage associated with trampling by:*
 - *permitting shore-based access in the intertidal area of the sanctuary only in Jawbone Bay*
 - *encouraging all visitors to comply with the Parks Victoria Minimal Impact Guidelines*
 - *voluntary protocols (e.g. booking systems) for visitors, educational institutions and other organised groups*
 - *undertaking regular patrols during popular periods and times to encourage appropriate visitor use.*

- *Integrate minimal impact messages for intertidal areas into existing information, interpretation and education programs and promote greater appreciation of intertidal marine organisms (section 6.1).*
- *Reduce impacts at Jawbone Bay during educational use by school and other groups, by ensuring that:*
 - *students are adequately supervised while in the sanctuary*
 - *school group sizes do not exceed class sizes (maximum 30 participants per leader)*
 - *formal interpretation and other groups do not exceed 25 participants per leader*
 - *groups are encouraged to use areas outside the sanctuary or off-site marine education and interpretation.*
- *Minimise disturbance to seabirds and shorebirds by encouraging visitors to avoid roosting areas and feeding seabirds and shorebirds (section 4.4).*
- *Encourage research into the impacts of intertidal trampling on intertidal communities in the sanctuary.*
- *Undertake standardised monitoring of impacts of trampling on intertidal areas from educational use and review the effectiveness of management measures. If impacts increase, work with users to develop an appropriate carrying capacity for the reefs and consider limiting or reducing annual visitation numbers.*

6.6 Dogs and horses

Prior to proclamation of the sanctuary, the intertidal area above low water mark lay within Jawbone Flora and Fauna Reserve and dogs had not been permitted since its reservation.

The sanctuary and the adjoining Jawbone Flora and Fauna Reserve protect unique grassland, mangrove, and saltmarsh communities that provide habitat for migratory and local seabirds and shorebirds.

Dogs can have serious impacts on bird populations and other wildlife through trampling, predation, disturbance and faecal pollution (Kirby, Clee & Seger 1993). Their

presence, scent and noise may disturb birds, leading to reduced species numbers, lower numbers of returning birds and low weight in migratory birds. Some visitors, particularly small children, may be annoyed or intimidated by unrestrained dogs. It is an offence for a dog to harass or injure people or wildlife under the *Domestic (Feral and Nuisance) Animals Act 1994* (Vic.) and the *Wildlife Act*.

Dogs are permitted on-lead on the nearby Bay Trail and in the adjacent council-managed Jawbone Reserve, which acts as a buffer zone between a housing estate and Jawbone Flora and Fauna Reserve. Dog walking is a popular activity for many local residents in the Jawbone Reserve.

Horse riding has not permitted in Jawbone Reserve, or adjoining Jawbone Flora and Fauna Reserve, including the area that is now the sanctuary since these areas were reserved. Horses ridden in the intertidal area of the sanctuary have the potential to damage and disturb intertidal communities and vegetation through trampling.

Dogs and horses are considered incompatible with the aims and objectives of areas managed under the *National Parks Act* such as the sanctuary and are generally prohibited from marine sanctuaries.

Aim

- Protect the sanctuary's natural values and ensure visitor safety.

Management strategies

- *Continue to exclude dogs and horses from the sanctuary except where confined to a vessel.*
- *Liaise with Hobsons Bay City Council to ensure dog management in the nearby reserves is complementary to management of the sanctuary.*
- *Develop and implement an ongoing education strategy on the impact of dogs on the natural environment and the benefits of responsible dog ownership through Marine Notes, information signs and ranger patrols.*

6.7 Tourism services

Parks Victoria's licensed tour operators play a key role in nature-based tourism in Victoria by offering guided sanctuary tours and supported recreation activities, and information that promotes sanctuary values and appropriate use. In 2007, two licensed tour operators offered activities within the sanctuary, including snorkelling and diving (section 6.4).

Activities by licensed tour operators are managed under a permit system, and include site-specific requirements regarding access, safety and permitted activities in accordance with the National Parks Act and the Policy for Sustainable Recreation and Tourism on Public Land (NRE 2002a).

To ensure diver safety licensed tour operators providing diving activities should also refer to the Dive Industry Victoria Association (DIVA) *Code of Practice for Commercial Providers of Recreational Snorkelling & Scuba Diving Services in Victoria* (DIVA 2004) and for snorkelling activities should refer to the *Snorkelling, Scuba Diving, and Wildlife Swims – Adventure Activity Standards Diving Adventure Activity Standard* (ORC 2004) (www.orc.org.au) (section 6.4).

Tourism Alliance Victoria is a membership-based industry association that provides a representative and professional development role for tourism businesses. Parks Victoria works collaboratively with Tourism Alliance Victoria in administering the Tour Operator Licensing system across Victoria's public land estate, including the sanctuary.

Aim

- Provide opportunities for, and encourage provision of, external tourism services while minimising impacts on the natural and cultural values of the sanctuary.

Management strategies

- *Ensure that all tour operators using the sanctuary are licensed and promote awareness of Adventure Activity Standards and Minimal Impact Guidelines.*
- *Continue to work with licensed tour operators and the tourism industry to assist with the delivery of appropriate sanctuary information.*

- *Ensure that tour operators comply with permit conditions, Parks Victoria Minimal Impact Guidelines and the Adventure Activity Standards.*
- *Ensure licensed tour operators provide a range of appropriate activities for an appropriate number of visitors, and at recommended sites (sections 6.1 and 6.4) that are compatible with the protection of sanctuary values.*
- *Work collaboratively with licensed tour operators and Tourism Alliance Victoria to ensure:*
 - *the provision of a high quality service*
 - *that tour operator activities are based on minimal impact practices*
 - *that information conveyed to visitors on tours is consistent with the management objectives for the sanctuary.*
- *Monitor the effectiveness of tourism services in contributing to objects of the National Parks Act.*
- *Promote use of licensed tour operators to enhance and maintain visitor safety.*
- *Provide opportunities and encourage Traditional Owners to facilitate cultural heritage tours (section 6.1).*
- *Encourage licensed Indigenous tour operators to add to the tourism experience in the sanctuary by developing and delivering interpretive and educational tours on Indigenous culture and history.*

6.8 Public safety

Some activities undertaken in the natural environment can pose inherent risks to visitors. This risk is increased if visitors are not familiar with the local environment, prevailing weather conditions and tidal height. Visitors need to be aware of safety risks to ensure that they enjoy a safe visit.

The intertidal area is highly used by visitors. Potential dangers for land-based activities or intertidal rock rambling include slippery and unstable rocks and boulders, broken glass and rubbish, venomous fauna and large waves. Shore-based visitors need to monitor weather and tide conditions, wear appropriate footwear

and ensure adequate protection from the sun and wind.

A survey of Victorian beaches in 1996 rated their safety as being in one of four hazard categories; safest, moderately safe, low safety and least safe (Short 1996). Beaches in the sanctuary have not been rated and there are no patrolled swimming areas within the sanctuary. Visitors should exercise caution while swimming in the sanctuary. The swimming beach at the nearby Williamstown Beach is patrolled by lifeguards from the Williamstown Swimming and Life Saving Club.

Although some sites in the sanctuary may appear inviting for water sports, the presence of vessels, rocks and wave energy can make conditions dangerous. While the underwater environment of the sanctuary has great appeal for snorkelling and diving, visitors undertaking in-water activities need to be aware of the unpredictable nature of the marine environment and should only undertake activities within their capabilities, under appropriate conditions. Risks associated with snorkelling and diving in the sanctuary include large waves, venomous marine animals, and exposure to cold.

