Port Phillip Bay Environmental Management Plan 2017–2027

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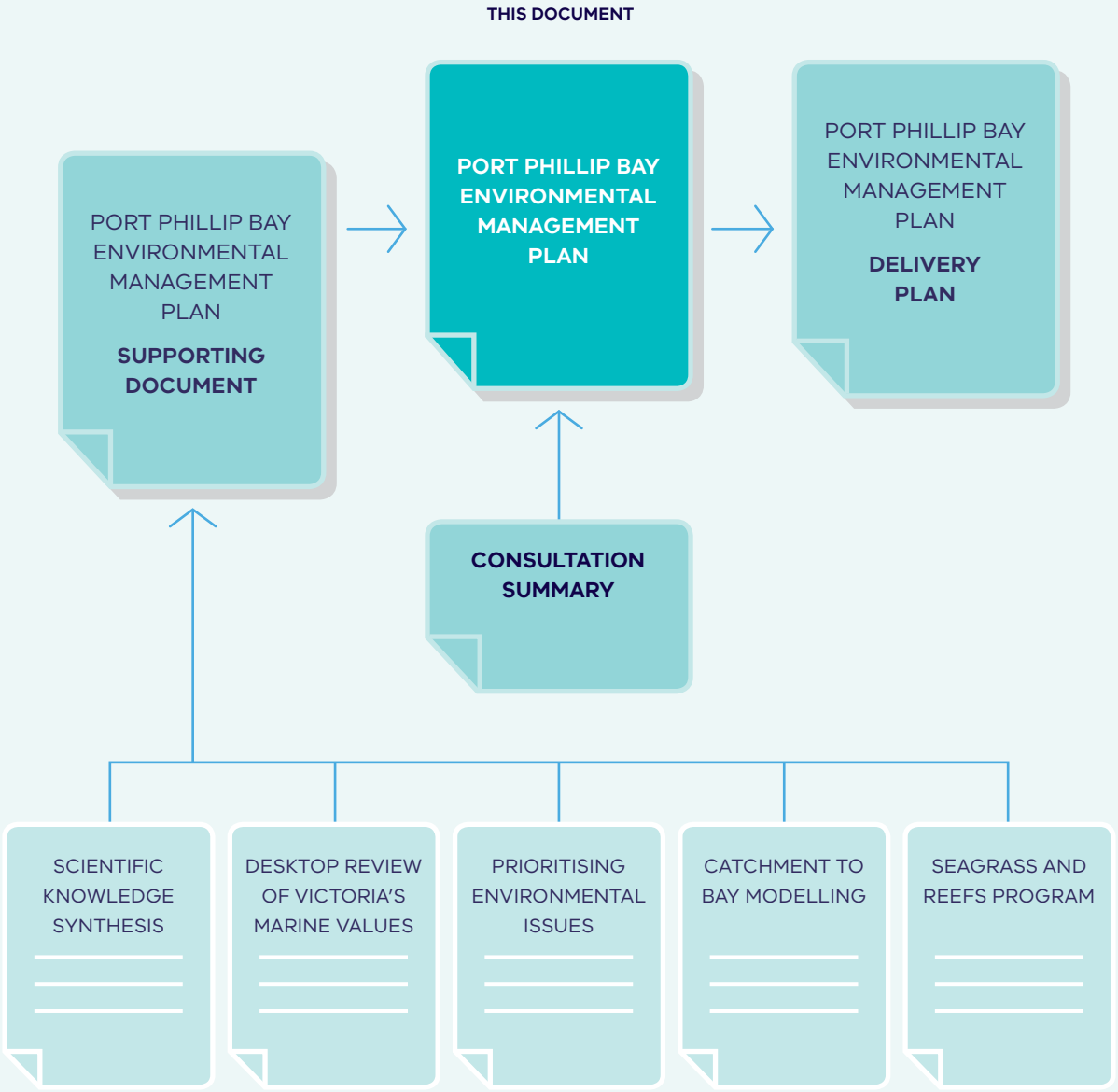
Port Phillip Bay Environmental Management Plan: publication library



Cover: Tourist boat operators provide opportunities for people to get up close with the Bay's marine life.
Photo – South Bay Eco Adventures

Contents

Minister's foreword

Long ago, the area known today as Port Phillip Bay was not a bay but a wide expanse of dry countryside. We know this from scientific evidence and from stories passed down through generations by the local indigenous people. The Traditional Owners of this area call the Bay 'Nairm'.

Today, long after its inundation, Port Phillip Bay is unrecognisable beyond the wildest imaginings of its original occupants. Fringed by suburbia, constantly traversed by ships, and enjoyed by millions who visit its beaches every year, Port Phillip Bay is both cherished and used by the people who live and work around its shores, from Portsea, to Melbourne, Geelong and on to Queenscliff.

The Bay continues to support a healthy ecology with abundant marine plant and animal life. This is in part due to the efforts of successive Victorian governments, which in recent decades have increasingly acted to protect the Bay and its vibrant ecology.

The first Environmental Management Plan for the Bay was released in 2001 and drove significant action and investment to reduce nutrient loads to the Bay by improving the quality of stormwater and wastewater inflows, and helping to reduce the risk of marine pest introduction and spread. Ongoing investment by government, industry and the community has helped to conserve and improve the health of the Bay.

While the Bay is currently in good condition, we cannot take its health for granted. Melbourne's population will almost double in the next 35 years, and significant growth will occur in Geelong and other regional centres. Combined with the additional pressures of climate change, it will be a challenge to ensure the Bay remains healthy.

This new Port Phillip Bay Environmental Management Plan will build on the good work that has already been done, and provides a framework for managing the Bay and its catchment out to 2027. The Plan's vision of a healthy Port Phillip Bay that is valued and cared for by all Victorians, and the goals and priority areas for action to achieve this vision, align with and complement the recently released *Protecting Victoria's Environment - Biodiversity 2037*.

I would like to thank all of the individuals and organisations that have contributed to the development of this Plan. Our shared care and stewardship of the Bay will ensure its future health and value for all Victorians.

Hon Lily D'Ambrosio

Aboriginal acknowledgment

The Victorian Government proudly acknowledges Victoria's Aboriginal communities and their rich culture, and pays respect to their Elders past and present. We acknowledge Aboriginal people as Australia's first peoples and as the Traditional Owners and custodians of the land and water on which we rely.

We recognise the intrinsic connection of the Kulin nation people to Nairm (Port Phillip Bay) and its catchment, and we value their contribution in the management of land, water and the natural landscape. We support the need for genuine partnerships with Aboriginal people and communities, to understand their culture and connections to Country, and to better manage the Bay and its catchment. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

Port Phillip Bay was created when the ocean flooded the plain some 8-10,000 years ago. Kulin nation tribes around the Bay have oral histories that tell of this event. One of these is reproduced here, as told by Boonwurrung elder, Carolyn Briggs.

The Filling of the Bay – The Time of Chaos

Many years ago the biik (land) we now call greater Melbourne extended right out to the warreeny (sea). Nairm (Port Phillip Bay) was then a large, flat, grassy plain. The Yarra River, as it is known today, flowed out across this flat plain into the warreeny. For the Boonwurrung, this wurneet was known as Birrarang (River of Mist). This large plain was covered in buath (grass) and tarrang biik (woodlands) on which the Boonwurrung guleeny (men) hunted guyeem (kangaroo) and barraeemal (emu). The bagurrk (women) cultivated the murrnong (yam daisy). They collected food from the wurneet (creek) and the warreeny, and harvested the iilk (eels) that migrated through there every year.

The Boonwurrung were the custodians of their biik, but traded with and welcomed people from other parts of the Kulin nation. They obeyed the laws of Bundjil, who travelled as an eagle, and Waang, who travelled as a crow.

One day – many, many years ago – there came a time of chaos and crisis. The Boonwurrung and the other Kulin nations were in conflict. They argued and fought. They neglected their biik. The murnong was neglected. The animals were over-killed and not always eaten. The gurnbak (fish) were caught during their spawning season. The iilk were not harvested.

As this chaos grew, the warreeny became angry and began to rise. The wurneet became flooded and eventually the whole flat plain was covered in baany (water). It threatened to flood their whole birrarang-ga (country).

The people became frightened and went to Bundjil, their creator and spiritual leader. They asked Bundjil to stop the warreeny from rising. Bundjil was angry with his people, and he told them that they would have to change their ways if they wanted to save their biik. The people thought about what they had been doing and made a promise to follow Bundjil.

Bundjil walked out to the warreeny, raised his tjeera (spear) and directed the warreeny to stop rising. Bundjil then made the Boonwurrung promise that they would respect the laws. The baany never subsided, but stayed to create a large bay that the Boonwurrung called Nairm. Today it is known as Port Phillip Bay. The warreeny took away much of the biik of the Boonwurrung and much of their birrarang-ga was reduced to a narrow strip of coastline.

The Boonwurrung learnt from their mistakes. They returned to their old values and the laws of Bundjil. They took greater care of the biik of Bundjil and the bubup (child) of Bundjil. They met with other Kulin people and sorted out their differences through sports, debates and dance. One of the most important laws that Bundjil required to be obeyed was for Boonwurrung people to always welcome visitors and to require all visitors to make a promise that they would obey the laws of Bundjil, not hurt the biik of Bundjil and not harm the bubup of Bundjil.

Today, the wurneet that once flowed through this large flat plain still flows under the Nairm.

Recreational snorkellers jumping into the water at Popes Eye, Port Phillip Heads Marine National Park. Photo – Parks Victoria

1 Purpose and scope

Port Phillip Bay Environmental Management Plan

This Plan recognises the environmental, social and economic values of Port Phillip Bay, and builds on current programs and investment to protect the Bay's health.

Port Phillip Bay and its catchment

Port Phillip Bay is the largest marine embayment in Victoria, with extensive coastal communities, the city of Melbourne on its northern edge, and the city of Geelong in the south-west (Figure 1).

Figure 1 Port Phillip Bay and catchment

Port Phillip Bay: fast facts

COASTLINE	333 kilometres
AVERAGE DEPTH	13 metres (almost half of the Bay is less than 8 metres deep)
MAXIMUM BASIN DEPTH	24 metres (depth at the heads is almost 100 metres)
VOLUME	26.3 billion cubic metres
TOTAL BAY AREA	1,934 square kilometres
TOTAL CATCHMENT AREA	9,694 square kilometres
CATCHMENT POPULATION	More than 4.5 million people (includes Melbourne and Geelong)

Mud Islands, Port Phillip Heads Marine National Park. Photo – Parks Victoria

History of the Bay and its Traditional Owners

We know that Aboriginal people have inhabited the land and catchment of Port Phillip Bay for more than 30,000 years.

Some 16,000 years ago, before the end of the last Ice Age, the land mass of Victoria was still connected to Tasmania. At this time, the Yarra and Werribee rivers meandered through a great plain of woodlands, grasslands and saltbush, before flowing through a gorge at the Heads. People of the Kulin nation lived, hunted and gathered on this great plain, which we now know as Port Phillip Bay.

Until between 8,000 and 10,000 years ago, what is now the Bay entrance was blocked with sand and silt, cutting it off from Bass Strait. When the ocean finally penetrated the entrance to the Bay, it would have filled rapidly. This dramatic environmental event is consistent with Aboriginal oral histories that describe the flooding of the plains where people of the Kulin nation had lived.

Aboriginal people have continued to live around the Bay since the great flooding. Almost 600 archaeological sites have been found that provide evidence of their ancestors' past activities.

Purpose and scope of this Plan

Healthy coasts, marine areas and waterways are vital to the prosperity and wellbeing of all Victorians. At the most basic human level, we need clean water for our survival. More broadly, healthy waterways and marine areas are vital to business and the state economy, and provide incalculable benefits to all the people who use them for recreation and tourism.

By almost any reckoning, Port Phillip Bay is Victoria's most significant marine area. Its immediate proximity to Greater Melbourne and Geelong defines its central place in the lives of millions of people.

