Shoalwater Islands Marine Park Management Plan

2007–2017
Management Plan No 58

Department of Environment and Conservation

MPRA
MARINE PARKS & RESERVES AUTHORITY

SHOALWATER ISLANDS MARINE PARK MANAGEMENT PLAN

2007–2017

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Vision

In the year 2017, the marine flora and fauna, habitats and water quality of the Shoalwater Islands Marine Park will be in the same or better condition than in the year 2007. The area will support and encourage public use and enjoyment and will be considered to be an important social and cultural asset to the local community and the public of Western Australia.

Prepared by the Department of Environment and Conservation.

ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

The *Shoalwater Islands Marine Park Management Plan 2007–2017* (the management plan) was formally approved by the Minister for the Environment in August 2007. It was produced on behalf of the Marine Parks and Reserves Authority by the Department of Environment and Conservation[1] and was developed in consultation with the community.

The management plan details the management arrangements for a 10-year planning period for the Shoalwater Islands Marine Park (the marine park), which was gazetted on 25 May 1990 as a Class A Reserve. The marine park is located within the Perth metropolitan area adjacent to the City of Rockingham and covers approximately 6658 hectares. The islands within the marine park are vested in the Conservation Commission of Western Australia and are managed in accordance with the *Shoalwater Islands Management Plan 1992–2002*.

The marine flora and fauna of the marine park is a mixture of tropical and temperate species, the former carried south by the Leeuwin Current from tropical northern waters and the latter carried north by the Capes Current from the cool temperate waters of the south. There is a diverse range of habitats within the marine park, including seagrass meadows, subtidal and intertidal macroalgal limestone reefs and the silty basin of Warnbro Sound. In the north of the marine park, a broken chain of islands and reefs protects the coast from south-westerly swell and waves. These habitats are home to a diverse range of finfish and invertebrates and a variety of wildlife including little penguins (*Eudyptula minor*), other sea and shore birds and marine mammals such as bottlenose dolphins (*Tursiops truncatus*) and Australian sea lions (*Neophoca cinerea*).

The marine park's pleasant Mediterranean climate, combined with its accessibility from Perth and its sheltered waters, make the area a popular place for a variety of recreational activities. Tourism in the marine park is increasing and caters for local and regional communities as well as national and international visitors. The marine park is popular for commercial and recreational fishing. The species and habitat diversity of the marine park also gives it a high scientific research and educational value, particularly as it is easily accessible to the State's major research institutions. Panoramic vistas of azure waters, offshore islands and beaches make the area a pleasant place to live and visit, and access to this coastal resource is highly valued by the community.

The management plan reflects a pro-active approach to conserving these values and managing human activities. The format of the management plan is based on key ecological and social values, an assessment of risks to these values and the formulation of management objectives, long-term management targets and key management strategies. The management plan takes an outcome-based approach to facilitate the effective auditing of the management plan's implementation by the Marine Parks and Reserves Authority.

Key outcomes of the planning process that are detailed in the management plan include:

- establishment of a zoning scheme that reflects the Government's commitment to a multiple-use approach in marine parks to meet a range of community and Government aspirations for biodiversity conservation, sustainable use, nature appreciation, scientific study and public enjoyment;
- a degree of representation of key habitats and species of the marine park in zones that are fully protected from extractive activities (approximately 5.8 per cent or 386 ha in sanctuary zones and in other zones with a strong conservation emphasis (approximately 9 per cent or 591 ha in special purpose zones)). Limitations of the zoning scheme are acknowledged in the management plan but are complemented by a range of management programs and strategies to achieve the marine park's objectives;
- a suite of strategies in seven program areas including education, public participation, management intervention and visitor infrastructure, patrol and enforcement, research and monitoring to help achieve the management objectives for biodiversity conservation and sustainable use;
- a collaborative approach between Government agencies, particularly between the Department of Environment and Conservation and the Department of Fisheries;
- prioritised and coordinated research and monitoring programs to support adaptive management and performance assessment; and
- complementary management of the adjacent island conservation reserves with the marine park.

[1] *The Department of Environment and Conservation was formed in 1 July 2006 through the amalgamation of the Department of Conservation and Land Management and the Department of Environment. Reference to the Department of Environment and Conservation prior to this date is interpreted to mean the former Department of Conservation and Land Management.*

The implementation of this management plan will be regularly reviewed by the Department of Environment and Conservation and monitored by the Marine Parks and Reserves Authority to ensure the management objectives are being met, and to ensure that the management regime for the marine park remain appropriate to meet these objectives.

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1 INTRODUCTION

The coastal environment of Western Australia extends from latitudes 14° to 35° south and ranges from the warm, tropical waters off the Kimberley coast to the cool temperate waters of the Great Australian Bight. The coastline is over 13,500 km in length and comprises about 40 per cent of the continental coastline of Australia. A unique feature of the coastal waters of Western Australia is the Leeuwin Current, a flow of warm tropical water that moves southwards along the edge of the continental shelf. Although flowing year round, the current is stronger and closer to shore during autumn and winter due to the absence of the opposing southerly wind. During late spring and summer the southward flowing current is less due to the nearshore and northward flowing Capes and Ningaloo currents (Pearce and Pattiaratchi, 1999; Taylor and Pearce, 1999).

As a consequence, the Leeuwin Current has a major influence on the biogeography of the State's marine flora and fauna and is responsible for the occurrence of tropical biota at latitudes where these species are not typically found. The three major marine biogeographical zones which occur around Western Australia are a *tropical* zone north of the North West Cape, a *temperate* zone east of Cape Leeuwin and a *biological overlap* zone in between. Other major influences on the marine environment of Western Australia are the regular occurrence of severe tropical storms (i.e. cyclones), particularly off the northwest coastline, the low level of freshwater and sediment input to most of the nearshore waters of the State and the high wave energy of the west and south coasts.

The above influences combine to produce diverse marine ecosystems and habitats. Much of the marine biodiversity of the State is poorly described, particularly along the south-west and south coasts where many endemic species are likely to occur. The conservation of Western Australia's marine biodiversity is not only important from an intrinsic point of view but also as the fundamental basis of major recreation, nature-based tourism, fishing and potentially, pharmaceutical industries.

In 1983, the Environmental Protection Authority (EPA) established the Conservation Through Reserves Committee to review and make recommendations on the adequacy of existing reserves and provide advice on additional national parks and nature reserves in Western Australia. The report, *Conservation Reserves for Western Australia: The Darling System - System 6*, recognised the waters between Cape Peron and Port Kennedy as being of regional significance for conservation, recreation and education and recommended that the waters area become a marine reserve (Department of Conservation and Environment, 1983).

The Shoalwater Islands Marine Park (the marine park) is located within the Perth metropolitan area, adjacent to the City of Rockingham (CoR). Its wide diversity of habitats and close proximity to Perth makes the area a valuable and important ecological and social resource. The marine park was gazetted on 20 May 1990 and in 1994 a planning team was established, which included representatives from State and local governments as well as the Recreation Camps and Reserves Board. The planning team, using contributions from community groups and individuals via meetings and workshops, released a draft management plan for a two-month public comment period in 1995. Most public comment received on the 1995 draft management plan was in relation to the lack of sanctuary zones in the proposed zoning scheme. Further community consultation was undertaken to facilitate the development of a zoning scheme which would better achieve conservation objectives while minimising impacts on user groups. In 2004–2005, the draft management plan was reviewed and adopted an outcome-based approach. In February 2006 a focus group was established, representing a range of community interests, to provide input into the draft management plan. The draft management plan was released for a statutory three-month public consultation period from 22 July to 27 October 2006, and amendments were made to the draft management plan based on submissions received. The *Shoalwater Islands Marine Park Management Plan 2007–2017* (the management plan) was released following approval by the Minister for the Environment.

The management plan provides a detailed description of the ecological and social values of the area, management objectives, strategies and targets. The goal of the management plan is to facilitate the conservation of the marine biodiversity of the area and to ensure that the existing and future pressures on the marine park's values are managed within an ecologically sustainable framework. The management plan also provides mechanisms for the community and visitors to actively participate in the day-to-day management of the marine park.

The management plan for the marine park should not be viewed in isolation, but as an integral part of a suite of complementary management practices that occur within and adjacent to the marine park. These include management of adjacent terrestrial areas, fisheries management, wildlife protection, pollution control, environmental impact assessment and maritime transport and safety measures, as well as community cooperation and participation. The management plan has been prepared to complement the management objectives of the

adjacent island reserves, outlined in the *Shoalwater Islands Management Plan 1992–2002*. In addition, it should be noted that many marine species are not permanent residents of the marine park and move in and out of the area during different stages of their lifecycles. The water quality within the marine park may also be affected by activities outside the marine park and by land-based activities. It is therefore critical that the environmental management objectives of the environment external to and within the marine park are compatible. The management plan provides a framework to achieve the integration and close cooperation between marine management and regulatory agencies that is necessary to achieve the conservation and sustainable management objectives outlined in the management plan.

2 MANAGEMENT CONTEXT

2.1 State policy context

The Department of Environment and Conservation (DEC) was formed on 1 July 2006 through the amalgamation of the Department of Conservation and Land Management and the Department of Environment. Reference to DEC prior to this date is to be interpreted to mean the former Department of Conservation and Land Management.

Seven marine parks and reserves were created under the *Conservation and Land Management Act 1984* (CALM Act) between 1987 and 1990. In 1994, the State Minister for the Environment released a report entitled *A Representative Marine Reserve System for Western Australia* (CALM, 1994) that identified approximately 70 areas in the coastal waters of Western Australia that were worthy of consideration for marine reservation under the CALM Act. In 1997, legislative changes were made to the CALM Act to alter mechanisms by which marine parks and reserves were established, vested and managed. These changes revised statutory consultative protocols for the establishment of marine reserves, provided clear guidance for commercial activities in marine reserves, and established the MPRA. The *New Horizons: the way ahead in marine conservation and management* policy released in June 1998 (Government of Western Australia, 1998a) provided policy guidance in respect to the establishment and management of marine parks and reserves.

The National Water Quality Management Strategy (ANZECC & ARMCANZ, 2000) provides a framework for water and sediment quality management, based on policies and principles that apply nationwide. The national strategy is being given effect in Western Australia through implementation of the State Water Quality Management Strategy (SWQMS) Document No. 6, which was endorsed by State cabinet in 2004. The EPA subsequently developed an Environmental Quality Management Framework (EQMF), which is consistent with both the National and State Water Quality Management Strategies. The EQMF aims to maintain high levels of water, sediment and biota quality by managing and controlling the impacts of waste discharges to the marine environment. This framework was implemented in Cockburn Sound in the Perth metropolitan area in 2005, and is being progressively implemented in other areas of Western Australia's marine environment. The EQMF is complementary to the development and management of marine parks and reserves in Western Australia, with the relationship between zones in marine parks and reserves and EQMF levels of protection defined.

2.2 Legislative framework

The CALM Act provides the legislative mechanism to create and manage marine parks and reserves in Western Australia. Marine parks and reserves are vested (i.e. legally entrusted) in the MPRA, and DEC has lead responsibility for their management. The *Wildlife Conservation Act 1950* (WC Act), which is also administered by DEC, provides legislative protection for flora and fauna across the State's lands and waters. The *Conservation and Land Management Regulations 2002* provide a mechanism to manage human impacts in marine parks and reserves through enforcement and licensing. The *Wildlife Conservation Regulations 1970* regulate interaction with fauna and flora through a licensing system.

The Department of Fisheries (DoF) is responsible for the management and regulation of recreational and commercial fishing, aquaculture and pearling throughout the State, including in marine parks and reserves, in accordance with the *Fish Resources Management Act 1994* (FRM Act) and the *Pearling Act 1990*. The *Fishing and Related Industries Compensation (Marine Reserves) Act 1997* provides the mechanism by which the holder of an existing authorisation for commercial fishing, aquaculture, pearling or fish processing operations may seek compensation if the commercial value of the authorisation is apparently diminished as a result of the creation of a marine park or reserve. Events that can give rise to compensation are the establishment of a marine nature reserve, or the classification of an area of a marine park as sanctuary, recreation or those special purpose zones in which commercial fishing activity has been restricted.

The *Western Australian Marine Act 1982* and *Navigable Waters Regulations 1983* regulate boating in State waters and apply within marine parks and reserves. These Acts are administered by the Department for Planning and Infrastructure (DPI). In addition, any development that may have a significant effect on the environment in or adjacent to a marine parks and reserve is assessed in accordance with the *Environmental Protection Act 1986* (EP Act) by the Environmental Protection Authority.

The marine park lies within State territorial waters and includes several islands and exposed rocks within its boundaries that are Class A Nature Reserves vested in the Conservation Commission of Western Australia (Conservation Commission) and managed by DEC. While these terrestrial reserves do not form part of the marine park and are managed in accordance with the *Shoalwater Islands Management Plan 1992–2002*, they do extend to mean low water mark and include intertidal areas with a marine character. Thus, DEC will ensure that the management of the islands will be complementary to that of the marine park. During the course of the management plan, the vesting authorities may further consider the most appropriate tenure and management arrangements for these intertidal areas and make any necessary changes.

2.3 National and international context

At a national level, the conservation of marine biodiversity, maintenance of ecological integrity and the sustainable use of marine resources are addressed by the Intergovernmental Agreement on the Environment. This is implemented through actions developed under national strategies such as the *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia, 1992), the *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia, 1996a), *Australia's Oceans Policy* (Commonwealth of Australia, 1998) and the *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A Guide for Action by Australian Governments* (ANZECC TFMPA, 1999).

The marine park is also part of the National Representative System of Marine Protected Areas (NRSMPA). The NRSMPA is being developed cooperatively by the Commonwealth, State and Territory governments for the conservation, protection and management of the marine environment (ANZECC TFPMA, 1998a). The primary goal of the NRSMPA is to establish and manage a comprehensive, adequate and representative system of marine protected areas to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems and to protect Australia's biological diversity at all levels. The development of an NRSMPA helps to fulfil Australia's international responsibilities and obligations as a signatory to the Convention on Biological Diversity, to provide a means of meeting obligations under the Convention on Migratory Species and to satisfy responsibilities under the Japan–Australia Migratory Bird Agreement and the China–Australia Migratory Bird Agreement. In addition, it supports the World Conservation Union World Commission on Protected Areas Program of promoting the establishment and management of a global representative system of marine protected areas (ANZECC TFPMA, 1998b).

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) includes provisions to protect matters of national environmental significance, namely the ecological character of internationally important wetlands, nationally listed threatened species and ecological communities, listed migratory species, the Commonwealth marine environment, the values of world heritage properties, the values of national heritage places, and protection of the environment from the impact of nuclear actions. Species on the threatened list are determined from time to time. Listed migratory species include those listed under the Bonn Convention and bilateral agreements for protection of migratory birds with Japan and China. This list also includes cetaceans, the dugong (*Dugong dugon*) the whale shark (*Rhincodon typus*) and the great white shark (*Carcharodon carcharias*). Other listed marine species include seals, marine turtles, sea snakes, crocodiles, seahorses, sea-dragons and pipefish.

2.4 Responsibilities of authorities and Government agencies

DEC is responsible for the overall management of marine parks and reserves under the marine reserve provisions of the CALM Act. DEC also collaborates with other agencies and authorities (i.e. MPRA, Conservation Commission, EPA, DoF and local government authorities) that have responsibilities within marine parks and reserves and in the surrounding waters and coastal areas, in order to ensure the various regulatory and management practices are complementary. The MPRA plays a pivotal role in the establishment of marine parks and reserves and their management plans, and in auditing the management of marine parks and reserves vested in the MPRA. The MPRA audit function is fundamental in ensuring that management of these reserves is achieving stated objectives and targets. The management plan provides the principal framework to enable the MPRA to carry out this function.

In some cases memoranda of understanding (MOU) are developed to facilitate cooperation and promote operational efficiency. A MOU has been developed between the Minister for the Environment and the Minister for Fisheries to establish principles of cooperation and integration between DEC and DoF in the management of the State's marine protected areas. Under this MOU, DEC works closely with DoF through collaborative operational plans for efficient and effective delivery of the strategies contained within the management plan for which there is an overlapping or shared agency responsibility or mutual interest. A MOU between the EPA and the Department of Industry and Resources (DoIR) has been developed to guide assessment of petroleum activities, including within marine reserves. Additional MOUs between agencies involved in environmental management in and outside the reserves are likely to be beneficial in resolving issues that may cross jurisdictional boundaries.

The State agencies with statutory responsibilities in marine parks and reserves in Western Australia are listed in Table 1.

Table 1: State authorities and agencies with responsibilities in the Shoalwater Islands Marine Park

Marine Parks and Reserves Authority	• vesting body for marine parks and reserves; • provides policy advice to the Minister for the Environment; and • audits management plan implementation by DEC.
Department of Environment and Conservation	• manages marine parks and reserves vested in the MPRA. This includes the: ▪ preparation of management plans; ▪ implementation of management plans; ▪ coordination with other agencies and stakeholders; ▪ implementation of education and public participation programs; ▪ implementation of research and monitoring programs; ▪ coordination of management intervention programs; ▪ management of recreation (non-fisheries) and nature-based tourism; ▪ lead role in enforcement (non-fisheries issues); and ▪ ensures the integrated management of marine parks and reserves and adjoining terrestrial conservation reserves. • assists the EPA in assessing proposals that may significantly affect the marine environment, including marine parks and reserves; and • administers pollution control legislation.
Department of Fisheries	• manages and regulates commercial and recreational fishing, aquaculture and pearling in all State waters, including marine parks and reserves. This includes the application of restricted seasons, bag and size limits; and • lead role in enforcement of fisheries legislation within marine parks and reserves.
Department for Planning and Infrastructure	• responsible for all boating regulations including licensing, safety standards, vessel navigation, marker buoys, moorings, jetties and support facilities such as navigation marks, navigation charts and harbour facilities (N.B. mooring controls can be delegated to other agencies); • chairs and supports the State Coordinating Committee which provides the mechanism to coordinate the management of marine pollution incidents; and • responsible for management of vessel navigation and the development and management of support facilities.
Environmental Protection Authority	• assesses, reports and makes recommendations on proposals that may significantly affect the marine environment, including marine parks and reserves.
Department of Water	• responsible for licensing, regulation and allocation of water supplies; and • monitor stream and groundwater quality and flows.
Department of Health	• lead State Government agency responsible for public health, which includes seafood safety (for human consumption), aquaculture, public health and water quality; and • undertakes routine monitoring of water quality at beaches within the marine park.
Western Australian Maritime Museum	• protects pre-1900 shipwrecks and artefacts under the *Maritime Archaeology Act 1973*. Shipwrecks over 75 years old are protected under the Commonwealth *Historic Shipwrecks Act 1976.*
Department of Industry and Resources	• administers Acts that control mineral and petroleum exploration and development; and • regulates petroleum industry operations.
Department of Indigenous Affairs	• protects indigenous heritage and culture under the *Aboriginal Heritage Act 1972*.

3 MANAGEMENT FRAMEWORK

3.1 Best practice management model

The conservation of estuarine and marine biodiversity and the sustainable management of human activities in these environments in Western Australia are achieved through a number of complementary mechanisms that include marine parks and reserves, fisheries regulations, pollution control, environmental impact assessment of development proposals and maritime safety regulations. The management of the marine park employs both generic (Section 7-8) and specific (Section 9) management strategies to ensure that human activities are carefully managed to meet conservation and sustainable use objectives.

The content of this section is based on the best practice principles outlined in the report *Best Practice in Performance Reporting in Natural Resource Management* (ANZECC, 1997). The model is also broadly consistent with the performance assessment framework as outlined in the *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A guide for action by Australian Governments* (ANZECC TFMPA, 1999). The values, objectives, strategies, performance measures and management targets outlined in Section 9 reflect an outcome-based best practice approach from which the effectiveness of management can be better assessed. This model has been adopted by the MPRA to facilitate better conservation and management outcomes and a more objective and effective approach to auditing DEC's management.

Ecological and social values

The conservation of marine biodiversity and the management of human uses are the major objectives of the marine park. These broad objectives need to be defined operationally to be useful in a management context. This is achieved by first identifying the key ecological and social values of the marine park, and then setting management objectives, strategies and targets in relation to these values.

Ecological values are the intrinsic physical, chemical, geological and biological characteristics of an area. For convenience, the major ecological values are listed individually in this management plan. However, in reality, the marine environment of the marine park is a structurally and functionally complex array of relationships between plants, animals interacting with their physical environment.

The ecological values should (where appropriate) include:

- species and communities that have special conservation status (e.g. endangered or rare species);
- key species endemic to the marine park;
- key structural components of the ecosystem (e.g. macroalgae and seagrass communities);
- exploited species and communities (e.g. targeted finfish populations); and
- key physical-chemical components of the ecosystem (e.g. water and sediment quality and geomorphology).

Social values are the major cultural, aesthetic, recreational and economic attributes of the area.

Management objectives

Management objectives identify **what** the primary aims of management are, and reflect the statutory responsibilities of the CALM Act. Objectives have been developed for all of the ecological and social values of the marine park. Where significant pressure/s on an ecological value has been identified, the management objective addresses the specific pressure/s. When there is not an obvious existing pressure or threat, the management objective provides broader management direction for protecting the value from the most likely future pressure/s. Management objectives for social values address, where appropriate, the effect of the activity on other values of the marine park and the complementary interests of other statutory management arrangements or activities that exist in the marine park.

Management strategies

Specific management strategies or actions provide direction on **how** the management objective/s for each value will be achieved. All strategies outlined in this management plan have been defined as high (**H**), medium (**M**) or low (**L**) priority to provide an indication of their relative importance. The strategies considered to be critical to achieving the long-term objectives of the marine park are designated as *key management strategies* (**H–KMS**). The agency with the primary responsibility for implementing the strategy is listed first. A timeline for implementing the management strategies is outlined in Appendix III. It should be noted that management priorities may alter in response to changes in usage patterns or to new knowledge acquired during the life of the management plan.

Performance measures
Performance measures are **indicators of management effectiveness** in achieving the marine park's objectives and targets. Performance measures should be quantitative, representative and, where possible, simple and cost-effective. The management plan usually contains generic performance measures (e.g. often diversity and abundance/biomass). Specific performance indicators will be developed during the design and implementation of monitoring programs. Performance measures for indirect (e.g. nutrient enrichment impacts on seagrass) and direct (e.g. anchoring impacts on seagrass) impacts should focus on surrogate (e.g. changes in phytoplankton biomass and species composition) and direct (e.g. changes in species cover) measures of the value respectively. These will be developed during the early phase of the implementation of the management plan.

In regard to the *active* social values (i.e. those social values that have the potential to negatively affect the ecological values of the marine park) the performance assessment approach incorporates information on the status and level of human activities. This information is important in monitoring human activities to assist in determining trends in use, and assessing impacts of these on the ecological values of the marine park.

Management targets
Management targets represent the **end points of management**. Targets should be measurable, time bound and expressed spatially. Ecological targets will be set as either the 'natural state' or some acceptable departure from the 'natural state'. The long-term targets provide specific benchmarks to assess the success or otherwise of management actions within the life of the management plan. The short-term targets, where identified, provide a rehabilitation milestone and are used when the condition of the value is well below the desired condition (i.e. the long-term target). The targets for *active* social values (e.g. marine nature-based tourism, commercial fishing, aquaculture, recreational fishing and scientific research) are process-based and are generally stated as *'Implementation of management strategies within agreed timeframes'*. This ensures that strategies for the social values are implemented in accordance with the management objectives.

Key performance indicators
Key performance indicators (KPIs) are a **measure of the overall effectiveness** of management in relation to the strategic objectives of the marine park. KPIs relate specifically to the management targets for key ecological and social values and reflect the highest conservation (from biodiversity and ecosystem integrity perspectives) and management (social) priorities of the MPRA, DEC and the community. KPIs are a key element of the MPRA audit process (Section 10).

The values of the marine park were prioritised and a risk assessment of the pressures on these values was completed. The KPIs for the marine park will be the management targets for the following ecological and social values; *water and sediment quality*, *seagrass communities, little penguin, finfish* and *seascapes*.

3.2 Determining management priorities
Management of the marine park aims to conserve marine biodiversity, while maintaining opportunities for people to appreciate and enjoy the area, where these activities are compatible with maintaining the marine park's values. A pro-active and precautionary approach to conserving marine biodiversity is used to determine management priorities. A risk assessment is undertaken by considering the likelihood of existing and potential pressures affecting the ecological and social values and their associated ecological and social consequences.

The level of risk posed by existing and/or potential pressures on the values of the marine park can be assessed by considering the following factors:

- the *biological intensity* of the pressure – pressures that impact lower trophic levels (i.e. primary producers such as seagrasses and macroalgal communities) are often of greater management concern than pressures on higher trophic levels;
- the *temporal* scale of the pressure – ongoing pressures are generally of greater management concern than pressures that are short-lived;
- the *spatial* scale of the pressure – pressures that occur over a large area are often of greater management concern than localised pressures;
- the *social consequence* – acknowledges that different pressures have different social and political consequences. A high socio-economic/political consequence is often of greater management concern; and
- the *probability* of a pressure occurring within the timeframe of the management plan.

It is therefore necessary to determine how each value is, or is likely to be, affected by existing or future pressures. The short-term and long-term cumulative ecological effects of these pressures on the environment are not fully understood. For the purposes of developing management priorities, pressures on the values are confined to current pressures and those likely to occur during the life of the management plan and considered to be manageable within a marine reserve context. By definition this excludes global pressures such as climate change. The vision and strategic objectives of the management plan (Section 6) provide the longer term (>10 years) direction for management of the marine park.

The pressures on the marine park's values are either a primary or secondary impact of user activities. Therefore, the strategies for the marine park focus on managing these pressures. These can be direct effects such as damage to seagrass habitats by indiscriminate anchoring or impacts on fish stocks due to fishing. Indirect effects on the marine park's values can arise from activities such as littering, inappropriate sewage disposal and downstream effects of activities such as dredging or nutrient enrichment from aquaculture projects. However, with the projected rise in marine park users in the next decade, the pressures on the ecological and social values of the marine park will increase significantly and conflicts between users are likely to emerge. Pro-active strategies involving education and extension programs and active participation of marine park users and the local community in the on-going management of the marine park will be important strategies in ensuring management objectives are met and conflicts minimised.

4 REGIONAL PERSPECTIVE

4.1 Bioregional setting

The marine park is located adjacent to the Perth metropolitan area (refer Figure 1), and under the classification system provided in the Integrated Marine and Coastal Regionalisation of Australia the waters are in the Leeuwin-Naturaliste (LNE) marine bioregion, which extends from Perth to Black Point, east of Augusta. The LNE marine bioregion is characterised by clear water, with a cool northward current flowing nearshore in early summer and the warm, southward-flowing Leeuwin Current during late summer, and winter in some years (DEH, 2006). The area is typically a high energy coast exposed to heavy wave action driven by the west wind belt. Geology of the LNE marine bioregion is generally characterised by intensely deformed Precambrian igneous rocks. In some places, rock platforms develop in superficial Quaternary limestone deposits and sandy beaches result. The marine flora and fauna of the LNE marine bioregion is a mixture of tropical and temperate species, the former carried south by the Leeuwin Current from tropical northern waters and the latter carried north by the Capes Current from the cool temperate waters of the south. Preliminary surveys indicate that the marine biota is very diverse and includes a number of endemic species.

4.2 Geology and geomorphology

Limestone ridges and reef platforms are found in the northern areas of the marine park, both along the coast and also as a broken chain of islands and reefs separated by linear depressions. These ridges and platforms protect the coast from south-westerly swell and waves. Underwater structures, including caves, archways, vertical channels, solution pipes, rocky slopes and platforms, are a result of chemical and mechanical weathering. Sand deposition has resulted in the formation of beach and dune systems, and mobile sandbars link islands to the mainland in some areas.

4.3 Climate

The south-west of Western Australia has a Mediterranean climate with hot, dry summers and mild, wet winters. Mean minimum and maximum temperatures vary between 18 and 30°C in summer and seven and 16°C in winter. Annual rainfall is approximately 750 mm, with most falling from May through to October. As with other areas of the south-west, the last few decades show a declining trend in rainfall. During winter, strong storm fronts cause gale force winds, which also produce high storm surges and can combine with large waves to cause coastal erosion (Bureau of Meteorology, 2006).

4.4 Oceanography

Local oceanographic studies, summarised as part of the Southern Metropolitan Coastal Waters Study (Department of Environmental Protection, 1996), have identified that wind, density stratification, sea and swell, tide, coastal evaporation and atmospheric heating and cooling of the water are key environmental factors that influence the hydrodynamics of the area. Local water circulation patterns are established as a result of the interaction between the wind's action on the water surface, density stratification and the sea floor topography. Wind-induced circulation is a primary dispersal and flushing mechanism for the inshore embayments of the

marine park and has a dominant influence on mixing and sediment transport. The chain of islands and reefs protects much of the marine park the from wave action, which minimises the transport of sediment through to the coast except where breaks in this limestone barrier occur. Regional coastal currents are predominantly northward in summer and are more variable but generally southward in winter. Due to the blocking effect of the islands, reefs and sand banks, it is generally considered that the Leeuwin Current has a relatively minor direct influence in driving currents within the semi-enclosed nearshore zone of the coast.

Research has shown that Warnbro Sound, the Peel-Harvey estuary outflow, the Sepia Depression off Cape Peron and Cockburn Sound are hydrodynamically connected. Under SSW wind conditions (particularly spring-summer) modelling and observations have shown that water from the Peel-Harvey Estuary will regularly enter the nearshore zone and be driven northwards into the marine park. Under NW wind conditions (particularly winter and to a lesser extent autumn) modelling and observations have shown waters from Cockburn Sound and Sepia Depression of Cape Peron will occasionally enter the nearshore zone and flow southwards into the marine park (D'Adamo *et al*, 1995a; D'Adamo *et al*, 1995b).

4.5 Ecology

The plants and animals in the marine park are generally representative for those described for sandy bays and reefs along the metropolitan coast. An exception is the apparent absence of some of the tropical corals and sea urchins which are found in Marmion Marine Park, at Rottnest Island and in Cockburn Sound. The Shoalwater Islands region is dominated by beach and rocky shore shoreline habitats and include six major marine benthic habitat types; seagrass, subtidal mobile sand, bare reef (intertidal offshore), macroalgae (subtidal high relief and subtidal low relief) and silt (as per the classification scheme of Bancroft, 2002) (Figure 2). Seagrass meadows consist mainly of *Posidonia* spp., *Amphibolis* spp., *Halophila ovalis* and *Heterozostera tasmanica*, and support a diverse assemblage of animals such as fish and invertebrates. Soft-bottom areas are inhabited by fish and burrowing invertebrates, including molluscs and polychaete worms. Intertidal reef platforms are characterised by diverse algal communities that support large populations of animals, such as Roe's abalone (*Haliotis roe*), whelk (*Thais orbita*), chiton (*Acanthopleura hirtosa*) and large turban shell (*Turbo torquatus*).