Vessels can be a potential risk to swimmers, snorkellers and scuba divers and vessel operators need to be aware of their presence in the water. Under the Marine Act scuba divers must dive with a flag indicating a diver below. Snorkellers should also adopt this practice when snorkelling to increase their visibility and safety (section 6.4). Public information and education programs are one of the most effective ways to promote safety (section 6.1). Safety messages are presented to visitors through signs, Park Notes and ranger patrols.

Boating activities undertaken in the sanctuary can pose inherent risks to visitors. Vessel operators need to be aware of the changing weather conditions, tidal height, shallow depths and submerged reefs and the local environment as well as other vessels, and users, particularly those in the water. Any person operating a powered recreational vessel in Victorian waters are required to have a current licence. Recreational boating accidents are highest in Victoria during summer and most fatalities are associated with recreational vessels of less than 8 m in length (Bugeja 2003).

Marine Safety Victoria conducts safety and awareness programs for recreational boat users, and the *Victorian Recreational Boating Safety Handbook* contains necessary safety information and outlines the requirements for operating a recreational vessel in Victoria (MSV 2005) (section 6.3).

The responsibilities for responding to emergency incidents in Victoria and Victorian waters are outlined in the *Emergency Management Act 1986* (Vic.). Parks Victoria is not the lead agency for most emergency response situations. Instead, it supports other agencies, including the Department of Sustainability and Environment, Marine Safety Victoria, the Country Fire Authority, the State Emergency Service and Victoria Police, in emergency incidents, where required.

Relevant agencies respond to incidents within the sanctuary in accordance with the Municipal Emergency Response Plan. Parks Victoria's response to emergency incidents during normal operating activities within the sanctuary is guided by the *Northern Port Phillip Emergency Management Plan* (Parks Victoria 2004).

Under the *Port Services Act 1995* (Vic.) Parks Victoria is the Local Port Manager of Port Phillip and has produced a Safety and Environment Management Plan (SEMP) (Parks Victoria 2005b) for the port. The SEMP is a risk management framework for managing the safety and environment of the port.

Aims

- Promote visitor safety and awareness of safety issues and risks within the sanctuary associated with access and use.
- Promote and observe safe practices, and cooperate with emergency services.

Management strategies

- *Provide relevant visitor safety information (section 6.1) and encourage visitors to adopt safe operating guidelines appropriate to their activity.*
- *Promote the display of diver-below flags by snorkellers.*
- *Incorporate the sanctuary into the Northern Port Phillip Emergency Management Plan and ensure that staff*

and licensed tour operators are aware of the plan.

- *Cooperate with and support responsible agencies in emergency response and ensure that Parks Victoria staff have adequate levels of training in emergency procedures.*
- *Liaise with Hobsons Bay City Council to ensure that the Municipal Emergency Response Plan makes adequate provision for likely incidents in the sanctuary.*

7 STRATEGIES FOR AUTHORISED AND ADJACENT USES

7.1 Authorised uses

A number of uses and activities may be permitted in the sanctuary subject to specified conditions to minimise impacts.

Hobsons Bay City Council manages a stormwater drain that discharges into the sanctuary. Stormwater from the drain is having an adverse impact on the intertidal habitats and communities and also delivers litter directly into the sanctuary. The natural and recreational values of the sanctuary will be protected by the removal of the drain (section 4.2).

Parks Victoria recognises the significant role that the filming and photography industry plays in the social and economic well-being of the community and in providing for such activities seeks to ensure protection of the natural and cultural values of the sanctuary. This is achieved through a permit system for all filming and photography conducted as part of a trade or a business. Amateur photographers or people taking film or video for personal or hobby interest do not require a permit.

All research and monitoring undertaking in a Marine National Park or Marine Sanctuary by external partners or individuals requires a research permit under the National Parks Act, issued by DSE.

Protected areas are generally avoided as locations for Victoria Police or Australian Defence Force training exercises, although they are sometimes used for search and rescue, field navigation and incident response activities. Activities are subject to a permit with conditions to ensure that values of the sanctuary are protected.

Petroleum extraction, exploratory drilling, mineral exploration and mining, and invasive searching for or extraction of stone and other materials, are prohibited in the sanctuary under the National Parks Act and/or earth resources legislation. Petroleum exploration, such as seismic survey from an aircraft or from a vessel, that is carried out in a manner which does not detrimentally affect the seabed or any flora or fauna of the sanctuary may be allowed with the consent of the Minister. However, the Government has announced that it will not

release any further areas in Victoria that contain Marine National Parks or Marine Sanctuaries for petroleum exploration. There is no petroleum exploration permit relating to the sanctuary. The construction of pipelines or laying of seafloor cables is prohibited in any part of the sanctuary.

Aim

- Manage authorised uses in accordance with the National Parks Act and minimise their impact on sanctuary values.

Management strategies

- *Review all uses of the sanctuary to identify those that do not conform with objectives of the National Parks Act. Allow uses to continue only in accordance with authorisations that are consistent with legislation and include conditions that effectively minimise the impacts of uses on the sanctuary.*
- *Monitor authorised activities to ensure that conditions of authorisations are met. Assess the effectiveness of conditions of authorisations in protecting the sanctuary and seek review of authorisations, if necessary, to arrest impacts.*
- *Seek permission from the Secretary to DSE for any public authority installations and services. Include conditions to ensure construction, operation and maintenance are consistent with protection of the sanctuary's natural and cultural values and amenity of visitors.*
- *Permit Defence Force and Victoria Police adventure training or field navigation exercises in the sanctuary in accordance with Parks Victoria's operational policy and relevant permit conditions.*

7.2 Boundaries and adjacent uses

The boundaries of the sanctuary are well marked and highly visible from both land and sea (figure 2). The onshore signs at either end of the sanctuary are yellow triangular signs pointing towards the sanctuary. A series of in-water pile markers with a yellow cross and a yellow buoy mark the seaward boundary

(section 6.1 and figure 2). Boundary coordinates are published on Parks Victoria's website and in Park Notes and will be added to navigational charts. Information signs are located on the adjacent reserve, and regulatory totems are located in the reserve at the main access points.

Part of the eastern end of the sanctuary is bound by a stone wall that forms the boat harbour of the fishing clubs in Bayview Street. A cyclone fence that marks the northern boundary of the fishing club extends out into the eastern end of the sanctuary (figure 2).

Jawbone Flora and Fauna Reserve, adjacent to the sanctuary, is reserved under the *Crown Land (Reserves) Act 1978* (Vic.) and managed by Parks Victoria. Management of the reserve (and the adjacent Jawbone Council Reserve) is directed by a *Management Statement* (Parks Victoria & Hobsons Bay City Council 2007). The Crown Land (Reserves) (Nature Conservation Reserve) Regulations 2004 apply.

Jawbone Reserve adjacent to Jawbone Flora and Fauna Reserve is managed for recreation and conservation by Hobsons Bay City Council as the committee of management. It is a modified environment with open grassy areas of semi-natural vegetation. The Bay Trail, a walking and bicycle track passes through the reserve. The reserve gives good access to the sanctuary and Jawbone Flora and Fauna Reserve. The *Williamstown–Altona Coastal Parklands Strategic Directions Plan* (Parks Victoria 1997), developed in conjunction with the Hobsons Bay City Council, provides a strategic overview for the management of the foreshore reserves and coastal parklands between Williamstown and Altona.

These reserves are zoned as Coastal Protection Zone (VCC 2002).