Apart from its well-known status as a recreational hotspot and as Australia's busiest container port, the Bay's importance and value can also be measured in square kilometres (almost 2,000 – making it the biggest embayment in the state), exceptional physical beauty, ecological richness and diversity, and its interdependence with other parts of the natural environment. For so many reasons, the Bay can be safely counted among Victoria's greatest and most precious natural assets.

The importance of maintaining a healthy Bay has been recognised by successive Victorian governments. As new environmental threats and challenges have emerged over recent decades, legislation and regulations dedicated to caring for the Bay (and other key marine environments) have been revised and strengthened, and management plans introduced. With the development of a new Environmental Management Plan for Port Phillip Bay (this 'Plan'), the government is consolidating the long-standing commitment to conserve and enhance Victoria's most important marine areas.

This Plan is required under the *State Environment Protection Policy (Waters of Victoria) – Schedule F6 Waters of Port Phillip Bay (1997)*. It applies to 'all the waters of Port Phillip Bay bounded by the high water mark, a line drawn between Point Lonsdale and Point Nepean and a line across the mouth of the Yarra River'.

In managing the health of the Bay, this Plan also seeks to influence the management of surrounding and connecting rivers and catchments, and all inputs they bring to the Bay.

Schedule F6 outlines beneficial uses and the environmental value of the Bay, and sets out what the environmental management plan must achieve. In summary these requirements include:

- Determining the priority management issues
- Outlining actions that respond to priority issues
- Identifying management responsibility for particular issues
- Coordinating the management for protection of the Bay's beneficial uses and natural values
- Identifying specific management actions for nutrients, sediments, pathogens, litter and marine pests
- Providing a process for reviewing and reporting progress to the community.

This Plan acknowledges the connection of Aboriginal people to the Bay and aims to improve their role in managing the Bay and preserving their cultural values. Photo – Robert Molloy

A broad range of issues have been evaluated against the risk they pose to Bay health; the need and the opportunity to improve their management and coordination; their existing management controls (legislation, policy, regulation); the community's level of concern; and the ability to achieve a positive and significant outcome in the ten-year life of this Plan.

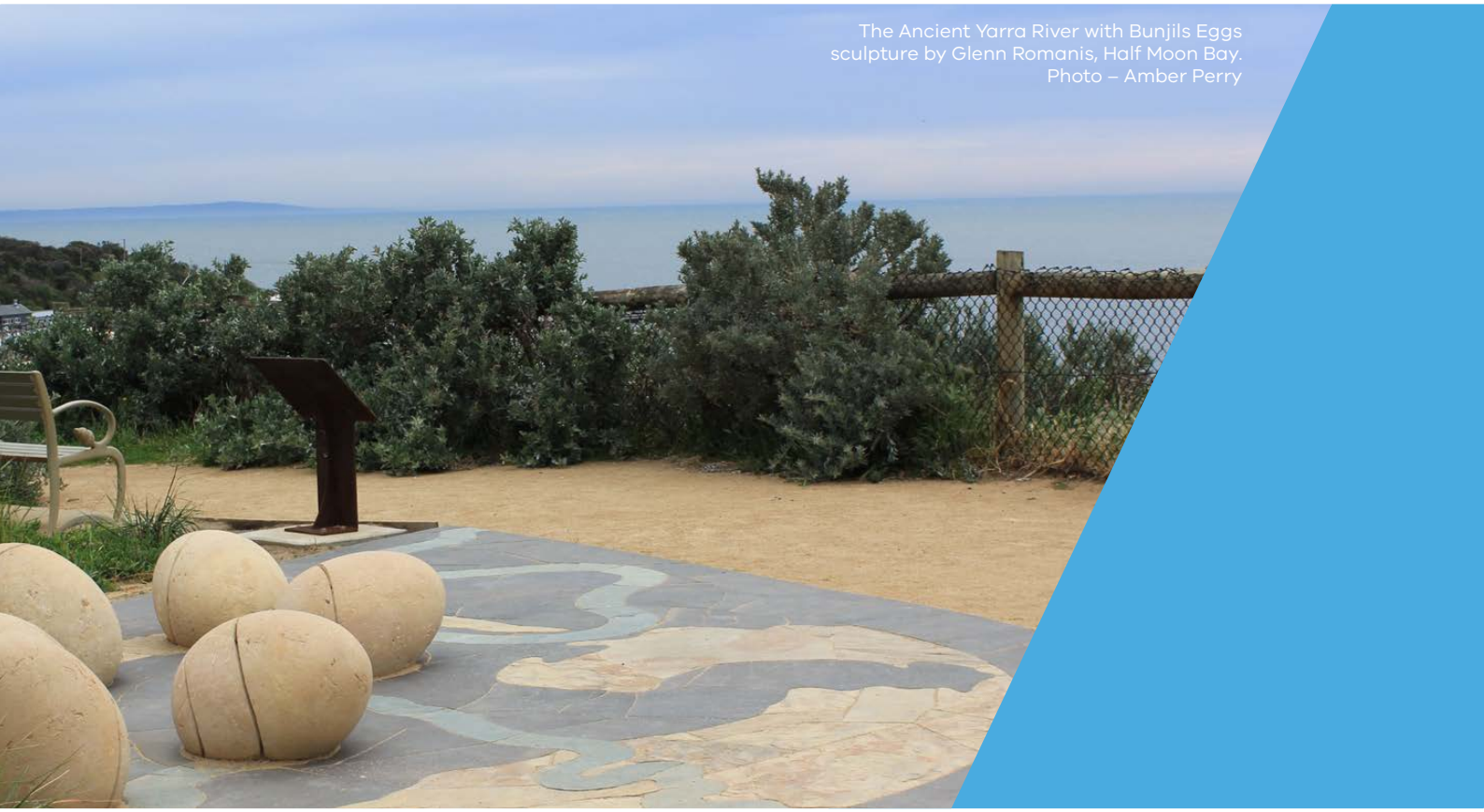
In prioritising issues and identifying actions and responsibilities, this Plan does not aim to manage or control every aspect of the Bay and its catchment, or every activity that takes place within them. The intention of the Plan is to ensure the key elements of Bay health are maintained so that the inherent environmental value, and the social and economic benefits derived from the Bay, are realised long into the future.

In responding to *Schedule F6*, this Plan places significant emphasis on managing impacts to water quality. This Plan does not include actions to address issues associated with coastal/foreshore processes, port activities such as dredging and spoil disposal, commercial and recreational fishing, use of jet skis and marine safety. These issues are managed through a range of government agencies, in accordance with state policy and legislation (see the following section for further detail).

This Plan is the result of a coordinated effort by the Department of Environment, Land, Water and Planning (DELWP) in partnership with Melbourne Water and the Environment Protection Authority (EPA) Victoria. It recognises that collective action from government, industry and the community will be required to achieve this Plan's vision and goals.

The accompanying ***Port Phillip Bay Environmental Management Plan: Supporting Document (2017)*** provides a comprehensive account of the legislative, policy, community and scientific factors around which this Plan has been developed.

The ***Port Phillip Bay Environmental Management Plan: Delivery Plan (2017)*** provides detail about the outputs and outcomes, timelines, monitoring and reviews that are required for the life of this Plan. Some activities will begin in year one; others will take longer to plan and initiate. This Plan will be delivered over ten years, with annual reporting on progress and evaluation at five-yearly intervals. This is consistent with the approach and principles of international standard ISO 14001:2015 for environmental management systems. Implementation of this Plan will include an iterative process for achieving continuous improvement and adaptive management.



The Ancient Yarra River with Bunjils Eggs sculpture by Glenn Romanis, Half Moon Bay. Photo – Amber Perry

Ricketts Point Marine Sanctuary. Photo – Parks Victoria

Current environmental management of the Bay

Management of the Bay involves a network of government agencies, community organisations and businesses. The health of the Bay relies on integrated management of marine, coastal and catchment-based pressures.

Shared management responsibilities

Management of the Bay occurs within a framework of federal, state, regional and local strategies, plans and policies. The state's *Environment Protection Act 1970* and the federal *Environment Protection and Biodiversity Conservation Act 1999* provide overarching legislation that defines core conservation and management principles.

The Department of Environment, Land, Water and Planning (DELWP) is responsible for leading and coordinating environmental management of the Bay, and other roles including wildlife protection, incident response, planning and issuing of permits for works.

While DELWP holds the lead role, many other organisations and agencies have management responsibilities in the Bay and within its catchment.

Environmental regulation

The Environment Protection Authority (EPA) Victoria is the environmental regulator and has responsibility for independent assessment, licensing, reporting and advice regarding environmental health issues affecting waterways and the Bay. The EPA is responsible for administering and enforcing the *Environment Protection Act 1970* and *State Environment Protection Policy (Waters of Victoria)*.

Coastal and foreshore management

Under the *Coastal Management Act 1995*, there is a hierarchy of agencies responsible for managing coastal issues such as inundation, erosion and development. The Victorian Coastal Council has responsibility for preparation of a framework to guide planning, management and sustainable use of the Victorian coast. At a regional level, the Central Coastal Board has developed the *Central Regional Coastal Plan*, incorporating Port Phillip Bay. At a local level, a range of public land managers (including local government and DELWP) are responsible for preparing coastal management plans and climate change adaptation plans.

Overarching adaptation to climate change is a whole-of-government priority, which will be guided by the new *Climate Change Act* and Victoria's *Climate Change Adaptation Plan 2017-2020*. There may be some change to coastal management responsibilities with the introduction of the new *Marine and Coastal Act* (which is currently in preparation).

Ten local councils in partnership with the Association of Bayside Municipalities have prepared the 'Bay Blueprint' to provide a consistent, bay-wide response to coastal adaptation.

CASE STUDY 1

Improving habitats with shellfish reef restoration

In many parts of Port Phillip Bay shellfish reefs have been completely lost or made 'functionally extinct'. These reefs, made up of oysters, mussels and other shellfish, were once an important feature of the Bay, providing a rich source of food and important ecological functions, such as coastal protection and habitat for other marine animals like crabs, sea squirts and fish.

In many parts of Port Phillip Bay shellfish reefs have been completely lost or made 'functionally extinct'. These reefs, made up of oysters, mussels and other shellfish, were once an important feature of the Bay, providing a rich source of food for the bay's traditional owners and important ecological functions, such as coastal protection.

Shellfish reef restoration project led by The Nature Conservancy. Photo – Simon Branigan

Waterways and catchment health

Melbourne Water and the Corangamite Catchment Management Authority (CMA) have waterway management functions for designated waterways within their districts under the *Water Act 1989*. They develop plans and carry out works and activities that will improve water quality and ecosystem health for waterways.

The Port Phillip and Westernport CMA also plays important roles in catchment management, improving biodiversity, reducing erosion, improving river health and supporting community action.

Marine protected areas, local ports and navigable waterways

Parks Victoria manages the Bay's marine national parks and marine sanctuaries, which help to safeguard Victoria's unique and diverse marine plants and animals and their habitats. Parks Victoria also holds responsibility for navigable waterways (including rivers, creeks and estuaries) and is the designated local port manager and waterway manager under the *Port Management Act 1995* and the *Maritime Safety Act 2010*.

Commercial ports, shipping and navigation

The Bay's commercial shipping is managed by the Victorian Ports Corporation (Melbourne) for Port Phillip Bay and Melbourne, and the Victorian Regional Channels Authority for the approaches to the Port of Geelong. Responsibilities for the commercial operations within the ports lie with Port of Melbourne Operations Pty Ltd and Geelong Port respectively. Victorian Ports Corporation and Victorian Regional Channels Authority both provide the harbour master function, which includes shipping control, oversight of channel management and the provision of navigation aids. Both organisations are responsible for the development and implementation of safety and environment management plans (SEMPs).

Commercial and recreational fishing

The Department of Economic Development, Jobs, Transport and Resources (DEDJTR), which includes Victorian Fisheries Authority, manages and regulates commercial and recreational fishing and aquaculture in the Bay under the *Fisheries Act 1995*.

Boating and marine safety

Maritime Safety Victoria, which is a branch of Transport Safety Victoria, regulates the safe operation of vessels (sailing, human-powered, and motor craft) in the Bay, under the *Marine Safety Act 2010*.