Subtidal reefs are dominated by large macrophytes, such as kelp *Ecklonia radiata*. These are recognised as being one of the substantial contributors to primary production of the marine communities in the area, and attract a wide range of fish and colourful assemblages of sponges, gorgonians and other invertebrates, including commercially important species such as the western rock lobster.

The habitats of the marine park are important for the feeding, resting and breeding of little penguins and other sea and shore birds. The bottlenose dolphin (*Tursiops truncatus*) is the most common marine mammal, although a colony of male Australian sea lions (*Neophoca cinerea*) use some of the islands as haul-out areas. The southern right whale (*Eubalaena australis*), the humpback whale (*Megaptera novaeangliae*) and some species of marine turtles are occasional visitors to park waters.

4.6 Social context

The marine park has a rich heritage. Aboriginal people are known to have used the marine park for fishing and hunting, and the islands were used to some extent by Aboriginal people both before and after the rise in sea level. The Shoalwater and Garden Islands area are significant as part of the Aboriginal story of creation and there are also a number of sites adjacent to and within the marine park which are registered on the Department of Indigenous Affairs' Aboriginal Sites Register. The reef systems have proved hazardous to mariners throughout history and a number of shipwrecks remain in marine park waters today.

Tourism in the marine park is increasing and the demand to establish commercial operations is expected to increase. Commercial dive charters and boat tours that involve wildlife observation and other nature-based tourism activities cater for local and regional communities as well as national and international visitors.

Commercial fishers target a number of species including the western rock lobster (*Panulirus cygnus*), abalone (*Haliotis* sp.), blue swimmer crab (*Portunus pelagicus*), whitebait (*Hyperlophus vittatus*) and blue sprat (*Spratelloides robustus*). Secondary species taken are yellow-eye mullet (*Aldrichetta forsteri*), sea mullet (*Mugil cephalus*), whiting (*Sillago* spp.), Australian herring (*Arripis georgianus*), pilchard (*Sardinops neopilchardus*) and garfish (*Hyporhamphus* spp.). The marine habitats of the marine park also support a mussel farming industry.

The marine park's pleasant Mediterranean climate, combined with its accessibility from Perth and its sheltered waters, have resulted in the area being a popular place for a variety of water sports including scuba diving,

sailing, kayaking, snorkelling, water skiing, kite surfing and windsurfing. The marine park's panoramic vistas of azure waters, offshore islands and beaches make it a pleasant area to live and visit, and access to this coastal resource is highly valued by the community.

Recreational fishing is a popular activity in the area and is likely to continue to increase as urban expansion in the area continues. Recreational fishers target a variety of species including the western rock lobster, blue swimmer crab, abalone, whiting, tailor, Australian herring, skipjack, trevally, snapper, West Australian dhufish and Australian salmon. Many of these species are endemic to Western Australia. Recreational fishers employ a variety of methods including line, spear and net fishing, as well as diving and potting for western rock lobster.

The diversity of the marine park biota is a high scientific research and educational value of the area, particularly given its location to Perth. Tertiary institutions, school groups and outdoor organisations use the marine park for research and educational purposes, and there are a number of interpretation opportunities which exist in the area.

Human activity in the Shoalwater Islands marine environment is increasing. Therefore, the commercial and recreational uses need to be managed to ensure compatibility with, and to minimise impact on, the marine park's ecological values.

4.7 Ecological and social values

The specific ecological and social values of the marine park are listed below.

Summary of ecological values

- ***Geomorphology:*** *A complex seabed and coastal topography consisting of islands, limestone ridges and reef platforms, protected inshore areas and deeper basins, sandbars and beaches.*
- ***Water and sediment quality:*** *The maintenance of good water and sediment quality is essential for a healthy marine ecosystem.*
- ***Seagrass communities:*** *Seagrass is an important primary producer and the extensive and diverse perennial seagrass meadows are important habitats for invertebrates and finfish.*
- ***Macroalgae (subtidal reef) communities:*** *The subtidal reefs of the marine park support an extensive macroalgae community that has a high floral diversity. The macroalgae communities are important primary producers, which in turn are important refuge areas for a diverse range of finfish and invertebrates.*
- ***Subtidal soft-bottom communities:*** *Two types of subtidal soft-bottom communities occur in the marine park; sand and the silty basin of Warnbro Sound. These habitats support a variety of invertebrate species both in and on the sediments.*
- ***Intertidal reef communities:*** *Intertidal reef communities provide shelter for a variety of intertidal organisms, which in turn are a valuable food source.*
- ***Australian sea lion:*** *The Australian sea lion* (Neophoca cinerea) *is a threatened species endemic to Australia and specially protected under the* WC Act. *It uses the marine park waters to feed and the islands as haul-out sites.*
- ***Cetaceans:*** *Cetaceans are of special conservation status and five species have been observed in the marine park.*
- ***Seabirds and shorebirds:*** *The marine park and adjacent nature reserves are important nesting and foraging areas for at least 14 species of sea and shorebirds.*
- ***Little penguin:*** *The little penguin* (Eudyptula minor) *colony on Penguin Island is close to the northernmost limit of the species' range and is the largest known breeding colony in Western Australia. The waters of the marine park are used to access feeding grounds, both in and adjacent to the marine park.*
- ***Finfishes:*** *A diverse finfish fauna contributes significantly to the biodiversity of the marine park.*
- ***Invertebrates:*** *A high diversity and abundance of invertebrate fauna in the marine park forms a critical component of the food web that supports the variety of marine animals including sea and shorebirds and finfish.*

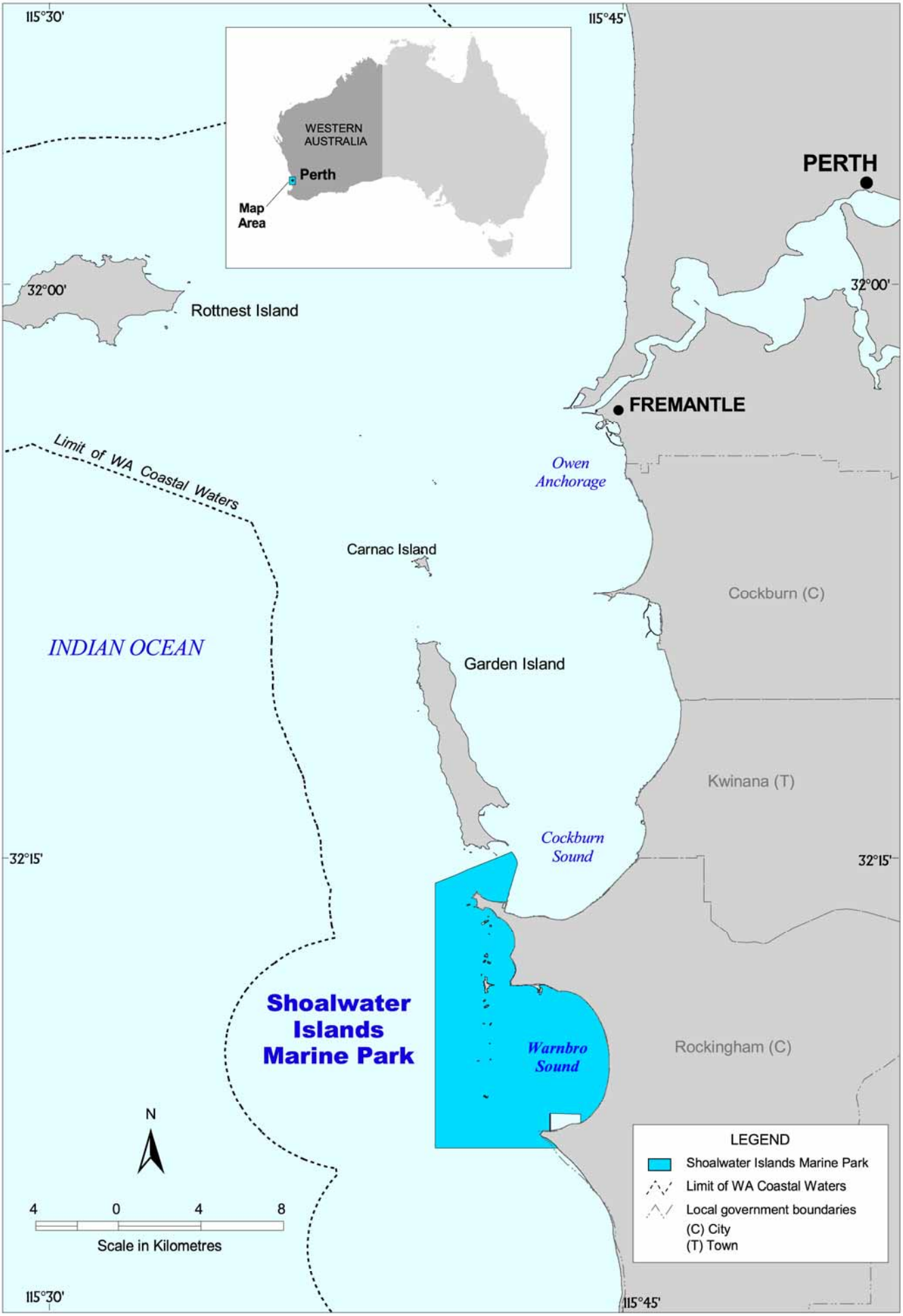

Figure 1: Locality of the Shoalwater Islands Marine Park.

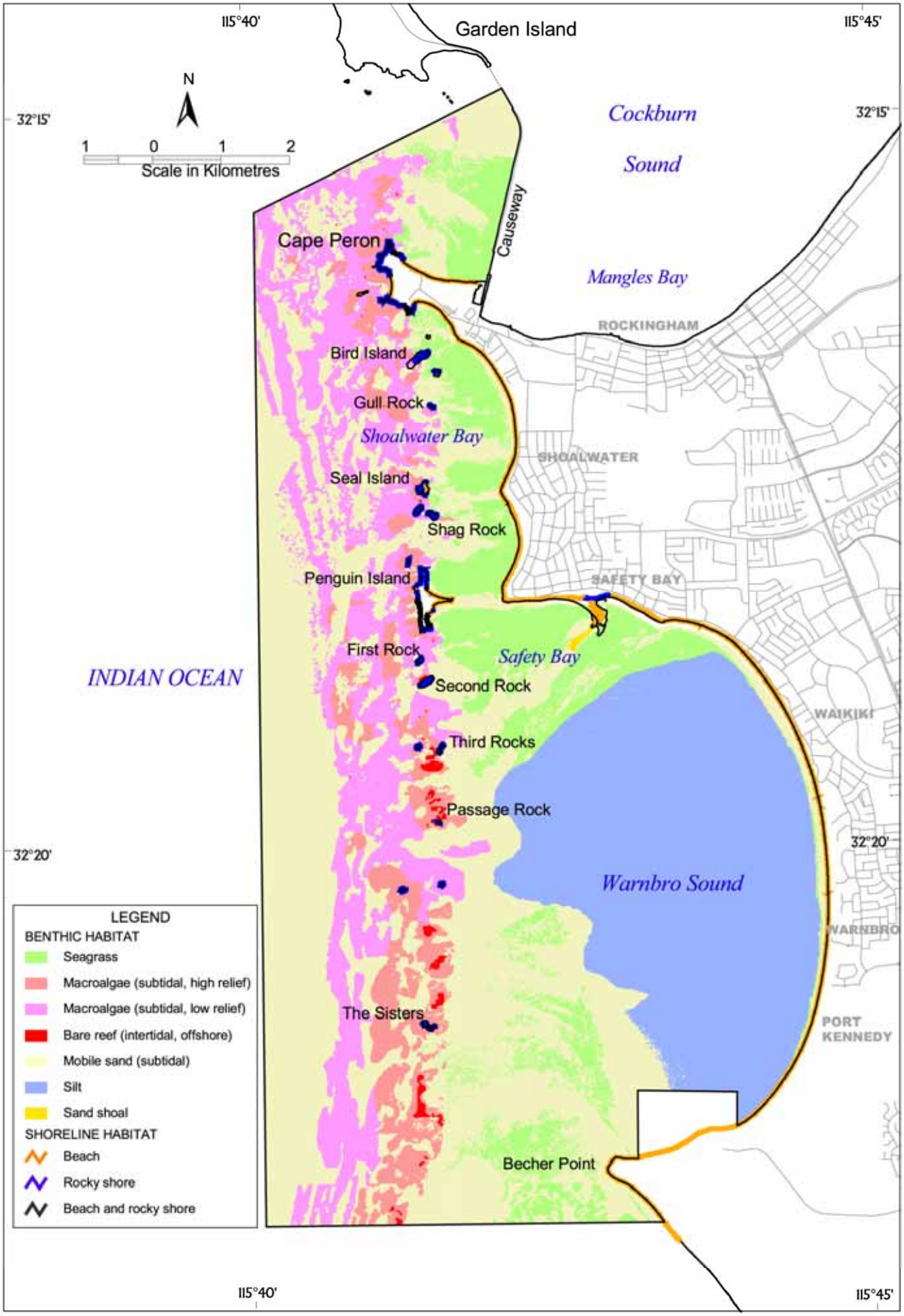

Figure 2: Major benthic and shoreline habitats within the Shoalwater Islands Marine Park.

Summary of social values

- ***Aboriginal heritage:*** *The area has significant Aboriginal heritage value and a number of sites are located in and adjacent to the marine park.*
- ***Maritime heritage:*** *The marine park has a significant maritime heritage and a number of historic shipwrecks are located in the marine park.*
- ***Marine nature-based tourism:*** *The marine park offers a wide range of attractions and opportunities for visitors to the area, which supports a marine nature-based tourism industry.*
- ***Commercial fishing:*** *The marine park is important for commercial fishers targeting rock lobster, abalone, crab, finfish, prawns, scallops, shark, specimen shell and aquarium fish.*
- ***Aquaculture:*** *The marine environment of Warnbro Sound supports a mussel farming industry.*
- ***Recreational fishing:*** *Line fishing, netting and spearfishing methods target a variety of pelagic and reef finfish species, crab, rock lobster and other invertebrates.*
- ***Recreational water sports:*** *The location, scenery, wildlife and marine environment makes the marine park a popular location for a range of activities including boating, diving and surface water sports.*
- ***Coastal and island use:*** *The coastline (including beaches, dunes and rocky shorelines) in and adjacent to the marine park provides for a range of recreational uses.*
- ***Seascapes:*** *Panoramic vistas of azure waters, offshore islands, reefs and beaches are major aesthetic attractions of the marine park.*
- ***Scientific research:*** *The diversity of the flora and fauna, combined with the range of human activities which occur in the marine park, provide opportunities for ecological and social research.*
- ***Education:*** *The unique array of ecological and social values in the marine park combined with the ease of access and the close proximity of the marine park to the Perth metropolitan area provides opportunities for community education about the marine environment.*

5 DEFINITION OF THE AREA AND RESERVE TENURE

The marine park was gazetted on the 25 May 1990 as Class A Marine Reserve No. 5. The marine park covers an area of approximately 6658 ha, and is located adjacent to Rockingham on the south-west coast of Western Australia, about 50 km south of Perth. The boundary of the marine park on the mainland is predominately the high water mark[1], while the boundary adjacent to the islands is predominately the low water mark[2]. An area in the southern reaches of Warnbro Sound at Port Kennedy is currently excluded from the marine park (refer Figure 3), however the management plan contains a specific recommendation for including this area in the marine park (refer Section 7.1).

Marine parks are declared under the CALM Act (Section 13B (1)) which states that a marine park is established *"… for the purpose of allowing only that level of recreational and commercial activity which is consistent with the proper conservation and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest."*

In addition, the CALM Act (Section 6 (6)) states that a marine park *"… includes:*

(a) the airspace above such waters or land;

(b) in the case of waters, the sea-bed or other land beneath such waters and the subsoil below that sea-bed or other land to a depth of 200 m; and,

(c) in the case of land other than waters, the subsoil below such land to a depth of 200 m."

The boundary of the adjacent Shoalwater Islands A Class Reserves extend to the low water mark, except at Penguin Island where the boundary extends to the high water mark. Under the statutory classification of Class A Reserves, any amendment to the purpose or boundaries of the marine park require the tabling of an order in both Houses of Parliament. Approval of both Houses of Parliament is required for reservation orders and as such Class A vesting provides high security of tenure. By contrast, the zoning scheme and the management plan can be amended through a formal public consultation process and do not require Parliamentary consideration. This approach provides the flexibility to respond to changing management priorities and community aspirations or new information on the values and uses of the area. Any substantial change to the management plan requires a minimum two-month statutory public submission period and relevant Ministerial approvals.

[1] High water mark is the ordinary (mean of) high water mark at spring tides, as defined by the *Land Administration Act 1997.*

[2] Low water mark is the ordinary (mean of) low water mark at spring tides, as defined by the *Land Administration Act 1997.*

6 VISION AND STRATEGIC OBJECTIVES

6.1 Vision

The vision statement for the marine park represents the community's aspirations for the conservation, use and management of the marine park and will provide a broad direction for future management.

Vision for the Shoalwater Islands Marine Park

In the year 2017, the marine flora and fauna, habitats and water quality of the Shoalwater Islands Marine Park will be in the same or better condition than in the year 2007. The area will support and encourage public use and enjoyment and will be considered to be an important social and cultural asset to the local community and the public of Western Australia.

6.2 Strategic objectives

Government policy includes the establishment of a comprehensive, adequate and representative system of marine parks and reserves in Western Australia, based on the principle of multiple-use. The objectives of the marine parks and reserve system are to:

- preserve representative as well as special ecosystems in the marine environment; and
- put a formal management framework in place to ensure the various uses of marine parks and reserves are managed in an equitable, integrated and sustainable manner.

Within the context of Government policy and the CALM Act, the strategic objectives for the marine park are to:

Conservation

- maintain and enhance the marine biodiversity;
- maintain ecological integrity (i.e. key ecosystem structure and function);

Science and education

- promote education, nature appreciation (through recreation and tourism opportunities) and scientific research;

Public participation

- promote community involvement in the management of the marine park;

Recreational uses

- facilitate, manage and where appropriate, assist in the management of recreational activities within an equitable and ecologically sustainable framework; and

Commercial uses

- facilitate, manage and where appropriate, assist in the management of commercial activities within an equitable and ecologically sustainable framework.

The strategic objectives of the marine park cannot be achieved in isolation from other statutory and non-statutory management measures both within and external to the marine park. The management of the marine park must thus be seen as part of a complementary suite of management practices including management of adjacent terrestrial area, fisheries management, wildlife protection, pollution control, environmental impact assessment and maritime transport and safety measures, as well as community cooperation and participation.

7 GENERIC MANAGEMENT STRATEGIES

The vision, strategic objectives, management targets and management objectives outlined in Sections 6-9 provide the framework for the development of specific management actions designed to conserve the ecological and social values. These actions are achieved by applying one or more of seven generic management strategies:

- the development of a management and administrative framework;
- education and interpretation;
- public participation;
- patrol and enforcement;
- management intervention and visitor infrastructure;
- research; and
- monitoring.

7.1 Development of a management and administrative framework

The development of an appropriate management and administrative framework is essential to ensure effective long-term management of the marine park. It consists of the legal, financial, human and administrative activities required to establish and maintain an appropriate framework for marine management. It includes administrative, financial and data management; office and infrastructure costs, human resource management, provision of internal and external advice, and licensing and reporting. It also includes the establishment of zoning and mooring schemes, preparation of planning schemes and other activities not covered by the other generic management strategies.

For administrative purposes, DEC is divided into regions which in turn are made up of districts. The marine park is within the Swan Region and operational responsibility for implementation of the management plan and its management programs rests with the Swan Coastal District. The Swan Coastal District has management infrastructure and staff at Shoalwater and Wanneroo. DEC's Marine Policy and Planning Branch has a strategic supporting role in assisting Regional and District offices in the management of marine parks and reserves and development of education programs throughout the State. A number of other specialist DEC branches provide support, direction and assistance in relation to such areas as wildlife management, licensing of tourism operations, research and monitoring.

The marine park comprises part of the NRSMPA. The objective of the NRSMPA is to build a system of marine protected areas that will be:

- *comprehensive* – include marine protected areas in all the major bioregions of Australia;
- *adequate* – include marine protected areas that are of appropriate size and configuration to ensure the conservation of biodiversity and the integrity of ecological processes; and
- *representative* – include the flora, fauna and habitats that are representative of the bioregion.

In 1994, the State Minister for the Environment released a report entitled *A Representative Marine Reserve System for Western Australia* (CALM, 1994). In this report, the Marine Parks and Reserves Selection Working Group recommended that the Shoalwater Islands Marine Park be extended to include the western side of Garden Island up to Carnac Island, the Port Kennedy exclusion area, and those intertidal areas of the islands where the boundary of the marine park is currently low water. During the development of the management plan, particularly during the public consultation period in 2006, the inclusion of these additional areas was raised by users (particularly the Port Kennedy exclusion area) with many indicating that the extension of the marine park should be a high priority.

In addition, throughout the planning process for the management plan, the level of intertidal and subtidal macroalage dominated reef habitat represented in sanctuary zones was recognised as deficient. This factor contributed to comment being sought on the establishment of a sanctuary zone in the Cape Peron area during the public consultation period in 2006. Although the submissions indicated a high level of support for a sanctuary zone adjacent to Cape Peron, significant concern was raised regarding the level of consultation with potentially affected stakeholders and the broader public. Consequently an additional sanctuary zone is not included within this management plan.

However, to address both the concern regarding the Port Kennedy exclusion area and the shortcomings in the level of consultation for the proposed sanctuary zone at Cape Peron, the Government has made a commitment to address the matter, including any subsequent amendments to the zoning scheme, within the first year after the management plan's gazettal. This process will include full statutory consultation with users of the area. Any

resulting amendment to the management plan will be printed as an addendum. A summary of the generic management and administrative framework objectives, strategies and targets is outlined below.

Summary of generic management and administrative framework objectives, strategies and targets

Management objectives	1. To implement the statutory management and administrative framework for the marine park. 2. To implement collaborative initiatives for the management of the marine park.
Strategies	1. Gazette appropriate notices under the CALM Act and FRM Act to implement the zoning scheme within three months following gazettal of the management plan (DEC, DoF) **(H-KMS)**. 2. Inform users about the types of zones, reasons for and restrictions on activities in the marine park using signage, information manuals and education programs (DEC, DoF) **(H-KMS)**. 3. Initiate the planning process to further consider a large sanctuary zone adjacent to Cape Peron with a focus on the level of subtidal and intertidal reef habitat. This process should also pursue including the Port Kennedy exclusion area within the marine park. Any resultant amendments to the management plan and/or zoning scheme to be completed within the year following gazettal of this management plan (DEC) **(H-KMS)**. 4. MPRA and Conservation Commission to develop an appropriate vesting basis for the intertidal areas of the marine park (MPRA, Conservation Commission, DEC) **(H)**. 5. Facilitate research on the effectiveness of zoning as an aid to achieving the objectives of the marine park (DEC) **(H)**. 6. Map the ecological and social values of the marine park that are highly sensitive to oil and chemical spills and ensure this information is accessible to the State Committee for Combating Marine Oil Pollution (DEC) **(H)**. 7. Collaborate with and provide advice to agencies and stakeholders to reduce impacts of pressures affecting the marine park's ecological values (DEC) **(H)**. 8. Initiate the statutory process, in consultation with relevant stakeholders, to extend the marine park boundary, considering the recommendations of '*A Representative Marine Reserve System for Western Australia*' (CALM, 1994) and submissions to this management plan (DEC) **(M)**.
Target	Implementation of management strategies within agreed timeframes (Appendix III).

7.1.1 Development of a zoning scheme

The implementation of an appropriate zoning scheme is an important strategy for both the conservation of marine biodiversity and the management of human use in the marine park. The partial or total restriction of extractive activities in representative habitats is a key strategy in the long-term maintenance of marine biodiversity values in the marine park. Specifically, the establishment of zones in which extractive activity is not permitted plays a key role in the protection of representative areas of important habitats such as intertidal reef communities, macroalgae (subtidal) reef communities and seagrass communities. As well as providing a measure of management 'insurance', these zones provide areas where natural processes can be studied relatively free of significant human influence. These zones also provide the opportunity to improve the understanding of the marine park's key ecological processes and to obtain critical baseline data to compare against areas of the marine park where extractive activities are permitted and/or where environmental impacts may be occurring. The zoning scheme assists in separating conflicting uses and provides for specific activities such as for commercial and recreational activities, scientific study and nature appreciation.

Zoning is a flexible management tool that can accommodate evolving use of the marine park during the duration of the management plan. The nature and extent of zoning should be considered within the context of the other generic management strategies (Sections 7.2 – 7.7).

Section 13B of the CALM Act requires marine parks be zoned as one or a combination of specific management zones, i.e. sanctuary, recreation, special purpose and general use zones, which are formally established as classified areas under Section 62 of the CALM Act. Changes to the zoning of the marine park during the life of the management plan can occur only after meeting the statutory public consultation requirements and acquiring relevant Ministerial approvals.

Sanctuary zones provide for the maintenance of environmental values and are managed for nature conservation by excluding human activities that are likely to adversely affect the environment. They are used to provide the highest level of protection for vulnerable or specially protected species and to protect representative habitats from human disturbance so that marine life can be seen, appreciated and studied in an undisturbed or largely undisturbed state. Passive recreational activities which do not compromise the maintenance of environmental values may be permitted but extractive activities including fishing and traditional fishing and hunting are not. Commercial tourism operations (such as for nature-based tours) are permitted where they do not conflict with other uses and will be regulated under the CALM Act. Sanctuary zones also provide areas for education and scientific study.

Recreation zones provide for conservation and compatible recreational activities, including recreational fishing. Commercial fishing, pearling, aquaculture and petroleum exploration and production are not permitted in these zones.

Special purpose zones are managed for a particular priority purpose or use, such as a seasonal event (e.g. wildlife breeding or whale watching) or a particular type of activity (e.g. surfing). Uses that are incompatible with the specified priority purpose are not permitted in these zones.

General use zones are all areas in the marine park not included in sanctuary, recreation or special purpose zones. Conservation of natural values is still the priority in general use zones, but activities such as sustainable commercial and recreational fishing, aquaculture, pearling and petroleum exploration and production are permitted provided they do not compromise the ecological values of the marine park.

The zoning scheme for the marine park was derived primarily through a consultative process with stakeholders including representative bodies, interest groups and community members, recreational and commercial fishers and a community based Focus Group. The zoning scheme reflects the high recreational value placed on the area by the community. Thus, a key goal of the zoning scheme is to ensure the various uses of the marine park are managed in an equitable, integrated and sustainable manner, while ensuring that ecological values are protected.

The development of the zoning scheme was guided by a number of key principles. These included:

- the zoning scheme should include a system of comprehensive, adequate and representative no-take or sanctuary areas for marine biodiversity conservation and for ecological 'insurance' via increased resilience to natural and human disturbances. They should include the major marine communities;
- the zoning scheme should provide areas relatively free of significant human impact for research and monitoring, nature appreciation and education;
- the precautionary principle should be applied, which means that a lack of scientific certainty about the location, size or number of no-take areas should not prevent the establishment of no-take areas;
- the importance of maintaining both ecological and social values;
- that, where possible, the placement of zones to achieve the management objectives should be done so as to minimise impacts on the existing social values;
- that community support is critical to achieving the strategic objectives; and
- that the zoning scheme should be simple for the public to understand and to therefore comply with any restrictions.

7.1.2 Zones in the Shoalwater Islands Marine Park

The zoning scheme is shown in Figure 3 and the name and size of each zone is shown in Table 2. The activities permitted in each zone are outlined in Table 3 and the coordinates are given in Appendix 1.

Table 2: Name and area of zones in the Shoalwater Islands Marine Park

Name	Area (hectares)
Seal Island Sanctuary Zone	79
Second Rock Sanctuary Zone	52
Becher Point Sanctuary Zone	255
Shoalwater Bay Special Purpose Zone (Wildlife Conservation)	425
Murray Reef Special Purpose Zone (Scientific Reference)	166
General Use Zone	5681
Total	**6658**

SANCTUARY ZONES

Three sanctuary zones (approximately 5.8 per cent or 386 ha of the total area) occur in the marine park. These sanctuary zones provide representation of major marine habitats as well as the flora and fauna associated with them, and provide protection of unique features of the region's marine environment. These zones provide areas free of extractive activities and passive recreation, nature-based tourism and nature observation are permitted.

Seal Island Sanctuary Zone

The Seal Island Sanctuary Zone includes areas of seagrass and intertidal and subtidal macroalgae dominated reef (high and low profile) communities. Located within this zone are long-term seagrass monitoring sites, which are important for scientific research due to the length of time they have been established and the quantity of long-term monitoring data. This zone provides an important buffer area to Seal Island, which is the most important Australian sea lion haul-out area in the marine park. In addition, Seal Island in conjunction with Shag Rock, are important for seabird nesting. To minimise the potential risk of boat strikes to Australian sea lions and disturbance to nesting seabirds via noise, an eight knot speed limit will apply throughout the zone. This restriction will commence from 1 July 2008 and will be gazetted under the *Conservation and Land Management Regulations 2002***.** In addition, access to Seal Island is prohibited, and vessels can not approach within five metres of the beach as per the *Shoalwater Islands Management Plan 1992–2002*.

The Seal Island Sanctuary Zone has been identified by the community to be important for commercial tourism, recreational diving and nature observation. By providing an area that is free of extractive activities, this sanctuary zone will enhance the value of the marine park waters for these activities. Shoalwater Bay has traditionally been important for commercial and recreational fishing. In recognition of these values, the sanctuary zone boundaries are located to exclude important commercial fishing areas to the north and west of the sanctuary zone and important recreational fishing areas to the north, south (e.g. Penguin Island) and east (i.e. nearshore region).

Second Rock Sanctuary Zone

The Second Rock Sanctuary Zone includes areas of seagrass, sand and subtidal macroalgae dominated reef (high and low profile) communities. This zone will provide a scientific reference site that could be used for monitoring issues such as water quality and edge effects of sanctuary zones. First Rock and Second Rock have historically been important areas for recreational fishing. The boundaries of the Second Rock Sanctuary Zone were thus established to reflect this important social use in adjacent areas.

Becher Point Sanctuary Zone

The Becher Point Sanctuary Zone includes areas of seagrass, sand and subtidal macroalgae dominated reef (high profile) communities. This zone is of high conservation importance as it is the only sanctuary zone in the marine park to include areas of offshore intertidal reef communities. Little penguins pass through the narrow corridor of water bordered by Becher Point and the reef system to reach their foraging grounds in Comet Bay, and are likely to travel through this zone. This zone will provide a scientific reference site that could be used for monitoring issues such as water quality, edge effects of sanctuary zones and spillover and recruitment of fish and invertebrate species from the adjacent Murray Reef Special Purpose Zone (Scientific Reference). The subtidal reef areas to the west of the Becher Point Sanctuary Zone have been traditionally used by recreational and commercial rock lobster fishers. In recognition of these values, the boundaries of the zone are located to minimise the potential impact on these fishing grounds.