The *Hobsons Bay Planning Scheme* (HBCC 2006a) provides a statutory framework for managing proposals and developments adjoining the sanctuary. Administered by Hobsons Bay City Council, the scheme extends to 600 m offshore. Under the scheme, the area that is now the sanctuary is mostly zoned as Public Conservation and Resource Zone and partly as Public Park and Recreation Zone. In accordance with the *State Planning Policy Framework* (DSE 2003), it should be

zoned a Public Conservation and Resource Zone. The adjacent land is overlaid with heritage and design and development overlays, which specify local objectives and requirements that must be met by a development application. These protect and enhance the environment of the Hobsons Bay foreshore as an environmental, conservation and recreational asset of State, metropolitan and local significance.

Mobil's Altona refinery was built on its current site adjacent to Kororoit Creek in 1946. The refinery produces petrol, diesel, aviation gas, petrochemical feedstock, bitumen, and heating oils. Mobil, with concern for the environment, has developed operational and management processes which minimise the potential for contamination of the sanctuary from refinery processes. Spills and ground water contamination from the refinery may impact on the sanctuary and adjacent areas (section 4.2).

Siltation in the mouth of the Kororoit Creek has changed the morphology of the mouth of the creek at Altona (section 4.1). Highly contaminated silt in the mouth of the creek may pose a threat to the sanctuary if disturbed (section 4.2). Proposals to dredge the mouth of the creek for boating access have been considered by relevant agencies, including Parks Victoria, EPA Victoria, DSE, Hobsons Bay City Council and Melbourne Water. The agencies agree that dredging of the mouth of the creek should not be undertaken as it is unlikely to be effective, it raises concerns about disturbing contaminated silt which may impact on the area that is now the sanctuary, the silting will not exacerbate flood levels and, because recreational boating is not a recognised use of the creek.

Coastal modifications and other changes to the hydrodynamics nearby or adjacent to the sanctuary, including artificial renourishment of the beach, could affect the natural and other values of the sanctuary through longshore drift, deposition and erosion. All coastal uses and developments or modifications require permission from the Secretary to DSE under the Coastal Management Act.

State waters and the underlying seabed adjoining the sanctuary are currently unreserved Crown land. The Government accepted the ECC's recommendation that a

Coastal Waters Reserve be established under the Crown Land (Reserves) Act for the major portion of Victoria's marine area not otherwise designated for a particular purpose, to provide for a diverse range of activities that are compatible with long-term sustainable use (ECC 2000).

Parks Victoria is the Local Port Manager for Port Phillip under the *Port Services Act 1995* (Vic.). Under this legislation, Parks Victoria is responsible for the management of port infrastructure including breakwaters, piers and jetties, and recreational boating, including navigational aids, and the preparation and implementation of the Port SEMP for Port Phillip (sections 4.2 and 6.8).

The Port of Melbourne Corporation is the Port Manager for the Port of Melbourne, which includes shipping channels that access the port. Oil or chemical spills from vessels accessing the Port Melbourne Channel near Williamstown could impact on the natural and cultural values and recreational opportunities of the sanctuary.

The deepening of sections of Port Phillip's shipping channels by the Port of Melbourne Corporation in 2007 to allow larger container ships to enter the port has the potential to affect the sanctuary, at least temporarily (POMC 2004; 2007).

Aims

- Effectively communicate the location of the sanctuary boundaries.
- Minimise impacts from adjacent developments and uses on sanctuary values.

Management strategies

- *Maintain boundary markers, signs and information about sanctuary boundaries (section 6.1).*
- *Recommend to Hobsons Bay City Council amendment of the planning scheme to recognise the sanctuary by rezoning the area that is the sanctuary as a Public Conservation and Resource Zone.*
- *Work with DSE and consult Hobsons Bay City Council to ensure beach-renourishment activities and coastal remediation works adjacent to or near the sanctuary have minimal impact on the sanctuary (section 4.1).*
- *Liaise with the Bayview Street fishing clubs to consolidate boundary infrastructure and ensure that maintenance of the boat harbour seawall does not impact on the sanctuary.*
- *Ensure that marine safety initiatives within the sanctuary and adjacent waters, including the implementation of the Port Phillip SEMP, improve environmental protection and visitor safety in the sanctuary.*
- *Liaise with Mobil to ensure the Altona Refinery's operational and management processes acknowledge the sanctuary and incorporate strategies to protect sanctuary values.*
- *Liaise with the Port of Melbourne Corporation to minimise the risks of oil and chemical spills from the nearby shipping channel on the sanctuary.*

8 STRATEGIES FOR COMMUNITY AWARENESS AND INVOLVEMENT

8.1 Community awareness

Raising the community's awareness of the sanctuary's values is an essential step in developing a sense of custodianship for the sanctuary and engagement in the area's management. The community is more likely to develop a sense of custodianship for the sanctuary if its views and values are respected and sanctuary-related social networks are encouraged and supported. A strong connection with the sanctuary among visitors and in the local and wider community assists in broader public education, raising awareness and reaching others in the community.

The Friends of Williamstown Wetlands have increasing connections with and are active in the sanctuary. They help to raise community awareness about the sanctuary and the benefits of volunteer activity through local publicity and their social networks (section 8.2). The Friends of Lower Kororoit Creek and Friends of Altona Coastal Park could also help raise community awareness about the sanctuary.

Education and interpretation programs (section 6.1) play an important role in raising the awareness of the sanctuary in the wider community. Parks Victoria aims to communicate the benefits of a healthy parks system and its contribution to the health of individuals and society through the 'Healthy Parks Healthy People' program.

The Coast Action/Coastcare summer activity program is a prime example of encouraging the broader community to experience the coast (section 8.2).

Government agencies, business associations, welfare bodies, Indigenous and ethnic associations, tourism and recreational organisations and schools could also help to build community awareness within their community networks (sections 8.2 and 8.3).

Aims

- Increase the community's awareness and mutual understanding of the sanctuary's values and management activities.

- Support the sense of shared ownership and custodianship for the sanctuary among community groups and individuals.

Management strategies

- *Promote opportunities for community members to improve sanctuary management through taking shared responsibility and becoming directly involved through interpretation and other information (section 6.1).*
- *Profile to the wider community the work of Friends, volunteers and community groups.*
- *Promote the benefits of assisting sanctuary programs to community groups in line with Healthy Parks Healthy People objectives.*
- *Partner with community groups to identify opportunities to increase public awareness about the sanctuary.*

8.2 Community participation

Participation of community groups and individuals in the sanctuary's management is pivotal in the effective long-term planning, use and care of the sanctuary's values.

Volunteers and community groups can make valuable contributions to sanctuary management. They bring diverse and valuable information, specific local knowledge, skills, concerns and experience that may otherwise not be available to the sanctuary managers. Despite the ongoing challenges of increasing administrative obligations, fluctuating membership and funding constraints, community groups bring considerable enthusiasm and add a valuable perspective and resources to assist with the care of the sanctuary.

The interests of community groups in the sanctuary often overlap and may not be complementary. There can be considerable mutual benefits where such groups work together and with Parks Victoria to achieve common goals. Parks Victoria can assist groups with advice and training, and by promoting the benefits of volunteerism.

The Traditional Owners have considerable interest in and aspirations for the sanctuary as part of *Country*. They are an important potential source of traditional knowledge about the area that has yet to be documented. A strong working relationship with relevant Registered Aboriginal Party will be essential to reflecting Traditional Owners views in the sanctuary's planning and management and reconciliation of their interests and aspirations with those of other members of the community.

There is a network of Friends groups in the Williamstown area. The Friends of Williamstown Wetlands, a volunteer Friends group specifically concerned with the well-being of the Jawbone area, including Jawbone Flora and Fauna Reserve and Jawbone Reserve, have extended their activities to include the sanctuary. The group's activities include tree propagation and planting, weed removal, and track maintenance. The Friends of Kororoit Creek and Friends of Altona Coastal Park are also actively involved in the conservation of the adjacent areas.