Other organisations

Other organisations with a role in conserving and caring for the Bay and its catchment include:

- Local committees of management for Crown Land Reserves
- Department of Economic Development, Jobs, Transport and Resources (which includes Agriculture, Biosecurity, Fisheries, Ports and Tourism)
- Department of Health and Human Services
- Local government (including local councils, Municipal Association of Victoria, and Association of Bayside Municipalities)
- Office of the Commissioner for Environmental Sustainability
- Sustainability Victoria
- Victorian Planning Authority
- Water corporations (Barwon Water, Central Highlands Water, City West Water, South East Water, Southern Rural Water, Western Water, and Yarra Valley Water)
- Zoos Victoria.

New legislation and policy

A number of new and revised state policies and legislation may impact on future environmental management of the Bay. Where required, the actions in this Plan are aligned with their intent. Further detail on these new policies and initiatives is provided in Appendix 1.

Beach goers, Port Phillip Bay.
Photo - Parks Victoria

Previous studies and initiatives

The Victorian Government and its agencies have led a number of initiatives to improve understanding of the Bay and to inform management actions over the past 20 years. These initiatives, including the 2001 Plan, are summarised below in Figure 2.

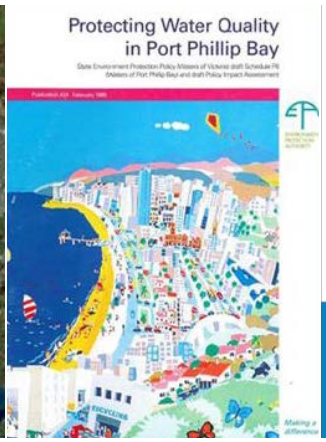
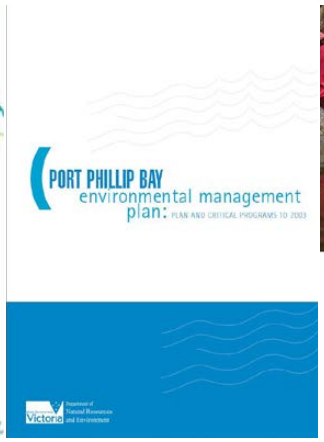
Port Phillip Bay Environmental Study	***State Environment Protection Policy (Waters of Victoria) Schedule F6***	***Port Phillip Bay Environmental Management Plan***	**Additional plans and strategies**
			
1992–1996	1997	2001	2006–2015
The *Port Phillip Bay Environmental Study* was directed by the CSIRO and funded by Melbourne Water. The $12 million study was undertaken over 4 years and investigated the ecology of the Bay, its physical processes, nutrient levels and toxicant levels. The study confirmed that nitrogen is the key element limiting algal growth and identified the critical nitrogen load for the Bay. A key recommendation was to reduce nitrogen loads to the Bay by 1000 tonnes per annum to improve water quality.	The *State Environment Protection Policy (SEPP) (Waters of Victoria)* established the statutory framework to protect and rehabilitate Victoria's freshwater and marine environments. *Schedule F6 Waters of Port Phillip Bay (1997)* included specific objectives for protection of water quality in the Bay. The schedule required the development of an environmental management plan (EMP) for the Bay and clearly identified what the EMP needed to achieve.	The first *Port Phillip Bay Environmental Management Plan* (EMP) was published in 2001 and provided an overarching framework to mitigate two key risks to the Bay's environment: nutrients and marine pests. The EMP included targets for reducing nitrogen loads from the Western Treatment Plant by 500 tonnes per annum, and a further 500 tonnes per annum from catchment waterways. The marine pest program aimed to improve management of vectors, reduce the impact of introductions, and, where technically feasible, reduce impacts of established pest populations.	Since the 2001 Plan was developed, other studies and strategies have been delivered by the government, Melbourne Water, EPA, the Port of Melbourne Corporation and other agencies. The studies have expanded our knowledge of the Bay's health and processes, including the provision of important information on its physical characteristics, nutrient loads and ecological variability. Strategies such as *Better Bays and Waterways, A Cleaner Yarra River & Port Phillip Bay* action plan and the *Victorian Coastal Strategy* have continued the momentum of the 2001 Plan.

Figure 2 Summary of past studies, policies and plans for managing Port Phillip Bay

Achievements to date

The first Environmental Management Plan for the Bay was released in 2001 and specified a set of environmental objectives to manage two priority risks to the Bay: nutrients (specifically nitrogen) and marine pests. Figure 3 provides a summary of activities and achievements that have helped to protect the Bay since the 2001 EMP was published.

Nutrient inputs were considered a key risk because they are one of the main causes of algal blooms, which pose a health risk to marine life and to humans. One of the major objectives of the 2001 Plan was to reduce the annual nitrogen load to the Bay by 1000 tonnes through upgrades to the Western Treatment Plant and improved stormwater management in the catchments. Monitoring data and modelling results show that this target has been achieved.

The 2001 Plan incorporated a marine pest program. Marine pests were considered a key risk because they can compete with native species, alter habitats and potentially disrupt nitrogen cycling processes. The objectives of the marine pest program were to continue to improve the management of vectors that lead to the introduction of marine pests, and to reduce the impact of pests. Initiatives of this program included release of the *EPA Waste Management Policy (Ships Ballast Water)* in 2004 and the *Environment Protection (Ships Ballast Water) Regulations* in 2006. These regulations ensure that high-risk ballast water is not discharged into Victorian ports or coastal waters. Engagement and communications programs with small boat operators were also undertaken to help improve awareness and understanding of how to avoid spreading marine pests.

INFRASTRUCTURE	LOCAL PLANNING	EDUCATION AND INCENTIVES	MONITORING AND RESEARCH	POLICY AND GUIDELINES
Upgrades to the Western Treatment Plant have reduced annual nitrogen loads to the Bay by 500 tonnes	Introduction of mandatory **stormwater quality performance standards** for new developments	**Capacity building** programs for **reducing nitrogen** inputs to waterways from rural areas	**Bay nutrient cycling** monitoring program	Regulations to **reduce** the risk of **spreading marine pests** through domestic ballast water
Construction of 52 wetlands and other **water sensitive urban design initiatives** have reduced annual nitrogen loads from waterways by 109 tonnes	Implementation of a **stormwater offset service** for new developments that cannot meet best practice stormwater management	**Incentives** for landholders to restore degraded land and **reduce sediment and nutrient** loads to waterways and the Bay	**Storm event** monitoring program	Contribution to the National System for the **prevention and management of marine pest incursions**
	$20 million to councils to prepare and implement **municipal stormwater strategies,** including construction of raingardens, wetlands and other projects	**Engagement** with small boat operators to encourage simple steps to **avoid spreading marine pests**	Research on **marine pest populations** and the impacts on nutrient cycling processes $5.5 million on research for management of **seagrass and temperate reefs**	

Figure 3 Summary of achievements since 2001

Decorator Crab. Photo – Raymond Lewis

3

Bay values and challenges

Environmental health underpins all that we value about the Bay.

Values of the Bay

The Bay's values, along with broader benefits to which they contribute, were identified through a literature review and community consultation. An environmental risk assessment of these values was used to identify priority areas of focus for this Plan. Figure 4, below, highlights the most important values of the Bay.

VALUES

Aquatic habitats and wildlife

- Fish, sharks and rays
- Marine mammals (dolphins, seals, whales)
- Birds (seabirds, shorebirds, penguins, waterfowl, etc.)
- Invertebrates (corals, jellyfish, squid, sea stars, worms, urchins, etc.)
- Shellfish (oysters, mussels, molluscs, pipis, etc.)
- Plankton (zooplankton and phytoplankton)
- Seaweeds
- Wetlands of significance for migratory birds
- Sponge gardens
- Subtidal rocky reefs
- Intertidal rocky shores
- Sandy beaches
- Intertidal mud flats
- Salt marshes and mangroves
- Unvegetated soft sediments

Ecosystem functions

- Denitrification
- Fish nurseries , living space and refuges
- Carbon capture and storage
- Filtration of sediment from water column
- Oxygenation
- Assimilation of waste
- Coastal protection

Fishing

- Wild fish harvesting (recreational and long line commercial fishing)
- Aquaculture

Industrial and commercial use

- Tourism
- Port operations (passenger and freight)
- Commercial seafood
- Hospitality

Cultural heritage – Aboriginal and post-European

- Traditional hunting, fishing and gathering sites and practices
- Customs, celebrations, stories, past and present connections to country
- Shell middens and sacred sites
- Historical structures and places
- Shipwrecks and maritime history

Recreation

- Swimming
- Kitesurfing and windsurfing
- Diving and snorkelling
- Boating and sailing
- Rockpool rambling
- Birdwatching
- Scenery and aesthetic enjoyment

BROADER BENEFITS

Healthy bay ecosystems

Thriving economy

Recreation and tourism

Liveable communities

Figure 4 Summary of values associated with the Bay

Environmental values

The Bay is home to a diversity of marine plants and animals, many of which are found nowhere else. They include hundreds of species of fish, molluscs, crustaceans, marine worms, cnidarians (e.g. jellyfish and sea anemones), algae (seaweeds) and sponges. The Bay also supports populations of marine mammals, including seals and dolphins.

The Bay supports many different natural habitats (Figure 5). Along the foreshore are sandy beaches, rocky intertidal reefs, mud flats, mangroves and saltmarshes. Habitats within the Bay include seagrass meadows, rocky reefs, sponge gardens and unvegetated soft sediments (sands and silt). Unvegetated soft sediments on the seafloor are home to a diverse array of invertebrates and micro-organisms that are critical in processing nitrogen and other nutrients. Seagrasses provide nurseries for many fish and invertebrate species. Rocky reefs provide hard substrate on which hundreds of species of seaweed grow.

The Port Phillip Bay (western shoreline) and Bellarine Peninsula Ramsar site, and the Edithvale-Seaford Wetlands Ramsar site, are internationally recognised for the quality of their wetlands and the large numbers of Australian and migratory birds that utilise them. There are also four marine protected areas in the Bay: the Port Phillip Heads Marine National Park, and the Point Cooke, Jawbone and Ricketts Point marine sanctuaries.