Shoalwater Bay Special Purpose Zone (Wildlife Conservation)

The Shoalwater Bay Special Purpose Zone (Wildlife Conservation) includes areas of seagrass, sand, subtidal macroalgae dominated reef (high and low profile) and rocky shore communities. This area has a high level of protection as it includes breeding and feeding grounds for migratory and resident seabirds and is a feeding area for the Australian sea lion. Bottlenose dolphins regularly use the area and the zone provides a buffer to the Seal Island Sanctuary Zone.

To minimise the potential risk of boat strikes to Australian sea lions, little penguins and bottlenose dolphins and disturbance to nesting seabirds via noise, the gazetted water ski area will be removed and an eight knot speed limit will apply throughout the zone. These restrictions will commence from 1 July 2008. The speed restriction will be gazetted under the *Conservation and Land Management Regulations 2002* while the removal of the water ski area will be done, in consultation with DPI, via the *Navigable Waters Regulations 1983*.

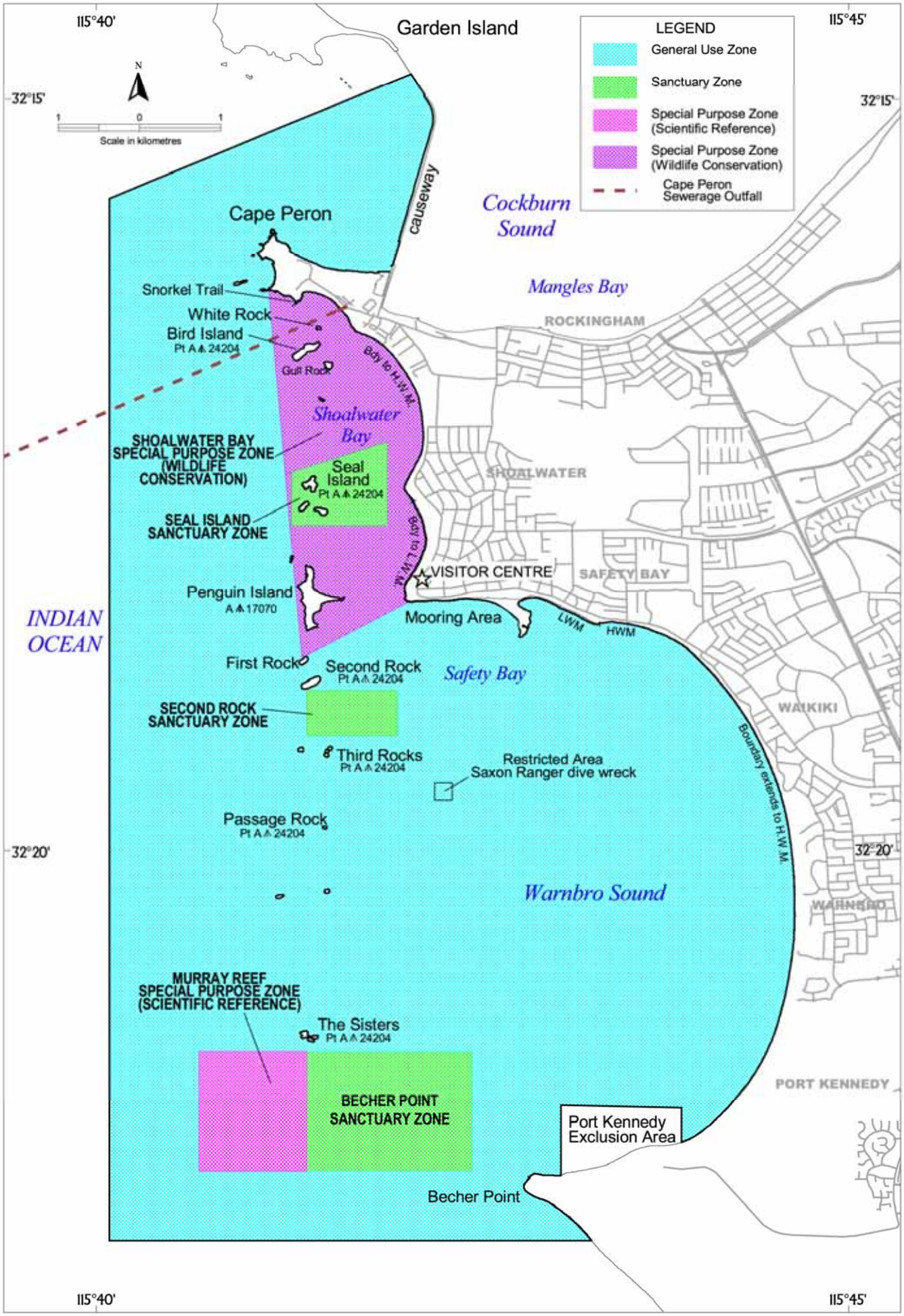

Figure 3: Zoning scheme of the Shoalwater Islands Marine Park.

Table 3. Uses permitted in the Shoalwater Islands Marine Park

ACTIVITY	General Use Zone (approx. 85%)	Shoalwater Bay Special Purpose Zone (Wildlife Conservation) (approx. 6%)	Murray Reef Special Purpose Zone (Scientific Reference) (approx. 3%)	Sanctuary Zone (approx. 6%)
COMMERCIAL				
Commercial rock lobster fishing	Yes (a)	Yes (a, b)	Yes (a)	No
Commercial south-west trawl fishery	Yes (a)	No	No	No
Commercial trolling	Yes (a)	No	No	No
Aquaculture	Yes (a)	No	No	No
Commercial crabbing	Yes (a)	Yes (a, b)	No	No
Commercial octopus pots	Yes (a)	No	No	No
Commercial abalone fishing	Yes (a)	Yes (a, b)	No	No
Commercial aquarium collecting (fish, coral, live rock and live sand)	Yes (a)	Yes (a, b)	No	No
Commercial specimen shell collecting	Yes (a)	Yes (a, b)	No	No
Commercial line fishing	Yes (a)	Yes (a, b)	No	No
Long-line/drop line fishing	Yes (a)	No	No	No
Commercial netting	Yes (a)	No	No	No
Charter vessels – fishing	Yes (a)	Yes (a, b)	No	No
Charter vessels – non-fishing	Yes (c)	Yes (b, c)	Yes (c)	Yes (b, c)
Mineral and petroleum exploration and development	Assess	No	No	No
RECREATIONAL				
Swimming/snorkelling/diving	Yes	Yes	Yes	Yes
Motorised boating	Yes (d)	Yes (b, d)	Yes (d)	Yes (b, d)
Non-motorised boating (e.g. sailing, kayaking)	Yes (d)	Yes (b, d)	Yes (d)	Yes (b, d)
Windsurfing/kite surfing	Yes (d)	Yes (b, d)	Yes (d)	Yes (b, d)
Water skiing	Yes (f)	No (e)	No	No
Jet skiing	Yes	Yes (b)	Yes	Yes (b)
Recreational rod and line fishing	Yes (a)	Yes (a, b)	No	No
Recreational trolling	Yes (a)	Yes (a, b)	No	No
Recreational rock lobster fishing	Yes (a)	Yes (a, b)	Yes (a)	No
Recreational abalone fishing	Yes (a)	Yes (a, b)	No	No
Recreational crabbing	Yes (a)	Yes (a, b)	No	No
Recreational octopus pots	Yes (a)	Yes (a, b)	No	No
Recreational haul and throw netting	Yes (a)	No	No	No
Recreational set netting	No	No	No	No
Recreational aquarium fish/specimen shell collecting	No	No	No	No
Spearfishing – breath hold	Yes (a)	No	No	No
Spearfishing – compressed air	No	No	No	No
Anchoring	Yes (d)	Yes (d)	Yes (d)	Yes (d)
Wildlife interaction	Yes (c)	Yes (b, c)	Yes (c)	Yes (b, c)
STRUCTURES AND DEVELOPMENT				
Minor infrastructure and development (e.g. moorings)	Yes (g)	Yes (g)	Yes (g)	Yes (g)
Major infrastructure and development (e.g. groynes, jetties, marinas)	Assess	No	No	No
OTHER ACTIVITIES				
Research (fish)	Yes (a, c)	Yes (a, b, c)	Yes (a, c)	Yes (a, b, c)
Research (other)	Yes (c)	Yes (b, c)	Yes (c)	Yes (b, c)
Educational activities	Yes (c)	Yes (b, c)	Yes (c)	Yes (b, c)

a) Subject to licence/provisions under the FRM Act
b) An eight knot speed limit applies to motorised vessels within the Shoalwater Islands Special Purpose Zone (Wildlife Conservation) and the Seal Island Sanctuary Zone from 1 July 2008. Non-motorised vessels and craft are encouraged to comply with this speed limit.
c) Subject to licence/provisions under the CALM Act and/or WC Act.
d) Restrictions on vessel type, speed etc and anchoring may be introduced in consultation with the community and major users.
e) The gazetted Shoalwater Bay water ski area will be phased out by 1 July 2008 in order to provide protection for the significant wildlife values of the area. Until that time, water skiing within the Shoalwater Bay water ski area can continue.
f) Within the gazetted water ski area in Warnbro Sound only.
g) Consideration will be given for moorings on the basis of environmental protection, public safety and the provision of essential services. DEC and DPI approval required.

Long term anchoring (overnight stays) are actively discouraged.

Permitted activities in this zone include commercial tourism, commercial rock lobster fishing, recreational fishing, diving, nature appreciation and a variety of surface water sports. Activities that impact or are likely to impact on the wildlife values will not be permitted and include commercial long-line and drop fishing, as well as spearfishing and all types of netting. Throughout the life of the management plan, activities that could potentially impact wildlife values will be subject to assessment under the relevant legislation and associated conditions to ensure that that the ecological values of this area are maintained.

Murray Reef Special Purpose Zone (Scientific Reference)
The Murray Reef Special Purpose Zone (Scientific Reference) includes areas of sand, subtidal macroalgae dominated reef (high and low profile) and offshore intertidal reef communities. The reef areas are representative of west coast near-shore systems, and are rich in macroalgae and invertebrates, including a high diversity of sponges. The Murray Reef system provides habitat and refuge for a wide variety of reef fishes and consequently is of high significance for scientific research and conservation.

The primary purpose of this zone is to provide an area primarily free of extractive activities to research and monitor ecological processes, species and habitats. This zone will provide some of the ecological benefits of sanctuary zones such as refugia, replenishment and ecological 'insurance' for some species.

Commercial and recreational rock lobster fishing is allowed in the zone. Other proposals or activities that do not cause significant changes to water quality, to the key marine habitats or to the diversity and abundance of flora and fauna are also permitted.

General Use Zone
All waters of the marine park not zoned as sanctuary or special purpose are zoned for general use. The General Use Zone will provide for recreational and commercial activities to occur, providing that they are compatible with the overall maintenance of the marine park's values.

7.1.3 Limitations of the zoning scheme
It is acknowledged that the zoning scheme has limitations from an optimal reserve design perspective. The highly protected areas (i.e. sanctuary zones in the marine park) are not representative of all the habitats found in the marine park. Habitats that are under represented include:

- seagrass communities;
- intertidal reef communities; and
- macroalgae (sub-tidal reef) communities;

In addition:

- the soft substratum (silt) habitat of Warnbro Sound and the deep water (> 10 m) habitat are not represented in sanctuary zones; and
- the value of the scientific reference zone is reduced as an area largely free of human impact due to historical disturbance and ongoing extraction of western rock lobster but is, nevertheless, useful as a reference area that is free of all extraction other than for this species;

Furthermore, while the sanctuary zones protect particular values their small size limits their ability to effectively provide for biodiversity conservation and they are also not sufficiently replicated. Hence the marine park's zoning scheme does not meet the guidelines for comprehensive, adequate or representative marine protected areas as outlined in NRSMPA.

The limitations in the design of the zoning scheme increase the vulnerability of this ecosystem to the cumulative impacts of increasing human activities. Thus, it is particularly important that there is both high compliance with rules and regulations and close monitoring of key components of the health of the ecosystem. Despite these limitations, the establishment of the zoning scheme and other management arrangements identified in the management plan provides a vastly improved framework to protect and conserve the marine biodiversity and manage the increasing and diverse human uses of this area.

7.2 Education and interpretation
Developing community support is critical to the effective implementation of marine park management and protection of the area's values. The level of public acceptance and support for management controls directly relates to the level of understanding of the values of the marine park and the reasons for the regulation of activities. The desired outcome of education is to increase public awareness and understanding of conservation and management issues in the marine park and of the marine environment in general. In a local sense, this

increased understanding will help to develop a real sense of community ownership, which will subsequently lead to better protection of the ecological and social values.

Under existing management arrangements, information is provided to the public through media articles, brochures, displays, signs, face-to-face contact with rangers and information sessions. Penguin Island is the major focus for visitors, and interpretative signs and displays will continue to highlight important aspects of the marine park. Information for marine park users is also provided through volunteer and friends groups and there is ongoing liaison with the CoR and the Tourism Western Australian to promote awareness of marine park values.

Upon release of the management plan, education programs will initially raise awareness of the new restrictions on commercial and recreational activities as a result of the implementation of zoning and other management strategies. Ongoing education programs will be required and a range of education and interpretative infrastructure (e.g. walk or dive trails, interpretative signs) will be considered where appropriate. Specific education strategies are detailed for each ecological and social value in Section 9 and education as a value is outlined in Section 9.2.11. A summary of the generic education and interpretation objectives, strategies and targets are outlined below.

Summary of generic education and interpretation objectives, strategies and targets

Management objective	To enhance community understanding of, and support for, the marine park and marine conservation through education and interpretation programs.
Strategies	1. Develop and implement, in collaboration with DoF and other relevant agencies, education and interpretation programs to ensure users are aware of and understand the values of the marine park, management zones and regulations, and the reasons for these controls (DEC, DoF) **(H-KMS)**. 2. Develop and distribute to the community and users appropriate education materials about the marine park's values, pressures on these values, strategies, targets, management and marine conservation more broadly (DEC, DoF) **(H)**. 3. Assist the fishing, tourism, charter and other key sectors to access and deliver marine information courses/materials to their staff or patrons (DEC) **(H)**. 4. Provide talks and briefings about the marine park's values, uses and management to user groups (DEC) **(M)**.
Targets	1. 70 per cent of visitors are aware of the values of the marine park and the need for marine conservation within three years of the release of the management plan. 2. 90 per cent of visitors are aware of the values of the marine park and the need for marine conservation within 10 years of the release of the management plan. 3. Implementation of management strategies within agreed timeframes (Appendix III).

7.3 Public participation

Public participation in management can help to generate the community support that is critical for effective implementation of the management plan.

Active organisations currently operating in the area include the Rockingham Regional Environment Centre and the Shoalwater Islands Volunteers, who roster their time and work closely with DEC. The long-term involvement of the local branch of the Western Australian Naturalists' Club and the assistance provided by Murdoch University students and researchers in collating information on the area is acknowledged. A continued close working relationship with these organisations will assist in protecting and enhancing conservation.

An important early step in the administration of the marine park is the establishment of a community-based Management Advisory Committee (MAC) to build upon the partnership between the local community and Government by actively engaging the community in marine park management. The MAC will be established by Ministerial endorsement and its main function will be the provision of advice and assistance to DEC and the MPRA. This will provide an ideal forum for information sharing as well as an avenue for dissemination of information to the public. For example, local stakeholders would be able to raise issues with DEC, the MPRA or the Minister in matters relating to the marine park's management, administration, zoning, conflicts in usage and any other management-related issues that arise during the life of the management plan. A summary of the generic public participation objectives, strategies and targets is outlined below.

Summary of generic public participation objectives, strategies and targets

Management objective	To facilitate on-going community participation in the management of the marine park.
Strategies	1. Establish and maintain a MAC (DEC) **(H-KMS)**. 2. Develop and implement a public participation strategy for the marine park (DEC) **(H)**. 3. Encourage community involvement in education and interpretation programs (DEC) **(M)**. 4. Encourage community involvement in monitoring and management programs (DEC) **(M)**.
Target	Implementation of management strategies within agreed timeframes (Appendix III).

7.4 Patrol and enforcement

This management plan details a range of strategies relating to the management of particular human activities, and the effectiveness of these strategies will be dependent on compliance by users. While users typically comply with management regulations when they understand why such controls have been implemented, there is always a need to monitor the level of compliance and take action to stop inappropriate or illegal behaviour. To achieve this, an appropriate level of 'on water' presence by DEC and DoF will be necessary in the marine park.

As noted in section 2.2, a MOU has been developed between the Minister for the Environment and the Minister for Fisheries to establish principles of cooperation and integration between DEC and DoF in the management of the State's marine protected areas. Collaborative operational plans will be developed between DEC and DoF to ensure efficient and effective delivery of a range of programs where there is overlapping, shared agency responsibility or mutual interest, including patrol and enforcement. Specific actions include joint patrols, cross-authorisation of agency staff, improved liaison and reporting arrangements. A summary of the generic patrol and enforcement objectives, strategies and targets is outlined below.

Summary of generic patrol and enforcement objectives, strategies and targets

Management objective	To maximise public compliance of regulations related to the on-going management of the marine park.
Strategies	1. Develop and implement procedures to ensure coordination between Government agencies to maximise efficiency and effectiveness of patrol and enforcement activities (DEC, DoF, DPI) **(H-KMS)**. 2. Develop and implement a patrol and enforcement program to ensure an adequate level of compliance with zoning restrictions and other regulations (DEC, DoF, DPI) **(H-KMS)**. 3. Facilitate cross authorisation of Government enforcement officers as appropriate (DEC, DoF, DPI) **(H-KMS)**. 4. Develop and implement a program that promotes voluntary compliance and peer enforcement of regulations (DEC, DoF) **(H)**. 5. Encourage the fishing, tourism, charter and other key sectors, as well as users of the marine park, to take an active role in a voluntary patrol and enforcement programs (DEC) **(H)**.
Target	Implementation of management strategies within agreed timeframes (Appendix III).

7.5 Management intervention and visitor infrastructure

Intervention comprises direct management actions required to achieve conservation outcomes. These can be either proactive (i.e. preventative) or reactive (i.e. restorative) management actions. Intervention includes provision of visitor facilities to reduce site disturbance and environmental impacts (such as moorings and designation of dive trails), rehabilitation of degraded areas and risk management.

Although the majority of the waters and coastal areas are in a relatively good condition, there are areas that have suffered some localised disturbance from past human use. Anecdotal evidence from current users of the marine park suggests that there are accumulations of litter in some areas, localised depletions of finfish stocks and damage to coastal vegetation due to visitor access. Such localised disturbances may negatively affect the ecological and social values of the area. Management response in this case is to identify areas which have been disturbed and evaluate what, if any, rehabilitation measures should be undertaken. Decisions as to whether it would be appropriate to rehabilitate an area are based on the ability of an area to recover naturally (i.e. if no further pressure is applied and with no management intervention), the current level of disturbance of the area,

ecosystem effects of not carrying out rehabilitation, aesthetic impacts of the disturbance and the cost of rehabilitation.

It is likely that human usage of the marine park will increase in the future. An increase in visitor numbers will require facilities to be provided, so as to protect the ecological values from human disturbance (e.g. moorings) and to enhance visitor experience (e.g. dive trails). The level of use of the marine park and the areas which come under the highest visitor pressure will be monitored and consideration given to provision of visitor facilities, where appropriate.

Visitor risk management is an important focus for DEC. The majority of accidents that have occurred in the marine park have been associated with people attempting to walk across the sandbar to Penguin Island and boating. Crossing the sandbar to Penguin Island on foot is hazardous and is actively discouraged. While the sandbar can sometimes be crossed at low tide, deeper channels exist, which are then difficult to cross as the tide rises. Lives have been lost due to a combination of strong afternoon winds, rising water levels and a strong current that flows through the channels in the sandbar. A number of education strategies are in place to notify visitors of the dangers associated with walking the sandbar, including signage on the mainland, in the water and on Penguin Island.

Sea lions represent a potential threat to visitors as they can be aggressive if approached, and attacks have occurred in the past. In addition, the rocky island coastlines with undercut cliffs may pose a risk to visitors. A number of strategies may be used to minimise visitor risk. The provision of information (e.g. caution signs) and the implementation of legislation to help manage visitor activity (e.g. *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998*) are examples of tools which have already been implemented in the marine park.

Within the marine park navigation aids, such as the markers in Minstrel Channel, have been installed. The installation and maintenance of navigation aids and other boating safety measures is the responsibility of DPI.

As visitation to the marine park is likely to increase during the life of the management plan, an ongoing visitor risk management program will be undertaken to identify potential hazards and measures implemented to minimise these. Risks to visitors are managed under the framework of DEC's Policy Statement No. 53 *Visitor Risk Management Policy*. A summary of the generic management intervention objectives, strategies and targets is outlined below.

Summary of generic management intervention and visitor infrastructure objectives, strategies and targets

Management objectives	1. To remediate, where appropriate, existing human impacts on the ecological and social values of the marine park. 2. To provide visitor facilities that enhances user enjoyment of, and minimises environmental impact to, the marine park. 3. To take reasonable steps to minimise visitor risk where possible in the marine park.
Strategies	1. Ensure zone markers and signage are installed within one year of gazettal (DEC) **(H)**. 2. Implement a program of routine inspections, maintenance and reporting on infrastructure conditions (e.g. zone markers, signage) in the marine park (DEC) **(M)**. 3. Identify degraded areas, assess rehabilitation options and implement, where appropriate (DEC) **(M)**. 4. Monitor human use (visitor numbers and high use areas) of the marine park and, consistent with available resources, provide visitor facilities where appropriate (DEC) **(M)**. 5. Perform regular assessments of visitor risk in the marine park and, where necessary, implement appropriate measures to minimise (DEC) **(M)**.
Target	Implementation of management strategies within agreed timeframes (Appendix III).

7.6 Research

An increased understanding of the natural and social environment is critical for effective management, and a targeted research program will provide background information on the environment of the marine park as well as an understanding of what is 'natural' as a benchmark for future monitoring. Considerable scope exists in the marine park for research that will establish the natural state of key ecological values and processes, and research programs should, ideally, be designed to fill key gaps in current knowledge that are relevant to management.

Licences under the WC Act may be required to conduct research within the marine park. Specific research strategies are detailed for each ecological and social value in Section 9 and scientific research as a value of the marine park is outlined in Section 9.2.10. A summary of the generic research objectives, strategies and targets is outlined below.

Summary of generic research objectives, strategies and targets

Management objectives	1. To obtain an appropriate understanding of the biodiversity, key ecological processes and social issues in the marine park. 2. To promote ecological and social research that improves knowledge of the marine park and provides the technical basis for management decisions.
Strategies	1. Develop and progressively implement a coordinated and prioritised research program focusing on key values, processes and issues of the marine park (DEC, DoF) **(H-KMS)**. 2. Gather baseline data for values for which insufficient data exist (DEC) **(H-KMS)**. 3. Develop and maintain detailed habitat and wildlife distribution maps for the marine park (DEC) **(H-KMS)**. 4. Develop and maintain a database of human usage and its impacts in the marine park (DEC) **(H-KMS)**. 5. Identify, prioritise and communicate high priority ecological and social research projects relevant to the management of the marine park and consistent with the prioritised research program to appropriate research organisations (DEC) **(H-KMS)**. 6. Develop and maintain a database of historical and current research in the marine park (DEC) **(H)**. 7. Facilitate ecological and social research in the marine park conducted by research, academic and educational institutions by providing financial and logistical assistance, where possible (DEC) **(H)**. 8. Develop partnerships with stakeholders and the community to implement research programs (DEC) **(H)**. 9. Using available data assess the sustainability of marine-based activities in the region (DEC) **(M)**.
Targets	1. Establishment of priority baselines against which changes can be measured. 2. Implementation of management strategies within agreed timeframes (Appendix III).

7.7 Monitoring

Monitoring the state of the marine environment is essential to measure the effectiveness of management of the marine park. Monitoring enables the early detection of detrimental impacts and thereby provides the trigger for corrective management action before ecological and social values of the marine park become significantly degraded. Where changes have occurred and remediation measures have been implemented, a monitoring program should determine the rate of recovery of an affected area or value.

A marine science program will be progressively implemented by DEC to coordinate and help deliver the research and monitoring strategies of the management plan as part of a State-wide initiative to improve the delivery of research and monitoring requirements within Western Australia's marine parks and reserves. Programs will focus on monitoring of key ecological and social values against their management targets. These are identified as the KPIs in the management plan. Where required, short-term management targets may need to be developed or further refined to reflect meaningful interim steps in achieving the longer term management targets and marine park objectives. The marine science program will also progressively define and use appropriate performance measures, or surrogates, to monitor the values of the marine park to measure whether the objectives of the management plan are being achieved. DEC will deliver these programs in collaboration with DEC's Regional and District staff who are responsible for day-to-day management of the marine park, DoF, and through external providers such as the Commonwealth Scientific and Industrial Research Organisation, Australian Institute of Marine Science, and universities.

Specific monitoring strategies are detailed for each ecological and social value in Section 9, and scientific research as a value is outlined in Section 9.2.10. A summary of the generic monitoring objectives, strategies and targets is outlined below.

Summary of generic monitoring objectives, strategies and targets

Management objective	To monitor key ecological values at risk and human usage to provide a basis to adapt and improve management of the marine park.
Strategies	1. Develop and progressively implement a coordinated and prioritised ecological and social monitoring program for the marine park, including community-based monitoring programs, with a particular emphasis on MPRA and DEC audit requirements (DEC, DoF) **(H-KMS)**. 2. Monitor changes in key values in the marine park against adequate baselines (DEC) **(H-KMS)**. 3. Ensure that proponents of development proposals or activities with the potential to impact on the marine park's values conduct appropriate monitoring programs (DEC) **(H)**.
Target	Implementation of management strategies within agreed timeframes (Appendix III).

8 DEVELOPMENT PROPOSALS WITHIN THE MARINE PARK

There is a range of existing infrastructure within the marine park including boat ramps, dive wrecks, public and private moorings, jetties and pipelines. When developments are proposed within the marine park they are subject to the environmental impact assessment requirements of the EP Act and consideration by DEC and the MPRA in the context of the management plan under the CALM Act. During the life of this management plan there may be proposals for the installation and construction of infrastructure associated with tourism operations, recreation or public works. These could be major developments such as marinas, marine refuelling stations or telecommunication or sewerage pipelines, or minor works such as the installation of moorings or navigation markers. The nature of the development will determine the appropriate level of assessment. All assessments will review the proposal in terms of its potential impacts on the marine park's ecological and social values and determine whether it is consistent with the targets of the marine park.

Recreational use of the marine park and the population of the adjacent communities are increasing and it is likely that new development proposals will arise to facilitate this growth. The location of launching areas largely governs the type of boating use and the potential impact that recreational boaters may have on the marine environment. Dive wrecks have also been placed in the marine park to enhance the recreational opportunities available. Any additional proposals will be subject to an environmental impact assessment and the approvals process required under legislation.

Public and private moorings are located within the marine park. Public moorings are managed by DEC and exist in two locations, one at the Sisters and one east of Penguin Island. Private moorings are licensed and managed by the DPI and imply exclusive rights to an area and, if not installed and maintained correctly, can cause irreversible environmental damage to seagrass beds (DCE, 1986). Policy Statement No. 59 *Mooring Policy* for marine parks and reserves (CALM and MPRA, 2002) aims to (i) minimise the detrimental impacts of uncontrolled mooring and anchoring; (ii) enhance user safety, access and equity in relation to moorings; and (iii) provide a framework to accommodate present and future mooring usage patterns. The Mooring Policy also states that DEC will seek to designate all marine parks and reserves as 'mooring control areas' under the *Shipping and Pilotage Act 1967*. In February 2006, the marine park was designated as a mooring control area and DEC was appointed as the controlling authority. DEC will develop a mooring plan in conjunction with DPI and appropriate consultation. This will include identification of areas where moorings are acceptable from an ecological and social perspective and will establish the capacities of these areas.

While acknowledging that healthy seagrass communities have a strong capacity to recover from incidental and minor damage, localised damage to seagrass meadows has occurred in Safety Bay and Mangles Bay through inappropriately designed moorings and anchoring. Consequently, it is proposed that specific areas within Safety Bay will be the only approved location for private moorings and the carrying capacity of the area will need to be periodically assessed. Existing moorings in other inappropriate locations may be required to be removed or relocated at the owner's expense. Applications for new moorings will be assessed on a case-by-case basis, and will need to meet the criteria established in the Mooring Policy, which includes mooring design specifications. A summary of the objectives, strategies and targets for development proposals is outlined below.

Summary of development proposals objectives, strategies and targets

Management objective	To ensure that the ecological and social impacts of development proposals on the ecological and social values of the marine park are evaluated at an appropriate level of environmental assessment.
Strategies	1. Ensure appropriate advice is provided to relevant authorities with regard to proposed developments with the potential to impact on the marine park's values (DEC, MPRA) **(H)**. 2. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for the marine park and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 3. Develop a mooring plan for the marine park, with appropriate consultation, which identifies areas in which moorings are acceptable and/or necessary from environmental, equity and safety perspectives, and includes an assessment of the capacity of each area (DEC, DPI) **(H)**. 4. Manage existing moorings and assess new moorings in the marine park in accordance with MPRA/DEC's Mooring Policy and the approved mooring plan (DEC, DPI) **(H)**. 5. Gazette restricted anchoring areas if anchoring is resulting in significant impacts on benthic communities (DEC) **(M)**.
Target	Implementation of management strategies within agreed timeframes (Appendix III).

9 MANAGEMENT OF ECOLOGICAL AND SOCIAL VALUES

9.1 Ecological values

Ecological values are the physical, geological, chemical and biological characteristics of an area. Ecological values are significant in terms of their biodiversity (i.e. representative, rare or unique) and ecosystem integrity role. Ecological values also have a social significance because many social values are functionally dependent on the maintenance of ecological values. Set out below is information on specific ecological values, their management objectives, strategies and targets. The generic strategies in Sections 7 and 8 also apply to each of these individual values.