Reef Watch is a non-profit project developed by the Australian Marine Conservation Society and the Marine and Coastal Community Network and funded by the Federal and State Government through Coast Action / Coastcare. The project calls on the voluntary assistance of Victorian divers (both scuba and snorkel) to help describe and monitor marine life in a variety of habitats. There are opportunities for Friends and volunteers to participate in Reef Watch programs in the sanctuary.

Coast Action / Coastcare programs work with a variety of volunteer groups and community organisations to help protect, monitor, manage and restore coastal and marine environments. In addition, Coast Action / Coastcare conduct education, training and awareness programs.

Aims

- Encourage and support the active participation of community groups and volunteers, particularly Indigenous communities, in projects that contribute to or complement sanctuary programs.
- Inform, enrich and strengthen the sanctuary's management with the community's tradition, knowledge,

experience, skills and enthusiasm, particularly that of the Traditional Owners.

Management strategies

- *Continue to maintain a strong and collaborative relationship with Friends and volunteer and community groups to ensure sustainable and rewarding volunteer experiences.*
- *Coordinate opportunities for Friends and volunteer and community groups to share experiences and discuss management objectives and work programs and progress in implementing the plan with Parks Victoria rangers.*
- *Support initiatives that build the capability of community members and groups to effectively contribute to sanctuary management objectives.*
- *Maintain ongoing dialogue with active groups, neighbouring clubs and community groups with a broad community agenda, as well as appropriate training and other measures that better enable their participation in managing the sanctuary.*
- *Promote and support such groups to work with each other and Parks Victoria to achieve shared goals for the sanctuary.*
- *Promote and support Coast Action / Coastcare programs within the sanctuary, particularly focusing on community interpretation and education.*
- *Promote community involvement in Reef Watch monitoring and recording programs and other programs using standard methods (sections 4.4 and 4.6).*
- *Work to continue to build, and strengthen and maintain relationships with relevant Indigenous communities. In particular, seek to further develop a close inclusive working partnership with the relevant Registered Aboriginal Party.*
- *Partner with community groups to foster ongoing community engagement that captures the diversity of people, ideas and opinions present in the community.*

8.3 Agency partnerships

Although Parks Victoria is responsible for overall management of the sanctuary, other agencies are responsible for planning, managing or regulating certain activities in the sanctuary.

All activities relating to the sanctuary that are carried out by Parks Victoria or other agencies need to accord with all legislation and government policy and, as far as practicable, be consistent with agencies' policies and guidelines. To ensure this occurs, Parks Victoria staff work closely with staff of relevant agencies and collaborate in implementing activities where appropriate.

The Department of Sustainability and Environment (DSE) establishes parks, oversees the management of land and resources of Victoria's coastal Crown land and waters, and provides strategic direction and policy advice for management of the sanctuary, including marine flora and fauna values and threatening processes. Parks Victoria is a support agency for responses to oiled wildlife and cetacean stranding or entanglement operating at the direction of DSE (sections 4.2 and 4.4).

Heritage Victoria (DSE) is the central government agency that provides information and advice about places listed on the Victorian Heritage Register and Archaeological Inventory. It supports the Heritage Council through research, recommends additions to the Register and issues permits for alterations to heritage places (section 5.2).

As part of agreed service delivery arrangements, Department of Primary Industries, Fisheries Victoria, has primary responsibility for enforcement to ensure compliance with the fishing prohibitions in the National Parks Act. Parks Victoria will continue to collaborate with Fisheries Victoria and Victoria Police in activities such as cooperative Ranger and Fisheries officer patrols and support arrangements in accordance with the *City and Bays Regional Compliance Plan* (Parks Victoria 2003a).

The Central Coastal Board (CCB) provides direction and policy advice to facilitate sustainable development of the central region of the Victorian coast through the implementation of the Victorian Coastal

Strategy (VCC 2002) and Coastal Priorities for the Central Region (CCB 2003) (section 4.2).

Port Phillip and Western Port Catchment Management Authority is responsible for ensuring the protection and sustainable development of land, vegetation and water resources within the region. The *Port Phillip and Western Port Regional Catchment Strategy* (PPWPCMA 2004) focuses on the management of land, water and biodiversity including the coastal and marine areas under the *Catchment and Land Protection Act 1994* (Vic.) (section 4.2).

The Victorian Environment Protection Authority (EPA Victoria) has the primary responsibility for environment protection of all waters in Victoria and is responsible for administering and enforcing the *Environment Protection Act 1970* (Vic.), including all activities relating to the discharge of litter and waste to the environment. EPA Victoria also develops and implements State Environment Protection Policies (SEPP) for State waters and facilitates the development of Neighbourhood Environment Improvement Plans (NEIPs), which enable communities to work towards achieving local environmental improvements (section 4.2).

Hobsons Bay City Council is the committee of management for the nearby Jawbone Reserve and administers the planning scheme for land adjacent to the sanctuary, including assessing developments that could have an impact on sanctuary values. Parks Victoria provides input into planning applications to ensure that sanctuary values are protected (section 7.2).

Melbourne Water manages rivers, creeks and major drainage systems throughout the Port Phillip and Westernport region. Melbourne Water has the primary responsibility for maintaining or improving the ecological health of rivers and creeks through erosion control, protecting riverbeds and banks, revegetation, weed control and by ensuring sufficient flows. Melbourne Water and Hobsons Bay City Council manage stormwater runoff and associated inputs into the sanctuary in accordance with the *Operating Charter for Waterways and Drainage* (Melbourne Water 1999) and the *Hobsons Bay Stormwater Quality Management Plan* (HBCC 2006b) (section 4.2).

Parks Victoria is a support agency for Marine Safety Victoria at a statewide and regional level for marine pollution incidents, contributing on-site response and incident management as well as technical advice. Parks Victoria is also the local authority responsible for administering the Marine Act, including marine safety initiatives (section 6.8) and planning and implementation of pollution response in accordance with the *Victorian Marine Pollution Contingency Plan (MSV 2002)* (section 4.2).

Through Aboriginal Affairs Victoria (AAV), the Department for Victorian Communities (DVC) has responsibility for administering legislation protecting cultural heritage (sections 2.5 and 5.1). AAV and the relevant Registered Aboriginal Party advise Parks Victoria on Aboriginal cultural heritage matters (section 5.1).

Tourism Victoria is the State Government authority responsible for developing and marketing Victoria to Australian and international travellers.

Aim

- Enhance sanctuary management by collaborating with other agencies to ensure that they give appropriate consideration to sanctuary values in planning and implementing activities that relate to the sanctuary.

Management strategies

- *Work collaboratively with all agencies to implement the vision and directions of the plan, in particular work with:*
 - *the Central Coastal Board on any future plans and strategies that relate to the sanctuary*
 - *DSE regarding future planning and management, including protection of marine flora and fauna from potentially threatening processes*
 - *Heritage Victoria on heritage management, and compliance with the Heritage Act (section 5.2)*

- *EPA Victoria to minimise impacts associated with discharge of waste into the environment, particularly those from stormwater, boating, shipping, marinas, ports and associated dredging activities (section 7.2) and assist local communities to develop a NEIP (section 4.2)*
- *Melbourne Water to minimise impacts associated with discharge of waste into the environment and discharge from waterways (section 4.2)*
- *Fisheries Victoria to implement the fishing prohibition and the City and Bays Regional Compliance Plan*
- *Hobsons Bay City Council on complementary management of the nearby reserve, stormwater and administration of the planning scheme, including input into adjacent or nearby developments that may impact on the sanctuary, and the promotion of responsible pet ownership (section 7.2)*
- *AAV and the relevant Registered Aboriginal Party on issues relating to cultural heritage protection (section 5.1)*
- *Marine Safety Victoria on recreational boating safety and marine pollution incidents (sections 6.3 and 6.8)*
- *Port Phillip and Western Port CMA to reduce the impacts of land use and catchment management on the sanctuary and develop appropriate actions in the Regional Catchment Strategy (section 4.2)*
- *State and regional tourism authorities to promote the sanctuary in regional visitor information centres and regional tourism strategies.*
- *Update contingency plans for marine pollution incidents, such as oil and chemical spills, and cetacean/wildlife incidents as required, and communicate arrangements to staff, relevant agencies and interested parties.*

9 PLAN IMPLEMENTATION

9.1 Delivery and reporting

A range of approaches will be used to implement strategies in this plan. Some will be undertaken as part of routine management activities such as ranger visits; others will be addressed as part of regional programs undertaken across the State each year.