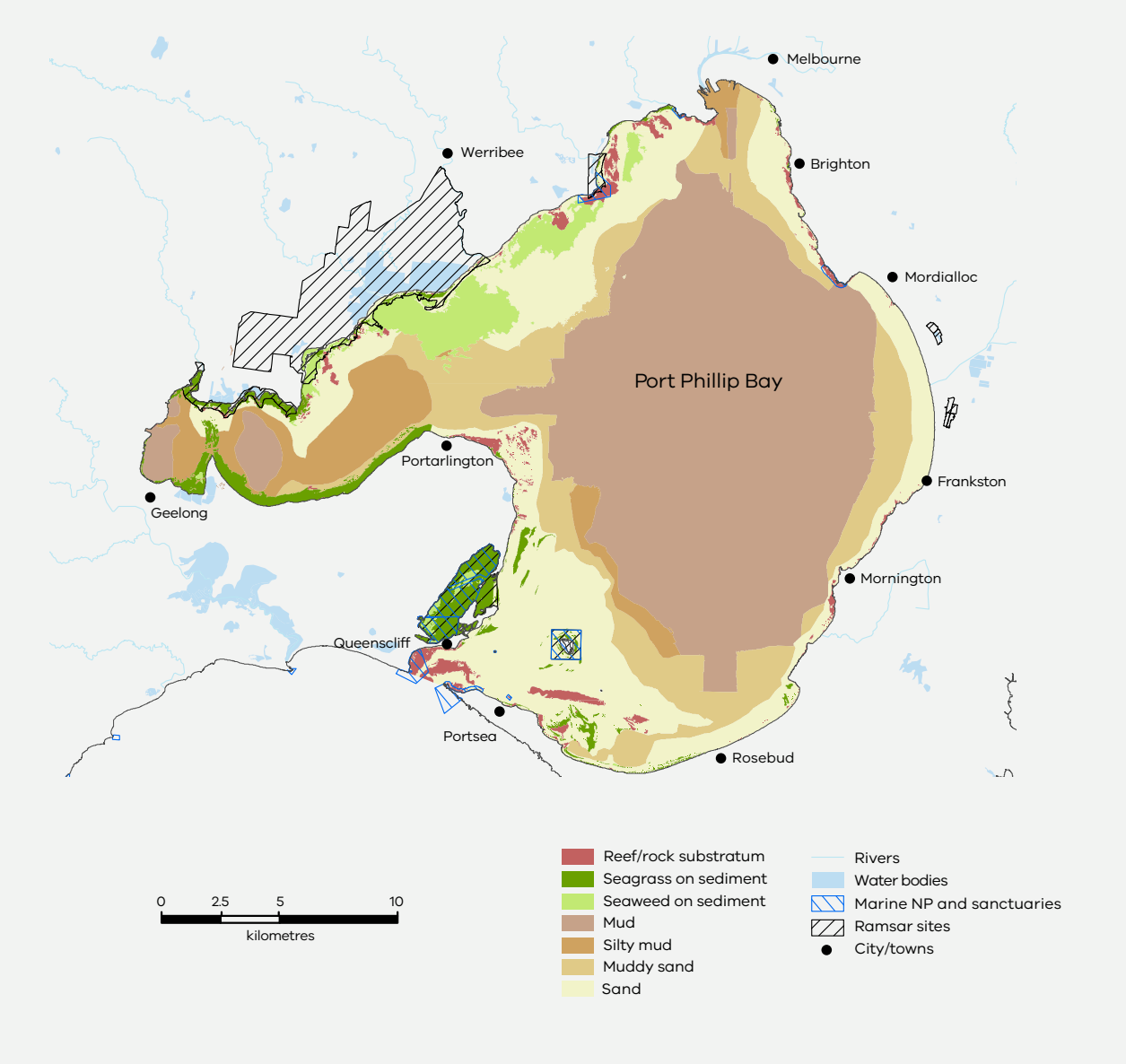


Figure 5 Bay habitats and protected areas

Social and cultural values

Port Phillip Bay is one of Victoria's most loved and popular recreational destinations, attracting more than 50 million visitors annually, including many from interstate and overseas.

For Melburnians and others who live close to its shores, the Bay is a vast and freely accessible sanctuary from the bustling metropolis, and a major contributor to the liveability of the city and its surrounds.

With its mostly calm, temperate waters and long lengths of sandy coastline, the Bay supports an array of beach and aquatic activities, from swimming, snorkelling, kite-surfing and scuba diving, to fishing, sailing, motor boating or just walking. Millions also can, and frequently do, just enjoy the Bay for its visual beauty, taking in the sights from the shoreline or from adjacent urban areas.

There are 135 beaches along the Bay coastline, some of which are patrolled by community volunteer lifesaving clubs. Popular dive sites in marine parks and sanctuaries include Popes Eye and Portsea Hole.

The Bay has a number of landscapes and sites of historical and cultural significance. Aboriginal tribes that have lived for millenia on and around the Bay include the Wathaurung, the Bunurong/Boon Wurrung, and the Wurundjeri. These tribes are part of the Kulin nation. Through their cultural traditions, Aboriginal people maintain their connection to their ancestral lands and waters. Traditional Owner groups want to maintain these connections to land and sea country into the future, and grow the community's understanding and appreciation of their cultural history.

Victoria's first European settlement was established in 1803 at Sullivan Bay, near Sorrento, 32 years before Melbourne was founded. There are many shipwrecks and heritage sites in the Bay associated with Victoria's early seafaring days.

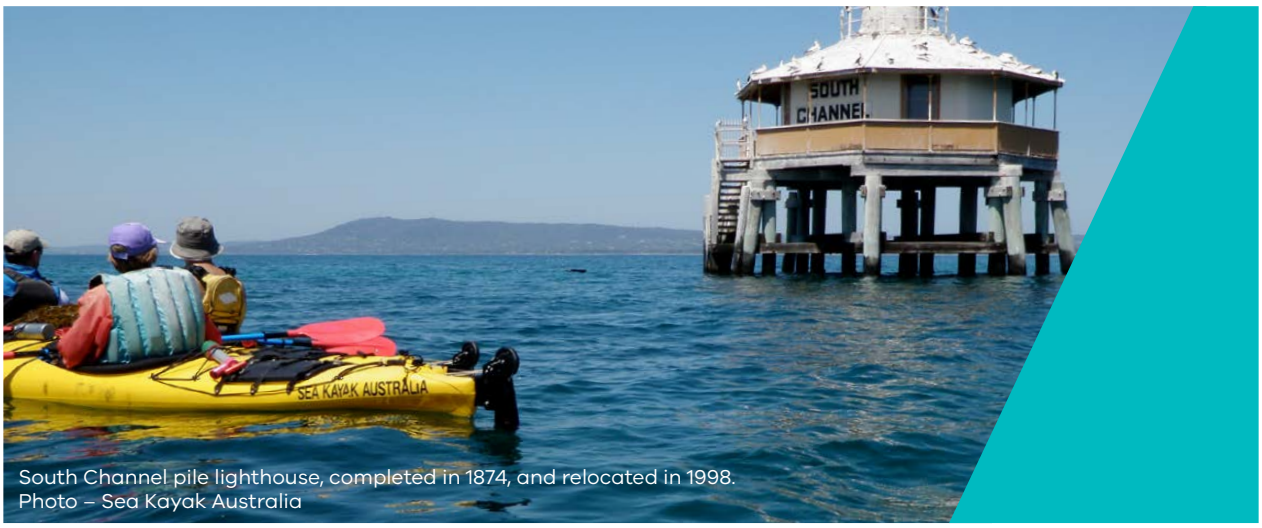
Economic values

The Bay is home to Victoria's largest commercial ports. The Port of Melbourne is Australia's busiest container port, handling more than a third of national container trade, with more than 3000 ship visits per year. The Port of Geelong is Victoria's largest regional port and its most important bulk commodities port, with more than 600 ship visits per year.

Commercial fisheries and aquaculture operate in the Bay. In the 35 years to 2012, annual production of finfish averaged around 1200 tonnes, with a market value of about $3.5 million. The value from commercial fishing will be reduced with the phasing out of netting by 2022 and the buy-back of commercial licences.

Aquaculture is a potential growth area for the Bay. There are currently seven aquaculture fisheries reserves, with farming of blue mussels the predominant activity. Total mussels production is around 900 tonnes per annum. There is also commercial diving for scallops, abalone and sea urchins.

Recreational fishing in the Bay is a major contributor to the Victorian economy, with an estimated economic value of over $420 million per year. Bay tourism and associated businesses contribute more than $320 million per year to the economy. Commercially operated boat tourism, including wildlife watching (dolphins, seals and penguins) and recreational diving, are among the most prominent water-based businesses. Activities on the water are supported by a range of other businesses along the coast, including accommodation, food and restaurants, sports hire, and boating and fishing supplies.



South Channel pile lighthouse, completed in 1874, and relocated in 1998.
Photo – Sea Kayak Australia

Challenges to Bay health

While much is being done to conserve the health of the Bay, population growth and climate change are putting increased pressure on its environmental health.

Climate change will exacerbate some existing problems and create new ones. Water temperatures will increase, leading to a change in species composition, and changing patterns of marine and coastal biological communities. Sea levels will rise and storm surges will become more frequent, exposing the coastline to erosion and inundation, and squeezing coastal habitat between the sea and urban development. It is predicted that under a changing climate there will be less rainfall, but more intense rainfall events, causing flooding, erosion in the catchment, and transportation of higher sediment and nutrient loads to the Bay.

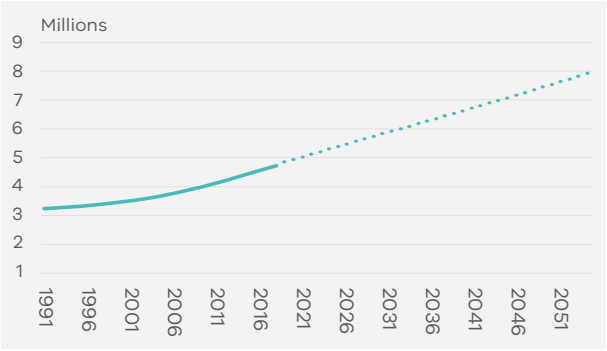


Figure 6 Predicted population of Greater Melbourne
Source: Victoria in Future, 2016

Victoria in Future 2016 predicts that Greater Melbourne's population will almost double over the next 35 years, from more than 4.5 million to more than eight million people (Figure 6).

This growth presents significant challenges to maintaining Bay health. More people will be using and enjoying the Bay, with more boats, more fishers and more people on the beaches. There will be more litter, more microplastics, more sewage and more pollution from the catchment. Urbanisation (the building of more houses, roads, footpaths, shops, etc.) will increase the area of hard or impervious surfaces within the Bay's catchment. Where water can't soak into the ground, increased stormwater runoff will flow to the Bay.

Greater volumes of stormwater and sewage will result in an increase in nutrients, litter and other pollutants draining into the Bay. Increasing nutrients and pollutants will cause more algal blooms and poor water quality during wet periods, potentially resulting in more frequent temporary closures of popular beaches.

Increasing water temperatures, changing nutrient levels and higher boat traffic increase the risk of marine pest introductions and spread. Marine pests can compete with native species, alter habitats, reduce important fish stocks, and potentially disrupt nitrogen cycling processes.

CASE STUDY 2

Understanding microplastics in the Bay

Microplastics are defined as any pieces of plastic less than 5mm in diameter. Examples include 'nurdles' (small plastic pellets used to manufacture a range of plastic products), 'microbeads' (from cosmetics) and the breakdown products of plastic litter.

Community concern about microplastics in the Bay is growing, driving a need for greater understanding of their sources and their impacts on the marine environment.

Several programs are already in place to increase our understanding of microplastics and their impacts in the Bay. RMIT University and EPA Victoria have started research and monitoring into the impact of microplastics; Sustainability Victoria is leading a collaborative research program to understand the sources and impacts of microplastics; and the Victorian Government has funded initiatives such as Operation Clean Sweep (led by Tangaroa Blue) to educate industry on the improved management of plastics at manufacturing sites.

Plastic resin pellets ('nurdles') caught in a surface trawl in Port Phillip Bay. Photo – Anna Kilborn

Snorkelling Beaumaris. Photo - David Reinhard

4

The Plan

A healthy Port Phillip Bay that is valued and cared for by all Victorians

This Plan identifies actions which address future challenges to the health and resilience of the Bay. The 21 actions over seven priority areas deliver on three goals: improved stewardship of the Bay, water quality and marine biodiversity.

A place to explore – to wonder and ponder and imagine

Used to help Victorian economy, not an end itself.

Pollution free

Strong ecosystem. Animal habitat looked after!

Harmony – people, wildlife, industry

Recreation very important

We are all linked - treat the Bay with respect

Improved water quality

Healthy fish Healthy water

Educate about the environment

Protect environmental outcomes of the Bay

I want the water to be nice and clean. Even the sand

A clean bay for everyone to enjoy and use

Figure 7 A collective vision for the Bay, drawn from community consultation

Shared vision for the Bay

As a part of this Plan, community and stakeholders have helped to create a new vision statement (below) describing the long-term aspirations for environmental management of the Bay.

Our collective vision is represented pictorially in Figure 7, with some of the personal visions provided during the consultation process.

The vision reflects the government's commitment to conserve the health and natural assets of the Bay, in accordance with the *State Environment Protection Policy (Waters of Victoria) – Schedule F6 Waters of Port Phillip Bay (1997)*.

The vision and goals are considered to be long-term aspirations, and will be progressively worked towards over time. This Plan outlines 21 actions, across seven priority areas, which will be delivered over ten years.