9.1.1 Geomorphology

Ecological value	*A complex seabed and coastal topography consisting of islands, limestone ridges and reef platforms, protected inshore areas and deeper basins, sandbars and beaches.*

Background	The geomorphology of the marine park is dominated by a series of ancient dune systems. With the end of a glacial period about 100,000 years before present, sea level rose, sediments moved onshore and the Tamala dune system was formed. This system consists of a series of limestone dune ridges which lie parallel to the shore, and include the Five Fathom Bank Ridge and the Garden Island Ridge. Between about 20,000 and 6000 years before present, as a result of the Holocene sea level rise, several of these Tamala Limestone ridges were drowned, however a number of prominent islands remained along the Garden Island Ridge. The inundation of the depressions between these ridges led to the formation of Warnbro Sound (maximum depth approximately 18 m) and the Sepia Depression (maximum depth approximately 20 m). The Garden Island Ridge forms the extensive system of intertidal and subtidal limestone reefs and islands in the marine park. These form a partial barrier that protects the coastline from offshore swell, creating relatively low energy coastal lagoons and embayments, such as Warnbro Sound. Approximately 8000 years ago, the chain of islands and reefs had relatively fewer gaps and effectively created a linear limestone barrier. As breaks occurred in this barrier over time, shoreward transport of material formed the Rockingham Bank at Cape Peron and the Becher Bank Holocene sand formation at Becher Point. The Becher Sands underlie many of the seagrass beds today while the deposition of the Safety Bay Sands has resulted in the formation of the upper beach, beach ridge and dune systems of the marine park. In more recent times, sediment deposition along the coast has been primarily influenced by localised zones of wave interference behind the chain of islands and reefs, which result from the dominant south-westerly swell. Sand deposition has produced the sandbar between Penguin Island and the mainland and sandbars between Seal and Bird Islands and the shore. This has in turn produced the lagoons of Shoalwater Bay. Some of the sedimentary features are mobile, which others are relatively stable features due to the binding nature of seagrass communities. Sediment movement along the shoreline within Warnbro Sound is cyclical, being to the north in summer and to the south in winter with a slight net northward sediment transport (Department of Conservation and Environment, 1986). Wind transport, which blows sand inland on coasts exposed to south-west and westerly winds, is an ongoing coastal process. The presence of large, vegetated and stabilised dunes is evidence of previous periods of major wind transport. At present, there is little wind transport except in areas where human activity has degraded dune vegetation or the dune scarp behind the beach, and small blowouts and parabolic dunes occur in these areas. Becher Point is a dynamic and actively changing coastal landform with a steadily eroding and retreating south-western shoreline and a prograding northerly shoreline. The Holocene period of quartz sand and carbonate-rich sand deposition is particularly well developed at Becher Point, making it a scientific site of international interest for studying the response of coastal processes to sea-level rise. Algae that detach from reefs often accumulate on the seabed and water surface where it is known as algal wrack. This wrack is often washed onto the shorelines and plays an important

	role in stabilising the beaches as well as harbouring invertebrates which are prey for surf zone fishes and birds (Muhling and Ryan, 2002). Consequently, the removal of wrack is managed through a permit system and is generally only allowed on and adjacent to boat ramps and other public facilities such as beach access paths. The removal of wrack for any other reason requires permission from the District Manager. The complex geomorphology of the area supports a wide diversity of marine habitats and ecological niches, which contribute to the high biodiversity of the area. Chemical and mechanical weathering of the reef systems over many years has formed underwater structures including caves, archways, vertical channels, solution pipes, rocky slopes and platforms. Limestone ridges and reef platforms are also found along the coast in the northern areas of the marine park. Development proposals in the marine park which may impact on the geomorphology are subject to assessment in accordance with the EP Act. The most significant pressure is the potential impact that coastal development could have on the marine park's geomorphology. Coastal and offshore development proposals such as marinas, groynes and pipelines have the potential to significantly affect sedimentation patterns or disturb the seabed. Localised disturbance to the seabed could also occur through dredging to maintain boat channels and infrastructure associated with the installation of navigation aids or aquaculture operations. Other pressures on adjacent lands include uncontrolled recreational use of fragile coastal dunes and headlands, which can lead to considerable erosion of these features. Management strategies for geomorphology include liaison with industry and other Government agencies to ensure that the approvals and the setting of conditions for new developments and operations are consistent with the management targets. In addition, the provision of coastal facilities (such as boardwalks or roads) or limiting access to specific areas may be required in future if sensitive areas are becoming significantly affected by human access and use.
Current status	The geomorphology is generally undisturbed apart from localised disturbance in some areas as a result of coastal infrastructure.
Existing and potential uses and/or pressures	• Physical disturbance from: ▪ infrastructure development (e.g. seabed pipelines, groynes, marinas); ▪ recreational use of coastal landforms (e.g. uncontrolled dune access); ▪ infrastructure associated with aquaculture operations; ▪ installation of markers and removal of hazards; and ▪ activities associated with the dredging of boating channels.
Current major pressures	Physical disturbance from infrastructure development.
Management objectives	1. To ensure the structural complexity and geomorphological processes of the marine park's seabed is not significantly altered by infrastructure development. 2. To ensure that coastal landforms within the marine park are not significantly altered by infrastructure development.
Strategies	1. See the development proposal strategies detailed in Section 8 **(H-KMS)**. 2. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for geomorphology and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 3. Identify areas where coastal erosion from recreational use is occurring and, where appropriate and through liaison with coastal land managers, implement controls on access and use of coastal features in and adjacent to the marine park (DEC, CoR) **(M)**. 4. Continue to prohibit the removal of algal wrack except on and adjacent to designated boat ramps or other public facilities. A permit may be granted to remove wrack for other reasons by the District Manager (DEC) **(M)**.

Performance measures	1. Area of seabed disturbance (ha). 2. Area of coastal disturbance (ha).	**Desired trends**	1. Constant or negative. 2. Constant or negative.
Short-term targets	To be developed as required.		

Long-term targets	1. In sanctuary and special purpose zones: ▪ no change in seabed structural complexity as a result of human activity in the marine park; and ▪ no change in coastal landforms as a result of human activity in the marine park. 2. In the general use zone: ▪ no change in seabed structural complexity, and ▪ no change in coastal landforms, except in designated areas where some level of acceptable change is approved by the appropriate Government regulatory authorities.

9.1.2 Water and sediment quality (KPI)

Ecological value	*The maintenance of good water and sediment quality is essential for a healthy marine ecosystem.*

Background	Like marine waters off much of the south-west coast of Western Australia, the waters of the marine park are nutrient-poor, primarily as a result of both relatively low riverine inputs and the absence of significant upwellings of nutrient-rich waters from the deeper ocean. Low nutrient concentrations limit biological productivity in the water column. These low rates of pelagic productivity result in high water clarity and penetration of light to benthic primary producers such as seagrass and macroalgae, which contribute significantly to the primary productivity of the marine park and other similar marine systems in south-west Western Australia. The oceanographic processes and the patterns of water circulation in the region influence water quality of the marine park. Local oceanographic studies, including those summarised as part of the Southern Metropolitan Coastal Waters Study (Department of Environmental Protection, 1996) and D'Adamo (submitted), have identified that water circulation patterns in the marine park are established mainly as a result of the interaction between the wind's action on the water surface, density stratification, effects of the earth's rotation and the sea floor topography, with wind stress being the most important forcing mechanism on water circulation and mixing patterns. Winds drive water currents predominantly northward in summer, whilst currents are more variable but generally southward in winter. The background salinity and temperature conditions of the marine park range between 34 and 37 parts per thousand and 15ºC to 25ºC for winter and summer respectively. The annual patterns of salinity and temperature closely coincide with seasonal flow regimes from the Swan-Canning and Peel-Harvey estuaries, which in turn exert influence over other aspects of water quality in the marine park (Department of Environmental Protection, 1996). Natural variability in salinity and temperature of seawater influences its density. Under some conditions (e.g. persistent low wind speeds, atmospheric heating and cooling, river discharges and regional currents), vertical salinity and temperature gradients in the water column create a phenomenon know as density stratification, which is a layering of the water column driven by variation in water density with the densest water near the bottom of the column. Such conditions create the potential for restricted water exchange between bottom and surface layers, particularly in deeper basins such as Warnbro Sound. Restricted mixing of bottom waters with the overlying layers has potential to lead to depletion of dissolved oxygen and/or trapping of contaminants in the near bottom waters of deeper basins such as Warnbro Sound. Studies have shown that a density stratified water column is more likely to occur during the periods of the year when winds tend to be lighter and more variable (e.g. the autumn period) compared to other times of the year such as summer when winds tend to be stronger and more persistent, completely mixing the water column (Department of Environmental Protection, 1996). Maintaining a high level of water and sediment quality is important, as inputs of nutrients, organic matter, toxicants and bacteria into the marine park by human activities can have ecological impacts, reduce amenity and contaminate seafood. For example, a build-up of organic material on the seabed can lead to de-oxygenation of sediments and near bottom waters, which in turn can lead to changes in sediment infauna communities and changes in the availability of sediment-bound toxicants. Nutrient enrichment can stimulate phytoplankton blooms which can reduce light penetration through the water column and promote excessive growth of 'nuisance' macroalgae and phytoplankton. These nutrient-related effects decrease the quantity and quality of light available for benthic plant photosynthesis. Prolonged light deprivation can result in severe degradation of highly productive benthic plant communities. Seagrass meadows, which generally occur in relatively sheltered waters, are particularly vulnerable to these nutrient enrichment effects. Toxicants can cause harmful effects to a wide range of marine life and decrease the diversity and abundance of marine communities and can enter the marine park via diffuse discharges (e.g. ground water) as well as point sources (e.g. drains and treated wastewater outlets). The re-suspension of contaminated sediments may also act as a source of toxicants to water and biota long after the cause of the initial contamination has ceased.

	The results of toxicant surveys on the sediments of Warnbro Sound in 1994 indicated that Warnbro Sound was not significantly contaminated with pesticides, polychlorinated biphenyls or hydrocarbons although the concentration of polycyclic aromatic hydrocarbons in Warnbro and Cockburn Sounds was shown to be increasing (Department of Environmental Protection, 1996). The result of toxicant surveys conducted in 1999 and 2006 show that concentrations of some heavy metals in the sediments of Warnbro Sound have increased, while for others the concentrations have decreased (Department of Water, 2006). Concentrations of toxicants measured in the marine park's sediments in 2006 were below relevant guideline values (Department of Water, 2006). The current pressures on water and sediment quality in the marine park are discharges of toxicants* and physical and chemical stressors† via industrial and urban development, plant and vessel-based sewage, groundwater discharges to the marine environment and shipping. Although at present there are no major direct industrial or riverine point source inputs into the marine park meteorological conditions, such as south-westerly and north-westerly winds in spring-summer and winter-autumn respectively, can drive the nutrient-enriched waters discharged outside the marine park from the Peel-Harvey Estuary, Swan-Canning Estuary, Cockburn Sound and the Sepia Depression Ocean Outlet (SDOO) into the marine park (D'Adamo *et al*, 1995a; D'Adamo *et al*, 1995b). Although the SDOO pipeline now takes discharges from industries in Kwinana, the majority of the discharge is domestic waste water treated to an advanced secondary stage. The effects of the discharge, in addition to any future decline in water quality in the Peel-Harvey and Swan-Canning estuaries could potentially have an impact on water and sediment quality in the marine park. The potential effects of the SDOO on water and sediment quality are monitored by the Water Corporation as part of its Perth Long Term Ocean Outlet Monitoring Program. In addition, water quality is monitored at key sites within the marine park with the data being used by the Cockburn Sound Management Council to establish the benchmarks against which to evaluate environmental quality in Cockburn Sound under the *State Environmental (Cockburn Sound) Policy 2005*. Nutrients from submarine groundwater discharge or surface run-off may also affect the water and sediment quality of the marine park. As the aquifer is located under an area of increasing urbanisation and is recharged by rainfall, it is susceptible to changes in surface run-off and pollution by nutrients and toxicants. Residential developments along Warnbro Sound may have long-term impacts on water and sediment quality due to nutrient run-off and polluted surface run-off (e.g. from roads). Large ships regularly navigate the waters in and adjacent to the marine park. The Royal Australian Navy operates a naval base on Garden Island. The presence of large ships increases the potential for non-indigenous marine species to be introduced to the marine park via ballast water discharge and hull fouling. There is also the potential for oil (and other chemical) spillage to the marine environment. In the last five years, a few minor oil spill incidents have occurred north of the marine park at Garden Island, Kwinana Beach and Rockingham Beach. An oil spill in or near the marine park could not only have detrimental effects on water and sediment quality, but could also have significant impacts on its other ecological and social values such as marine mammals, birds, reptiles, intertidal communities, nature appreciation and commercial and recreational fishing. The National Water Quality Management Strategy provides a framework for water and sediment quality management, based on policies and principles that apply nationwide. The national strategy is being given effect in Western Australia through implementation of the State Water Quality Management Strategy (SWQMS) Document No. 6, which was endorsed by State cabinet in 2004. Consistent with SWQMS Document No. 6, the EPA has undertaken broad consultation with the community and stakeholders to establish environmental values and objectives for Perth's coastal waters, including waters of the marine park. The Environmental Values and spatially-defined Environmental Quality Objectives and levels of ecological protection arising from the community consultation are set out in the EPA's 2000 document titled *Perth's Coastal Waters: Environmental Values and Objectives*. The environmental values and objectives compliment the zoning scheme and KPIs contained in the management plan and will be used to guide management and protection of the marine

	environment from the effects of waste inputs and pollution. Through the consultation the community has signalled that water and sediment quality should be maintained such that a 'high level of ecological protection' is maintained throughout the marine park and social environmental values relating to the quality of waters for recreation, human consumption of seafood and aquaculture are protected (EPA, 2000). Management strategies for water and sediment quality include applying the *Strategy for Management of Sewage Discharge from Vessels into the Marine Environment*. This strategy, which was adopted by the Government in 2004, details a framework for the implementation of controls of sewage discharge from boats through designation of high risk areas where discharge is prohibited or where only treated sewage can be discharged from vessels. The strategy outlines a number of guidelines but allows some flexibility by the managing agency. The basis of this strategy is that three zones will apply in State coastal waters: • Zone 1 – no discharge; • Zone 2 – discharge only using approved treatment systems; and • Zone 3 – open for discharge of untreated vessel sewage. All waters of the marine park will be designated 'Zone 1' (no discharge). Other management strategies for water and sediment quality include the maintenance and development of existing monitoring programs. Warnbro Sound and Shoalwater Bay are important areas as natural baselines for ecological studies and environmental management of Perth's southern metropolitan coastal waters. For example, the Cockburn Sound Management Council relies on the use of Warnbro Sound as the reference site for assessing environmental quality of Cockburn Sound.
Current status	The water and sediment quality of the marine park is generally good.

Existing and potential uses and/or pressures	• Discharges of toxicants* and physical and chemical stressors† from:
	  ▪ treated waste water and sewage;
	  ▪ industrial effluent;
	  ▪ urban stormwater runoff;
	  ▪ groundwater;
	  ▪ shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge);
	  ▪ catchment runoff (e.g. transported via the Peel-Harvey and Swan-Canning estuaries); and
	  ▪ future aquaculture developments.
	• Introduced marine pests (e.g. via ballast water and hull fouling).
	• Pathogen inputs (e.g. from sewage discharge, urban stormwater runoff).
	• Litter (e.g. from recreational activities, commercial fishing and aquaculture, visitors and urban stormwater runoff).
	• Hydrological changes as a result of developments (e.g. jetties, groynes and marinas).

Current major pressures	None.
Management objectives	To ensure the water and sediment quality of the marine park is not significantly impacted by future human activities.
Strategies	1. See the development proposal strategies detailed in Section 8 **(H-KMS)**. 2. Review and continue existing (if appropriate) water and sediment quality monitoring programs in relation to the discharge of toxicants* and chemical and physical stressors† into the marine park (DEC, Water Corporation) **(H-KMS)**. 3. Develop and maintain a pollutant inputs database for the marine park (DEC) **(H)**. 4. Ensure that approvals and the setting of conditions for new and existing developments and operations are consistent with the management objectives and targets for water and sediment quality and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 5. Continue to develop an appropriate understanding of the oceanography of the marine park's waters (DEC) **(M)**. 6. Facilitate the development of methods to reduce contamination of groundwater (industry, Cockburn Sound Management Council, CoR, Town of Kwinana, DEC) **(M)**.

	7. Develop and enforce controls prohibiting discharge of vessel-based sewage in the marine park (DPI, DEC) **(M)**. 8. Educate marine park users about the ecological importance of the marine park's water and sediment quality, the potential detrimental impacts of human activities on this value and about Government policy and regulations on vessel-based sewage discharge (DEC, DPI) **(M)**.

Performance measures	1. Nutrients: *Chlorophyll a* and inorganic nitrogen concentration in seawater. 2. Toxicants*: concentration in seawater and sediments. 3. Pathogens: faecal coliform concentrations in seawater. 4. Litter: mass (Kg) of litter at selected monitoring sites.	**Desired trends**	1. Constant or negative. 2. Constant or negative. 3. Constant or negative. 4. Negative.
Short-term targets	To be developed as required.		
Long-term targets	Maintain water and sediment quality at the current high level^, except for designated areas where a different level of acceptable change is approved by the appropriate Government regulatory authority.		

**toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

†*physical and chemical stressors* is used here to describe a number of naturally-occurring physical and chemical stressors that can cause degradation of the marine environment when ambient values are too high or too low as a result of human activity (modified from ANZECC/ARMCANZ, 2000).

^ a *high* level of protection has been defined for the marine park as set out in Perth's Coastal Waters Environmental Values and Objectives (EPA, 2000).

9.1.3 Seagrass communities (KPI)

Ecological value	*Seagrass is an important primary producer and the extensive and diverse perennial seagrass meadows are important habitats for invertebrates and finfish.*

Background	Seagrass meadows generally occur on the sandy seafloor inside the reef chain in water depths of less than 10 m, and covers approximately 15 per cent of the total area of the marine park. The area has a high diversity of seagrass, with 10 species recorded in Perth's southern metropolitan waters (Department of Environmental Protection, 1996). Most of the seagrass meadows in the marine park consist of perennial (i.e. long-lived) genera, such as *Posidonia* and *Amphibolis* that may take decades to recover if lost. Ephemeral (i.e. short-lived) species, such as *Halophila ovalis* and *Heterozostera tasmanica* also occur. Seagrass meadows are important habitat and nursery areas and support a high diversity of marine species, including important commercial and recreational species. Seagrasses are an important food source for some species and also help maintain water clarity and light penetration to the seabed. Seagrasses are protected in the State under the WC Act and the FRM Act. In addition, development proposals that may impact on seagrass communities may be subject to an environmental impact assessment by the DEC/EPA in accordance with *Guideline for the Assessment of Environmental Factors. Benthic Primary Producer Habitat Protection* (Environmental Protection Authority, June 2004). Guidance statements are developed by the EPA to provide non-statutory advice to proponents and the public generally about the minimum requirements for environmental management which the EPA would expect to be met by proposals during an environmental impact assessment process (EPA 2004). Long-term monitoring data indicates that changes in seagrass density and coverage are a result of natural variability. Localised damage to seagrass meadows however, has occurred in Safety and Mangles bays through the scouring action of moorings and boat anchors and Lavery (1994) found evidence of eutrophication on some seagrass communities in Shoalwater and Safety bays. Seagrass meadows are susceptible to a number of impacts, including physical disturbance from infrastructure and discharges of toxicants[*] and chemical and physical stressors[†], such as nutrient enrichment through sewage discharge. Excessive nutrient enrichment of waters results in increases in phytoplankton concentrations in the water and epiphyte (i.e. algae) loads on seagrass leaves, subsequently reducing the amount of light reaching the leaves and causing the seagrasses to die of light starvation. Although at present there are no major direct industrial or riverine point source inputs into the marine park meteorological conditions, such as south-westerly and north-westerly winds in spring-summer and winter-autumn respectively, can drive the nutrient-enriched waters discharged outside the marine park from the Peel-Harvey Estuary, Swan-Canning Estuary, Cockburn Sound and the SDOO into the marine park (D'Adamo *et al*, 1995a; D'Adamo *et al*, 1995b). Although the SDOO pipeline now takes discharges from industries in Kwinana, the majority of the discharge is domestic waste water treated to an advanced secondary stage. The effects of the discharge, in addition to any future decline in water quality in the Peel-Harvey and Swan-Canning estuaries could potentially have an impact on water and sediment quality in the marine park. The potential effects of the SDOO on water and sediment quality are monitored by the Water Corporation as part of its Perth Long Term Ocean Outlet Monitoring Program. In addition, water quality is monitored at key sites within the marine park with the data being used by the Cockburn Sound Management Council to establish the benchmarks against which to evaluate environmental quality in Cockburn Sound under the *State Environmental (Cockburn Sound) Policy 2005*. Other potential pressures include shore-line development on the fringing meadows along the near-shore zone (e.g. eastern Warnbro Sound) and further planned development of the Port Kennedy area, which has the potential to increase toxicant and nutrient inputs. Management strategies for seagrass communities include the implementation of spatial controls to provide representative and undisturbed areas as 'scientific reference sites' for monitoring, research, education and an appropriate level of insurance against future impacts. Other strategies include ensuring that the approvals and the setting of conditions for new developments and operations are consistent with the management targets for seagrass communities. Moorings will be managed in accordance with Policy Statement No. 59

	Mooring Policy and long-term (overnight) anchoring will be actively discouraged in Shoalwater Bay. Seagrass monitoring plots have been maintained for a number of years by the DEC and a local volunteer seagrass monitoring group. These sites, in addition to sites established by other organisations, will be used as to assess seagrass health as part of the long-term monitoring program.
Current status	Seagrass meadows are generally undisturbed apart from some localised disturbance where there is evidence of eutrophication and/or small losses from anchor and mooring damage.
Existing and potential uses and/or pressures	• Physical disturbance from: ▪ vessel activity (e.g. anchoring, installation of moorings, propeller scour); and ▪ coastal developments (e.g. marinas). • Discharges of toxicants* and chemical and physical stressors† from: ▪ Treated waste water and sewage; ▪ industrial effluent; ▪ urban stormwater runoff; ▪ groundwater; ▪ shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge); and ▪ agricultural runoff (e.g. transported via the Peel-Harvey and Swann-Canning estuaries).
Current major pressures	None.
Management objectives	To ensure seagrass communities are not significantly impacted by future human activities.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. See the development proposal strategies detailed in Section 8 **(H-KMS)**. 3. Continue to monitor the spatial distribution and biomass of seagrass communities in the marine park (DEC) **(H-KMS)**. 4. Continue to build the knowledge base on the floral and faunal diversity and natural variability of seagrass communities in the marine park (DEC) **(H)**. 5. Continue to monitor sewage and industrial discharge from the SDOO and Peel-Harvey Estuary and its potential impacts on seagrass communities in the marine park (DEC, Water Corporation) **(H)**. 6. Implement a mooring plan, which includes identifying areas where moorings are not appropriate, and ensure all new and existing moorings meet the specified environmentally acceptable standard as outlined in the Mooring Policy (DEC, DPI) **(H)**. 7. Identify areas where damage to seagrass communities is occurring through inappropriate anchoring, and if required, restrict anchoring in these areas (DEC) **(H)**. 8. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for seagrass communities and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 9. Educate marine park users about the ecological importance of the marine park's seagrass communities and the potential detrimental impacts of human activities (e.g. anchoring, boat moorings and increased nutrients) on these communities (DEC) **(M)**.

Performance measures	1. Diversity. 2. Biomass.	**Desired trends**	1. Constant or positive. 2. Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	1. No loss of seagrass species diversity as a result of human activity in the marine park. 2. No loss of perennial seagrass biomass Ø as a result of human activities in the marine park		

**toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

†*physical and chemical stressors* is used here to describe a number of naturally-occurring physical and chemical stressors that can cause degradation of the marine environment when ambient values are too high or too low as a result of human activity (modified from ANZECC/ARMCANZ, 2000).

Ø In this context a loss or change in *'biomass'* excludes losses of a minor, transient or accidental nature.

9.1.4 Macroalgae (subtidal reef) communities

Ecological value	*The subtidal reefs of the marine park support an extensive macroalgae community that has a high floral diversity. The macroalgae communities are important primary producers, which in turn are important refuge areas for a diverse range of finfish and invertebrates.*

Background	Subtidal reefs comprise approximately 20 per cent of the benthic structure of the marine park and have a high diversity and abundance of flora and fauna (Le Provost *et al.*, 1981; Gordon, 1986). The reef flora is dominated by large attached macroalgae such as the kelp *Ecklonia radiata* and *Sargassum spp.* with an understorey of foliose, filamentous and red coralline algae. The diversity of the plant community combined with the reef structure provides habitat for a diverse range of finfish and a variety of immobile invertebrates such as ascidians, sponges and soft corals, and mobile invertebrates including crustaceans, echinoderms, molluscs and burrowing infauna. Macroalgae are protected throughout the State under the WC Act and the FRM Act. In addition, development proposals that may impact on macroalgal communities are subject to an environmental impact assessment by the DEC/EPA in accordance with *Environmental Protection Authority Guidance for the Assessment of Environmental Factors. Guidance No. 29: Benthic Primary Producer Habitat Protection* (Environmental Protection Authority, 2004). The macroalgae communities in the marine park are currently in a good condition. Macroalgae communities are susceptible to a number of impacts including physical disturbance from anchoring, infrastructure and some fishing methods (e.g. rock lobster pots). However unlike perennial seagrass communities, the algae can recover relatively quickly from disturbance. Although at present there are no major industrial or riverine point source inputs direct to the marine park, meteorological conditions such as south-westerly and north-westerly winds in spring-summer and winter-autumn respectively, can drive the nutrient-enriched waters discharged outside the marine park from the Peel-Harvey Estuary, Swan-Canning Estuary, Cockburn Sound and the SDOO into the marine park (D'Adamo *et al*, 1995a; D'Adamo *et al*, 1995b). Although the SDOO pipeline now takes discharges from industries in Kwinana, the majority discharge is domestic waste water treated to an advanced secondary stage. The effects of the discharge, in addition to any future decline in water quality in the Peel-Harvey and Swan-Canning estuaries could potentially have an impact on water and sediment quality in the marine park. The potential effects of the SDOO on water and sediment quality are monitored by the Water Corporation as part of its Perth Long Term Ocean Outlet Monitoring Program. In addition, water quality is monitored at key sites within the marine park with the data being used by the Cockburn Sound Management Council to establish the benchmarks against which to evaluate environmental quality in Cockburn Sound under the *State Environmental (Cockburn Sound) Policy 2005*. Management strategies for macroalgae communities include the implementation of spatial controls to provide representative and undisturbed areas as 'scientific reference sites' for monitoring, research, education and for an appropriate level of insurance against future impacts. Other strategies include ensuring that the approvals and the setting of conditions for new developments and operations are consistent with the management targets for macroalgae communities.
Current status	Macroalgae (subtidal reef) communities are generally undisturbed.
Existing and potential uses and/or pressures	• Physical disturbance (e.g. anchoring, mooring, rock lobster pots, industrial development). • Discharges of toxicants* and chemical and physical stressors including: ▪ shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge); ▪ industrial effluent; and ▪ treated waste water and sewage.
Current major pressures	None.
Management objectives	To ensure macroalgae communities are not significantly impacted by future human activities.

Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess the nature, level and potential impacts of human activities on macroalgae communities in the marine park and implement an appropriate monitoring program (DEC) **(H)**. 3. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for macroalgae communities, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 4. Educate marine park users about the ecological importance of marine park's macroalgae communities and the potential detrimental impacts of physical disturbance (e.g. anchoring, rock lobster pots) on these communities (DEC) **(M)**.

Performance measures	1. Diversity. 2. Biomass.	**Desired trends**	1. Constant or positive. 2. Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	1. No loss of macroalgae species diversity as a result of human activity in the marine park. 2. No loss of macroalgae community biomass [Ø] as a result of human activity in the marine park.		

[*] *toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

[Ø] In this context a loss or change in *'biomass'* excludes losses of a minor, transient or accidental nature.

9.1.5 Subtidal soft-bottom communities

Ecological value	*Two types of subtidal soft-bottom communities occur in the marine park; sand and the silty basin of Warnbro Sound. These habitats support a variety of invertebrate species both in and on the sediments.*

Background	Subtidal soft-bottom communities consist of silt or sand habitat. Approximately 25 per cent of the benthic habitat in the marine park is silt and 25 per cent is bare sand. The silt habitat occurs in the sheltered areas of Warnbro Sound while the sand habitat generally occurs between the reefs and seagrass meadows. Compared with sediments in more exposed areas, the sediments of Warnbro Sound are relatively rich in fine carbonate sands and have a high organic content (approximately 20 per cent) (DOE, 1996). The flora and faunal assemblages that occur in the central deep basins (>10 m depth) of Warnbro Sound and Cockburn Sound are unique on the central west coast of Western Australia (Wilson and Gillett, 1971; Wilson and Stevenson, 1977; Wilson *et al.*, 1978). The flora is impoverished, largely due to the depth and naturally high turbidity that limits the light available for photosynthesis. A study of the benthic invertebrate fauna from Warnbro Sound and Cockburn Sound was undertaken in collaboration with the Western Australian Museum. Over 40,000 individuals consisting of 222 species from the six major invertebrate phyla were recorded. The benthic invertebrate fauna in Warnbro Sound was found to be distinct from Cockburn Sound, with only 54 per cent of the species recorded common to both basins and with the assemblage of Warnbro Sound having the highest species richness and diversity. The structure of benthic faunal communities appeared to be more related to the differences in sediment mineralogy in Warnbro Sound, whereas in Cockburn Sound they were related to the differential contamination of sediments by toxic substances (Cary *et al.* 1995a, 1995b). The sediments of the bare sand habitat are relatively coarse, with a lower organic content compared to the deep sedimentary basins, which reflects a more energetic environment due to greater exposure to ocean swell. Benthic microalgae are the dominant primary producers in these areas, which consist primarily of diatoms living on or between sand grains (Masini, 1990), however sparse seagrass occurs in some areas. Due to the dynamic nature of the sediment in this habitat, the fauna is generally impoverished and restricted to fish and burrowing invertebrates (DOE, 1996). Sandbanks are dynamic features along the coast which change their position and extent over time. The infaunal olive shell (*Olivia australis*) is known to be abundant at these sites and is indicative of the special nature of these features. However, more research is required to determine the assemblages of these sandbanks. Subtidal soft-bottom communities are protected throughout Western Australia under the WC Act and the FRM Act. In addition, development proposals that may impact on subtidal soft-bottom communities may be subject to an environmental impact assessment by the DEC/EPA. Current potential pressures on subtidal soft-bottom communities in the marine park include physical disturbance from anchoring, localised trawling, dredging of boating channels and the development of infrastructure. In addition, toxicants tend to accumulate in sediments, particularly the fine organic-rich sediments of Warnbro Sound, and these substances have the potential to affect benthic communities. Where ships are sunk as part of the 'West Coast Dive Park' proposal, there may be impacts to the soft-bottom communities in that localised area. However, the current level of impact of these threats on the soft-bottom communities is not considered to be significant. Management strategies for sand subtidal soft-bottom communities include the implementation of spatial controls to provide representative and disturbed areas as 'scientific reference sites' for monitoring, research, education and for an appropriate level of insurance against future impacts. Other strategies include increasing the level of scientific knowledge about the nature of these communities, educating park users about the detrimental impacts of human activities on these communities and ensuring that the approvals and the setting of conditions for new developments and operations are consistent with the management targets for subtidal soft bottom communities.
Current status	Generally undisturbed apart from localised areas where activities such as trawling and

	dredging of boat channels takes place.
Existing and potential uses and/or pressures	• Physical disturbance (e.g. anchoring, trawling, dredging). • Discharges of toxicants* and chemical and physical stressors† including: – shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge); – industrial effluent (e.g. turbidity); and – treated waste water and sewage. • Future additional dive wrecks.
Current major pressures	None.
Management objectives	To ensure subtidal soft-bottom communities are not significantly impacted by future human activities.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. See the development proposal strategies detailed in Section 8 **(H-KMS)**. 3. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for subtidal soft-bottom communities and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 4. Assess the nature, level and potential impacts of human activities on subtidal soft-bottom communities in the marine park and implement an appropriate monitoring program (DEC) **(H)**. 5. Implement a mooring plan, which includes identifying areas where moorings are not appropriate, and ensure all new and existing moorings meet the specified environmentally acceptable standard as outlined in the Mooring Policy (DEC, DPI) **(H)**. 6. Educate marine park users about the ecological importance of the marine park's subtidal soft-bottom communities and the potential detrimental impacts of human activities on these communities (DEC) **(L)**.