A priority list of all the strategies in the plan will be used to guide routine management, and identify detailed actions in annual regional programs. Priorities for regional programs vary from year to year, depending on available resources and government priorities.

At the end of each year, progress towards implementing strategies in the plan will be reviewed and the priority list updated. Staff report internally against 'on time and within budget' delivery of regional programs and whether the completed strategy has achieved the objective. Parks Victoria reports annually to Government on the overall delivery of regional and divisional programs. This broader reporting on management performance is available in annual reports prepared on the National Parks Act and Parks Victoria.

During implementation of the plan, Parks Victoria will work in partnership with Traditional Owners. Ongoing collaborative activities with interested members of Indigenous communities, the wider community, scientists and agencies in realising the vision and management directions for the sanctuary will be especially important as outlined in previous sections of the plan.

Implementation of the plan will be consistent with Parks Victoria's commitment to sustainable practices, which involves the delivery of operations, services and facilities in an ecologically and socially responsible manner with minimal use of expendable resources and minimal generation of waste.

In implementing the plan, management will respond to monitoring and research information as it emerges. Parks Victoria's Environmental Management Framework (EMF) makes this possible. Based on the International Standard for Environmental Management Systems (ISO 14001), the framework ensures that the future condition of

values is considered in identifying threats and developing actions to ameliorate them. Over time, the success of actions is reviewed against set objectives to ensure ongoing learning and refinement of management. The selection of actions and treatments of threats are guided by the precautionary principle. Management options are evaluated on the basis of least impact on the environment. Treatment of threats with a potential for serious damage that is not addressed in the plan will not be postponed for lack of information.

Parks Victoria will use a variety of means to report to the community about the progress of implementation of the plan. The primary means will be through routine liaison between Parks Victoria, interested groups and individuals from the local community and relevant government agencies. In addition to giving regular updates, there will be opportunities for input by interested members of the community into annual priority setting and feedback on management performance. Events such as sanctuary open days and community and volunteer forums will offer similar opportunities for reporting and discussions about annual programs.

The results of monitoring and research work will continue to be available to the community as technical reports (available on Parks Victoria's website, www.parkweb.vic.gov.au).

Parks Victoria will also report on evaluation of the plan (section 9.3) at the start of the new or revised plan, through routine liaison and community forums and in the subsequent draft plan.

Future reporting on the Statewide Strategy (Parks Victoria 2003b) and State of the Parks reports (which will be available on the Parks Victoria website) will also include information on management performance in the sanctuary.

9.2 Plan amendment

During the 10-year life of the plan, amendments to the plan may only be made by the Secretary to DSE, following an authorised process, which includes appropriate community consultation.

Circumstances that might lead to amendment of the plan include:

- the results of monitoring or research, management experience or new information (such as greater understanding of new threatening processes) that indicate the need for a change in management direction
- significant changes in visitation or use
- a change in policy that calls into question plan objectives
- new legislation (such as significant boundary changes).

The plan may also be amended if an activity, development or use that conflicts with the provisions of the plan is approved by government (such as native title outcomes).

9.3 Evaluation and review

Periodically through the life of the plan, Parks Victoria will assess overall progress towards implementing the strategies in the plan and also assess progress towards achieving the plan vision and directions. These evaluations will inform a decision about whether a new or revised plan is required. The achievements of the plan will be assessed by considering performance areas such as the following.

Protecting natural values

- Overall benefit to biodiversity.
- Compliance with no-fishing provisions and sanctuary regulations.
- Timely management intervention to minimise threats.
- Minimal impact of permitted uses.

Protecting cultural values

- Progress towards working with relevant Registered Aboriginal Party in managing the sanctuary and in protecting and interpreting Indigenous cultural heritage.
- Timely management intervention to minimise damaging activities and threats.

Managing recreation and visitor use

- Managing impact from visitors, including individuals and school and tour groups.
- Meeting community expectations in relation to Parks Victoria's management of the sanctuary.
- Improving community and visitor awareness.

Providing for research and promoting understanding

- Improving understanding of the composition and distribution of habitats and ecological processes.
- Ongoing participation of the Indigenous and the wider community.
- Clear identification of major knowledge gaps and threats.

Methods for evaluating the benefits of the plan are likely to be refined over time. Parks Victoria partners with external research agencies to establish benchmarks and indicators for major communities and habitats. Through sound monitoring and assessment methods this monitoring and research work will strengthen the basis for comparing management performance over time.

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GLOSSARY

Aboriginal cultural heritage – Aboriginal places, objects and Aboriginal human remains.

Accretion – slow addition to land by deposition of water-borne sediment.

Algae (seaweed) – photosynthetic plant-like organisms belonging to the kingdom Protista. Unlike plants, not differentiated into roots, stems and leaves. Commonly called seaweed.

Alluvial fan – a fan-shaped body of sediment deposited by a stream.

Amphipod – a small crustacean of the order Amphipoda, such as the beach flea, having a laterally compressed body with no carapace.

Aquaculture – cultivation of fish, molluscs or other aquatic organisms in fresh or salt water.

Artefacts – an object produced or shaped by human craft, especially a tool, weapon, or ornament of archaeological or historical interest.

Ascidian (sea squirt) – common solitary or colonial marine animal.

Attrition – a rubbing away or wearing down by friction.

Ballast water – water carried in a ship's tanks for stability; normally discharged to the sea when the ship is loaded, and can be contaminated with pollution or exotic organisms.

Beach renourishment – artificial renourishment of eroding beaches by pumping sand from a suitable part of the seabed.

Benthic – of or relating to or happening on the bottom under a body of water.

Biodiversity – the natural diversity of all life: the sum of all our native species of flora and fauna, the genetic variation within them, their habitats and the ecosystems of which they are an integral part.

Bioregion – an area with particular underlying environmental and ecological features.

Biota – the combined flora and fauna of a region.

Bivalve – type of mollusc with a pair of hinged shells (e.g. scallop, mussel).

Bryozoan (lace coral) – common small colonial marine animal with a flat or upright growth form and a range of colours.

Calcarenite – soils and sedimentary rock with a sandy texture that has become hardened or cemented together and is composed largely of calcium carbonate fragments formed by the

mechanical breakage or abrasion of the parent rock i.e. dune limestone.

Canopy – a structural overstorey (e.g. of kelp).

Catchment – the area of land that drains to a watercourse or estuary.

Cetacean – marine mammals of the order Cetacea, including the whales, dolphins, and porpoises, characterised by a nearly hairless body, anterior limbs modified into broad flippers, vestigial posterior limbs, and a flat notched tail.

Coast – in broad terms, the sea and the seabed to the State limit (3 nautical miles, or 5.5 km) and the land and inland waters within the coastal catchment.

Coastline – generally, where the land meets the sea.