Our collective vision for the bay is:

A healthy Port Phillip Bay that is valued and cared for by all Victorians

Goals, priority areas and actions

Three goals have been developed, each based on input and advice from key agencies and stakeholder groups, and on feedback from the community, to achieve the long-term vision for the health of the Bay. These goals are consistent and aligned with the intent of *SEPP (Waters of Victoria) – Schedule F6*, to conserve the beneficial uses of the Bay by minimising adverse impacts associated with human activity and the use of the Bay and its catchment. The goals are also consistent with other Victorian Government environmental policies.

GOAL 1
Stewardship of the Bay is fostered across community, industry and government

This goal aims to enhance Victorians' appreciation for the Bay and support the development of partnerships between government, community and industry to improve the health of the Bay.

GOAL 2
Water quality is improved to ensure environmental health and community enjoyment of the Bay

This goal aims to ensure that the Bay continues to have good environmental and recreational water quality to support healthy and diverse ecosystems and the wide variety of human uses.

GOAL 3
The Bay's habitats and marine life are thriving

This goal aims to support the health of the Bay's marine life and habitats, including preventing the introduction and spread of exotic marine pests.

Priority areas and strategies have been identified under each goal. For these priority areas a series of actions outline what needs to be done to achieve the goals. More information on the rationale for each priority area is included in the *Port Phillip Bay Environmental Management Plan 2017–2027: Supporting Document*.

Some activities that can have an impact on the Bay are not within the scope of this Plan. Community concern about these out-of-scope issues is acknowledged. These issues include dredging and spoil disposal, commercial and recreational fishing, coastal erosion and inundation, and management of jet skis. These issues are managed through other mechanisms, regulation and legislation. More details on out-of-scope issues are provided in the *Supporting Document*.

The Victorian Government is committed to conserving and enhancing the health of the state's marine and coastal environments. The *Port Phillip Bay Environmental Management Plan 2017–2027* is an important step towards achieving this goal.

Port Phillip Bay is a unique and precious natural asset, with spectacular scenery and rich and diverse marine life. The Bay supports a wide range of community uses, underpins local and regional businesses, and provides significant economic benefits to the State of Victoria.

This Plan builds on the good work that is already being done to maintain the health of the Bay. It aligns government, industry and community groups on actions that will address challenges resulting from population growth, urbanisation and climate change.

Understanding this Plan

This Plan focuses action and investment on priority issues affecting Bay health. Priorities were identified through background investigations, and community and agency consultation.

Goals, priority areas and actions in this Plan are based on:

- What scientific investigation has identified as key threats to the health of the Bay
- Issues on which stakeholders and the broader community want action
- Which issues need more attention or coordination
- Which actions will have the most impact on protecting long-term Bay health.

Priority actions will be implemented over ten years, and will follow an adaptive management approach. Specific interventions and activities will be aligned to, and in some cases delivered by, broader state or regional plans and strategies (such as whole-of-catchment planning or integrated water cycle management).

Outcomes from the 21 actions across the seven priority areas will collectively contribute to the goals of this Plan. Further details on the potential types of activities under each action are listed on the following pages. Potential partner organisations for actions have been listed in alphabetical order. More details on activities and success measures will be provided in the Delivery Plan, which will be reviewed annually.

VISION	**A healthy Port Phillip Bay that is**	
GOALS	Stewardship of the Bay is fostered across community, industry and government	
PRIORITY AREAS	**Connect and inspire**	**Empower action (work together)**
STRATEGIES	Improve appreciation and understanding of Bay values and connections to catchment	Improve collaboration and partnerships across community, industry and government
PRIORITY ACTIONS	**1.1** Work with Aboriginal groups to improve understanding of Aboriginal cultural values and interests in the Bay and support connections to Country	**2.1** Build capacity and knowledge within community and industry networks
	1.2 Develop and deliver programs to inspire greater appreciation of the Bay's values	**2.2** Empower the broader community to get more actively involved in caring for the Bay
	1.3 Build understanding of management responsibilities and programs for the Bay and its catchment	**2.3** Support stronger partnerships across community, industry and government to ensure aims and outcomes are aligned

valued and cared for by all Victorians

Water quality is improved to ensure environmental health and community enjoyment of the Bay			The Bay's habitats and marine life are thriving	
Nutrients and pollutants	**Litter**	**Pathogens (human health)**	**Habitat and marine life**	**Marine biosecurity**
Ensure nutrient and sediment loads do not exceed current levels and pollutant loads are reduced where practicable	Reduce litter loads to the Bay	Minimise risks to human health from pathogens	Conserve and restore habitats and marine life	Manage risks from marine pests
				
3.1 Effectively maintain existing stormwater infrastructure and programs to mitigate loads to the Bay, or secure via equivalent means	**4.1** Establish a baseline estimate of the volume of litter entering the Bay and support clean up activities	**5.1** Improve understanding of links between pathogen concentrations and human health for swimming and consumption of shellfish	**6.1** Monitor indicator species and key habitats at priority locations	**7.1** Prevent introduction and dispersal of marine pests
3.2 Prevent increases in nutrient loads from wastewater systems and where practicable reduce loads of other pollutants	**4.2** Support capability and capacity building programs that target litter prevention, including reduction of microplastics	**5.2** Adopt a risk-based approach to mitigate sources of pathogens found in the Bay	**6.2** Improve understanding of ecological processes, threats and pressures	**7.2** Monitor priority locations for early detection of marine pest introductions
3.3 Ensure all urban and rural land use effectively controls impacts from stormwater and runoff, and that controls are in place to manage increases in loads	**4.3** Identify and prioritise litter sources and pathways, and take actions to prevent litter entering the Bay	**5.3** Improve monitoring and reporting to better detect and communicate human health risks from pathogens	**6.3** Improve overall extent and condition of the Bay's natural ecosystems	**7.3** Respond rapidly to new introductions of marine pests

PRIORITY AREA 1

Connect and inspire

Improve appreciation and understanding of Bay values and connections to catchment

Consultation in early 2016 highlighted a sense that the biodiversity and cultural heritage of the Bay was underappreciated and that people didn't understand how their behaviours in the broader catchment impacted on the Bay's health. There is a need to foster deeper community understanding and connections to the Bay and its management challenges.

ACTION 1.1

Work with Aboriginal groups to improve understanding of Aboriginal cultural values and interests in the Bay and support connections to Country

This action will provide greater acknowledgement of the importance of Aboriginal values and contributions to managing the health of the Bay, and commits to working with the region's Aboriginal groups in delivering this Plan.

Proposed activities include:

- Supporting opportunities for Traditional Owners to strengthen connections with their cultural values.
- Supporting opportunities for Traditional Owner groups to lead on assessments of Aboriginal cultural values and interests (past and present) across different regions of the Bay.
- Developing opportunities to educate government, industry and the broader community about Aboriginal cultural values and interests in the Bay.

Delivery of this action could be linked to similar activities across the region for improving understanding of Aboriginal values.

Potential partner organisations:: Traditional Owner groups.

ACTION 1.2

Develop and deliver programs to inspire greater appreciation of the Bay's values

This action will improve understanding and appreciation of the Bay's values across government, industry and the community. While the social benefits derived from the Bay are well appreciated by many, the economic and environmental benefits (i.e. its diverse marine life) are often under-appreciated. This action seeks to inspire greater environmental stewardship by citizens, to help the community understand the impacts of their actions on the Bay's health, and to provide motivation for them to act to conserve it.

This action will include programs to foster positive behavioural change and building of social networks to support protective action for the Bay. Citizen science will play an important role in this action, as will community awareness and engagement programs. Current examples include programs being run by the Dolphin Research Institute, Parks Victoria, Port Phillip EcoCentre, Zoos Victoria and Museums Victoria.

Proposed activities include:

- Conducting social and economic research on community values and identifying gaps in knowledge.
- Identifying and promoting the types of programs that would advance this priority, including programs to encourage connection to nature and environmental stewardship.
- Supporting organisations to promote and implement community-based programs that allow more people to connect with nature and inspire environmental stewardship. This will build on existing awareness and education programs such as 'i Sea i Care', Baykeeper, ReefWatch and Coastcare.

Potential partner organisations: CMAs, community groups, Councils, DELWP, educational and research organisations, EPA, Melbourne Water, Parks Victoria, Sustainability Victoria and Traditional Owner groups.

ACTION 1.3

Build understanding of management responsibilities and programs for the Bay and its catchment

This action will improve communication of key responsibilities for Bay management to the community. It will improve the visibility of active management, provide confidence that the Bay is being well managed and increase the ease of reporting incidents. It will involve developing a range of communication strategies to reach target audiences.

Proposed activities include:

- Implementing programs to communicate roles and responsibilities for management of key issues in the Bay, as well as providing clear information on who to contact if there's a problem, and identifying gaps and overlaps that create confusion.
- Developing catchment-based maps and other communication tools to explain where various programs and projects are occurring, how they interrelate, and how people can get involved.
- Establishing regular forums on Bay issues to enable government and non-government organisations to meet, share advice and strategies, and consider progress in actions and activities.

Potential partner organisations: CMAs, Councils, DELWP, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups and broader government, industry and community organisations

Cross Cultural Awareness training day presented by Uncle Bill Nicholson Jnr at Dights Falls. Photo – Melbourne Water

PRIORITY AREA 2

Empower action

Improve collaboration and partnerships across community, industry and government

Strong partnerships and collaboration are crucial for successful environmental management programs. With strong partnerships, innovation can flourish, resources can be maximised, knowledge can be shared, and long-term community and organisational networks are built. A strong foundation of community networks already exists, as do partnerships involving volunteers, researchers and agencies. These will be supported and further developed.

ACTION 2.1

Build capacity and knowledge within community and industry networks

This action will improve the ability of communities and industries to contribute to managing the health of the Bay. Capacity building programs will provide community and industry organisations with the knowledge, skills, techniques, guidelines and tools needed to implement the goals of this Plan.

Capacity building needs of community and industry groups include:

- Access to technical advice, training, equipment, scientific techniques, resources and tools.
- Access to strategic advice on group administrative matters, governance and where to source funding.
- Fostering of peer-to-peer learning and information-sharing networks between groups.

Proposed activities include:

- Establishing region-wide and catchment-based frameworks for supporting citizen science programs and local community groups, including consideration of regional support hubs.
- Supporting existing community and industry capacity building programs (such as Clearwater, Waterwatch coordinators, Coastcare coordinators, Landcare) and developing other programs where needed.
- Developing innovative tools to support citizen science and on-the-ground community action.

Potential partner organisations: CMAs, Councils, DELWP, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups, research organisations and industry and community groups

ACTION 2.2

Empower the broader community to get more actively involved in caring for the Bay

This action will empower a greater cross section of the community to get involved in caring for the Bay and its catchments by promoting preventative actions, and raising awareness of opportunities for positive community or personal behavioural change. This will involve promoting new programs and building upon existing programs that help communities and individuals care for the Bay, such as Zoos Victoria's 'Seal the Loop' bins and the Australian Marine Mammal Conservation Foundation's 'Bin not Bay' campaign.

Proposed activities include:

- Implementing communication programs to promote existing opportunities, and to identify gaps and new opportunities to develop programs that allow the broader community to get more actively involved in caring for the Bay.
- Communicating achievements of community programs more widely to attract interest and inspire action.

Potential partner organisations: CMAs, community groups, Councils, DELWP, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups and educational and research organisations

ACTION 2.3

Support stronger partnerships across community, industry and government to ensure aims and outcomes are aligned

This action will support the many initiatives being undertaken by a range of groups, and will result in a more coordinated approach to achieve better management outcomes for the Bay.

Proposed activities include:

- Identifying mechanisms to ensure strong collaboration between community, industry and government organisations involved in caring for the Bay.
- Improving mechanisms to ensure a greater representation of Traditional Owners in management activities for the Bay.
- Identifying opportunities for sharing and reporting of activities being undertaken across the community, industry and government.

Potential partner organisations: CMAs, community groups, Councils, DELWP, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups and educational and research organisations

CASE STUDY 3

Community groups improving the health of the Bay

Community groups and community-agency partnerships play an important role in keeping the Bay healthy and vibrant. The award-winning 'Port Phillip Baykeeper', run by the Port Phillip EcoCentre, is one example of a successful community program. The Baykeeper brings together community members and stakeholders, and facilitates projects to improve the health of the Bay.