Performance measures	1. Diversity. 2. Biomass.	**Desired trends**	1. Constant or positive. 2. Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	1. No loss of subtidal soft-bottom species diversity as a result of human activity in the marine park. 2. No loss of subtidal soft-bottom community biomass Ø as a result of human activity in the marine park.		

**toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

†*physical and chemical stressors* is used here to describe a number of naturally-occurring physical and chemical stressors that can cause degradation of the marine environment when ambient values are too high or too low as a result of human activity (modified from ANZECC/ARMCANZ, 2000).

Ø In this context a loss or change in *'biomass'* excludes losses of a minor, transient or accidental nature.

9.1.6 Intertidal reef communities

Ecological value	*Intertidal reef communities provide shelter for a variety of intertidal organisms, which in turn are a valuable food source.*

Background	Intertidal reef communities occur on sedimentary limestone shores with low cliffs formed by a combination of wave action, biological erosion, undercutting and rock falls. Reef platforms surround some of the smaller islands and also occur along or adjacent to the southern, western and northern sides of Penguin Island. Rocky shores can also be found at the mainland shore at Cape Peron. Intertidal reef platforms provide habitat for a wide range of algal communities and exhibit varying tolerances to tidal movement and sun exposure, which undergo strong seasonal changes. Zonation of the plants across the platforms is limited by the small tidal range, high insolation (exposure to the sun) and consequent desiccation (drying up) during summer. The upper intertidal area is relatively impoverished, with some species of blue-green algae (e.g. *Calothrix confervicola*) occurring and species of green (e.g. *Ulva lactuca*) and red (e.g. *Gelidium pusillum*) algae being abundant during winter. The lower levels of the reef platforms are generally dominated by small red and green turf algae, sometimes with an overstorey of macroalgae such as *Ecklonia radiata* and *Sargassum* spp.. Reef platforms support a variety of marine fauna with bivalve shells, snails, crabs, worms and small fish seeking refuge from desiccation in shallow rock pools at low tide, while larger fish and other marine animals come in to feed on these organisms when the tide is high. The dominant animals of reef platforms include Roe's abalone (*Haliotis roei*), whelk (*Thais orbita*), chiton (*Acanthopleura hirtosa*) and large turban shell (*Turbo torquatus*). Some reef platforms support large populations of certain animals (e.g. the sea star *Patiriella gunnii* at Penguin Island). The abundance of invertebrate life on intertidal reefs provides a valuable food source for shorebirds and migratory waders and contributes significantly to the biological diversity of the marine park. The ecology of animals on intertidal reef platforms is poorly understood. Under the FRM Act, DoF is responsible for the management of the recreational and commercial take of invertebrate species from intertidal reef communities. Management includes bag limits, size limits and seasonal and area closures. In addition, any development proposals which may impact on intertidal reef communities are currently subjected to assessment under the EP Act. The current major pressures on intertidal reef communities are recreational and commercial fishing and trampling (reef walking), particularly around Cape Peron and Penguin Island. It is important that educational groups and the public using these intertidal reef communities are fully informed about their sustainable management. In addition, intertidal reefs are vulnerable to pollution from floating debris and toxicants, introduced pests and wildlife entanglement in strand-line litter. Most of the Shoalwater Islands are gazetted as A Class Reserves and currently extend to the low water mark. Some of the intertidal reef communities are therefore currently excluded from the marine park. During the life of the management plan, the vesting authorities will consider the most appropriate tenure and management arrangements for these intertidal areas and make any necessary changes. Management strategies for intertidal reef communities include the implementation of spatial controls to provide representative and disturbed areas as 'scientific reference sites' for monitoring, research, education and for an appropriate level of insurance against future impacts. Other strategies include education of marine park users about the importance of these communities and ensuring that the approvals and the setting of conditions for new developments and operations are consistent with the management targets for intertidal reef communities.
Current status	The intertidal reef communities adjacent to the smaller rocks are generally undisturbed, however they are significantly disturbed adjacent to Cape Peron and Penguin Island.
Existing and potential uses and/or pressures	• Recreational fishing, particularly abalone fishing. • Physical disturbance (e.g. reef walking). • Litter (e.g. from recreational activities, commercial fishing and aquaculture, visitors and

	urban stormwater runoff). • Discharges of toxicants* and chemical and physical stressors† including: ▪ shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge); ▪ industrial effluent; and ▪ treated waste water and sewage.
Current major pressures	• Recreational fishing, particularly abalone fishing. • Physical disturbance from reef walking by educational and other user groups.
Management objectives	To ensure that intertidal reef communities are not significantly impacted by reef walking or recreational fishing in the marine park.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess the nature, level and potential impact of human activities on intertidal reef communities in the marine park and implement an appropriate monitoring program (DEC) **(H-KMS)**. 3. Educate marine park users about the ecological importance of the marine park's intertidal reef communities and the potential detrimental impacts of human activities (e.g. trampling) on these communities (DEC) **(H)**. 4. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for intertidal reef communities, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 5. Consider the most appropriate tenure and management arrangements for intertidal reef communities and make any necessary changes (DEC, MPRA, Conservation Commission) **(M)**.

Performance measures	1. Diversity. 2. Biomass.	**Desired trends**	2. Constant or positive. 3. Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	1. No loss of intertidal reef species diversity as a result of human activity in the marine park. 2. No loss of intertidal reef community biomass Ø as a result of human activity in the marine park.		

**toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

†*physical and chemical stressors* is used here to describe a number of naturally-occurring physical and chemical stressors that can cause degradation of the marine environment when ambient values are too high or too low as a result of human activity (modified from ANZECC/ARMCANZ, 2000).

Ø In this context a loss or change in *'biomass'* excludes losses of a minor, transient or accidental nature.

9.1.7 Australian sea lion

Ecological value	*The Australian sea lion* (Neophoca cinerea) *is a threatened species endemic to Australia and specially protected under the* WC Act*. It uses the marine park waters to feed and the islands as haul-out sites.*

Background	The Australian sea lion (*Neophoca cinerea*) is one of the of the world's rarest seal species, breeding on approximately 50 islands in Western and South Australia. The total population is currently estimated at 11,200 with around 2700 to 3400 animals in Western Australia. Although population estimates are unavailable for pre-1800s, the failure of the species to recover from seal harvesting at the same rate as other species, such as the New Zealand and Australian fur seals, is of concern (DEH, 2005). Australian sea lions are excellent divers and spend their time at sea foraging close to or on the seabed. Australian sea lions can feed in depths that can exceed 300 metres, but also use the marine park waters to feed. Their feeding is opportunistic with fish, sharks, squid, octopus, cuttlefish, lobster and even occasionally birds and turtles making up their diet. The Shoalwater Islands are used by Australian sea lions to 'haul-out' or rest. These sites are used almost exclusively by mature and juvenile males during the non-breeding season, with Seal and Carnac islands being the primary sites in the Perth metropolitan area. There are no breeding colonies within the marine park as females are mostly restricted to the breeding islands in the Jurien Bay region, the Houtman Abrolhos and off the south coast. Australian sea lions have a unique breeding cycle which occurs approximately every 18 months. For approximately six months out of every 18, the males migrate north to islands off the Midwest coast to breed with the resident females. After this, the males return to the islands off the metropolitan coast for approximately 12 months. It is thought that this spatial separation of the population may occur to relieve pressures on the limited food resources for females and pups. The retention of the metropolitan haul-out sites is therefore important to the survival of the entire west coast population. The New Zealand fur seal, Sub-Antarctic fur seal, crab-eater seal and the leopard seal are also infrequent visitors to the marine park. All species of seal and sea lion are protected under the WC Act, and the Australian sea lion and New Zealand fur seal are listed as vulnerable under the Commonwealth EPBC Act. Australian sea lions represent a potential threat to marine park visitors as they may be aggressive if approached, and attacks have occurred in the past. Marine mammal interaction by the public is managed under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998.* This notice specifies that a person may not come within 10 m of an Australian sea lion when in the water, and it is recommended that a person not come within five metres on land. If an Australian sea lion approaches to within these distances, the person must move away from the animal until they are greater than 10 or five metres away respectively. If a vessel is near any Australian sea lion that exhibits signs of being disturbed, the person in charge must move the vessel away from the animal at a speed of less than five knots. The relatively small numbers and low fecundity of the central west coast Australian sea lion population suggest this species is very vulnerable to human disturbance and pressures on the Australian sea lion population in the marine park are considered to be high. Current major pressures include boat strikes, entanglement in discarded litter and fishing gear, disturbance due to vessel noise, disturbance of resting or feeding animals and the introduction of pathogens via feeding. Artificial feeding of Australian sea lions is not permitted as this can be fatal and may also result in an increase in Australian sea lion attacks. To reduce the incidence of boat strikes within the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones, an eight knot speed limit will apply to motorised vessels from 1 July 2008. This includes removing the gazetted water ski area within Shoalwater Bay. Non-motorised vessels and crafts, including kite surfers and windsurfers, will be encouraged to comply with this speed restriction.

	Other management strategies for Australian sea lions include assessing the nature, level and potential impacts of human activities on Australian sea lions within the marine park and the implementation of an appropriate monitoring program. Education of marine park users about Australian sea lions will continue and ensuring that the approvals and the setting of conditions for new developments and operations (e.g. tourist operations) are consistent with the management targets for Australian sea lions.
Current status	In the last 150 years, the Australian sea lion population within the greater Perth metropolitan area has declined by approximately 80–90 per cent. However, currently within the marine park the population is considered stable.
Existing and potential uses and/or pressures	• Physical disturbance from human interaction (e.g. tourism and vessel activity, noise and boat strike). • Discharges of toxicants*, particularly shipping related wastes and spillage (eg. accidental spillages of oil, fuel and other chemicals; hull anti-fouling of commercial and recreational boats and ballast and bilge water discharge). • Entanglement (e.g. litter, fishing gear). • Incidental feeding by marine park users.
Current major pressures	Physical disturbance from human interaction (e.g. tourism and vessel activity, noise and boat strike).
Management objectives	To ensure Australian sea lions frequenting the marine park waters are not injured, killed or significantly disturbed by human activities or interactions.
Strategies	1. Assess the nature, level and potential impacts of human activities to Australian sea lions in the marine park and implement an appropriate monitoring program (DEC) **(H-KMS)**. 2. Remove the gazetted water ski area from Shoalwater Bay by 1 July 2008 through liaison with DPI (DEC, DPI) **(H)**. 3. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**. 4. Regulate access of visitors to marine park areas adjacent to Australian sea lion haul-out sites as required (DEC) **(H)**. 5. Educate marine park users about the Australian sea lion and the potential detrimental impacts of human activities (e.g. feeding and discarding of offal and bait) on the marine park's Australian sea lions, of marine mammal interaction controls in place under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998* and the dangers of interacting with Australian sea lions (DEC) **(H)**. 6. Maintain records of the mortality, injury or disturbance of Australian sea lions in the marine park (DEC) **(M)**. 7. Undertake complementary management actions in the terrestrial reserves, such as restricting visitor access, if required (DEC) **(L)**.

Performance measures	1. Number of reported Australian sea lion injuries and deaths. 2. Number of reported disturbances.	**Desired trends**	1. Negative. 2. Negative
Short-term targets	To be developed as required.		
Long-term targets	No loss in abundance Ø of the Australian sea lion as a consequence of human activities in the marine park.		

**toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

Ø In this context a loss or change in *'abundance'* excludes losses due to accidents. Minor or transient losses are unacceptable.

9.1.8 Cetaceans

Ecological value	*Cetaceans are of special conservation status and five species have been observed in the marine park.*

Background	The bottlenose dolphin (*Tursiops truncatus*) is the most common marine mammal in the marine park. This species is common in cold, temperate and tropical seas and estuaries all over the world. Pods of dolphins are regularly seen in the marine park surfing waves and as they come to the surface to breathe. Anecdotal information suggests that dolphins frequent the shallow waters of Shoalwater Bay, and users have often seen dolphins with calves in this area. The humpback whale (*Megaptera novaeangliae*) may occasionally enter the marine park on its migration to and from Antarctic waters. Humpbacks migrate north to the warm tropical waters off the Pilbara and Kimberley coasts in June and July to give birth and suckle their young, and migrate south in spring to feeding grounds in Antarctica. The southern right whale (*Eubalaena australis*) occasionally uses the marine park during its annual winter migration to the south and west coasts of Western Australia. The minke whale (*Balaenoptera acutorostrata*) and pygmy right whale (*Caperea marginata*) have also been recorded in the marine park. All cetaceans are protected under the WC Act. In addition, the humpback whale and southern right whale are threatened species declared to be specially protected under the WC Act. The humpback whale is declared to be vulnerable and the southern right is declared to be endangered under the Commonwealth EPBC Act. Marine mammal interaction by the public is managed under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998.* A current threat to the dolphin population of the marine park is via feeding, boat noise and collisions, entanglement in and digestion of litter, toxicants and general harassment. Dolphins also can become entangled in fishing gear however this threat is considered to be low. To provide a focus on wildlife appreciation, conservation and to address some concerns regarding potential boat strikes within the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones, an eight knot speed limit will apply to motorised vessels from 1 July 2008. This includes removing the gazetted water ski area within Shoalwater Bay. Non-motorised vessels and crafts, including kite surfers and windsurfers, will be encouraged to comply with this speed restriction. Management strategies for cetaceans include assessing the nature, level and potential impacts of human activities in the marine park, implementing an appropriate monitoring program and educating marine park users about the marine mammal interactions controls in place.
Current status	Populations of cetaceans are generally considered to be stable.
Existing and potential uses and/or pressures	• Physical disturbance from human interaction (e.g. tourism and vessel activity, noise and collisions). • Incidental feeding by marine park users. • Discharges of toxicants*, particularly shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge). • Entanglement (e.g. litter, fishing gear).
Current major pressures	None.
Management objectives	To ensure the abundance of cetaceans is not significantly impacted by future human activities in the marine park.
Strategies	1. Remove the gazetted water ski area from Shoalwater Bay by 1 July 2008 through liaison with DPI (DEC, DPI) **(H)**. 2. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**. 3. Educate marine park users about cetaceans, the potential detrimental impacts of human activities on the marine park's cetaceans and marine mammal interaction controls in place under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998* (DEC) **(M)**. 4. Maintain records on the incidence of entanglement, boat collisions, strandings or mortalities of cetaceans in the marine park (DEC) **(M)**.

Performance measures	Abundance.	**Desired trends**	Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	No loss of cetacean abundance [Ø] as a result of human activity in the marine park.		

[*] *toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

[Ø] In this context a loss or change in *'abundance'* excludes losses due to accidents. Minor or transient losses are unacceptable.

9.1.9 Seabird and shorebirds

Ecological value	*The marine park and adjacent nature reserves are important nesting and foraging areas for at least 14 species of sea and shorebirds.*

Background	As well as being of ecological significance, the sea and shorebird colonies of the marine park are one of the major attractions for people who visit the Shoalwater Islands. The marine park and adjacent nature reserves are important foraging and nesting areas for at least 14 species of seabirds. Amongst the most notable species are the little penguin (*Eudyptula minor*) (see Section 9.1.10), little shearwater (*Puffinis assimilis*), pied cormorant (*Phalacrocorax varius*) and Australian pelican (*Pelecanus conspicillatus*). Many of the sea and shorebirds are resident in the area throughout the year however the marine park is also an important area for a variety of migratory shorebird species that journey from Asia and the Arctic Circle to feed on the worms, bivalves and other invertebrates. Species listed under the Japan-Australia Migratory Bird Agreement or China-Australia Migratory Bird Agreement include the caspian tern (*Hydroprogne caspia*), bridled tern (*Sterna anaethetus*), ruddy turnstone (*Arenaria interpres*), whimbrel (*Numenius phaeopus*) and bar-tailed godwit (*Limosa lapponica*). Sea and shorebirds use marine park waters and foreshores and the island nature reserves for feeding, nesting, courtship and/or roosting. Although the primary feeding grounds for most seabirds are outside of the marine park, it is expected that some species forage substantially in marine park waters, including pelicans, pied cormorants and Caspian terns (Dunlop, *pers. comm.*). Important resting and foraging areas for sea and shorebirds include the islands and mainland foreshores. All native birds are protected under the WC Act. In addition, Australia also has an international obligation to protect those species which are listed under the Japan-Australia Migratory Bird Agreement and the China-Australia Migratory Bird Agreement. A significant pressure on the sea and shorebird populations is thought to be disturbance by human activity. Some boating activities around the islands and visitation to marine park foreshores may disturb sea and shorebird populations. Some of the important resting and foraging areas include foreshores which are subject to frequent disturbance, such as Becher Point. Other potential pressures on sea and shorebird populations include discharges of toxicants, litter and the provision of food sources (which causes for example, an increase in silver gull numbers). Potential pressures on sea and shorebirds on the islands include a reduction of nesting space (e.g. due to competition with the feral pigeon, *Columba livia*), pests (e.g. feral pigeons and silver gulls in high numbers) and habitat alteration (e.g. changes in guano cycle and introduced woody weeds). Algae that detach from reefs often accumulate on the seabed and water surface where it is known as algal wrack. This wrack is often washed onto the shorelines and plays an important role in stabilising the beaches. It is also ecologically significant as it contains large numbers of invertebrates which are prey for surf zone fishes and birds (Muhling and Ryan, 2002). Consequently, the removal of wrack is managed through a permit system and is generally only allowed on and adjacent to boat ramps and other public facilities such as beach access paths. The removal of wrack for any other reason requires permissions from the District Manager. Management strategies for sea and shorebirds include monitoring of populations, restricting the vessel speed to eight knots within the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones, monitoring of pests and introduced species. Other strategies include ensuring that the approvals and the setting of conditions for new developments and operations are consistent with the management targets for sea and shorebirds populations. The management of sea and shorebird populations on the islands is addressed under the *Shoalwater Islands Management Plan 1992-2002*.
Current status	The populations of some seabirds are increasing in the marine park (e.g. bridled terns, Australian pelicans, pied cormorants), while the population information for some species is limited (e.g. fairy terns, crested terns, little shearwaters).
Existing and potential uses and/or pressures	• Physical disturbance of roosting and nesting sites by human activities. • Discharges of toxicants*, particularly shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water

	discharge). • Entanglement (e.g. litter, fishing gear). • Predation and competition from feral species, especially at and for nests. • Degradation of critical habitats. • Habituated feeding.
Current major pressures	• Physical disturbance of roosting and nesting sites by human activities. • Degradation of critical habitats.
Management objectives	To ensure that sea and shorebirds are not significantly impacted by physical disturbance of roosting and nesting sites or through loss or degradation of critical habitats.
Strategies	1. Assess the nature, level and potential impacts of human activities and pest species to the sea and shorebird populations in the marine park and implement an appropriate monitoring program (DEC) **(H-KMS)**. 2. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**. 3. Regulate access of visitors to marine park areas that are significant sites for sea and shorebirds (e.g. breeding, feeding, roosting) if required (DEC) **(H)**. 4. Through liaison with land managers, undertake complementary management actions on adjacent land and terrestrial reserves to manage potential detrimental impacts on sea and shorebirds. This could include encouraging the completion of management plans for specific species or areas and/or restricting visitor access if necessary (DEC, CoR) **(H)**. 5. Continue to prohibit the removal of algal wrack except on and adjacent to designated boat ramps or other public facilities. A permit may be granted to remove wrack for other reasons by the District Manager (DEC) **(M)**. 6. Educate marine park users about sea and shorebirds and the potential detrimental impacts of human disturbance to the marine park's sea and shorebirds, and the controls in place to protect these species (DEC) **(M)**. 7. Identify significant breeding, feeding and roosting sites for sea and shorebirds in or adjacent to the marine park (DEC) **(M)**.

Performance measures	1. Diversity. 2. Abundance. 3. Number of reported sea and shorebird injuries and deaths per year.	**Desired trends**	1. Constant or positive. 2. Constant or positive. 3. Negative.
Short-term targets	To be developed as required.		
Long-term targets	1. No loss of seabird or shorebird diversity as a result of human activity in the marine park. 2. No loss of seabird or shorebird abundance [Ø] as a result of human activity in the marine park.		

[*] *toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

[Ø] In this context, a loss or change in *'abundance'* excludes losses due to accidents. Minor or transient losses are unacceptable.

9.1.10 Little penguin (KPI)

Ecological value	*The little penguin* (Eudyptula minor) *colony on Penguin Island is close to the northernmost limit of the species' range and is the largest known breeding colony in Western Australia. The waters of the marine park are used to access feeding grounds, both in and adjacent to the marine park.*

Background	The little penguin is the smallest of the penguin species and occurs on the southern coastline of Australia from Fremantle to northern New South Wales. Penguin Island is home to the largest breeding colony of little penguins on the west coast of Australia, with a population estimate of between 500-700 pairs (Cannell, pers comm). Apart from small colonies on Carnac and Garden islands, this colony is at the northern and western limits of its range. The metropolitan population appears to be genetically isolated from the south coast population, and this is reflected in a larger adult size. There is evidence that the Penguin Island colony may merit sub species status (Wienecke, 1993). A radio-tracking study conducted in 1996–1997 found that penguins move south from Penguin Island before dawn to forage in Warnbro Sound and Comet Bay. They tend to travel and forage within 10 km of the coastline, remaining between the coast and the Murray Reef system. Thus, the birds all pass through a narrow corridor of water in the morning, bordered by Becher Point on one side and the reefs on the other, in order to reach their foraging grounds off Comet Bay. The penguins begin the return swim to the island along the same route before dusk, with peak arrival times from one to two hours after dusk (Klomp and Wooller, 1991; Wooller *et al.*, in review). Little penguins leave Penguin Island at the end of the moulting period in December–January, and return to the island around March to begin their pre-breeding activities. It is not known where the penguins go between the moult and pre-breeding, although there have been recoveries as far south as Bunbury during this period. During the breeding period (April to December, with the peak time of egg-laying in June and September), the penguins are mostly found in Comet Bay (just south of the marine park). Their foraging range decreases when they are rearing chicks (Wooller *et al.*, in review). From diet studies, it has been found that little penguins feed mainly on whitebait (*Hyperlophus vittatus*), pilchard (*Sardinops neopilchardus*), garfish (*Hyporhamphus melanochir*), anchovy (*Engraulis australis*) and bluesprat (*Spratelloides robustus*). However, whitebait comprises 60–80 per cent of the penguin's diet while rearing chicks (Klomp and Wooller, 1988; Wienecke, 1989; Connard, 1995 and Wooller *et al*, in review). Research has shown that the shallow nearshore waters in the vicinity of Becher Point consistently provide a particularly important nursery area for the juvenile whitebait (Valesini, pers comm; Lenanton *et al.*, 2003). Appropriate management of this whitebait population and the nearshore shallow habitats around Becher Point are therefore critical to the ongoing survival of the little penguin population on Penguin Island. The WC Act provides for protection of all native birds. The colony of little penguins on Penguin Island has been given the highest conservation status of the 256 colonies of the little penguin around Australia (Dann *et al*, 1996). This study used several criteria to make this assessment including population size, location, vulnerability, history of scientific research and special features. Potential threats to the little penguin population in the marine park include a reduction in the food supply (through fishing, disturbance of whitebait nurseries and decline in water quality). Because penguins select particular species during different stages of their life cycle (e.g. pilchards in the early part of their breeding season and whitebait during chick rearing), and because the distance travelled by the penguins is related to breeding success (Wooller *et al.*, in review), a nearby plentiful supply of whitebait is essential to maintain population levels. Penguins are difficult to see in the water, and recent research has shown they can spend up to 90 per cent of their time at sea in the top 1–2m of the water column (Cannell *et al.,* in prep.). They are therefore susceptible to strikes by boats and other water craft (i.e. jet skis, windsurfers). To address some of these concerns, an eight knot speed limit for motorised vessels will apply within the Shoalwater Bay Special Purpose Zone (Wildlife Conservation) from 1 July 2008. In addition, the south-western boundary of the Warnbro Sound water ski

	area may be reduced to minimise the any potential impacts on little penguins as they travel to and from their foraging areas in Port Kennedy and Comet Bay. Penguins are susceptible to entanglement in plastic pollution, such as discarded fishing line, and oil spills which can cause devastating effects on penguin populations. While on the islands, little penguins are susceptible to direct disturbance, particularly during the moult period. Other impacts potential impacts include trampling of nesting sites, loss of suitable habitat for breeding and moulting and destabilisation of foredunes that may prevent penguin access to nest sites. Management of the little penguin colony on Penguin Island and the associated issues are detailed in the *Shoalwater Islands Management Plan 1992–2002*. However, complementary management in the marine park and surrounding waters is required. One such management strategy to address the pressures on the whitebait population occurring east of Becher Point is to include this area in the marine park. Greater knowledge of the status of the little penguin population while at sea and feeding requirements will become increasingly important as development pressures and marine park visitor numbers increase.
Current status	The little penguin colony on Penguin Island has approximately 500–700 pairs however accurate estimates of population size and fluctuations are not available.
Existing and potential uses and/or pressures	• Physical disturbance, including mortality, in commuting or in foraging areas (e.g. boat-strike, entanglement in litter). • Reduction of prey biomass in the Becher Point and/or Comet Bay areas (e.g. recreational and commercial fishing, disturbance of whitebait nurseries through activities including infrastructure development). • Discharges of toxicants*, particularly shipping related wastes and spillage (e.g. accidental spillage of oil, fuel and other chemicals; anti-fouling agents, ballast and bilge water discharge).
Current major pressures	• Reduction of prey biomass through commercial and recreational fishing and disturbance of nursery areas. • Physical disturbance from boats, boat-strike and entanglement in litter.
Management objectives	To ensure the abundance of the little penguin is not significantly impacted by a reduction in available prey species or from physical disturbance by boats or boat-strikes in the marine park.
Strategies	1. Facilitate research and monitoring programs to determine a robust population estimate and the potential impacts of human activities, including little penguin mortality from boat strike, to the little penguin population and their prey species in the marine park (DEC) **(H-KMS)**. 2. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones. If necessary, apply further speed restrictions to address mortality from boat strikes (DEC, DPI) **(H)**. 3. Review the south-western boundary of the water ski area in Warnbro Sound (DEC, DPI) **(H)**. 4. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management targets and objectives for the little penguin, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**. 5. Amend the marine park boundary to include the Port Kennedy exclusion area in the marine park (DEC) **(H)**. 6. Encourage the completion and implementation of the review of the *Shoalwater Islands Management Plan 1992–2002*, to enable complementary management (including regulation of visitor access) to protect little penguins (DEC) **(H)**. 7. Maintain records on the incidence of entanglement, boat collisions or mortalities of little penguins in the marine park (DEC) **(M)**. 8. Educate marine park users about the little penguin, the potential detrimental impacts of human disturbance to the marine park's little penguin population and the importance of the Becher Point whitebait nursery and Comet Bay foraging area (DEC) **(M)**.

Performance measures	1. Little penguin breeding success. 2. Abundance. 3. Number of reported little penguin entanglements per year.	**Desired trends**	1. Constant or positive. 2. Constant or positive. 3. Negative.
Short-term targets	To be developed as required.		
Long-term targets	1. No reduction in little penguin breeding success on Penguin Island as a result of human activity in the marine park. 2. No loss of little penguin abundance [Ø] as a result of human activity in the marine park.		

[*] *toxicants* are chemical contaminants that have the potential to exert toxic effects at concentrations that might be encountered in the environment due to human activity (modified from ANZECC/ARMCANZ, 2000).

[Ø] In this context, a loss or change in *'abundance'* excludes losses due to accidents. Minor or transient losses are unacceptable.