Committee of Management – a committee appointed under the Crown Land (Reserves) Act 1978 to manage reserved Crown land on behalf of the Minister. For coastal land, most committees are either an agency (e.g. the local municipality, Parks Victoria or the Department of Sustainability and Environment) or a committee appointed through an expression of interest process.

Competition – an interaction between or among two or more individuals or species in which exploitation of resources by one affects any others negatively.

Coralline algae – algae that contain calcified components. Can take a variety of forms, from encrusting to upright.

Country – in Indigenous usage, all of nature, culture and spirituality relating to an area.

Crown land – land belonging to the State.

Crustacean – arthropods of the class Crustacea, including lobsters, crabs, shrimps and barnacles, characteristically having a segmented body, a chitinous exoskeleton, and paired, jointed limbs.

Cryptic – tending to conceal or camouflage.

Ctenophores – any of various marine animals of the phylum Ctenophora, having transparent, gelatinous bodies bearing eight rows of comblike cilia used for swimming; also called a comb jelly.

Customs – observances and practices of people (includes land management and resource use) in accordance with their tradition.

Cyanobacteria – photosynthetic bacterium of the class Coccogoneae or Hormogoneae, generally blue-green in colour and in some species capable of

nitrogen fixation. Cyanobacteria were once thought to be algae: also called blue-green alga.

Diatom – a microscopic unicellular alga.

Dinoflagellates – small protozoans of the order Dinoflagellata, characteristically having two flagella and a cellulose covering and forming one of the chief constituents of plankton; including bioluminescent forms and forms that produce red tide.

Disturbance – a rapid change in an environment that greatly alters a previously persistent biological community.

Driftwood – wood from a natural source floating or that has been washed ashore.

Ebbing – receding tide.

Echinoderm – radially symmetrical marine invertebrates of the phylum Echinodermata, which includes the starfishes, sea urchins, and sea cucumbers, having an internal calcareous skeleton and often covered with spines.

Ecologically sustainable development (ESD) – development that improves the total quality of life both now and in the future, in a way that maintains the ecological processes on which life depends.

Ecologically sustainable use – the use of a species or ecosystem at a level that allows it to renew naturally and continuously.

Ecosystem – a dynamic complex of interacting organisms and their associated non-living environment.

Effluent – a liquid, partially or completely treated or in its natural state, flowing from a water or sewage treatment plant.

Endemic – unique to a particular area, and not found naturally anywhere else.

Environmental flow – minimum flows of water (by volume and season) necessary to maintain aquatic life.

Epiphytic – a plant that grows on another plant upon which it depends for mechanical support but not for nutrients.

Estuary – an inlet or river mouth that is influenced by tides and freshwater inputs from the catchment.

Exotic marine organism/species – *see* Pest.

Flooding – advancing tide.

Flotsam – in maritime law, applies to wreckage or cargo left floating on the sea after a shipwreck. The common term ‘flotsam and jetsam’ is now used loosely to describe any objects found floating or washed (respectively) ashore. *See also* Jetsam.

Foram – protozoans of the order Foraminifera, characteristically having a calcareous shell with perforations through which numerous pseudopods protrude.

Foreshore – generally, the land between a coastal road and the low water mark.

Freehold land – land under private ownership.

Gastropod – molluscs of the class Gastropoda, such as the snail, slug, cowrie, or limpet, characteristically having a single, usually coiled shell or no shell at all, a ventral muscular foot for locomotion, and eyes and feelers located on a distinct head.

Geomorphology – the scientific study of landforms and geological formations and the processes that shape them.

Glacial – of, relating to, or derived from a glacier; a glacial epoch.

Gorgonian – soft coral fan generally found in high flow areas.

Groundwater – water beneath the earth’s surface, often between saturated soil and rock, that supplies wells and springs.

Habitat – the preferred location or ‘home’ of an organism.

Hard coral – coral with solid calcareous cases for structure. Generally colonial and found on hard surfaces.

Heritage – a place, activity, cultural way of life, structure or group of structures that have aesthetic, historic, scientific or social value for past, present or future generations.

High water mark – the landward boundary of high water mark is the average of the highest tides (spring and neap).

Hyroid – small, tentacled animal related to corals and sea-jellies. Common but often overlooked.

Index of River Condition (IRC) – the Index of River Condition (IRC) ratings are based on the Index of Stream Condition (ISC) developed by DSE for rural rivers and creeks. They have been modified, however, to account for the urban rivers and creeks in Melbourne Water’s operating area and include data for all of the rivers and creeks that Melbourne Water manages.

Indigenous people – people who are descendants of Aboriginal Australians and Torres Strait Islanders.

Indigenous communities – indigenous people who share cultural values and activities relating to the sanctuary.

Indigenous species – species that occur naturally in a region.

Infrastructure – physical structures that facilitate the human use of an area (e.g. roads, paths and toilet blocks).

Interglacial – occurring between glacial epochs.

Intertidal – the area between low and high tide levels, which is subject to daily changes in physical and biological conditions from tide movements.

Invertebrate – an animal without a backbone at any stage of development (e.g. worms, sponges, crustaceans, molluscs).

Isopods – crustaceans of the order Isopoda, characterised by a flattened body bearing seven pairs of legs and including the sow bugs and gribbles.

Jetsam – in maritime law, applies to cargo or equipment thrown overboard from a ship in distress and either sunk or washed ashore. The common term ‘flotsam and jetsam’ is now used loosely to describe any objects found floating or washed (respectively) ashore. *See also* Flotsam.

Lichens – any plant organism of the group Lichenes, composed of a fungus and an alga in symbiotic association.

Macrofauna – invertebrate animals that are larger than 0.5 mm.

Mangrove – any of various similar shrubs or trees, especially of the genus *Avicennia*, having stiltlike roots and stems and forming dense thickets along tidal shores.

Marine National Park – in Victoria, highly protected areas reserved and managed under the National Parks Act that represent the range of marine environments in Victoria, and in which no fishing, extractive or damaging activities are allowed.

Marine protected area – a marine area that has some form of protection and is managed for conservation objectives.

Marine Sanctuary – in Victoria, a small, highly protected area reserved and managed under the National Parks Act to protect special values, and in which no fishing, extractive or damaging activities are allowed. These areas complement Marine National Parks.

Meiofauna – invertebrate animals that are smaller than 0.5 mm but larger than 0.063 mm.

Midden – a mound or deposit containing the remains of shellfish eaten by Indigenous people. Coastal shell middens can consist of the shells and other remains from a single meal or many different meals eaten in the same location over many years.

Middens can also contain other cultural items such as stone and bone artefacts.

Mollusc – broad group of animals including snails, sea slugs, squids, octopuses, cuttlefish and mussels.

Mooring – a structure or apparatus used to secure any floating object. A private mooring is a mooring installed and maintained by any non-government agency or individual.

Morphology – the characteristics and configuration and evolution of rocks and land forms [syn: geomorphology].

Nature-based tourism – tourism that provides a range of experiences associated with the natural environment, generally related to outdoor activity.

Neap tide – tide occurring twice every month between spring tides but is slightly lower.

Nekton – organisms with swimming abilities that permit them to move actively through the water column and to move against water currents.

Nematodes – worms of the phylum Nematoda, having unsegmented, cylindrical bodies, often narrowing at each end.

Outfall – the place where sewage is discharged to the ocean.

Pest – exotic organisms (plants, animals or pathogens) that, if introduced outside their natural or previous distribution, cause significant changes to habitats, food chains, ecosystems or human health by feeding on or competing with native species. Can refer to either terrestrial or marine species.

Photosynthesis – the process by which organic molecules are made from carbon dioxide and water, using light energy. This process is essential for the growth and survival of plants and algae.