Baykeeper activities for schools, community and corporate groups include plastic pollution clean-ups and audits on streets and beaches, shoreline shell surveys, live mollusc surveys, monitoring beach erosion, and coastal revegetation for seabird habitats.

Port Phillip EcoCentre Life Support for the Bay.
Photo - Chris Cossar

PRIORITY AREA 3

Nutrients and pollutants

Ensure nutrient and sediment loads do not exceed current levels and pollutant loads are reduced where practicable

Research shows nutrients, sediment and other pollutants flowing into the Bay from the surrounding catchment are the main contributors to poor water quality. Without careful management of our stormwater and wastewater, pollution flowing into the Bay will significantly increase as our population expands and our cities and towns become more urbanised.

ACTION 3.1

Effectively maintain existing stormwater infrastructure and programs to mitigate loads to the Bay, or secure via equivalent means

This action will ensure that reductions in nitrogen, sediment and pollutant loads to the Bay (achieved via stormwater improvement programs and infrastructure built since the previous Environmental Management Plan) are sustained. This includes assessing the effectiveness of existing constructed wetlands systems and other stormwater assets (such as raingardens and stormwater harvesting schemes).

The most effective ways to mitigate nitrogen and sediment loads may not just involve remediation of existing stormwater assets. Alternative approaches and best value investment programs for stormwater management infrastructure will also be explored.

Proposed activities include:

- Undertaking audits of stormwater management assets to assess whether they are meeting their design intent for nitrogen, sediment and pollutant reduction. And where required, remediating, replacing or offsetting infrastructure that is failing to meet its design intent.
- Continuing research into contaminants of emerging concern in stormwater, and methods to reduce these contaminants.

Potential partner organisations: CMAs, Councils, DELWP, EPA, Melbourne Water, Parks Victoria, other land managers with stormwater assets, research organisations and stormwater industry

ACTION 3.2

Prevent increases in nutrients loads from wastewater systems and, where practicable, reduce loads of other pollutants

This action will address the challenges of urban growth and forecast increases in the volume of wastewater (from sewage) that is predicted in line with population growth. Water corporations will operate wastewater treatment plants to ensure their annual nitrogen load discharges do not exceed current levels, and that the loads of other pollutants are reduced where practicable.

Proposed activities include:

- Obtaining annual discharge monitoring data for individual wastewater treatment plants to assess against targets and to calculate cumulative annual loads discharged into the Bay.
- Reporting forecast volumes of nitrogen and other pollutants discharged from wastewater treatment plants and areas with onsite wastewater systems (e.g. septic tanks), and assessing the adequacy of plans to address growth and to contain total nitrogen loads to the Bay at current levels.
- Undertaking improvement works at Western Treatment Plant to ensure that nitrogen loads to the Bay do not exceed 3100 tonnes per year (as a three-year rolling average).
- Continuing research into contaminants of emerging concern within wastewater, the impact of these on the Bay, and methods to reduce their presence in discharge waters.

Potential partner organisations: CMAs, Councils, DELWP, EPA, Melbourne Water, other water corporations, industry and research organisations

ACTION 3.3

Ensure all urban and rural land use effectively controls impacts from stormwater and runoff, and that controls are in place to manage increases in loads

This action will investigate current planning, building and other control mechanisms to improve effectiveness in stormwater management across all land uses within the catchment. New and innovative ideas will be explored to minimise any increase in stormwater flows (and pollutant, nutrient and sediment loads) resulting from increased urbanisation and more intense rainfall events.

Proposed activities include:

- Reviewing the performance of existing planning controls (planning mechanisms, regulations and standards) for stormwater management and recommending appropriate changes.
- Improving understanding of stormwater management requirements and achieving improved compliance rates.
- Continuing with land management activities and community-based programs that reduce impacts of stormwater and run-off from urban and rural land.
- Developing a monitoring and modelling framework for reporting catchment loads of nitrogen and sediment and for assessing the impact of these loads on water quality in the Bay.

Potential partner organisations: CMAs, Councils, DELWP, EPA, Melbourne Water and other water corporations, Traditional Owner groups, Victorian Planning Authority, land development industry, community groups, and research organisations

Yarra River plume after large rainfall event in February 2011. Photo – Fairfax Syndicate

PRIORITY AREA 4

Litter

Reduce litter loads to the Bay

Litter has negative impacts on marine life and on community enjoyment, and evidence is growing on the ecological and health impacts of microplastic litter in particular. Litter in the Bay comes from a range of sources, but most flows in from the surrounding drains and waterways. Without strong management actions, litter loads to the Bay are projected to increase significantly as our urban population grows.

ACTION 4.1

Establish a baseline estimate of the volume of litter entering the Bay, and support clean up activities

This action will support the ongoing clean-up of beaches, and will establish standards for collecting data on the amount of litter being cleaned up. These data will be used for mapping the sources of litter being collected from beaches and the Bay. Understanding litter distribution, types (e.g. containers, plastic bags, straws and packaging) and accumulation points will inform management strategies. These data will also provide a baseline to evaluate litter prevention strategies and clean-up activities.

Proposed activities include:

- Preparing a baseline estimate of the volume of litter entering the Bay, and estimating how much is already in the Bay. This will include reviewing beach survey and data collection methods, and developing a process for ongoing estimates.
- Investing in research and analyses to better understand the types and sources of litter, how it is getting into the Bay, and the impact it is having on community use and health of the Bay. This will include catchment, coastal and marine source litter. This research will be used to develop litter reduction strategies and targeted infrastructure and clean-up activities.
- Continuing to support organisations involved in cleaning up beaches, as this is recognised as a valuable contribution to the maintenance of Bay health and recreational appeal. Information based on the volume and types of litter collected by these organisations will be used to evaluate litter prevention strategies.

Potential partner organisations: CMAs, Councils, DELWP, EPA, Melbourne Water, Metropolitan Waste Resource and Recovery Group, Sustainability Victoria, research organisations and community groups (including Beach Patrol and the Port Phillip EcoCentre)

ACTION 4.2

Support capability and capacity building programs that target litter prevention, including reduction of microplastics

This action will support programs to reduce litter and littering. These programs will align with the government's *Victorian Waste Education Strategy* and will adopt the Victorian Litter Action Alliance best-practice model for litter prevention. This model recognises an evidence-based and multi-faceted approach, combining education, infrastructure and enforcement. This action will also draw on research aimed at addressing gaps in our understanding of litter, particularly microplastics, and its ecological impact.

Proposed activities include:

- Supporting the capacity of councils and community groups to deliver programs that reduce the generation of litter, as well as littering behaviours. The focus will be on reducing littering from key locations (such as shopping and eating precincts) and from coast and water-based activities (such as fishing, boating, festivals and events).

ACTION 4.2 CONTINUED	• Developing programs that encourage stewardship and leadership in litter prevention, including partnering with businesses and industry to encourage waste reduction, re-use and recycling. ***Potential partner organisations:*** CMAs, Councils, DELWP, EPA, Melbourne Water, Metropolitan Waste Resource and Recovery Group, Sustainability Victoria, industry and community groups
ACTION 4.3 **Identify and prioritise litter sources and pathways, and take actions to prevent litter entering the Bay**	Although the government is committed to preventing littering, widespread behaviour change will not occur instantly. In the interim, it is important that beaches are kept clean. This action will support councils, waterway and coastal land managers, businesses and community groups on projects that aim to prevent litter from hotspots entering the Bay. This action will involve stakeholders working in partnership to manage litter in waterways and drains identified as major pathways for litter entering the Bay. Proposed activities include: • Identifying locations where significant volumes of litter are deposited; key sources and pathways; and infrastructure or behavioural changes to reduce litter at these locations. • Conducting audits of gross pollutant traps (GPTs) installed on drains and waterways to evaluate performance and recommend maintenance or remediation. Outputs from these investigations will be used to identify and prioritise locations where new GPTs can be built to reduce litter entering the Bay. ***Potential partner organisations:*** CMAs, Councils, DELWP, EPA, Melbourne Water, Metropolitan Waste Resource and Recovery Group, Parks Victoria, Sustainability Victoria and industry

Frankston Beach Patrol group assisting with beach surveys of microplastics. Photo – Sustainability Victoria

PRIORITY AREA 5

Pathogens (human health)

Minimise risks to human health from pathogens

Pathogens are bacteria or other micro-organisms that can cause disease. High levels of pathogens in recreational waters can increase the risk of illnesses such as gastroenteritis. Pathogen levels can be particularly high during and after wet weather, when stormwater runoff from the catchment is correspondingly high. When pathogen concentrations are high, the public is provided with advice that beaches may not be suitable for swimming. Pathogens can also impact the Bay's aquaculture industry.

Research has shown pathogens associated with faecal contamination mainly enter the Bay from stormwater drains and waterways, but can also come from other sources. Targeting the key sources of pathogens and good public communication are powerful tools for minimising risks to human health.

ACTION 5.1

Improve understanding of links between pathogen concentrations and human health risks for swimming and consumption of shellfish

This action will help to quantify the risk relationship between pathogen concentrations in Bay waters and human health from swimming and consumption of shellfish. This knowledge will inform priorities for investment in mitigation activities.

Health-based water quality objectives, quantitative microbial risk assessments (QMRAs) and epidemiological studies are used to quantify human health risks. For swimming, epidemiological studies provide a direct measure of human illness rates for swimmers who are exposed to recreational waters. Results from these studies can inform policy and regulatory guidance via the association between these illness rates and regular sampling of water quality indicators at the site in question. QMRAs provide information on the risk from different faecal sources and mitigation strategies.

Proposed activities include:

- Undertaking investigations to establish the risk of illness from swimming at beaches with elevated concentrations of pathogens. QMRAs or epidemiological studies may be conducted to measure risks to health from swimming and related activities.
- Using QMRAs to characterise and indirectly measure health risks from consumption of seafood such as commercially grown mussels and species of shellfish harvested from the Bay.
- Continuing to investigate new methods for measuring pathogen concentrations and profiling microbial sources of contamination to establish sources of risk.

Potential partner organisations: Councils, DELWP, DEDJTR, DHHS, EPA, Melbourne Water, other water corporations, industry and research organisations

Beach affected by poor water quality. Photo – Ross Kilborn

ACTION 5.2

Adopt a risk-based approach to mitigate sources of pathogens found in the Bay

This action will investigate and identify the highest risk faecal sources (transported via waterways and stormwater drains or located directly at a beach), where they are located, their likely risk to human health, and the best approaches for mitigating the risk.

Proposed activities include:

- Identifying and mapping stormwater drains that directly discharge to the Bay and, based on catchment characteristics, classifying these drains as potential sources of pathogens. For priority drains, undertaking short-term monitoring projects to assess their significance as sources of pathogens.
- Using research, on-ground investigations and modelling to:
  - Predict what level of flow and microbial concentration from drains and waterways contributes to the increased health risk at beaches.
  - Predict volume of sewage (e.g. sewer leaks or spills, licensed discharges, cross connections and septic overflows) and other contributions of faecal pollution in stormwater runoff for dry and wet weather flows.
  - Predict risk to swimmers from local beach sources (e.g. bather shedding, sediment re-suspension).
  - Identify locations or high-risk areas for faecal sources.
  - Build water quality models and modelling tools that can support water corporations and Councils in managing pathogens risks from stormwater.
- Trialling and evaluating source tracking and control methods for mitigation of faecal sources (includes end-of-pipe solutions, capital infrastructure, or source control).
- Reviewing outcomes from the above-listed activities to ensure that appropriate mitigation measures (including sewer upgrades) are implemented to reduce pathogen concentrations at beaches.

Potential partner organisations: Councils, DELWP, DHHS, EPA, Melbourne Water and other water corporations, industry and research organisations

ACTION 5.3

Improve monitoring and reporting to better detect and communicate human health risks from pathogens

This action will improve the Beach Report program by using the latest methods and technologies to improve the accuracy of forecasting for water quality, and to improve the response to, and management of, contamination sources. This action will incorporate citizen science programs to help identify pathogen risks, and to provide a strong foundation for behaviour change.