9.1.11 Finfishes (KPI)

Ecological value	*A diverse finfish fauna contributes significantly to the biodiversity of the marine park.*

Background	The finfish fauna of Western Australia comprises just over 3000 species, and is recognised as possibly the most diverse in Australia. Approximately 1500 of these are associated with shallow reefs (0–40m) (Hutchins, 2001). The fish fauna found in the marine park is composed mostly of warm-temperate species, with smaller numbers of tropical and subtropical species. The seagrass and subtidal reef habitats of the marine park provide important habitats for many species, and the marine park embayment areas and adjacent Cockburn Sound provide nearshore habitats for one of the most diverse finfish populations on the lower west coast of the State. Out of 75 species that have been recorded in nearshore shallow waters of the marine park, over half have a seagrass affiliation of some kind (Hyndes, *pers. comm*). The shallow nearshore waters around Becher Point are regionally important as a habitat and nursery area for whitebait and other bait fish species. Sampling at 14 sites covering 55 km of the coastline (north and south of the marine park) revealed that the highest densities of juvenile whitebait were found inshore at Becher Point. These bait fish species are ecologically significant because they form the base of many marine food chains. For example, studies examining the chemical signatures of whitebait otoliths (ear bones) found in the gut contents of little penguins at Penguin Island has shown that the whitebait the penguins feed on originate from the Becher Point nursery area. Juvenile whitebait use the Becher Point area as a nursery prior to moving south into Comet Bay, which is one of the main feeding areas of the little penguin when they are rearing chicks (Wooller *et al.*, in review). The rich fish fauna of the marine park is not only of intrinsic ecological value, but is also important because of its significant recreation and tourism potential. Divers and snorkellers have the opportunity to view a wide diversity of species in this area, making these activities popular recreational pursuits in the marine park. Finfish are also actively sought by recreational and commercial fishers. Finfish species targeted by recreational line fishermen include whiting (*Sillago spp*), tailor (*Pomatomus saltatrix*), Australian herring (*Arripis georgianus*), skipjack trevally (*Pseudocaranx spp.*), snapper (*Pagrus auratus*), West Australian dhufish (*Glaucosoma hebraicum*) and Australian salmon (*Arripis truttaceus*). Species that were historically targeted by commercial fishermen are whitebait and blue sprat (*Spratelloides robustus*). Secondary species taken by commercial fishers are yellow-eye mullet (*Aldrichetta forsteri*), sea mullet (*Mugil cephalus*), whiting, Australian herring, pilchard and garfish. Under the FRM Act, DoF is responsible for the management of the recreational and commercial take of finfish species. Fish stocks are managed through a wide range of management tools, including size and bag limits, gear restrictions, licences and closed seasons. The collection of aquarium fish is only permitted for commercial purposes and for those collectors authorised under the FRM Act. Within the marine park are three species which are totally protected in Western Australian waters, these being the great white shark (*Carcharodon carcharias*), the leafy sea dragon (*Phycodorus eques*) and the grey nurse shark (*Carcharias taurus*). The grey nurse and great white sharks are declared vulnerable under the Commonwealth EPBC Act. The major pressures on the diversity and abundance of finfish in the marine park is extraction by recreational and to a lesser extent by commercial fishing activities. With the continued urban expansion of the Rockingham and Port Kennedy area, the take of finfish by recreational fishers is expected to increase. Management strategies for targeted finfish species needs to consider the viability of the populations of these species in the context of maintaining the values of the marine park. Fisheries management scales rarely reconcile with the spatial scales of marine parks and reserves and as such, populations of some species in a reserve could become locally depleted even though the fishery is being managed on a sustainable basis at the broader scale. To overcome this potential problem, consideration is required as to the appropriateness of recreational and/or commercial extraction of these species and whether specific finfish species should be protected in part of the entire marine park. This decision would be based on a

	number of factors including species distribution, abundance, life history and an assessment of the ecological and social importance of the species in the context of the marine park (e.g. 'iconic' species). Species for which extraction is considered appropriate will be managed by DoF, in accordance with sustainable management principles. In particular, management will focus on maintaining targeted species diversity throughout the marine park by protecting important habitats, maintaining or increasing finfish abundance by maintaining sustainable levels of extraction and maintaining or recovering age structure in sanctuary zones similar to that found in unexploited populations. The remaining species will be protected throughout the marine park using appropriate legislation. Given the increasing pressure associated with population growth and possible increases in scale of recreational fishing, priority species to monitor include those that are long-lived, change sex, aggregate to spawn, and/or have limited home ranges. In addition, the current level of effort for the recreational take of aquarium fishes is unknown, however this activity has the potential to significantly impact on populations in the marine park, given the marine park's accessibility and the large number of users. Recreational take of aquarium fishes will therefore not be permitted.
Current status	Most finfish populations are considered to be stable. However anecdotal information suggests that localised depletions have occurred for many of the popular targeted species.
Existing and potential uses and/or pressures	• Recreational and commercial fishing. • Degradation of critical habitats as a result of human activity.
Current major pressures	Recreational and commercial fishing.
Management objectives	1. To manage targeted finfish species for ecological sustainability in the marine park. 2. To ensure non-targeted finfish species are not significantly impacted by recreational and commercial fishing in the marine park.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess the nature, level and potential impacts of human activities on finfish populations in the marine park and implement an appropriate monitoring program (DEC) **(H-KMS)**. 3. Identify finfish species that need to be protected from recreational or commercial fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H-KMS)**. 4. Educate marine park users about the potential detrimental impacts of human activity on finfish stocks, the conservation issues associated with finfish, and appropriate behaviours and conduct to minimise these impacts (DEC, DoF) **(H)**. 5. Ensure that approvals and the setting of conditions for new aquaculture developments and operations are consistent with the management objectives and targets for finfish and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DPI) **(H)**. 6. Prohibit recreational aquarium fish collecting in the marine park (DEC, DoF) **(H)**. 7. Participate in DoF processes regarding the management of recreational and commercial fisheries, including review and amendment, if necessary, of management controls (DEC) **(M)**. 8. Initiate research programs to characterise finfish diversity and abundance and to identify important nursery, spawning and aggregation sites in the marine park (DEC, DoF) **(M)**. 9. Quantify the level and significance of bycatch for commercial and recreational fishing activities in the marine park and, if necessary, implement measures to progressively reduce the bycatch of finfish species (DoF, DEC) **(M)**.

Performance measures	1. Diversity. 2. Biomass.	**Desired trends**	1. Constant or positive. 2. Constant or positive.
Short-term targets	One hundred per cent increase of targeted finfish abundance in sanctuary zones and the Murray Reef Special Purpose Zone (Scientific Reference) within five years.		
Long-term targets	1. No loss of finfish diversity as a result of human activity in the marine park. 2. No loss of non-targeted finfish species biomass $^{\emptyset}$ as a result of human activities in the marine park. 3. Abundance and size composition of finfish species in sanctuary zones and the Murray Reef Special Purpose Zone (Scientific Reference) and non-targeted finfish species in		

	other zones to be at natural [Ω] levels. 4. Management targets for targeted finfish species to be determined in consultation with DoF and stakeholders.

[Ø] In this context a loss or change in *'biomass*' excludes losses of a minor, transient or accidental nature.

[Ω] In this context *'natural'* refers to the abundance that would occur in areas that are undisturbed and/or unexploited by human activities.

9.1.12 Invertebrates

Ecological value	*A high diversity and abundance of invertebrate fauna in the marine park forms a critical component of the food web that supports the variety of marine animals including sea and shorebirds and finfish.*

Background	Marine invertebrates found in the marine park include sponges, rock lobster, squid, cuttlefish, shells, jellyfishes, sea stars and anemones. This diversity is attributed to the complex range of habitats including intertidal and subtidal reefs, sandy and silty seabeds, and seagrass. Each habitat is home to a unique assemblage of invertebrates, with some species occurring over a range of habitats. The invertebrate fauna is comprised mostly of warm temperate species, with smaller numbers of tropical and subtropical species which are endemic to the west coast. The dominant invertebrates on intertidal reef platforms include abalone (*Haliotis roei*), whelk (*Thais orbita*), chiton (*Acanthopleura hirtosa*) and the large turban shell (*Turbo torquatus*). Some reef platforms support large populations of certain animals (e.g. the sea star *Patiriella gunnii* at Penguin Island). The ecology of these animals is however, not fully understood. Subtidal reef and limestone pavements attract a wide range of marine invertebrates, while underwater limestone features such as caves and pinnacles harbour a variety of invertebrate assemblages including sponges, gorgonians and other species. The subtidal reefs harbour a particularly high diversity of sponges. Over 70 sponge genera have been recorded from around reefs of the Garden Island Ridge and Five Fathom Bank (LeProvost *et al*, 1981), representing one of the most diverse sponge populations in Australia (MA Borowitzka, *pers. comm.* DCE, 1986). Subtidal reefs within and west of the marine park provide settlement sites and nursery grounds for larvae and juveniles of the western rock lobster (*Panulirus cygnus*). On the more exposed reefs, large macrophytes such as kelp (*Ecklonia radiata*) are an important food source and shelter for herbivorous invertebrates such as sea urchins. Burrowing invertebrates, including certain species of molluscs and polychaete worms, are the dominant fauna in sandy areas of the marine park. Warnbro Sound is home to a diverse and abundant infaunal community comprised of anemones, cerianthids, sponges, tunicates, burrowing polychaetes, echinoderms, crustaceans and molluscs, particularly bivalves. The infaunal olive shell (*Olivia australis*) is known to be abundant in the emergent sandbanks of the marine park however more research is needed on the fauna of these dynamic habitats. Seagrass meadows also provide food and shelter for a diverse assemblage of invertebrates. Under the FRM Act, DoF is responsible for the management of the recreational and commercial take of invertebrate species. Several invertebrate species are targeted by commercial and recreational fishers including western rock lobster and Roe's abalone and a licence is required for the take of these species. Fishing is considered the current major pressure on these targeted invertebrate populations. However, invertebrates are also susceptible to a number of other impacts, including human activities which pollute the environment and degrade critical habitats. Management strategies for targeted invertebrate species need to consider the viability of the populations of these species in the context of maintaining the values of the marine park. Fisheries management scales rarely reconcile with the spatial scales of marine parks and reserves and as such, populations of some species could become locally depleted even though the fishery is being managed on a sustainable basis at the broader scale. To overcome this potential problem, consideration is required as to the appropriateness of recreational and/or commercial extraction of these species and whether specific invertebrate species should be protected in part of the entire marine park. This decision will be based on a number of factors including species distribution, abundance, life history and an assessment of the ecological and social importance of the species in the context of the marine park (e.g. 'iconic' species). Species for which extraction is considered appropriate will be managed by DoF, in accordance with sustainable development principles. In particular, management will focus on maintaining targeted species diversity throughout the marine park by protecting important habitats, maintaining or increasing invertebrate abundance by maintaining sustainable levels of extraction, and maintaining or recovering age structure in sanctuary zones similar to that found in unexploited populations. Non-target species will be protected throughout the marine

	park using appropriate legislation. The current effort for the recreational take of specimen shells is unknown, however this activity has a high potential to significantly impact on invertebrate populations given the accessibility of the intertidal reefs and the large number of users. Recreational take of specimen shells will therefore not be permitted. Other management strategies include education of users about the potential detrimental impacts of human activities (e.g. reef walking). In addition, knowledge of the invertebrate fauna is incomplete due to limited surveys. Many invertebrate groups are not well known and further research is likely to result in new species. Future research is therefore a key strategy which will assist the future management of the marine park's values.
Current status	Most invertebrate populations are considered to be stable. However anecdotal information suggests some species of molluscs and crustaceans, particularly in shallow, easily accessible areas may be significantly depleted.
Existing and potential uses and/or pressures	• Commercial and recreational fishing. • Incidental commercial take (i.e. bycatch). • Degradation of habitats as a result of human activities, such as reef walking.
Current major pressures	Recreational and commercial fishing.
Management objectives	1. To manage targeted invertebrate species for ecological sustainability in the marine park. 2. To ensure non-targeted invertebrate species are not significantly impacted by recreational and commercial fishing in the marine park.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess the nature, level and potential impacts of human activities on invertebrate populations in the marine park and implement an appropriate monitoring program (DEC) **(H-KMS)**. 3. Identify invertebrate species that need to be protected from recreational or commercial fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H-KMS)**. 4. Prohibit recreational specimen shell collecting in the marine park (DEC, DoF) **(H)**. 5. Educate marine park users about the potential detrimental impacts of human activity on invertebrate stocks, the conservation issues associated with invertebrates and appropriate behaviours and conduct to minimise these impacts (DEC, DoF) **(M)**. 6. Participate in DoF processes regarding management of recreational and commercial fisheries, including review and amendment, if necessary, of management controls (DEC) **(M)**. 7. Initiate research programs to characterise invertebrate diversity and abundance in the marine park (DEC, DoF) **(M)**. 8. Quantify the level and significance of bycatch for recreational and commercial fishing activities in the marine park, and if necessary, implement measures to progressively reduce the bycatch of invertebrate species (DoF, DEC) **(M)**.

Performance measures	1. Diversity. 2. Biomass.	**Desired trends**	1. Constant. 2. Constant or positive.
Short-term targets	One hundred per cent increase in the abundance [Ø] of lobster species in sanctuary zones within five years.		
Long-term targets	1. No loss of invertebrate diversity as a result of human activity in the marine park. 2. No loss of non-targeted invertebrate species biomass [Ø] as a result of human activities in the marine park. 3. Abundance and size composition of invertebrate species in sanctuary zones and non-targeted invertebrate species in other zones to be at natural [Ω] levels. 4. Management targets for targeted invertebrate species to be determined in consultation with DoF and stakeholders.		

[Ø] In this context a loss or change in *'abundance'* or *'biomass'* excludes losses of a minor, transient or accidental nature.

[Ω] In this context, *'natural'* refers to the abundance that would occur in areas that are undisturbed and/or unexploited by human activities.

9.2 Social values

Social values are those cultural, aesthetic, recreational and economic characteristics for which an area is significant or well known. These can include heritage, commercial and recreational usage, science and education. Striking a balance between protecting the marine environment for current and future generations and facilitating ongoing recreational and commercial opportunities is the primary purpose of the management plan. It should be noted that DEC's Policy Statement No. 18 *Recreation, Tourism and Visitor Services* provides a framework for the "provision of world class recreation and tourism opportunities, service and facilities for visitors to the public conservation estate while maintaining in perpetuity Western Australia's natural and cultural heritage". Recreation and tourism will be managed in light of this policy. Set out below is information on specific ecological values, their management objectives, strategies and targets. The generic strategies in Section 7 also apply to each of these individual values.

9.2.1 Aboriginal heritage

Social value	*The area has significant Aboriginal heritage value and a number of sites are located in and adjacent to the marine park.*

Background	The south-west Aboriginal people are collectively known as Noongar. Records show the Swan Coastal Plain is rich in resources and consequently supported a significant population of Aboriginal people. Aboriginal people are known to have used the marine park for fishing and hunting. The islands were utilised to some extent by Aboriginal people both before the rise in sea level, when the islands were a part of the Swan Coastal Plain, and afterwards. The Shoalwater and Garden Island area is significant as part of the Aboriginal story of creation. The Rainbow Serpent (the Wagyl) travelled to the Shoalwater area to rest and recover after a battle with Yondock (Garden Island). The Serpent rested his head at Lake Richmond before leaving the area, making a big hole in the middle of the lake. The Rainbow Serpent left his spit on the coastal rocks, which is seen as the green algae on the rocks today and his colours are said to be seen in the abalone of the area (Walley, *pers. comm.*). Aboriginal sites and objects are covered by the provisions of the *Aboriginal Heritage Act 1972* and there are a number of sites adjacent to and in the marine park registered on the Department of Indigenous Affairs' Aboriginal Sites Register. No sites are registered on the Shoalwater Islands, however no known archaeological and ethnographic surveys have been conducted. The location of many Aboriginal sites remains confidential to avoid disturbance. Management strategies for Aboriginal heritage of the marine park will focus on developing, in collaboration with the local Aboriginal population, an understanding of the significance of the area to Aboriginal people and ensuring that there is Aboriginal representation on the MAC.		
Requirements	• Protection of heritage sites. • Recognition of cultural and traditional activities. • Provision of access for cultural and traditional activities. • Collaborative involvement of Aboriginal people in planning and management of the marine park.		
Management objectives	1. To ensure that, in collaboration with local Aboriginal people and the relevant management authorities, human activities do not significantly impact on sites of significance to Aboriginal people in the marine park. 2. To involve local Aboriginal people in the management of the marine park. 3. To raise awareness and knowledge of Aboriginal relationships with the marine environment.		
Strategies	1. Ensure that there is appropriate Aboriginal representation on the MAC (DEC) **(H-KMS)**. 2. Develop mechanisms, in collaboration with local Aboriginal groups and relevant authorities, which ensure Aboriginal people have meaningful involvement in the management of the marine park (DEC, DIA, local Aboriginal groups) **(H)**. 3. Develop and implement education programs and interpretative opportunities, in collaboration with the local Aboriginal community, to promote a greater understanding of the significance of the area to Aboriginal people (DEC, local Aboriginal groups) **(H)**.		
Performance measures	To be developed as required.	**Desired trends**	To be developed as required.
Short-term targets	To be developed as required.		
Long-term targets	Maintenance of Aboriginal heritage values in and associated with the marine park.		

9.2.2 Maritime heritage

Social value	*The marine park has a significant maritime heritage and a number of historic shipwrecks are located in the marine park.*

Background	The marine park has a significant maritime history. Whaling, recreational fishing and diving have been the most popular activities throughout the marine park's history. In 1837 and 1838, the American whaler the *Pioneer* was stationed in Warnbro Sound. It appears to have established a shore station there, together with Western Australian interests. However, whaling activity in the area ceased soon after. The legendary Seaforth McKenzie squatted on Penguin Island from about 1914 to 1926, using the island caves for accommodation, a library and to store supplies. The *SS Dolphin* was a wooden hulled ship obtained for a group of sea-scouts led by Seaforth for use as a floating headquarters. This vessel was later abandoned opposite Mackenzie's cave circa 1926, and the remains of the keel are still visible in the weed today, approximately 100m offshore. The reef systems and rocky outcrops of the Shoalwater Islands region formed a natural shallow water shelter for passing ships throughout history and Port Kennedy was so named in recognition of this feature. However, the reef systems have also proved hazardous to mariners, and there are a number of shipwrecks in the marine park waters. Four of these wrecks form part of the existing Mandurah and proposed Rockingham wreck trails designed by the Western Australian Maritime Museum (WAMM); the *Belle of Bunbury*, which struck a rock just off Penguin Island in 1886 and sailed only 80 metres before sinking, losing six tons of potatoes and 70 bales of wool (today this wreck lies under sand); the *Bungaree*, which ran aground near the Sisters Reef in 1876, losing 32 tons of tea, sugar and coconuts; the *Chalmers*, which was a 606 ton British wooden vessel that ran aground in 1874 and can now be seen near the Sisters; and the *Hero of the Nile*, which was a 356 ton wooden barque that sank at Becher Point in 1876 (although little can be seen today as much lies under sand and seagrass). In addition, archaeologists have recovered material from a number of historic wreck sites in the marine park and they can now be viewed at the WAMM. All pre-1900s shipwrecks and artefacts are protected under the *Maritime Archaeology Act 1973* and all shipwrecks and artefacts greater than 75 years old are protected under the Commonwealth *Historic Shipwrecks Act 1976.* The WAMM has statutory responsibility for management of these wrecks. An MOU between DEC and the WAMM is in place and provides for a cooperative approach to management of historic sites in the marine park. The primary management issue regarding the maritime heritage of the marine park is the potential human impacts on important historical sites such as litter, physical disturbance and tourism. Management strategies will therefore involve the education of users about the maritime historical values of the area.
Requirements	• Protection of maritime heritage and historical sites. • Recognition of cultural value.
Management objectives	1. To ensure that, in collaboration with the WAMM, human activities do not significantly impact on historical sites or shipwrecks in the marine park. 2. To increase awareness of maritime heritage within the local community and among visitors.
Strategies	1. Develop and implement education programs and interpretive opportunities to enhance the awareness of the maritime heritage of the marine park (WAMM, DEC, TWA) **(M)**. 2. Monitor known historical sites to determine if their condition is deteriorating and, if warranted, implement appropriate protective action (WAMM, DEC) **(M)**. 3. Encourage and assist research on maritime heritage, including recording oral histories, to facilitate long-term management (WAMM, DEC) **(M)**. 4. Determine and maintain appropriate levels of access to historical sites (DEC, stakeholders) **(L)**.

Performance measures	To be developed as required.	**Desired trends**	To be developed as required.
Short-term targets	To be developed as required		
Long-term targets	Maintenance of maritime heritage and historical sites in the marine park.		

9.2.3 Marine nature-based tourism

Social value	*The marine park offers a wide range of attractions and opportunities for visitors to the area, which supports a marine nature-based tourism industry.*

Background	Marine nature-based tourism in the marine park and Shoalwater Islands is rapidly expanding and there are a wide range of attractions for visitors to the area. The spectacular underwater scenery and the variety and abundance of flora and fauna, including large marine wildlife, provide a valuable experience for visitors who enjoy the natural environment. Marine nature-based tour operators in the marine park cater for activities such as diving, snorkelling, boating, kayaking and wildlife appreciation. A commercial ferry service operates between Mersey Point and Penguin Island, facilitating access to the estimated 80,000 visitors a year to the island. Studies of the Shoalwater Islands have recognised that public contact and interaction with wildlife in its natural environment is an area of tourism which is experiencing rapid growth in the area (CALM, 1992). Marine nature-based tourism can enhance visitor experience and help foster a greater understanding of the environment and therefore has the potential to make an important contribution to protecting the marine park's values. DEC will issue licences/leases for commercial tourism activities that are sustainable and environmentally and socially acceptable. Successful management of tourism operators will be dependent upon an effective licensing/leasing system, education, sufficient patrol and enforcement and the development of cooperative working relationships between DEC and commercial tour operations. DEC's Policy Statement No. 18 *Recreation, Tourism and Visitor Services* and the *Commercial Tourism Operators Handbook* are important guiding documents for nature-based tourism in the marine park. All commercial wildlife interaction operations must be licensed by DEC under the WC Act. Marine mammal interaction by the public is managed under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998*. DEC manages commercial operations by issuing commercial operation licences under the CALM Act. Two types of licences are issued, 'T' Class (open to many operators) and 'E' Class (restricted number of licences issued due to environmental, management, safety or access considerations). Commercial tour operators are able to apply for two month, one, three or five-year licences, depending on the level of industry accreditation programs they have achieved. DEC will consider applications for licences on a case-by-case basis. All licences currently issued in the marine park are 'T' Class except the two restricted licences for the Penguin Island ferry and Shoalwater Bay tour services and the two commercial dive licences associated with the Saxon Ranger Dive site. However, unless carefully managed, marine nature-based tourism has the potential to cause environmental damage, particularly as the number of visitors continues to increase. Potential impacts include increases in litter, overfishing and disturbance to marine and island ecosystems and wildlife. The impacts from all commercial tour operations will be monitored and consideration may be given to restricting commercial tourism activity (e.g. by issuing 'E' class licenses) to protect the marine park's ecological values and to limit conflicts with other users. These would only be issued following a public 'Expression of Interest' notice and process. Non-extractive tourism activities will be permitted in all zones of the marine park where this activity is shown to be compatible with the primary purpose of each zone. Extractive tourism activities will be permitted in the General Use Zone and in special purpose zones where the activity is compatible with the primary purpose of the zone (Table 2).
Requirements	• High water quality. • Healthy marine communities. • Clean beaches. • High aesthetic quality of marine environment. • Provision of relatively 'undisturbed' areas for nature appreciation. • Equitable access to the natural values of the marine park, in appropriate zones. • Appropriate infrastructure and facilities.
Management	1. To manage marine nature-based tourism in a manner that is consistent with maintaining

objectives	the marine park's values. 2. To maintain the ecological and social values of the marine park that are important to the marine nature-based tourism industry.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. License/lease and manage an ecologically sustainable level of marine nature-based tourism operations in the marine park with appropriate conditions to ensure the protection of the ecological and social values of the marine park (DEC) **(H-KMS)**. 3. Assess on a strict need and environmental impact basis any future proposals for development, exploration, production and the establishment of dive wrecks, and refer any proposals to the MPRA and EPA for assessment, as appropriate (EPA, DEC, MRRA, DoF, DPI, industry, TWA) **(H)**. 4. Develop Codes of Practice for marine nature-based tourism operations in the marine park, which will be a part of licence conditions and will include: ▪ appropriate behaviours and conduct to minimise potential impacts; ▪ performance measures; ▪ desired trends; ▪ short-term and long-term management targets; and ▪ monitoring and reporting requirements (DEC, TWA) **(M)**. 5. Ensure equitable access for marine nature-based tourism in appropriate areas of the marine park (DEC) **(M)**. 6. Raise the awareness of marine nature-based tourism operators regarding the potential detrimental impacts of tourism on the ecological values of the marine park through education and participation in management (e.g. conduct workshops for information exchange, interpretation training and issue identification) (DEC, TWA) **(L)**.

Reporting	To be developed as required.
Targets	Implementation of management strategies within agreed timeframes (Appendix III).

9.2.4 Commercial fishing

Social value	*The marine park is important for commercial fishers targeting rock lobster, abalone, crab, finfish, prawns, scallops, shark, specimen shell and aquarium fish.*

Background	Commercial fishing in the marine park uses a variety of methods to target species including pots, line, trawl, net, long lining and collection by hand. Pot fisheries within the marine park target two main species, rock lobster (*Panulirus cygnus*) and blue-swimmer crab (*Portunus pelagicus*). The West Coast Rock Lobster Fishery is the major fishery undertaken in the marine park and is certified by the Marine Stewardship Council. As at the close of 2006, there was only one licence to take blue-swimmer crabs. Commercial line fishing target associated reef species and is undertaken using either attended or unattended lines. Attended line fishing is fishing with a hand line or rod, while unattended line fishing is fishing with a line fixed to a boat or an object in the water, such as drop line or longline fishing. Commercial line fishing (using attended lines) is permitted within the Special Purpose (Wildlife Conservation) and General Use Zones. Commercial drop line or longline fishing is permitted in the General Use Zone of the marine park, but not within Warnbro Sound. The current effort of this fishery in the marine park is low. The Southwest Trawl Fishery targets the western king prawn (*Penaeus latisulcatus*) and the saucer scallop (*Amusium balloti*) however a wide variety of species can be taken by this fishery. Trawling is permitted in a small area inside the western boundary of the marine park where the sea floor is predominantly bare sand however this area is closed to the fishery between 15 November and 31 December each year. The abundance and market price of western king prawns and saucer scallops determine the levels of fishing effort and consequently the level of by-catch. Three net fisheries, the West Coast (Beach Bait Fish Net), the West Coast Purse Seine and the West Coast Demersal Gillnet and Demersal Longline, have historically operated in the marine park. The major species targeted by the beach bait fishery are whitebait (*Hyperlophus vittatus*) and blue sprat (*Spratelloides robustus*). Other species taken include yellow-eye mullet (*Aldrichetta forsteri*), sea mullet (*Mugil cephalus*), whiting (*Sillago* spp.), Australian herring (*Arripis georgianus*), pilchard (*Sardinops neopilchardus*) and garfish (*Hyporhamphus* spp.). Fishing for whitebait occurs from the beach in at Becher Point in Warnbro Sound and 4WD access to the beach is limited to the few remaining licensed fishers. Purse seining primarily targets pilchards and most fishing effort occurs west of the Murray Reefs. The catch is generally low and governed by local demand for bait. Purse seining is permitted in the majority of the General Use Zone of the marine park, although it is prohibited from Safety Bay. Currently no licensed fishers under the West Coast Demersal Gillnet and Demersal Longline Fishery operate within the marine park. Commercial fishing for marine aquarium fish and specimen shell are dive-based fisheries where individuals are taken by hand. There are currently 14 aquarium fish licenses and 33 specimen shell licences with access to the marine park, although only three marine aquarium fishers and seven specimen shell fishers regularly access marine park waters. Current level of effort within the marine park is not significant. DoF are currently undertaking a review of both the marine aquarium fish and specimen shell fisheries across Western Australia (Fletcher and Head, 2006). Commercial fishing in Western Australian is managed under the FRM Act by DoF. A range of management strategies are used including limitations on fishing gear, closed areas, limits to the number of licences issued and the monitoring of catch and stock levels. Other management strategies include the use of by-catch exclusion devices to reduce the impacts of commercial fishing. Management arrangements for commercial fisheries may be reviewed and additional restrictions may be applied if there are sustainability concerns for fish stocks. Where the establishment of a marine parks and reserve or exclusion zone in a marine parks and reserve is determined to have reduced the commercial value of a commercial fishing authorisation or a directly related activity, e.g. fish processing, the relevant licensee may be

	eligible for compensation under the *Fishing and Related Industries Compensation (Marine Reserves) Act 1997.* There are currently few management issues in regard to commercial fishing in the marine park. However one potential issue with the marine aquarium fish and specimen shell fisheries is the take of 'live rock', 'live sand' and corals. Live rock and coral are important habitats for many species and take could impact these species. DoF and DEC will collaborate to further develop an appropriate State-wide framework for managing the collection of coral, live rock and live sand within marine parks and reserves. The aim of management for commercial fishing in the marine park is to help maintain the natural values of the marine park on which the industry depends and, in liaison with DoF, ensure that commercial fishing activities in the marine park are ecologically and socially sustainable. Management strategies include using spatial controls to provide for no-take areas as 'reference' sites for research and monitoring opportunities, through which the impacts of commercial fishing on the marine park's values can be assessed. Commercial fishing will be permitted in the marine park as stipulated in Table 2.
Requirements	• High water quality. • Maintenance of key habitats (e.g. nursery areas). • Equitable access to fishing grounds in appropriate zones. • Maintenance of sustainable targeted fish stocks. • Appropriate infrastructure and facilities.
Management objectives	1. To ensure that, in collaboration with the industry and DoF, commercial fishing activities in the marine park are managed in a manner consistent with maintaining the marine park's values. 2. To maintain ecological values of the marine park that are important to commercial fisheries.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess the nature, level and potential impacts of commercial fishing on the marine park's values and implement an appropriate monitoring program (DEC, DoF) **(H-KMS)**. 3. Participate in DoF processes regarding management of commercial fisheries, including review and amendment, if necessary, of management controls (DEC) **(H)**. 4. Ensure commercial fishers are aware of the zoning scheme and any restrictions that may apply to their operations in the marine park (DEC, DoF) **(H)**. 5. Apply the appropriate framework for managing the collection of coral, live rock and live sand in the marine park once developed, including an assessment of areas where these activities will not be permitted (DoF, DEC) **(H)**. 6. Identify species that need to be protected from commercial fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H)**. 7. Monitor commercial fishing catch/effort in the marine park and report the results publicly (DoF) **(M)**. 8. Ensure equitable access for commercial fishing in appropriate areas of the marine park (DEC) **(M)**. 9. Ensure that, through DoF and the DEW processes, licences meet sustainable development requirements and reporting and are consistent with the strategies for the marine park's ecological values (DoF, DEW, EPA, DEC) **(M)**. 10. Liaise with the MPRA in regard to proposed new fisheries and major changes to existing fisheries (DoF) **(M)**. 11. Ensure that DoF licensing processes take into account MPRA/DEC audit requirements (DoF) **(M)**.

Reporting	To be developed with DoF
Targets	Implementation of management strategies within agreed timeframes (Appendix III).