Phytoplankton – Small plants that drift in open water.

Plankton – the collection of small or microscopic organisms, including algae and protozoans, that float or drift in great numbers in fresh or salt water, especially at or near the surface, and serve as food for fish and other larger organisms.

Pneumatophores – an air-filled root (submerged or exposed) that can function as a respiratory organ of a mangrove, marsh or swamp plant.

Poaching – to take fish or game in a forbidden area or unlawfully.

Polychaetes – annelid worms of the class Polychaeta, including mostly marine worms such as the lugworm, and characterised by fleshy paired appendages tipped with bristles on each body segment.

Predation – the consumption of one organism by another.

Primary productivity – a measure of the rate at which new organic matter is developed through photosynthesis and chemosynthesis in producer organisms based on the oxygen released and carbon taken in; the transformation of chemical or solar energy to biomass.

Ramsar Convention on Wetlands – an international agreement created in Ramsar, Iran, in 1971 to recognise wetlands of international importance.

Recruitment – the residual of those larvae that have dispersed, settled at the adult site, made some final movements towards the adult habitat, metamorphosed successfully and survived to be detected by the observer.

Registered Aboriginal party – registered under part 10 of the Aboriginal Heritage Act by the Aboriginal Heritage Council.

Remnant vegetation – remaining natural vegetation.

Saltmarsh – a coastal habitat consisting of salt-resistant plants residing in an organic-rich sediment accreting towards sea level.

Sediment – insoluble material carried in water, consisting mainly of particles derived from rock, soil and organic material; in particular such material that has settled out of the water, onto the seabed.

Sedimentation – the deposition of sediment on a surface.

Semidiurnal – occurring or coming approximately once every 12 hours, as the tides.

Sessile organism – an organism that is attached to an underwater surface (e.g. pier, seabed, pile).

Sewage – household or commercial waste water including human and industrial wastes.

Sewerage – the system that facilitates the collection, transport, treatment and discharge of sewage.

Shellfish – an aquatic animal, such as a mollusc or crustacean, which has a shell or shell-like exoskeleton.

Soft coral – coral without a solid calcareous cases for structure. Generally colonial and found on hard surfaces.

Sponge – multicellular filter-feeding animals with a variety of forms. Sponges are the simplest form of invertebrate life.

Spring tides – occur twice every month at the new and full moon, and are the highest tides.

Stakeholder – an individual or group that has a vested interest in, or may be affected by, a project or process.

Stormwater – runoff from land during and following rain. Stormwater removes accumulated material including litter, soil, nutrients, pathogens, chemicals, pesticides, oils and grease.

Substrate – a surface on which an organism grows or is attached.

Subtidal – waters below the low-tide mark.

Surfactants – a surface-active substance.

Threatening process – a source of potential harm or a situation with a potential to cause loss.

Toxicant – a poison or poisonous agent.

Tradition – the body of knowledge, belief and customs that is passed from generation to generation.

Traditional Owners – person with traditional or familial links, an Aboriginal person with particular knowledge about traditions, observances, customs or beliefs associated with the area, and the person has responsibility under Aboriginal tradition for significant aboriginal places located in, or significant Aboriginal objects originating from, the area; or is a member of a family or clan group that is recognized as having responsibility under Aboriginal tradition for significant aboriginal places located in or significant Aboriginal objects originating from, the area.

Translocation – the transfer of pest animals or plants from one area to a new area.

Turbidity – having sediment or foreign particles stirred up or suspended; muddy: turbid water.

Values – natural and cultural assets (e.g. historic artefacts, features, species, communities) that have been given worth or are considered to be desirable.

Vascular plant – plants, such as the ferns and seed-bearing plants, in which the phloem transports sugar and the xylem transports water and salts.

Vessel – (as defined in the Marine Act) any kind of vessel that is used, or capable of being used, in navigation by water, however propelled or moved, and includes (a) a barge, lighter, floating restaurant or other floating vessel; (b) an air-cushion vehicle, or other similar craft, that is used in navigation by water; and (c) any aeroplane that is designed for and capable of being waterborne, for so long as that aeroplane is waterborne.

Water column – water habitat extending between the surface and the seabed.

Wetland – land where saturation by water is the dominant factor for soil type and plant and animal

communities (e.g. tidal areas, saltmarsh and mangroves).

Wrack – organic matter, including seaweed that has been washed ashore.

Zooplankton – plankton that consists of animals, including the corals, rotifers, sea anemones, and jellyfish.

Abbreviations

AAV – Aboriginal Affairs Victoria

ANZECC – former Australian and New Zealand Environment and Conservation Council.

CAMBA – China-Australia Migratory Bird Agreement

CBD – Central Business District

CMA – Catchment Management Authority

CSIRO – Commonwealth Scientific and Industrial Research Organisation

CRIMP – Centre for Research on Introduced Marine Pests

DIVA – Dive Industry Victoria Association

DPI – Department of Primary Industries

DSE – Department of Sustainability and Environment, formerly NRE

DVC – Department of Victorian Communities

ECC – Environment Conservation Council, formerly LCC

EPA – Environment Protection Authority

EMF – Environmental Management Framework of Parks Victoria

EPBC – Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)

FFG – Flora and Fauna Guarantee Act 1988

JAMBA – Japan-Australia Migratory Bird Agreement

GPS – Global Positioning System

HBCC – Hobsons Bay City Council

IMCRA – Interim Marine and Coastal Regionalisation for Australia

IRC – Index of river condition

IUCN – International Union for the Conservation of Nature

LCC – Land Conservation Council

MOU – Memorandum of understanding

MSV – Marine Safety Victoria

NEIP – Neighbourhood Environment Improvement Program

NRE – former Department of Natural Resources and Environment

NRSMPA – National Representative System of Marine Protected Areas

PIRVIC – Department of Primary Industries Research Victoria (formerly MAFRI)

PPWPCMA – Port Phillip and Western Port Catchment Management Authority

PWC – Personal water craft

Scuba – Self-contained underwater breathing apparatus

SDFV – Scuba Divers Federation of Victoria

SEMP – Safety and Environment Management Plan

SEPP – State Environment Protection Policy

TFMPA – Taskforce for Marine Protected Areas

VCC – Victorian Coastal Council

WTP – Werribee Treatment Plant

APPENDIX 1 MANAGEMENT OBJECTIVES FOR MARINE SANCTUARIES

Management objectives for marine national parks and marine sanctuaries included on Schedule 7 or 8 of the National Parks Act are detailed in Sections 4 and 17D of the Act as listed below. For an up-to-date copy of the Act, refer to Victorian Acts on the Victorian Legislation and Parliamentary Documents website www.dms.dpc.vic.gov.au.

4. Objects of the Act

The objects of this Act are –

- (a) to make provision, in respect of national parks, State parks, marine national parks and marine sanctuaries –
 - (i) for the preservation and protection of the natural environment including wilderness areas and remote and natural areas in those parks;
 - (ii) for the protection and preservation of indigenous flora and fauna and of features of scenic or archaeological, ecological, geological, historic or other scientific interest in those parks; and
 - (iii) for the study of ecology, geology, botany, zoology and other sciences relating to the conservation of the natural environment in those parks; and
 - (iv) for the responsible management of the land in those parks;
- (c) to make provision in accordance with the foregoing for the use of parks by the public for the purposes of enjoyment, recreation or education, and for the encouragement and control of that use.