Proposed activities include:

- Continuing to collect water samples at beaches for analysis of Enterococci, which is the key indicator for bacteriological water quality in marine waters, and which informs the Beach Report program.
- Investigating more accurate and timely forecasting of microbial water quality, and adopting new water quality monitoring technologies, techniques and modelling approaches to better detect and communicate risks to managers and the public.

Potential partner organisations: Councils, DELWP, DHHS, EPA, Melbourne Water and other water corporations, and research organisations

PRIORITY AREA 6

Habitat and marine life

Conserve and restore habitats and marine life

The habitats and marine life of Port Phillip Bay are rich and diverse – but are vulnerable to external threats. Research has identified significant risks to the health of the Bay's habitat and marine life from water-borne pollution, litter and climate change. By tackling these issues and engaging in direct habitat conservation and restoration efforts, it is hoped that the Bay's marine life will be resilient and able to prosper through environmental change.

ACTION 6.1 **Monitor indicator species and key habitats at priority locations**	This action will improve knowledge and understanding of the spatial extent, condition and temporal changes of indicator species (organisms that can be studied as a measure of ecological health) and key habitats in the Bay. It will also improve knowledge on the impact of stressors (including sea level rises, water temperature increases, ocean acidity, storm surges, sand movement and catchment discharges) on these habitats. Proposed activities include: • Monitoring and mapping key habitats at priority locations in the Bay, and assessing changes in their extent and condition. • Supporting the use of citizen science programs for monitoring. These programs increase the skills and knowledge of volunteers and provide the community with opportunities to participate in natural resource management and contribute to local decision making. • Using information from monitoring programs to establish baselines that can be used for target setting for conservation and restoration projects, evaluating the effectiveness of management interventions and attainment of clauses in the *SEPP (Waters of Victoria)*. ***Potential partner organisations:*** DEDJTR, DELWP, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups, research organisations, community and industry groups
ACTION 6.2 **Improve understanding of ecological processes, threats and pressures**	This action will increase understanding of how ecosystem processes are affected by key threats and pressures. Issues highlighted for investigation include: • Consequences of changes in nutrient regimes on ecosystem structure and function, including further examination of nutrient sources (e.g. groundwater). • Impacts of climate change on key ecosystem structures and function, including intertidal reefs and low-lying coastal areas. • Impacts of catchment discharges on denitrification processes (which remove nitrogen from Bay waters). This action will build on results from DELWP's Seagrass and Reefs research program, and on issues identified for further investigation through Action 6.1. This action will also provide an opportunity to use Aboriginal cultural heritage data in a more cross-disciplinary manner. For example, learning more about fish species and selection from shell midden deposits could provide further information about the condition of the Bay prior to European occupation. ***Potential partner organisations:*** DELWP, DEDJTR, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups, fishing industry, research organisations and community groups

ACTION 6.3

Improve overall extent and condition of the Bay's natural ecosystems

This action will protect, build resilience and restore natural ecosystems across prioritised locations. Proposed activities for further consideration include:

- Restoring degraded habitats through activities such as The Nature Conservancy's reef restoration project.
- Developing and piloting approaches for managing marine life issues. For example, selective removal of over-abundant species.
- Identifying and implementing eco-engineering techniques. For example, establishment of habitat on marine infrastructure.

Potential partner organisations: DELWP, DEDJTR, EPA, Melbourne Water, Parks Victoria, Traditional Owner groups, research organisations, and community and industry groups

Marine life under Rye Pier.
Photo – Josie Jones

PRIORITY AREA 7

Marine biosecurity

Manage risks from marine pests

Risk assessments have indicated marine pests pose a significant risk to the water quality and ecosystems of the Bay. Without proactive management, increased vessel movements (commercial shipping and recreational boating) could result in new marine pests becoming established in the Bay, or those that are already in the Bay being spread elsewhere.

ACTION 7.1 **Prevent introduction and dispersal of marine pests**	This action will reduce the risk of marine pests being introduced into the Bay and spreading, continuing the work commenced through the 2001 Plan. It will focus on biofouling (the attachment of marine organisms to sea vessels and their equipment) and transport of aquaculture equipment (noting that regulation of ballast water is transitioning to the Commonwealth Government). Potential activities include: • Working with the Commonwealth Government to develop programs to improve management of biofouling on large vessels. • Improving the awareness of small boat users about the risks of spread of marine pests from biofouling, and ways to reduce this. • Ensuring that aquaculture guidelines, protocols and management plans are current. ***Potential partner organisations:*** DEDJTR, DELWP, EPA, Parks Victoria, port managers, boating and community groups
ACTION 7.2 **Monitor priority locations for early detection of marine pest introductions**	This action recognises the importance of early detection of marine pest introductions for effective management. It supports a risk-based approach to research and ongoing monitoring and surveillance of priority locations and key causes (vectors) for the transfer and spread of marine pests into and out of the Bay, including ballast water and biofouling. Priority locations are likely to be those considered high risk for primary introductions (e.g. the ports of Melbourne and Geelong) or spread (e.g. marine parks and sanctuaries). This action may include piloting new rapid assessment tools (e.g. eDNA sampling, settlement plates) and exploring opportunities to use citizen science to assist in monitoring for marine pest introductions. ***Potential partner organisations:*** DEDJTR, DELWP, EPA, Parks Victoria, port managers, boating, diving and community groups
ACTION 7.3 **Respond rapidly to new introductions of marine pests**	This action will focus on emergency management through rapid response to new pest introductions and developing an operational manual to build response capacity and preparedness. Implementing actions to mitigate the impact of established pests will continue to be considered in the longer term where and when this is technically feasible and environmentally, economically and socially beneficial. ***Potential partner organisations:*** DEDJTR, DELWP, EPA, Parks Victoria, port managers, boating, diving and community groups

Rosebud Pier.
Photo – David Reinhard

Implementation

This Plan has been developed with an understanding that its implementation will be a collaborative effort between government, industry and the community.

The Department of Environment, Land, Water and Planning (DELWP) is required to develop and implement this Plan under the *State Environment Protection Policy (Waters of Victoria) – Schedule F6 Waters of Port Phillip Bay (1997)*.

Implementation will be guided by a detailed Delivery Plan. It will be a five-year rolling plan, updated annually to allow for adaptive management.

The first part of the Delivery Plan will set out arrangements for governance and coordination, monitoring, and reporting. The second part will provide a schedule for actions and activities to be undertaken in the next two to three years.

Arrangements for delivery of actions and activities will be confirmed through discussion and agreement between the lead government agencies and those organisations undertaking the activities.

Figure 8 illustrates the adaptive management process for implementation of this Plan, which will incorporate findings from the *State of the Bays* report.

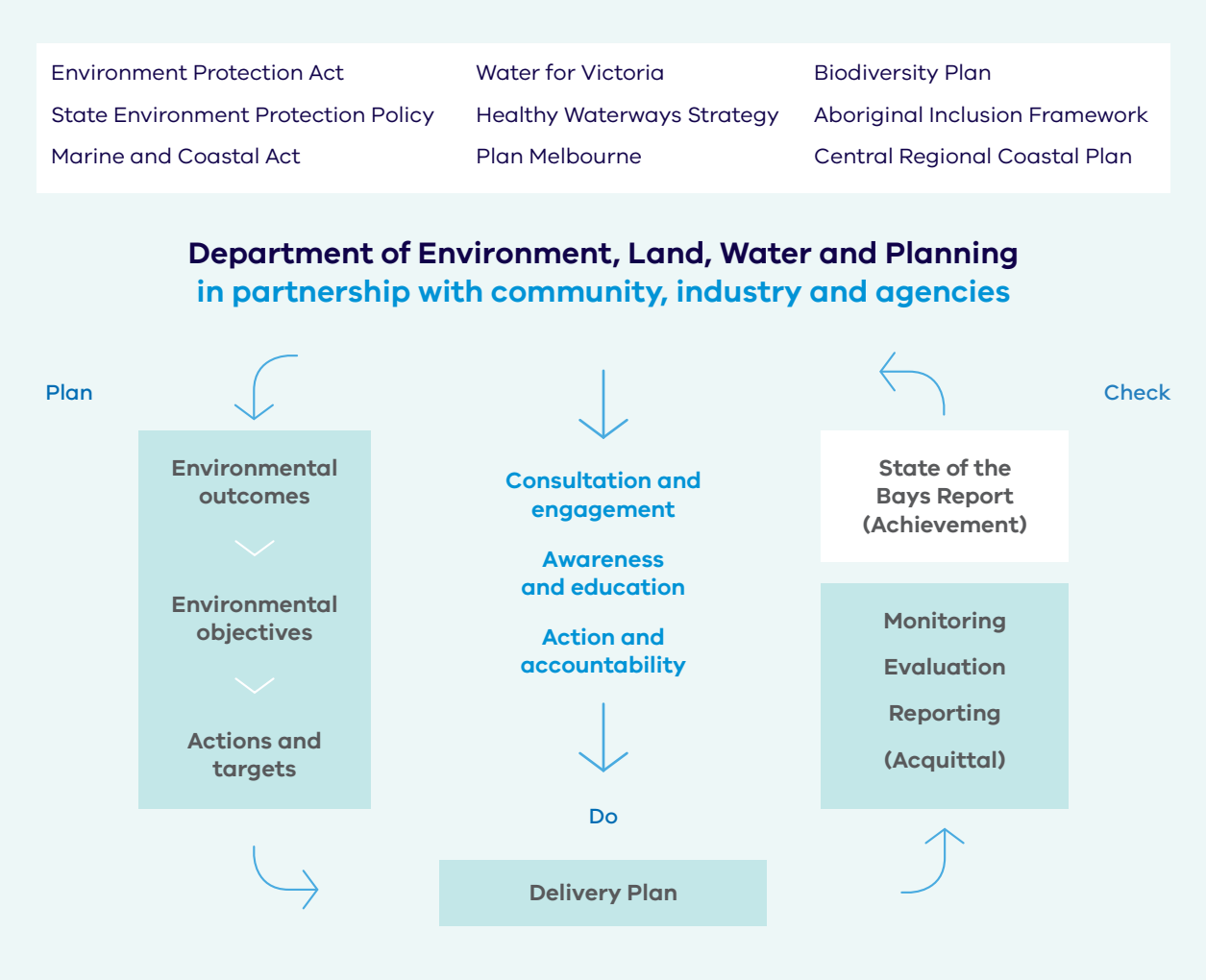


Figure 8 Adaptive management framework for implementation of the Port Phillip Bay Environmental Management Plan, and its related legislation

Monitoring, evaluation, reporting and improvement (MERI)

To be consistent with the approach and principles of the international standard ISO 14001:2015 for environmental management systems, regular evaluation of this Plan will be required to refine and improve its implementation. The Delivery Plan will set out the strategy for monitoring, evaluation, reporting and improvement (MERI) to support implementation of this Plan.

The MERI strategy will adopt a flexible approach to enable agencies to determine the most efficient and effective ways to implement the actions. It will:

- Provide the framework for collection and analysis of the information needed to determine if this Plan is meeting its goals.
- Guide and facilitate provision of data and information for annual reporting, and five-yearly evaluation reporting.
- Ensure, through reporting of outcomes, that actions and activities meet requirements for accountability, transparency, learning and improvement.
- Provide the principal mechanism to reinforce, review and refine activities as part of a continual improvement process.

Monitoring and reporting for this Plan will be coordinated with other monitoring and evaluation programs, such as the EPA's water quality monitoring programs and DELWP's monitoring of denitrification in the Bay. The dependence on these broader frameworks for monitoring, evaluation and reporting will allow the focus for implementation to be on evaluation and reporting the delivery of actions, and the achievement of the Plan's goals.