9.2.5 Aquaculture

Social value	*The marine environment of Warnbro Sound supports a mussel farming industry.*

Background	Mussel farming is the only aquaculture operation in the marine park, and two mussel operations are located on the edge of the drop-off into the Warnbro Sound basin as the topographical change enhances circulation and food availability. Management of aquaculture is the statutory responsibility of DoF, under the FRM Act. Management strategies include the granting of licences and leases (with associated conditions) and regulations under the FRM Act. Ministerial Policy Guideline Number 8 (FWA, 1998) sets out guidelines for the assessment of aquaculture proposals in the aquatic environment within Western Australia. This involves the referral of the application to the EPA to determine the level of environmental assessment required under the EP Act. The application is also referred to DEC, the MPRA, and a range of other Government, community and industry groups. Following the consultation process, the Director General of DoF decides on whether to grant the application, which is then sent to the Minister for the Environment for final approval. Details of licence conditions are developed through existing statutory procedures by DoF, in collaboration with DEC. Where the establishment of a marine parks and reserve or exclusion zone in a marine parks and reserve is determined to have reduced the commercial value of an aquaculture licence or lease, the licensee or lessee may be eligible for compensation under the *Fishing and Related Industries Compensation (Marine Reserves) Act 1997*. The main concerns regarding the use of the marine park for aquaculture is the potential environmental impacts, conflicts with other users over space and the visual aspect of the operation. Ropes and markers have the potential to shade benthic flora and fauna, entangle marine wildlife, litter the water column and nearby beaches and impact visual aesthetics if not properly managed. The cleaning of mussel shells in the marine park is not permitted as it can lead to large accumulations of shell and organic material under the cleaning site. Aquaculture operations involving any exotic species or genotypes will not be permitted in the marine park. The aim of management for aquaculture is to help maintain the natural values of the marine park on which the industry depends and, in liaison with DoF, ensure that aquaculture within the marine park is socially and ecologically sustainable. Management strategies will include the implementation of spatial controls to provide no-take areas as 'reference' sites for research and monitoring opportunities to assess the potential impact of aquaculture on the marine park's values. Aquaculture is permitted in General Use Zone as stipulated in Table 2.
Requirements	• High water quality. • Equitable access in appropriate zones, subject to environmental assessment.
Management objectives	1. To ensure that, in collaboration with the industry and DoF, aquaculture in the marine park is managed in a manner consistent with maintaining marine park's values. 2. To maintain ecological and social values of the marine park that are important to the aquaculture industry.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Ensure that approvals and the setting of conditions for existing and new aquaculture developments and operations are consistent with maintaining the marine park's ecological and social values and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DoF, DPI, DEC, MPRA, EPA) **(H)**. 3. Ensure operators provide an annual status report on the environmental impacts of aquaculture activity in the marine park in accordance with DoF licence conditions and the MPRA's auditing requirements (ACWA, DEC) **(M)**. 4. Ensure equitable access for aquaculture in appropriate areas of the marine park (DEC) **(M)**. 5. Provide formal advice to DoF and EPA (as appropriate) in relation to the environmental assessment of proposed aquaculture activity in the marine park (DEC) **(M)**. 6. Ensure that DoF licensing processes takes MPRA/DEC audit requirements into account (DoF) **(M)**. 7. In collaboration with the Aquaculture Council of Western Australia (ACWA) and DoF, asses the existing Codes of Practice and Environmental Management Systems for aquaculture, and modify if necessary, to ensure social and ecological sustainability in the

	marine park (DEC, DoF, ACWA) **(M)**.

Reporting	To be developed as required.
Targets	Implementation of management strategies within agreed timeframes (Appendix III).

9.2.6 Recreational fishing

Social value	*Line fishing, netting and spearfishing methods target a variety of pelagic and reef finfish species, crabs, rock lobster and other invertebrates.*

Background	Recreational fishing is enjoyed by about 34 per cent of the Western Australian population (DoF, 2007). Recreational fishing is a popular activity in the marine park and is likely to continue to increase as urban expansion in this area continues. In 1996/1997, an estimated 10,626 boats fished in the southern half of Warnbro Sound and Comet Bay (Sumner and Williamson 1999). Recreational fishers target a variety of species, including the western rock lobster (*Panulirus cygnus*), blue swimmer crabs (*Portunus pelagicus*), abalone (*Haliotis* sp.), whiting (*Sillago spp*), tailor (*Pomatomus saltatrix*), Australian herring (*Arripis georgianus*), skipjack trevally (*Pseudocaranx spp.*), snapper (*Pagrus auratus*), West Australian dhufish (*Glaucosoma hebraicum*) and Australian salmon (*Arripis truttaceus*). Recreational fishers employ a variety of methods principally line but including spear and net fishing, as well as diving and pots for western rock lobster. Recreational fishing is conducted from boats and on beaches or rocks adjacent to the marine park. Recreational fishing in the marine park is managed by DoF under the FRM Act. Management of recreational fishing currently occurs through gear restrictions, bag limits, size limits and seasonal and area closures, and needs to be consistent with the maintenance of the conservation values of the marine park. Management arrangements for recreational fisheries may be reviewed and additional restrictions may be applied if there are sustainability concerns for fish stocks. Pink snapper is a popular fish caught by recreational fishers in the metropolitan area and the level of take of this species by both recreational and commercial fishers was an issue of concern raised during the review of recreational fishing on the west coast in 2001. To further protect pink snapper stocks, which are vulnerable during the spawning period October-November, additional control measures have been implemented including restrictions on possession, increased size limits and a seasonal closure. During the seasonal closure, fishing for pink snapper within the majority of the marine park is prohibited. For more information on pink snapper fishing controls including the dates of the seasonal closure (which can change depending on the spawning season), please contact DoF. Haul netting and cast (or throw) netting is permitted in some parts of the marine park however recreational set netting is prohibited as at the close of 2006. Closed waters to haul and cast netting include: • sanctuary and special purpose zones; • all waters within 800 metres of the high water mark from the Garden Island causeway west to a line due north of Point John; and • all waters within 800 metres of the high water mark from a line due south of Point John to June Road (Safety Bay), including all waters within 1600 metres of Penguin Island. Brochures with maps showing these restricted areas are available from DoF. Within the Shoalwater Bay area, there have been incidents where Australian sea lions and seabirds have been injured by spears from spearguns. Although this happens infrequently, it poses an unacceptable risk to these animals. To reduce the likelihood of these types of incidents from happening, spearfishing will be prohibited within the Shoalwater Bay Special Purpose Zone (Wildlife Conservation). Spearfishing is however a legitimate method of taking fish and spearfishing using a snorkel is therefore permitted in the General Use Zone. Spearfishing using gidgees, compressed air breathing equipment or spearfishing competitions are prohibited in the marine park. Long or drop line fishing by recreational fishers is also not permitted in Western Australian waters. The main issues of concern regarding the ecological impacts of recreational fishing in the marine park are localised depletion of site attached target species and the consequent modification of population structures, by-catch of unwanted non-target species, and associated impacts on the ecological values, for example, from litter and trampling of sensitive habitat. In addition, anecdotal evidence suggests that localised depletion from the top of the near shore reef platforms has been experienced in recent years off certain Perth metropolitan beaches.

	Another issue concerns the uncertainty regarding the level of effort for the recreational take of aquarium fishes and specimen shells. This activity has the potential to significantly impact on populations in the marine park, given the marine park's accessibility and the large number of users. Recreational take of aquarium fishes or specimen shells will therefore not be permitted. The aim of management for recreational fishing in the marine park is to help maintain the natural values of the marine park on which recreational fishing depends and, in liaison with DoF, ensure that recreational fishing activities in the marine park are ecologically and socially sustainable. Management strategies include using spatial controls to provide for no-take areas as 'reference' sites for research and monitoring opportunities, through which the impacts of recreational fishing on the marine park's values can be assessed. Recreational fishing will be permitted in the marine park as stipulated in Table 2.
Requirements	• High water quality. • Maintenance of key habitats e.g. nursery and spawning areas. • Equitable access to fishing grounds, in appropriate zones. • Maintenance of sustainable targeted fish stocks. • Maintenance of recreational fishing experience. • Appropriate infrastructure and facilities.
Management objectives	1. To ensure that, in collaboration with the community and DoF, recreational fishing in the marine park is managed in a manner consistent with maintaining marine park's values. 2. To maintain ecological and social values of the marine park that are important to recreational fishing. 3. Collaborate with the community and DoF in maintaining quality recreational fishing opportunities in the marine park.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess the nature, level and potential impacts of recreational fishing on the marine park's values and implement an appropriate monitoring program (DoF, DEC) **(H-KMS)**. 3. Prohibit recreational aquarium fish and specimen shell collecting in the marine park (DEC, DoF) **(H)**. 4. Identify species that need to be protected from recreational fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H)**. 5. Examine the effects and evaluate the sustainability of recreational fishing activities, including monitoring catch/effort, in the marine park and review management controls as required (DEC, DoF) **(H)**. 6. Educate recreational fishers about: ▪ the zoning scheme and other restrictions that may apply to their activities in the marine park; ▪ cumulative impacts of recreational fishing on fish stocks; and ▪ appropriate behaviours and conduct to minimise potential impacts (DoF, DEC) **(H)**. 7. Ensure equitable access for recreational fishing in appropriate areas of the marine park (DEC) **(M)**. 8. Conduct research on the possible benefits of the zoning scheme for recreational fishing (DEC, DoF) **(M)**.

Reporting	To be developed with DoF.
Targets	Implementation of management strategies within agreed timeframes.

9.2.7 Recreational water sports

Social value	*The location, scenery, wildlife and marine environment makes the marine park a popular location for a range of activities including boating, diving and surface water sports.*

Background	Boating is a popular recreational activity in Western Australia, with approximately 72,000 private vessels registered with the DPI (DPI, 2007). The marine park offers excellent boating opportunities with good shelter afforded by the islands and bays. There are a number of locations where small boats can be launched, with the main access areas at the Cape Peron and Safety Bay. The location of launching access largely governs the type of boating use that may occur and determines the level of impact that recreational boaters may have on the marine environment. The variety of marine habitats and fauna, including underwater structures such as caves, archways, vertical channels, solution pipes, rocky slopes and platforms, makes the marine park attractive for divers and snorkellers. In May 2005, the former trawler the *Saxon Ranger* was sunk in the waters of Warnbro Sound. In conjunction with existing wrecks it forms part of the 'West Coast Dive Park'. A three-dimensional seabed lease will be granted to the CoR to allow for ongoing management of the Saxon Ranger Restricted Area. Popular surface water sports in the marine park include sailing, water skiing, sea kayaking, surfing, windsurfing and kite surfing. Two declared water skiing areas have been gazetted in the marine park; in Warnbro Sound and Shoalwater Bay. Organised competitive events have included jet skiing, sailing, windsurfing, kite surfing and surfing. Swimming is also popular at the protected beaches of the marine park. A number of mechanisms are in place to manage recreational activities in the marine park. The DPI is responsible for all boating regulations including licensing, safety standards, marker buoys and jetties (refer Section 8). DEC is the 'mooring controlling authority' for the marine park and will be developing a mooring plan which will identify areas where moorings are acceptable from ecological and social perspectives and establish capacities for these areas. Marine mammal interaction is a popular activity and interaction by the public is managed under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998.* It is important to note that whales, dolphins and sea lions are fully protected under the WC Act and interactions (or disturbance) not in accordance with the wildlife conservation notice are an offence. Birds are also afforded a similar level of protection under the WC Act and it is an offence to disturb these animals. One management issue is increased recreational use of the marine park as the population increases in the Rockingham area as this has the potential to negatively impact the marine park's values. Another management issue primarily concerns safety of users, and the majority of accidents that have occurred in the marine park have been a result from people attempting to walk across the sandbar to Penguin Island and boating activities (refer Section 7.7). One of the main concerns regarding recreational water sports is disturbance of fauna and conflict between users. Australian sea lions, dolphins and little penguins are species of concern within the marine park, and physical disturbance through noise, vessel activity and boat strikes, posses a current threat to these animals (refer Sections 9.1.7, 9.18 and 9.1.10). Disturbance to nesting or roosting sea and shorebirds is also a concern. To provide additional protection to these species, restrictions to specific activities will commence from 1 July 2008: • motorised vessels will be limited to eight knots within the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones; and • the gazetted water ski area in the Shoalwater Bay Special Purpose Zone (Wildlife Conservation) will be removed; Non-motorised vessels and crafts, including kite surfers and windsurfers, will be encouraged to comply with the speed restrictions. However, additional spatial controls to kite surfers/windsurfers may be required during the life of the management plan to protect wildlife values. In addition, the south-western boundary of the Warnbro Sound water ski area may be

	reduced to minimise the any potential impacts on little penguins as they travel to and from their foraging areas in Port Kennedy and Comet Bay. Additional management strategies for recreational water sports will be implemented through spatial controls as detailed in the zoning scheme and permitted uses table (refer Table 2). Access to marine park waters is a key issue in managing the ecological impacts of recreational boating. The approval and setting of conditions for new developments to facilitate recreational use of the marine park will be assessed and advice provided to the MPRA/EPA as required. With regard to wreck diving opportunities, through the *Conservation and Land Management Regulations 2002*, the FRM Act and the *Navigable Water Regulations 1983*, the *Saxon Ranger* dive site has been declared a: • restricted area at all times for the purposes of the cleaning of fish, the anchoring of vessels, and the operation of vessels; • fishing exclusion zone; and • boating restricted area (except with a permit). It is the intention of DEC to replicate such proclamations for any additions to the 'West Coat Dive Park'. Any proposals to further add decommissioned vessels to the 'West Coast Dive Park' will be subject to an environmental impact assessment and the approvals process as stipulated under State and Commonwealth legislation.
Requirements	• High water quality. • High aesthetic quality of the marine environment. • Equitable access to the natural values in appropriate zones. • Separation of incompatible activities. • Appropriate infrastructure and facilities.
Management objectives	1. To ensure recreational water sports are managed in a manner that is consistent with maintaining the marine park's values. 2. To maintain the ecological and social values of the marine park that are important to those participating in recreational water sports. 3. To manage recreational water sports in a manner that minimises conflict between marine park users.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. Assess on a strict need and environmental impact basis any future proposals for development, exploration and the establishment of dive wrecks, and refer any proposals likely to significantly impact on the marine park values to the MPRA and EPA for assessment, as appropriate (EPA, CoR, industry, TWA, DoF, DEC) **(H)**. 3. Ensure that any future sinkings or additions to the 'West Coast Dive Park' have the appropriate lease arrangements with the proponent for the seabed to ensure ongoing maintenance and monitoring, gazettals and proclamations declared governing commercial and recreational use of such sites (EPA, CoR, DEC, DoF, DPI) **(H)**. 4. Remove the gazetted water ski area from Shoalwater Bay by 1 July 2008 through liaison with the DPI (DEC, DPI) **(H)**. 5. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**. 6. Review the south-western boundary of the water ski area in Warnbro Sound (DEC, DPI) **(H)**. 7. Educate marine park users about the potential detrimental impacts of recreational water sports on the ecological values of the marine park and appropriate behaviours and conduct to minimise these impacts (DEC, DPI) **(H)**. 8. Investigate strategies to separate incompatible water sports in the marine park, as required (DEC, DPI) **(M)**. 9. In collaboration with user groups, develop Codes of Practice to minimise environmental impacts of recreational water sports, as appropriate (DEC) **(M)**. 10. Determine the nature, spatial patterns, compatibility and potential environmental impacts of all existing recreational water sports in the marine park and maintain a database of these (DEC) **(M)**. 11. Liaise with DPI to designate speed restrictions, where necessary, for wildlife protection and/or for safety requirements (DEC, DPI) **(L)**.

	12. Investigate the development of dive and snorkel opportunities by the creation of interpretive nature trails in the marine park (DEC) **(L)**.

Reporting	To be developed as required.
Targets	Implementation of management strategies within agreed timeframes (Appendix III).

9.2.8 Coastal and island use

Social value	*The coastline (including beaches, dunes and rocky shorelines) in and adjacent to the marine park provides for a range of recreational uses.*

Background	The marine park's mainland beaches have been used for various recreational activities such as swimming, sunbathing, walking, windsurfing, beach fishing, photography, picnicking and nature appreciation for many years. The natural attractions of the Cape Peron Peninsula, including limestone cliff formations, terrestrial vegetation and intertidal limestone reefs, are an important part of the area's conservation and passive recreation values. The Cape has been used extensively as a base for recreational activities within the marine park, including shore-based fishing, crabbing, boat launching, surfing, windsurfing, diving, snorkelling, rock lobster fishing, abalone fishing, walking, sightseeing and educational purposes. Beaches and rocky shorelines provide important social functions in that they provide a buffer against wave action, thereby protecting coastal structures and are an important focus for many recreational activities An estimated 80,000 people visit Penguin Island each year. Access to Penguin Island principally occurs by way of the commercial ferry service, however access by private vessels is increasing. Vessel access is largely restricted to the northeastern bay of Penguin Island due to reef platforms and surf surrounding most of the island. Access into the northeastern bay is difficult due to shallow seagrass beds. The deepest water is at the approach to the jetty and vessels should follow the recommended access routes shown in Figure 4. This access route is suitable only for shallow draft vessels. Vessels accessing Penguin Island must anchor in the shallows rather than hauling their vessel onto the island or placing a sand anchor on the beach. A public mooring has been provided to the east of the island (see Section 8). Further restrictions on access by vessels may be necessary, such as defined anchoring areas or limits on vessel numbers, if visitation levels are assessed as warranting such management response. Vessel landings and access to all other islands of the marine park is prohibited because of the potential disturbance to wildlife on these islands. Recreational use and its management on the islands are addressed under the *Shoalwater Islands Management Plan 1992–2002*. Local government is responsible for implementing planning schemes. Any proposal to develop or rezone land that is likely to have an effect on marine park values or proposed developments which do not appear consistent with achieving the marine park management objectives, should be referred to DEC for advice and recommendations. Destruction of beach and dune vegetation by inappropriate vehicle use can lead to erosion and deterioration of the amenity value of beaches and disrupt nesting shorebirds. Access to the beach by four wheel drive vehicles in the marine park is therefore restricted to licensed professional fishermen who require this access for beach net fishing. Similarly, litter from recreational and commercial activities can significantly reduce amenity values. Increasing beach usage can also lead to conflict between uses. Dogs on the beach have the potential to impact on the social and ecological values of the marine park, and are managed along the foreshore through local government regulations. As visitor numbers and therefore recreational usage of the coast increases, it will become increasingly important that management of both the coastal and marine reserves are integrated. The marine park is adjacent to Rockingham and much of the beach and dive areas are managed by the CoR. DEC and the CoR have a close working relationship in co-operatively managing the access and facilities provided for visitors to the marine park. Over the last 10 years, there have been considerable DEC and CoR resources allocated to develop coastal management plans in recognition of the sensitive nature of the coast and the increasing recreational use of the area. Other issues such as recreational vehicle use, litter and domestic animals on the beaches will also become increasingly important and strategies to manage these issues must be developed in liaison with the CoR for each beach area. In addition, a management plan is being prepared for Rockingham Lakes Regional Park, which will include broad direction for the protection and enhancement of the values of Cape Peron and Becher Point.

Requirements	• High aesthetic quality of the marine environment. • Equitable access to the natural values, in appropriate zones. • Clean beaches. • Separation of incompatible activities in coastal areas. • Appropriate infrastructure and facilities.
Management objectives	1. To ensure that coastal uses are managed in a manner that is consistent with maintaining the marine park's values. 2. To maintain the ecological and social values of the marine park that are important for coastal use. 3. To ensure integration of marine, coastal and terrestrial management.
Strategies	1. Educate marine park users about the potential detrimental impacts of coastal use on the ecological values of the marine park and appropriate behaviours and conduct to minimise these impacts (DEC) **(H)**. 2. Investigate strategies to separate incompatible coastal and island uses, as required (DEC, CoR) **(H)**. 3. Determine the nature, spatial patterns, compatibility and potential environmental impacts of all existing coastal and island uses in the marine park and maintain a database of these (DEC) **(M)**. 4. Liaise with adjacent land managers to ensure that the management of adjacent landforms is consistent with the maintenance of the marine park's values (e.g. appropriate designation of dog-exercise and dog-prohibited areas, recreational vehicles on beaches) (DEC, CoR) **(M)**. 5. Identify coastal areas of the marine park that are degraded and implement rehabilitation programs, as required (DEC) **(M)**. 6. Actively encourage the recommended access route for private vessels visiting Penguin Island as shown in Figure 4 (DEC, DPI) **(M)**. 7. Develop and implement an appropriate patrol and enforcement program, as required (DEC, DPI) **(M)**.

Reporting	To be developed as required.
Targets	Implementation of management strategies within agreed timeframes (Appendix III).

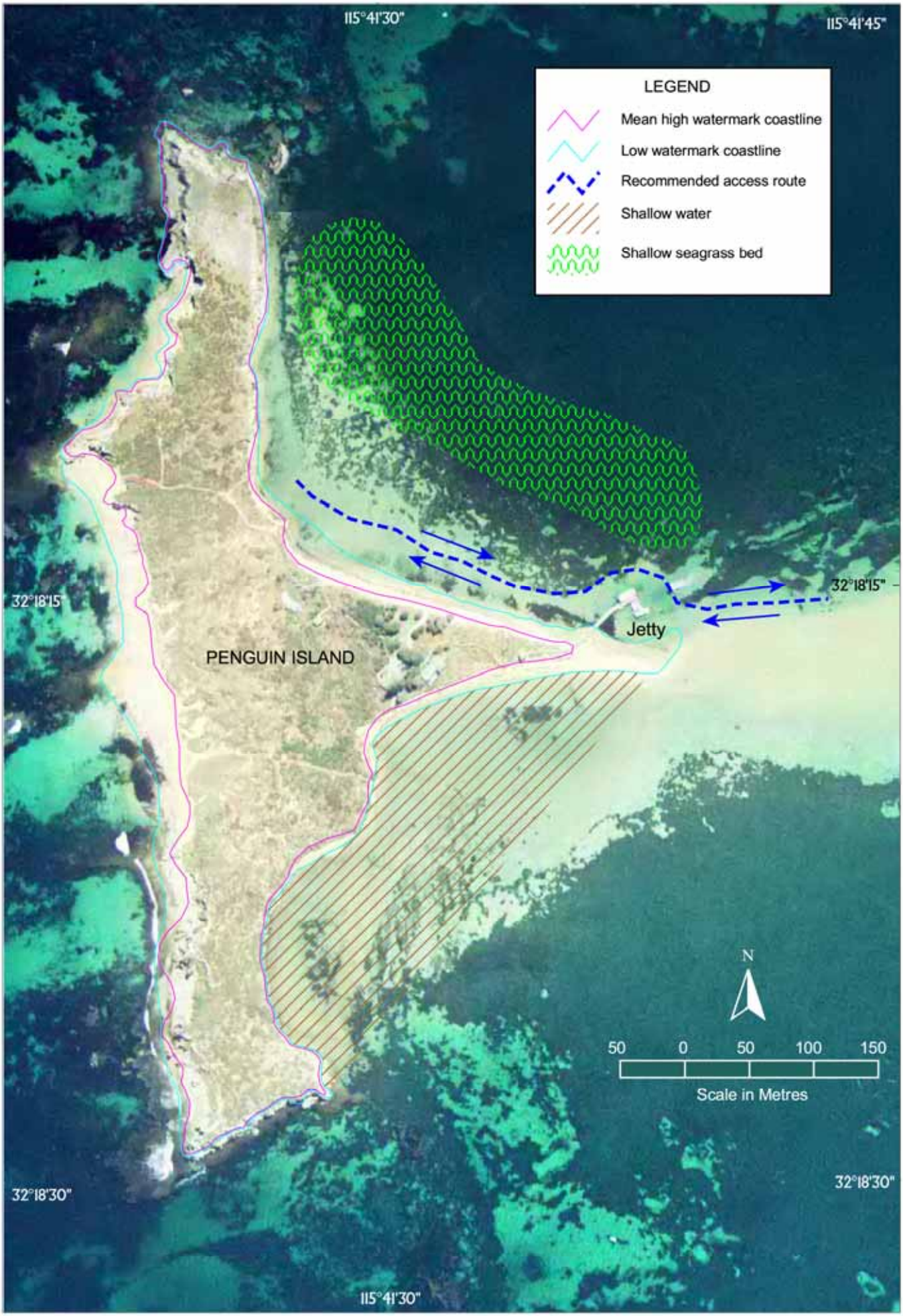

Figure 4: Vessel access to Penguin Island.

9.2.9 Seascapes (KPI)

Social value	*Panoramic vistas of azure waters, offshore islands, reefs and beaches are major aesthetic attractions of the marine park.*

Background	Panoramic vistas of azure waters, offshore islands, reefs and beaches are major aesthetic attractions of the Shoalwater Islands region. These attributes can be enjoyed from the mainland and island shores or from the deck of a boat. The Battery Complex Observation Post at Cape Peron and the Penguin Island lookouts are excellent vantage points. Underwater vistas of the marine environment are varied and interesting and include a diversity of marine habitats including seagrass meadows and underwater structures such as caves, archways, vertical channels, solution pipes, rocky slopes and platforms. The diversity of the underwater scenery accounts for the popularity of diving and snorkelling activities in the marine park. Inappropriate structures along the coastline, on the islands and in the surrounding waters have the potential to degrade the aesthetic values of the marine park. As such, coastal developments and marine infrastructure projects must be planned with careful consideration of this issue. Alterations to seascapes or landscapes should be subtle and remain subordinate to natural elements. Potential developers will be informed of the management objectives and targets of the marine park to ensure development proposals do not unnecessarily impact on the seascape value. Landscape management principles, as outlined in DEC's Landscape Management Policy Statement No. 34, should be considered.
Requirements	• Generally uninterrupted coastal vistas. • Sensitively designed and located offshore and coastal infrastructure.
Management objectives	1. To ensure the aesthetic values of the marine park are not degraded by human activities. 2. To minimise visual intrusions on seascapes and coastal vistas in and adjacent to the marine park.
Strategies	1. Identify user perceptions on the importance of aesthetic values and sustainable levels of use to ensure that these values do not become significantly degraded (DEC) **(H-KMS)**. 2. Identify and determine the key characteristics and spatial extent of the major seascapes of the marine park (DEC) **(H)**. 3. Provide formal advice to relevant Government authorities to ensure development proposals both in and adjacent to the marine park do not unnecessarily impact on the seascapes of the marine park (DEC, MPRA) **(H)**. 4. Ensure potential developers are informed of relevant management objectives and targets of the marine park in relation to seascape values (DEC, CoR, DPI) **(M)**. 5. Ensure the seascape values of the marine park values are not diminished as a result of human activities in and adjacent to the marine park (DEC) **(M)**.

Performance measures	Spatial extent of the major seascapes	**Desired trends**	Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	1. No reduction in the spatial extent of the major seascape qualities in the marine park. 2. No significant loss of aesthetic values as a result of human activity in the marine park.		

9.2.10 Scientific research

Social value	*The diversity of the flora and fauna, combined with the range of human activities which occur in the marine park, provide opportunities for ecological and social research.*

Background	The marine park's proximity to Perth universities and other research centres, ease of access, diversity of habitats and communities and the wide range of human activities which occur in the marine park make the area a focus for scientific research. Knowledge of the biodiversity of the marine park, environmental processes and existing pressures on the marine park's values is developing, but limited in many areas. Social research carried out to date includes visitor and issues surveys, and more research is needed to assess visitor expectations and the perceptions of park management. The opportunities that the marine park provides for scientific research is an important value of the area, however research and monitoring are also important generic management tools used as a management strategy for many of the other values. This is discussed further in Sections 7.4 and 7.5. All research within the marine park requires the appropriate research permit issued under the CALM Act, WC Act or the FRM Act Most scientific research programs have relatively benign sampling methods, however the combined effects of many destructive research projects has the potential to adversely impact the ecological values of the marine environment. Conflicts with other human activities can also be an issue for management as scientific research has specific access requirements e.g. access to representative areas free of major human influences for 'scientific reference sites' and areas covering the range of major human activities for 'impact sites'. Management strategies for scientific research include the implementation of spatial controls to provide for the monitoring and assessment of key ecological processes and the level of human impact as well as equitable access to appropriate zones. Integration of research efforts is important to ensure that information required for management is accomplished. In addition, collation and analysis of data sets and reviewing papers and reports are also important for managers. Scientific research is permitted in all areas of the marine park, subject to the appropriate permit and conditions (Table 2).
Requirements	• Access to representative sites free of major human influences for 'scientific reference sites'. • Access to representative sites covering the range of major human activities for 'impact sites'. • Equitable access to the marine park for ecological and social research opportunities in appropriate zones.
Management objectives	1. To provide access and opportunities for ecological and social research in the marine park. 2. To ensure ecological and social research is ethical and ecologically sustainable in the marine park.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. See the research and monitoring strategies detailed in Sections 7.6 and 7.7 **(H-KMS)**. 3. Facilitate social research to assess visitor expectations and perceptions of marine park management (DEC) **(H)**. 4. For necessary research, implement a policy of non-destructive sampling in sanctuary and special purpose zones, where possible (DEC) **(M)**. 5. Assess research and monitoring permit applications and apply conditions to ensure that research conducted is ethical and ecologically sustainable, as required (DEC) **(H)**. 6. Ensure the values of that marine park that are important for scientific research are not diminished as a result of human activities in the marine park (DEC) **(M)**.

Reporting	Number of current research projects relevant to priority information needs.
Targets	Implementation of management strategies within agreed timeframes (Appendix III).

9.2.11 Education

Social value	*The unique array of ecological and social values in the marine park combined with the ease of access and the close proximity of the marine park to the Perth metropolitan area provides opportunities for community education about the marine environment*.

Background	The wide range of habitats and species and variety of human activities provides the community with a focus for education about the marine park and the marine environment. The opportunities that the marine park provides for education is an important value of the area, however education is also an important generic management tool used as a management strategy for many of the other values. This is discussed further in Section 7.2. The marine park is used by local schools, tertiary institutions and community groups for educational purposes, and it is anticipated that the use will continue to increase. The Point Peron Camp School has accommodated school groups for many years, with activities focused on the marine environment. DEC staff and volunteers at Cape Peron have also run successful university extension courses. Educational use has been facilitated by the development of a marine education kit for schools, which outlines marine and coastal activities that enable teachers to effectively use the marine park to develop their curriculum. DEC will work with educators as part of its education and interpretation programs. Environmental studies of the islands and park have provided, and will continue to provide, important information for management and interpretation. The integration of this information and coordination of Government agencies is essential for the educational process in the marine environment. An effective education program will be enhanced by support from licensed commercial tour operators and the community in the marine park area. The primary management issues with respect to education are conflicts with other values. For example, signage and other interpretive materials used for educational purposes have the potential to degrade other values of the marine park such as seascapes. Management strategies for education in the marine park will focus on implementing spatial controls to provide for equitable access for education.
Requirements	Equitable access to the marine park for the full range of educational opportunities in appropriate zones.
Management objectives	1. To promote and facilitate the use of the marine park for marine education. 2. To ensure that the education programs are ethical and ecologically sustainable. 3. To maintain the ecological values of the marine park that are important for marine education.
Strategies	1. See the zoning strategies detailed in Section 7.1 **(H-KMS)**. 2. See the education and interpretation strategies detailed in Section 7.2 **(H-KMS)**. 3. Support local schools who wish to develop a marine education program relating to the marine park (DEC, schools) **(M)**. 4. Ensure education programs conducted are ethical and ecologically sustainable (DEC) **(M)**. 5. Provide support, where possible, to institutions using the marine park for educational purposes (DEC) **(L)**.