17D Marine national parks and marine sanctuaries

(3) The Secretary must –

- (a) ensure that each marine national park and marine sanctuary is controlled and managed in accordance with the objects of this Act. in a manner that will –
 - (i) preserve and protect the natural environment and indigenous flora and fauna of the park and any features of the park which are of geological, geomorphological, ecological, scenic, archaeological, historic or other scientific interest; and
 - (ii) promote the prevention of the introduction of exotic flora and fauna into the park; and
 - (iii) provide for the eradication or control of exotic flora and fauna found in the park; and
- (b) subject to paragraph (a) –
 - (i) provide for the use, enjoyment and understanding of Marine National Parks and Marine Sanctuaries by the public; and
 - (ii) promote an understanding of the purpose and significance of Marine National Parks and Marine Sanctuaries; and
- (c) prepare a plan of management in respect of each marine national park and each marine sanctuary.

APPENDIX 2 SUBMISSIONS ON THE DRAFT MANAGEMENT PLAN

A total of 12 submissions were received on the draft plan, comprising 7 from organisations and 5 from individuals. Two submissions were marked confidential.

ORGANISATION/ INDIVIDUAL	SUBMISSION NUMBER
SUBMISSIONS FROM ORGANISATIONS	
	TOTAL: 7
Australian Marine Conservation Society	06
Confidential	11
Confidential	01
Field Naturalists Club of Victoria	07
Friends of Williamstown Wetlands	03
Hobsons Bay City Council	12
Mobil	10
SUBMISSIONS FROM INDIVIDUALS	
	TOTAL: 5
Robynn Bennison & Helen Tregear	08
Robert Charlesworth	04
Leonie & Frank Jones	09
Ian Rae	02
David Scott	05

APPENDIX 3 SHIPWRECKS

NAME	COMMENTS
Location known:	
<i>Carmen</i>	Wooden brigantine built in Austria in 1879, formerly employed as a whaling relief vessel. Possibly hulked in Melbourne in 1911. Melbourne Harbour Trust licence issued to McIlwraith, McEacharn & Co Ltd to operate <i>Carmen</i> as a coal/wool lighter on 16 May 1917. Licence to new owners, Victorian Lighterage on 22 February 1921. Last renewal 14 January 1935. Register closed in 1936 – ‘broken up’. Was burnt by owners in company with hulk <i>Ester</i> .
<i>Macedon</i>	The lighter <i>Macedon</i> broke away from its tow by the tug <i>Swiftness</i> while under tow to Geelong, drifted ashore at the back of the Rifle Range on 20 Feb 1952 and was abandoned by her owners Victorian Lighterage Pty Ltd. Williamstown locals were encouraged to strip the wreck for firewood. The site consists of large timbers strewn along the rocky shoreline in shallow water.
Location unknown:	
<i>Agnes</i>	Former steamer converted to ketch, blew ashore in 1933.
<i>Ester</i>	Wooden barque arrived in Hobart in 1900 from London. Purchased by Ester Shipping Co. Also known as the ‘ <i>Yellow Peril</i> ’. Only vessel out of Hobart fitted with a windmill pump – used on leaking, undermanned vessels. Condemned and hulked in Melbourne. Licence to operate as coal/wool lighter issued by Melbourne Harbour Trust 16 March 1912 – tonnage altered. Licence renewed 8 January 1918, last renewal 14 January 1935. Burnt, together with hulk <i>Carmen</i> , by owners in 1936.
<i>Baldrock</i>	Operated as a Hobsons Bay ferry between 1907 and 1911. Not popular with passengers due to a lack of enclosed accommodation, and suffered continual engine and boiler problems. In 1908 Ports and Harbours / Public Works Dept converted into a tug for use towing powder barges to the Altona Explosives anchorage. Register closed 9 February 1928 after it was run ashore and broken up behind the Rifle Range.

Source: Heritage Victoria (2000); R. Anderson pers. comm. (2005)

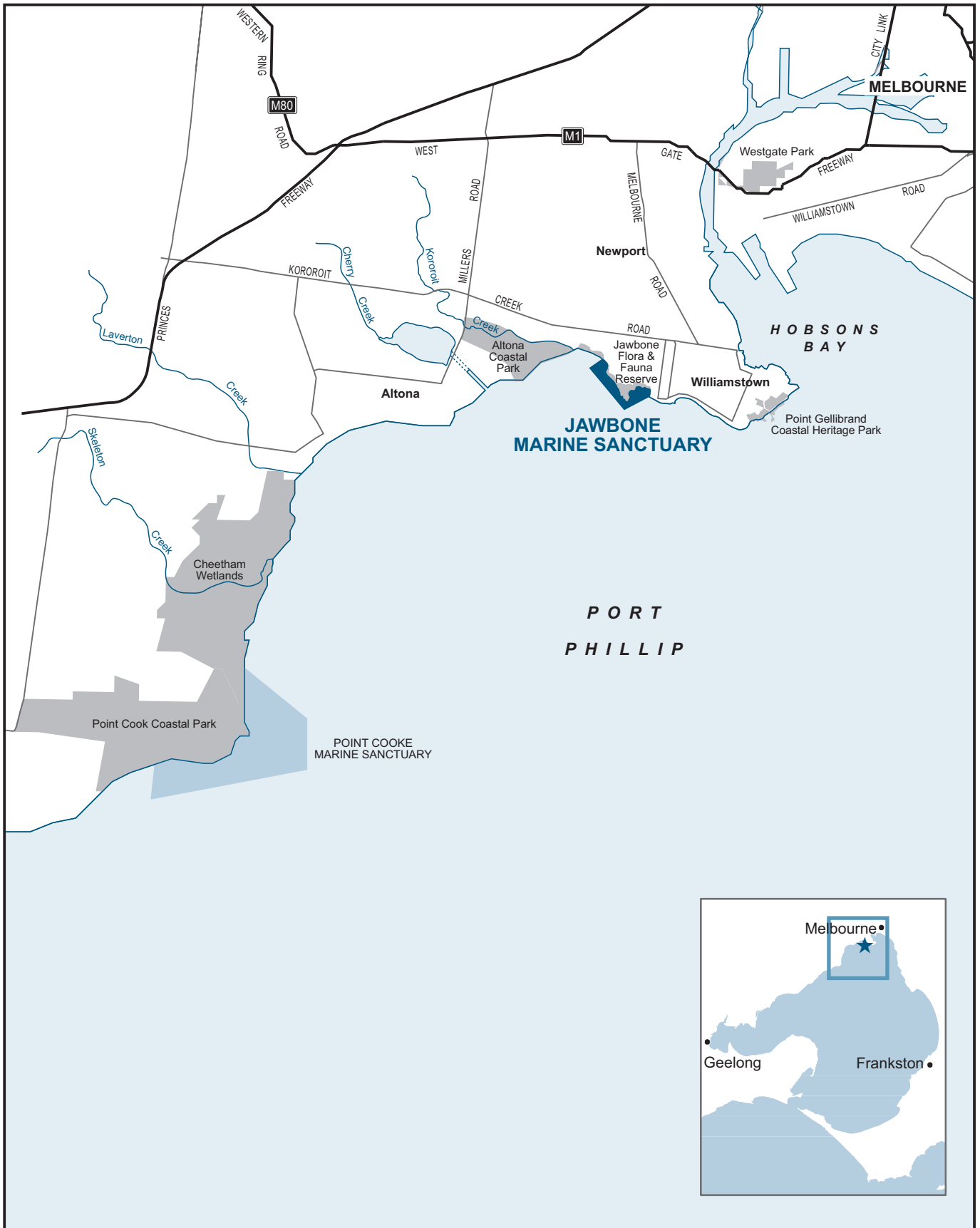







Figure 1
LOCATION
JAWBONE MARINE SANCTUARY

-  Freeway/Highway
-  Major sealed road
-  Jawbone Marine Sanctuary
-  Point Cooke Marine Sanctuary
-  Other Parks