Revegetation works to improve the health of a waterway. Photo – Melbourne Water

Ricketts Point education session. Photo - Parks Victoria

5

Appendices

Appendix 1: Policy setting for the new Plan

The Victorian Government is currently undertaking a comprehensive review of marine, coastal and waterway policy and legislation. Alongside existing legislation and policy, the following reviews have been considered during preparation of this Plan.

SEPP (Waters of Victoria) sets a framework for conservation of the state's fresh and marine water environments. The goal of *Schedule F6* is specifically to 'protect the beneficial uses of Port Phillip Bay by minimising the adverse impacts of waste discharge and other impacts associated with human activity and resource use of the Bay and its catchment'. *Schedule F6* also states the requirement to implement an Environmental Management Plan for the Bay. The new *SEPP (Waters)*, currently in preparation, is planned to more comprehensively cover surface water, groundwater and marine water.

Victoria's first *State of the Bays* report, published in December 2016, provides a scientifically rigorous baseline report on the health of Port Phillip Bay and Western Port. The *State of the Bays* report considers existing research and data, identifies knowledge gaps, proposes new data collection and monitoring priorities, and develops indicators for future reporting. Having an updated condition status for the Bay will provide a baseline for evaluating the effectiveness of this Plan. *State of the Bays* will also be an important part of the monitoring and reporting framework of this Plan.

The *Water for Victoria* plan was released in October 2016, and will guide strategic investment in water and wastewater planning across the state. It is focused on nine key water themes: climate change; waterway and catchment health; agriculture; recreational values; Aboriginal values; resilient and liveable cities and towns; water entitlements and planning potential of water grid and water markets; jobs, economy and innovation.

The Victorian Government released the *Yarra River Action Plan (Wilip-gin Birrarung murron)* in February 2017. It contains 30 actions to ensure the long-term protection of the Yarra River and its parklands. The Plan reflects the government's response to the recommendations made by the Yarra River Protection Ministerial Advisory Committee and community feedback on the *Protecting the Yarra River (Birrarung) Discussion Paper.*

Plan Melbourne is a long-term plan to maintain a highly functional and liveable city. *Plan Melbourne* recognises that in order to remain a sustainable and resilient city, we must protect the coastline and waters of Port Phillip Bay, restore natural habitats, enhance the health of waterways, reduce waste and improve waste management.

Protecting Victoria's Environment – Biodiversity 2037 is a long-term plan for halting the overall decline of our native plants and animals, ensuring all Victorians can enjoy the benefits of a healthy natural environment now and into the future.

The Flora and Fauna Guarantee Act 1988 is a key piece of legislation designed to conserve Victoria's native plants and animals, and is currently being updated. The new Act will support the government's biodiversity plan and include key tools for conservation of threatened species and communities, and for management of threatening processes.

The proposed new *Marine and Coastal Act* will see coastal and marine management better integrated. It is proposed to replace the *Coastal Management Act 1995*, and will guide future revisions of marine and coastal strategies. It will support the vision of a healthy coast and marine environment in the face of long-term future challenges, and will consider the development of a marine spatial planning framework.

The *Port Phillip and Western Port Regional Catchment Strategy and the Corangamite Regional Catchment Strategy* are integrated catchment management strategies that together cover the entire area that feeds into Port Phillip Bay. The health of the Bay is significantly impacted by the condition of the catchment and the inputs that flow from it. The roles of the regional strategies in coastal, bay and marine management are expected to be strengthened with the development of the new *Marine and Coastal Act*.

The *Victorian Government Aboriginal Inclusion Framework* helps to ensure that services are accessible and inclusive for Aboriginal Victorians and provides for increased employment opportunities. The framework outlines the objective of providing policy makers, program managers and service providers with a structure for reviewing their practices and reforming the ways they engage with and address the needs of Aboriginal people in Victoria.

Port Phillip Bay Fund uses some of the proceeds from the Port of Melbourne lease to support projects that protect and preserve the Bay. Projects include water quality improvement, dune stability, amenity upgrades and wetlands improvements.

Appendix 2: Glossary of terms and abbreviations

Ballast water is water carried by ships to improve their stability and balance. It is taken up or discharged when cargo is unloaded or loaded, or when a ship needs extra stability in bad weather. Ballast water can be a means for the spread of marine pests.

Best practice means the best combination of techniques, processes or technology used in an industry or activity that minimise the environmental impact of that industry or activity.

Biodiversity is a measure of the number and variety of plants, animals and other living things (including micro-organisms) across our land, rivers, coast and oceans. It includes the diversity of their genetic information, the habitats and ecosystems within which they live, and their connections with other life forms and the natural world. Reduced biodiversity is considered a negative influence on the health of an ecosystem such as the Bay.

Biofouling refers to the attachment of marine organisms to any part of a vessel hull or any equipment attached to or on-board the vessel (including mooring devices, anchor wells, cargo spaces, bilges etc.). Prevention of biofouling is an important part of management strategies to reduce the risk of marine pest transfer.

Capacity building typically includes the provision of access to technical advice, training, resources and tools on best practice science and management techniques. It also includes access to strategic advice on group administrative matters, governance, where to source funding, and fostering of peer-to-peer learning across groups.

Citizen science aims to facilitate partnerships between scientists and enthusiastic community members to foster the input of the wider community in building scientific knowledge. Citizens can contribute through collection or processing of scientific data. They can also assist in the design, analysis and/or communication of projects and key findings, and can be important ambassadors to lead awareness campaigns.

eDNA are the DNA traces left in the environment by living organisms.

Indicator species are organisms that can be studied as a measure of ecological health.

Litter constitutes any solid or liquid domestic or commercial waste that is deposited inappropriately. Litter includes land sourced plastic garbage (e.g. bags, bottles, ropes, fibreglass, piping, insulation, paints and adhesives), cigarette butts, nappies, dog faeces, fast-food wrappers, derelict fishing gear and ship-sourced, solid non-biodegradable floating materials lost or disposed of at sea. The types of litter sources addressed in this Plan are aligned to feedback from community consultation as well as state (Victorian Litter Action Alliance) and national *(Threat Abatement Plan for the impacts of marine debris on vertebrate marine life)* litter and marine debris management policy.

Liveability refers to the wellbeing of a community and comprises the many characteristics that make a location a place where people want to live now and in the future. Increasing public access to waterways and beaches and reducing impacts of pollution are ways in which the liveability of an area can be improved.

Marine pests are plants or animals that can rapidly increase in abundance and have the potential to change the local ecosystem and adversely affect marine industries or human health. Most of the marine pests in the Bay have been introduced through transfer from ships and other marine vessels that have travelled here from other ports. Marine pests can attach themselves to boat hulls, anchor chains, fishing gear, recreational equipment, internal boat compartments, or can travel in any seawater system on a boat including inside pipes, in bilge and ballast water.

Microplastics are pieces of plastic with a diameter less than 5mm. Sources of microplastics include granules (microbeads) used in cosmetic and personal care products, nurdles, by-products from sandblasting with microplastic particles, plastic packaging that has disintegrated, and fibres from washing water used to clean synthetic clothes. Microplastics are of a size that allows them to be ingested by animals.

Nurdles are plastic pre-production pellets used in the manufacture of plastic products. They are a sub-category of microplastics.

Nutrients promote plant and algal growth and, in the context of this Plan, are defined as nitrogen and phosphorus. In high concentrations, nutrients can contribute to nuisance plant growth and potentially toxic algal blooms. The death and decay of algal blooms can also reduce the amount of dissolved oxygen available to support aquatic life, which can lead to fish kills.

Appendix 2: Glossary of terms and abbreviations (continued)

Pathogens are micro-organisms that cause infection or disease; they include viruses, bacteria and protozoa. Sewage is a major source of pathogens. Pathogens affect recreational water quality and can make water unsafe for swimming and other recreational activities.

Planning mechanisms is a collective term for the state and metropolitan strategies, legislation (*Planning and Environment Act 1987*), regulation (*Planning and Environment Regulations 2005*), state provisions (*Victoria Planning Provisions*), Ministerial Directions, and planning schemes that are used to manage land use across Victoria. Planning schemes for each municipality incorporate both policy (which provides guidance for planning decision) and controls (zones, overlays and local provisions). These mechanisms can be used to provide local area or statewide guidance and controls on issues such as stormwater management.

Stewardship refers to a commitment to conserve and enhance the value of environmental assets within the Bay, such as marine plants and animals and ecosystem services. This will ensure the Bay can continue to provide value for current and future generations.

Stormwater is rainfall that runs off roofs, roads and other surfaces into gutters, drains, creeks and rivers, and eventually into the Bay. This water can carry contaminants such as sediments, litter, oils, detergents, heavy metals, nutrients, pathogens and other toxicants.

Sediments are generated from the erosion of waterways, together with runoff from roads, urban, agricultural and forested lands. High levels of sediments in water can reduce the amount of light available for plants, smother bottom dwelling (benthic) plants and animals, block estuaries and river mouths and have detrimental impacts on the suitability of water for recreational activities and aquaculture. The concentration of sediments in stormwater is used as an indicator of potential contamination by toxicants.

Toxicants are chemical compounds that can have a negative effect on organisms.

Vectors are carriers or transporters of pests, pathogens or disease. They can include boats, ships, imported soil, animals and plant material.

Abbreviation	Definition
CMA	Catchment Management Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land, Water and Planning
DHHS	Department of Health and Human Services
eDNA	environmental DNA (deoxyribonucleic acid)
EMP	Environmental Management Plan
EPA	Environment Protection Authority
GPT	Gross pollutant trap
ISO	International Organization for Standardization
MERI	Monitoring, evaluation, reporting and improvement
QMRA	Quantitative microbial risk assessment
SEMP	Safety and environment management plan
SEPP or SEPP (Waters of Victoria)	State Environment Protection Policy (Waters of Victoria) *Existing regulations*
SEPP (Waters)	State Environment Protection Policy (Waters) *New regulations, currently being developed*

Appendix 3: Acknowledgements

DELWP would like to acknowledge contributions from the following organisations in development of the *Port Phillip Bay Environmental Management Plan (2017–2027)*.

Association of Bayside Municipalities

Australian Marine Mammal Conservation Foundation

Barwon Water

Bayside City Council

Bellarine Catchment Network

Boon Wurrung Foundation

Borough of Queenscliffe

Bunurong Land Council

Central Coastal Board

Central Highlands Water

City West Water

Commissioner for Environmental Sustainability

Corangamite Catchment Management Authority

Department of Economic Development, Jobs, Transport and Resources

Department of Health and Human Services

Dolphin Research Institute

Environment Protection Authority (EPA) Victoria

Frankston City Council

Greater Geelong City Council

Hobsons Bay City Council

Kingston City Council

Melbourne City Council

Melbourne Water

Metropolitan Waste and Resource Recovery Group

Mornington Peninsula Shire

Municipal Association of Victoria

Museums Victoria

Parks Victoria

Port Phillip and Western Port Catchment Management Authority

Port Phillip City Council

Port Phillip Ecocentre (including Port Phillip Baykeeper)

Seafood Industry Victoria

South East Water

Southern Rural Water

Sustainability Victoria

The Nature Conservancy

Victorian Coastal Council

Victorian National Parks Association

Victorian Planning Authority

Victorian Ports Corporation (Melbourne)

Victorian Recreational Fishing Peak Body (VR Fish)

Victorian Regional Channels Authority

Victorian Water Industry Association (VicWater)

Watharung Aboriginal Corporation (trading as Wadawarrung)

Werribee River Association (including Werribee Riverkeeper)

Western Water

Wurundjeri Tribe Land and Compensation Cultural Heritage Council

Wyndham City Council

Yarra Riverkeeper Association

Yarra Valley Water

Zoos Victoria

DELWP would like to acknowledge and thank all groups and individuals who have given time to review and provide comment during development of the Port Phillip Bay Environmental Management Plan.

To obtain a copy of the Port Phillip Bay Environmental Management Plan

- Download documents from DELWP's website: https://www.coastsandmarine.vic.gov.au/coastal-programs/port-phillip-bay
- Call DELWP on **136 186** and ask for a copy to be posted
- For queries, email **Bay.Plan@delwp.vic.gov.au**

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