Performance measures	1. Visitor knowledge regarding the marine park. 2. Number of current education programs relevant to priority education needs.	**Desired Trends**	1. Positive. 2. Constant or positive.
Short-term targets	To be developed as required.		
Long-term targets	Implementation of management strategies within agreed timeframes (Appendix III).		

10 PERFORMANCE ASSESSMENT

The effectiveness of the management plan will be periodically reviewed through a formal auditing and review process. This will be undertaken through an annual assessment carried out by DEC and a formal audit by the MPRA every three years. The audits will include reports on the status of key ecological and social values and an assessment of the effectiveness of current management strategies, which will provide feedback to reserve managers.

Overall management performance will be reviewed by the MPRA via a performance assessment report. This report will assess compliance against the stated key ecological and social management targets (i.e. outcome-based approach) and against progress regarding implementation of the key management strategies (i.e. activity-based approach covering resource inputs and outputs) as outlined in Sections 7–9. Management targets of selected key ecological and social values of the marine park are used as *key performance indicators* of management effectiveness as discussed in Section 3 and are identified in Section 9 by the symbol KPI. The KPIs reflect both the conservation priorities and the management imperatives of the MPRA, DEC and the community. The KPIs for the marine park will be the management targets for *water and sediment quality, seagrass meadows, little penguin, finfish* and *seascapes*. *Key management strategies* are identified in Sections 7–9 by the symbol H-KMS.

10.1 Performance assessment by the Department of Environment and Conservation

The prioritised strategies outlined in Sections 7–9 of the management plan will be built into the annual works program of DEC's Swan Coastal District, which will be responsible for the day-to-day management of the marine park. Progress against KPIs, H-KMSs and the remaining management targets and strategies will form the basis of an annual performance assessment report on the marine park prepared by DEC's Swan Coastal District for the MPRA and DEC's Corporate Executive.

10.2 Audit by the Marine Parks and Reserves Authority

Progress against the KPIs and H-KMSs will form the basis of a formal MPRA audit of the marine park every three years. DEC will provide annual performance assessment reports to the MPRA, which will enable monitoring of DEC's implementation of the management plan. The adequacy of the selected KPIs and H-KMSs will be reviewed following each MPRA audit and they will be amended if appropriate.

10.3 Review of the management plan

After its approval, the management plan will guide management of the marine park for a period of 10 years, or until such time as the statutory review of the management plan in undertaken and a new management plan is prepared. The management plan will be reviewed after 10 years with full public consultation, re-submitted to the MPRA and then submitted to the Minister for the Environment. The CALM Act specifies that, in the event of such a revision not occurring by the end of the management plan's specified life-span, the management plan will remain in force in its original form, unless it is either revoked by the Minister or until a new management plan is approved.

10.4 Links with State environment reporting

The first Western Australian State of the Environment Report was prepared in 1992, and subsequent reports produced in 1998 and 2007 (Government of Western Australia, 2007). These reports provided an overview of the key marine and terrestrial environmental issues in the state. The EPA will be responsible for ongoing State of the Environment reporting building on the framework contained within the 1998 report. Relevant marine issues covered by this framework are the implementation of a State-wide system of marine parks and reserves, biodiversity, degradation of marine habitats, environmental contamination, introduction of exotic species, tourism and fisheries. The performance assessment of the marine park as described above is broadly consistent with the State of the Environment reporting framework.

10.5 Links with national environment reporting

At a national level, there are two major reporting mechanisms relevant to marine parks and reserves. These are the national State of the Environment Report and the performance assessment framework for the NRSMPA. The national State of the Environment Report, which has been published in 1996, 2001 and 2006, is prepared by an independent committee to provide an assessment of the Australian environment (Australian State of the Environment Committee, 2006). A range of performance assessment criteria are being developed to assess whether the goals of the NRSMPA are being achieved. The performance assessment framework of this plan is broadly consistent with the performance assessment criteria being developed for the NRSMPA.

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Western Australian Marine Act 1982
Wildlife Conservation (Close Season for Marine Mammals) Notice 1998
Wildlife Conservation Act 1950

13 APPENDICES

Appendix I: List of acronyms

ACWA	Aquaculture Council of Western Australia
AGWA	Agricultural Department of Western Australia
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
CALM	Department of Conservation and Land Management
CALM Act	*Conservation and Land Management Act 1984*
CoR	City of Rockingham
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCE	Department of Conservation and Environment
DEC	Department of Environment and Conservation
DEH	Commonwealth Department of Environment and Heritage
DoE	Department of Environment
DoF	Department of Fisheries
DPI	Department for Planning and Infrastructure
EMS	environmental management systems
EP Act	*Environment Protection Act 1986*
EPA	Environmental Protection Authority
FRM Act	*Fish Resources Management Act 1994*
H	high priority management strategy
H-KMS	key management strategies
IMCA	Integrated Marine and Coastal Regionalisation of Australia
KPI	key performance indicators
L	low priority management strategy
LNE	Leeuwin-Naturaliste Marine Bioregion
M	medium priority management strategy
MAC	Management Advisory Committee
MOUs	memorandums of understanding
MPRA	Marine Parks and Reserves Authority
NRSMPA	National Representative System of Marine Protected Areas
TFMPA	Task Force on Marine Protected Areas
TWA	Tourism Western Australia
SDOO	Sepia Depression Ocean Outlet
SWQMS	State Water Quality Management Strategy Document No. 6
WAMM	Western Australian Maritime Museum
WC Act	*Wildlife Conservation Act 1950*

Appendix II: Technical description of the zoning scheme

(as classified under the CALM Act Section 62)

Sanctuary Areas

Seal Island Sanctuary Zone

All that portion of Shoalwater Islands Marine Park that is contained within and bounded by a line:

i) commencing at a point joining the coordinates latitude 32º17'29" south and longitude 115º41'18"east; and
ii) extending generally east north-easterly along the geodesic to a point joining the coordinates latitude 32º17'17" south longitude 115º41'56" east;
iii) thence south along longitude 115º41'56" east to latitude 32º17'50" south;
iv) thence west along latitude 32º17'50" south to longitude 115º41'18"east;
v) thence north along longitude 115º41'18"east to the point of commencement.

Second Rock Sanctuary Zone

All that portion of Shoalwater Islands Marine Park that is contained within and bounded by a line:

i) commencing at a point joining the coordinates latitude 32º18'56" south longitude 115º41'24" east; and
ii) extending east along latitude 32º18'56" south to longitude 115º42'00" east;
iii) thence south along longitude 115º42'00" east to latitude 32º19'14" south;
iv) thence west along latitude 32º19'14" south to longitude 115º41'24" east;
v) thence north along longitude 115º41'24" east to the point of commencement.

Becher Point Sanctuary Zone

All that portion of Shoalwater Islands Marine Park that is contained within and bounded by a line:

i) commencing at a point joining the coordinates latitude 32º21'20" south longitude 115º41'24" east; and
ii) extending east along latitude 32º21'20" south to longitude 115º42'30" east;
iii) thence south along longitude 115º42'30" east to latitude 32º22'08" south;
iv) thence west along latitude 32º22'08" to longitude 115º41'24" east;
v) thence north along longitude 115º41'24" east to the point of commencement.

Special Purpose Areas

Shoalwater Bay Special Purpose Zone (Wildlife Conservation)

All that portion of Shoalwater Islands Marine Park that is contained within and bounded by a line:

i) commencing at the intersection of longitude 115º41'07.66" east and the High Water Mark at the westernmost point of the unnamed island west of Point Peron; and
ii) thence generally south - easterly and southerly along High Water Mark to latitude 32º16'16.25";
iii) thence east along latitude 32º16'61.61" south to the High Water Mark at Point Peron that is the boundary of Marine Reserve No. 5 as shown on Department of Land Administration Miscellaneous Plan 1687;
iv) thence generally south westerly and southerly along the shoreline boundary of Marine Reserve No. 5 to Mersey Point at the intersection of the Low Water Mark and the geodesic joining the coordinates latitude 32º18'19" south longitude 115º42'08" east and latitude 32º18'43.63" south longitude 115º41'22.38" east;
v) thence generally south westerly along that geodesic to the Low Water Mark on First Island;
vi) thence generally westerly along the Low water Mark on First Island to longitude 115º41'22.38" east;
vii) thence generally northerly along the geodesic to the point of commencement.

Murray Reef Special Purpose Zone (Scientific Reference)

All that portion of Shoalwater Islands Marine Park that is contained within and bounded by a line:

i) commencing at a point joining the coordinates latitude 32º21'20" south longitude 115º40'41" east; and
ii) extending east along latitude 32º21'20" south to longitude 115º41'24" east;
iii) thence south along longitude 115º41'24" east to latitude 32º22'08" south;
iv) thence west along latitude 32º22'08" south to longitude 115º40'41" east;
v) thence north along longitude 115º40'41" east to the point of commencement.

General Use Areas

Shoalwater Islands Marine Park General Use Zone

All that portion of Shoalwater Islands Marine Park that is not sanctuary area or special purpose area.

NOTES:

1. All geographic coordinates are expressed in terms of the Geocentric Datum of Australia 1994 ("GDA94").
2. Low water mark (LWM) is the ordinary (mean of) low water mark at spring tides.
3. High Water Mark (HWM) is the ordinary high water mark at spring tides as defined in the *Land Administration Act 1997* section 3.

Appendix III: Guide for the implementation of management strategies

VALUE	MANAGEMENT STRATEGY	YEAR									
Generic		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Development of a management and administrative framework (GV 7.1)	1. Gazette appropriate notices under the CALM Act and FRM Act to implement the zoning scheme within three months following gazettal of the management plan (DEC, DoF) **(H-KMS)**.										
	2. Inform users about the types of zones, reasons for and restrictions on activities in the marine park using signage, information manuals and education programs (DEC, DoF) **(H-KMS)**.										
	3. Initiate the planning process to further consider a large sanctuary zone adjacent to Cape Peron with a focus on the level of subtidal and intertidal reef habitat. This process should also pursue including the Port Kennedy exclusion area within the marine park. Any resultant amendments to the management plan and/or zoning scheme to be completed within the first year following gazettal of this management plan (DEC) **(H-KMS)**.										
	4. MPRA and Conservation Commission to develop an appropriate vesting basis for the intertidal areas of the marine park (MPRA, Conservation Commission, DEC) **(H)**.										
	5. Facilitate research on the effectiveness of zoning as an aid to achieving the objectives of the marine park (DEC) **(H)**.										
	6. Map the ecological and social values of the marine park that are highly sensitive to oil and chemical spills and ensure this information is accessible to the State Committee for Combating Marine Oil Pollution (DEC) **(H)**.										
	7. Collaborate with and provide advice to agencies and stakeholders to reduce impacts of pressures affecting the marine park's ecological values (DEC) **(H)**.										
	8. Initiate the statutory process, in consultation with relevant stakeholders, to extend the marine park boundary, considering the recommendations of *A Representative Marine Reserve System for Western Australia* (CALM, 1994) and submissions to this management plan (DEC) **(M)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Generic		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Education and interpretation (GV 7.2)	1. Develop, in collaboration with DoF and other relevant agencies, education and interpretation programs to ensure users are aware of and understand the values of the marine park, management zones and regulations and the reasons for these controls and										
	implement these education and interpretation programs (DEC, DoF) **(H-KMS)**.										
	2. Develop and distribute to the community and users appropriate education materials about the marine park's values, pressures on these values, strategies, targets, management and marine conservation more broadly (DEC, DoF) **(H)**.										
	3. Assist the fishing, tourism, charter and other key sectors to access and deliver marine information courses/materials to their staff or patrons (DEC) **(H)**.										
	4. Provide talks and briefings about the marine park's values, uses and management to user groups (DEC) **(M)**.										
Public participation (GV 7.3)	1. Establish a MAC and										
	maintain the MAC (DEC) **(H-KMS)**.										
	2. Develop a public participation strategy for the marine park and										
	implement the public participation strategy (DEC) **(H)**.										
	3. Encourage community involvement in education and interpretation programs (DEC) **(M)**.										
	4. Encourage community involvement in monitoring and management programs (DEC) **(M)**.										
Patrol and enforcement (GV 7.4)	1. Develop procedures to ensure coordination between Government agencies to maximise efficiency and effectiveness of patrol and enforcement activities and										
	implement these procedures (DEC, DoF, DPI) **(H-KMS)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Generic		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	2. Develop a patrol and enforcement program to ensure an adequate level of compliance with zoning restrictions and other regulations and										
	implement the patrol and enforcement program (DEC, DoF, DPI) **(H-KMS)**.										
	3. Facilitate cross authorisation of Government enforcement officers as appropriate (DEC, DoF, DPI) **(H-KMS)**.										
	4. Develop a program that promotes voluntary compliance and peer enforcement of regulations and										
	implement the voluntary compliance and peer enforcement program (DEC, DoF) **(H)**.										
	5. Encourage the fishing, tourism, charter and other key sectors, as well as users of the marine park, to take an active role in a voluntary patrol and enforcement programs (DEC) **(H)**.										
Management intervention and visitor infrastructure (GV 7.5)	1. Ensure zone markers and signage are installed within one year of gazettal (DEC) **(H)**.										
	2. Implement a program of routine inspections, maintenance and reporting on infrastructure conditions (e.g. zone markers, signage) in the marine park (DEC) **(M)**.										
	3. Identify degraded areas, assess rehabilitation options and implement, where appropriate (DEC) **(M)**.										
	4. Monitor human use (visitor numbers and high use areas) of the marine park and, consistent with available resources, provide visitor facilities where appropriate (DEC) **(M)**.										
	5. Perform regular assessments of visitor risk in the marine park and, where necessary, implement appropriate measures to minimise (DEC) **(M)**.										
Research (GV 7.6)	1. Develop a coordinated and prioritised research program focusing on key values, processes and issues of the marine park and										
	progressively implement the prioritised research program (DEC, DoF) **(H-KMS)**.										
	2. Gather baseline data for values for which insufficient data exist (DEC) **(H-KMS)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Generic		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	3. Develop detailed habitat and wildlife distribution maps for the marine park and										
	maintain the habitat and wildlife distribution maps (DEC) **(H-KMS)**.										
	4. Develop a database of human usage and its impacts in the marine park and										
	maintain the database of human usage (DEC) **(H-KMS)**.										
	5. Identify, prioritise and communicate high priority ecological and social research projects relevant to the management of the marine park and consistent with the prioritised research program to appropriate research organisations **(H - KMS)**.										
	6. Develop a database of historical and current research in the marine park and										
	maintain the database of historical and current research (DEC) **(H)**.										
	7. Facilitate ecological and social research in the marine park conducted by research, academic and educational institutions by providing financial and logistical assistance, where possible (DEC) **(H)**.										
	8. Develop partnerships with stakeholders and the community to implement research programs (DEC) **(H)**.										
	9. Using available data assess the sustainability of marine-based activities in the region (DEC) **(M)**.										
Monitoring (GV 7.7)	1. Develop a coordinated and prioritised ecological and social monitoring program for the marine park, including community-based monitoring programs, with a particular emphasis on MPRA and DEC audit requirements and										
	progressively implement the monitoring program (DEC, DoF) **(H-KMS)**.										
	2. Monitor changes in key values in the marine park against adequate baselines (DEC) **(H-KMS)**.										
	3. Ensure that proponents of development proposals or activities with the potential to impact on the marine park's values conduct appropriate monitoring programs (DEC) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Generic		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Development proposals within the marine park (GV 8)	1. Ensure appropriate advice is provided to relevant authorities with regard to proposed developments with the potential to impact on the marine park's values (DEC, MPRA) **(H)**.										
	2. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for the marine park and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	3. Develop a mooring plan for the marine park, with appropriate consultation, which identifies areas in which moorings are acceptable and/or necessary from environmental, equity and safety perspectives, and includes an assessment of the capacity of each area (DEC, DPI) **(H)**.										
	4. Manage existing moorings and assess new moorings in the marine park in accordance with MPRA/DEC's Mooring Policy and the approved mooring plan (DEC, DPI) **(H)**.										
	5. Gazette restricted anchoring areas if this activity is resulting in significant impacts on benthic communities (DEC) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Geomorphology (EV 9.1.1)	2. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for geomorphology, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	3. Identify areas where coastal erosion from recreational use is occurring and, where appropriate and through liaison with coastal land managers, implement controls on access and use of coastal features in and adjacent to the marine park (DEC, CoR) **(M)**.										
	4. Continue to prohibit the removal of algal wrack except on and adjacent to designated boat ramps or other public facilities. A permit may be granted to remove wrack for other reasons by the District Manager (DEC) **(M)**.										
Water and sediment quality (KPI) (EV 9.1.2)	2. Review existing water and sediment quality monitoring programs in relation to the discharge of toxicants* and chemical and physical stressors† into the marine park and										
	continue (if appropriate) water and sediment quality monitoring programs (DEC, Water Corporation) **(H-KMS)**.										
	3. Develop a pollutant inputs database for the marine park and										
	maintain the pollutant inputs database (DEC) **(H)**.										
	4. Ensure that approvals and the setting of conditions for new and existing developments and operations are consistent with the management objectives and targets for water and sediment quality and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	5. Continue to develop an appropriate understanding of the oceanography of the marine park's waters (DEC) **(M)**.										
	6. Facilitate the development of methods to reduce contamination of groundwater (industry, Cockburn Sound Management Council, CoR, Town of Kwinana, DEC) **(M)**.										
	7. Develop controls prohibiting discharge of vessel-based sewage in the marine park and										
	enforce controls on the discharge of vessel-based sewage (DPI, DEC) **(M)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	8. Educate marine park users about the ecological importance of the marine park's water and sediment quality, the potential detrimental impacts of human activities to this value and about Government policy and regulations on vessel-based sewage discharge (DEC, DPI) **(M)**.										
Seagrass communities (KPI) **(EV 9.1.3)**	3. Continue to monitor the spatial distribution and biomass of seagrass communities in the marine park (DEC) **(H-KMS)**.										
	4. Continue to build the knowledge base on the floral and faunal diversity and natural variability of seagrass communities in the marine park (DEC) **(H)**.										
	5. Continue to monitor sewage and industrial discharge from the SDOO and Peel-Harvey Estuary and its potential impacts on seagrass communities in the marine park (DEC, Water Corporation) **(H)**.										
	6. Implement a mooring plan, which includes identifying areas where moorings are not appropriate, and ensure all new and existing moorings meet the specified environmentally acceptable standard as outlined in the Mooring Policy (DEC, DPI) **(H)**.										
	7. Identify areas where damage to seagrass communities is occurring through inappropriate anchoring, and if required, restrict anchoring in these areas (DEC) **(H)**.										
	8. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for seagrass communities and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	9. Educate marine park users about the ecological importance of the marine park's seagrass communities and the potential detrimental impacts of human activities (e.g. anchoring, boat moorings and increased nutrients) on these communities (DEC) **(M)**.										
Macroalgae (subtidal reef) communities **(EV 9.1.4)**	2. Assess the nature, level and potential impacts of human activities on macroalgae communities within the marine park and										
	implement an appropriate monitoring program (DEC) **(H)**.										
	3. Ensure that approvals and the setting of conditions for new developments and										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	operations are consistent with the management objectives and targets for macroalgae communities, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	4. Educate marine park users about the ecological importance of marine park's macroalgae communities and the potential detrimental impacts of physical disturbance (e.g. anchoring, rock lobster pots) on these communities (DEC) **(M)**.										
Subtidal soft-bottom communities (EV 9.1.5)	3. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for subtidal soft-bottom communities and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	4. Assess the nature, level and potential impacts of human activities on subtidal soft-bottom communities in the marine park and										
	implement an appropriate monitoring program (DEC) **(H)**.										
	5. Implement a mooring plan, which includes identifying areas where moorings are not appropriate, and ensure all new and existing moorings meet the specified environmentally acceptable standard as outlined in the Mooring Policy (DEC, DPI) **(H)**.										
	6. Educate marine park users about the ecological importance of the marine park's subtidal soft-bottom communities and the potential detrimental impacts of human activities on these communities (DEC) **(L)**.										
Intertidal reef communities (EV 9.1.6)	2. Assess the nature, level and potential impacts of human activities on intertidal reef communities in the marine park and										
	implement an appropriate monitoring program (DEC) **(H-KMS)**.										
	3. Educate marine park users about the ecological importance of the marine park's intertidal reef communities and the potential detrimental impacts of human activities (e.g. trampling) on these communities (DEC) **(H)**.										
	4. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management objectives and targets for intertidal reef communities, and that appropriate monitoring conditions are applied to ensure these										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	5. Consider the most appropriate tenure and management arrangements for intertidal reef communities and make any necessary changes (DEC, MPRA, Conservation Commission) **(M)**.										
Australian sea lion (EV 9.1.7)	1. Asses the nature, level and potential impacts of human activities to Australian sea lions in the marine park and										
	implement an appropriate monitoring program (DEC) **(H-KMS)**.										
	2. Remove, by 1 July 2008 through liaison with DPI, the gazetted water ski area from Shoalwater Bay (DEC, DPI) **(H)**.										
	3. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**.										
	4. Regulate access of visitors to marine park areas adjacent to Australian sea lion haul-out sites as required (DEC) **(H)**.										
	5. Educate marine park users about the Australian sea lion and the potential detrimental impacts of human activities (e.g. feeding and discarding of offal and bait) on the marine park's Australian sea lions, of marine mammal interaction controls in place under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998* and the dangers of interacting with Australian sea lions (DEC) **(H)**.										
	6. Maintain records of the mortality, injury or disturbance of Australian sea lions in the marine park (DEC) **(M)**.										
	7. Undertake complementary management actions in the terrestrial reserves, such as restricting visitor access, if required (DEC) **(L)**.										
Cetaceans (EV 9.1.8)	1. Remove the gazetted water ski area from Shoalwater Bay by 1 July 2008 through liaison with DPI (DEC, DPI) **(H)**.										
	2. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	Zones (DEC, DPI) **(H)**.										
	3. Educate marine park users about cetaceans and the potential detrimental impacts of human activities on the marine park's cetaceans and marine mammal interaction controls in place under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998* (DEC) **(M)**.										
	4. Maintain records on the incidence of entanglement, boat collisions, strandings or mortalities of cetaceans in the marine park (DEC) **(M)**.										
Seabirds and shorebirds (EV 9.1.9)	1. Assess the nature, level and potential impacts of human activities and pest species to the sea and shorebird populations in the marine park and										
	implement an appropriate monitoring program (DEC) **(H-KMS)**.										
	2. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**.										
	3. Regulate access of visitors to marine park areas that are significant sites for sea and shorebirds (e.g. breeding, feeding, roosting) if required (DEC) **(H)**.										
	4. Through liaison with land managers, undertake complimentary management actions on adjacent land and terrestrial reserves to manage potential detrimental impacts on sea and shorebirds. This could include encouraging the completion of management plans for specific species or areas and/or restricting visitor access if necessary (DEC, CoR) **(H)**.										
	5. Continue to prohibit the removal of algal wrack except on and adjacent to designated boat ramps or other public facilities. A permit may be granted to remove wrack for other reasons by the District Manager (DEC) **(M)**.										
	6. Educate marine park users about sea and shorebirds and the potential detrimental impacts of human disturbance to the marine park's sea and shorebirds, and the controls in place to protect these species (DEC) **(M)**.										
	7. Identify significant breeding, feeding and roosting sites for sea and shorebirds in or adjacent to the marine park (DEC) **(M)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Little penguin (KPI) (EV 9.1.10)	1. Facilitate research and monitoring programs to determine a robust population estimate and the potential impacts of human activities, including little penguin mortality from boat strike, to the little penguin population and their prey species in the marine park (DEC) **(H-KMS)**.										
	2. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones. If necessary, apply further restrictions to address mortality from boat strikes (DEC, DPI) **(H)**.										
	3. Review the south-western boundary of the water ski area in Warnbro Sound (DEC, DPI) **(H)**.										
	4. Ensure that approvals and the setting of conditions for new developments and operations are consistent with the management targets and objectives for the little penguin, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DoIR, DPI, CoR) **(H)**.										
	5. Amend the marine park boundary to include the Port Kennedy area in the marine park (DEC, DPI) **(H)**.										
	6. Encourage the completion and implementation of the review of the *Shoalwater Islands Management Plan 1992-2002*, to enable complementary management (including regulation of visitor access) to protect little penguins (DEC) **(H)**.										
	7. Maintain records on the incidence of entanglement, boat collisions or mortalities of little penguins in the marine park (DEC) **(M)**.										
	8. Educate marine park users about the little penguin, the potential detrimental impacts of human disturbance to the marine park's little penguin population and the importance of the Becher Point whitebait nursery and Comet Bay foraging area (DEC) **(M)**.										
Finfishes (KPI) (EV 9.1.11)	2. Assess the nature, level and potential impacts of human activities on finfish populations in the marine park and										
	implement an appropriate monitoring program (DEC) **(H-KMS)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	3. Identify finfish species that need to be protected from recreational or commercial fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H-KMS)**.										
	4. Educate marine park users about the potential detrimental impacts of human activities on finfish stocks, the conservation issues associated with finfish and appropriate behaviours and conduct to minimise these impacts (DEC, DoF) **(H)**.										
	5. Ensure that approvals and the setting of conditions for new aquaculture developments and operations are consistent with the management objectives and targets for finfish, and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DEC, MPRA, EPA, DoF, DPI) **(H)**.										
	6. Prohibit recreational aquarium fish collecting in the marine park (DEC, DoF) **(H)**.										
	7. Participate in DoF processes regarding the management of recreational and commercial fisheries, including review and amendment, if necessary, of management controls (DEC) **(M)**.										
	8. Initiate research programs to characterise finfish diversity and abundance and to identify important nursery, spawning and aggregation sites in the marine park (DEC, DoF) **(H)**.										
	9. Quantify the level and significance of catch of bycatch for both commercial and recreational fishing activities in the marine park and, if necessary, implement measures to progressively reduce the bycatch of finfish species (DoF, DEC) **(M)**.										
Invertebrates (EV 9.1.12)	2. Assess the nature, level and potential impacts of human activities on invertebrate populations in the marine park and										
	implement an appropriate monitoring program (DEC) **(H-KMS)**.										
	3. Identify invertebrate species that need to be protected from recreational or commercial fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H)**.										
	4. Prohibit recreational specimen shell collecting in the marine park (DEC, DoF) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Ecological		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	5. Educate marine park users about the potential detrimental impacts of human activity on invertebrate stocks, the conservation issues associated with invertebrates and appropriate behaviours and conduct to minimise these impacts (DEC, DoF) **(M)**.										
	6. Participate in DoF process regarding management of recreational and commercial fisheries, including review and amendment, if necessary, of management controls (DEC) **(M)**.										
	7. Initiate research programs to characterise invertebrate diversity and abundance in the marine park (DEC, DoF) **(M)**.										
	8. Quantify the level and significance of bycatch for recreational and commercial fishing activities in the marine park, and if necessary, implement measures to progressively reduce the bycatch of invertebrate species (DoF, DEC) **(M)**										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Aboriginal heritage (SV 9.2.1)	1. Ensure that there is appropriate Aboriginal representation on the MAC (DEC) **(H-KMS)**.										
	2. Develop mechanisms, in collaboration with local Aboriginal groups and relevant authorities, which ensure Aboriginal people have meaningful involvement in the management of the marine park (DEC, DIA, local Aboriginal groups) **(H)**.										
	3. Develop education and interpretive opportunities, in collaboration with the local Aboriginal community, to promote a greater understanding of the significance of the area to Aboriginal people and										
	implement these education programs and interpretive opportunities (DEC, local Aboriginal groups) **(H)**.										
Maritime heritage (SV 9.2.2)	1. Develop education programs and interpretive opportunities to enhance the awareness of the maritime heritage of the marine park and										
	implement these education programs and interpretive opportunities (WAMM, DEC, TWA) **(H)**.										
	2. Monitor known historical sites to determine if their condition is deteriorating and, if warranted, implement appropriate protective action (WAMM, DEC) **(M)**.										
	3. Encourage and assist research on maritime heritage, including recording oral histories, to facilitate long-term management (WAMM, DEC) **(M)**.										
	4. Determine and maintain appropriate levels of access to historical sites (DEC, stakeholders) **(L)**.										
Marine Nature-based Tourism (SV 9.2.3)	2. License/lease and manage an ecologically sustainable level of marine nature-based tourism operations in the marine park with appropriate conditions to ensure the protection of the ecological and social values of the marine park (DEC) **(H-KMS)**.										
	3. Assess on a strict need and environmental impact basis any future proposals for development, exploration, production and the establishment of dive wrecks, and refer any proposals to the MPRA and EPA for assessment, as appropriate (EPA, DEC, MPRA, DoF, DPI, industry, TWA) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	4. Develop Codes of Practice for marine nature-based tourism operations in the marine park, which will be a part of licence conditions, and will include: ▪ appropriate behaviours and conduct to minimise potential impacts; ▪ performance measures; ▪ desired trends; ▪ short-term and long-term management targets; and ▪ monitoring and reporting requirements (DEC, TWA) **(M)**.										
	5. Ensure equitable access for marine nature-based tourism in appropriate areas of the marine park (DEC) **(M)**.										
	6. Raise the awareness of marine nature-based tourism operators regarding the potential detrimental impacts of tourism on the ecological values of the marine park through education and participation in management (e.g. conduct workshops for information exchange, interpretation training and issue identification) (DEC, TWA) **(L)**.										
Commercial fishing (SV 9.2.4)	2. Assess the nature, level and potential impacts of commercial fishing on the marine park's values and										
	implement an appropriate monitoring program (DEC, DoF) **(H-KMS)**.										
	3. Participate in DoF process regarding management of commercial fisheries, including review and amendment, if necessary, of management controls (DEC) **(H)**.										
	4. Ensure commercial fisheries are aware of the zoning scheme and any restrictions that may apply to their operations in the marine park DEC, DoF). **(H)**										
	5. Apply the appropriate framework for managing the collection of coral, live rock and live sand in the marine park once developed, including an assessment of areas where these activities will not be permitted (DEC, DoF) **(H)**.										
	6. Identify species that need to be protected from commercial fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	7. Monitor commercial fishing catch/effort within the marine park and report the results publicly (DoF) **(M)**.										
	8. Ensure equitable access for commercial fishing in appropriate areas of the marine park (DEC) **(M)**.										
	9. Ensure that, through DoF and the DEW processes, and licensees meet sustainable development requirements and reporting and are consistent with the strategies for the marine park's ecological values (DoF, DEW, EPA, DEC) **(M)**.										
	10. Liaise with the MPRA in regard to proposed new fisheries and major changes to existing fisheries (DoF) **(M)**.										
	11. Ensure that DoF licensing processes takes into account MPRA/DEC audit requirements (DoF) **(M)**.										
Aquaculture (SV 9.2.5)	2. Ensure that approvals and the setting of conditions for existing and new aquaculture developments and operations are consistent with maintaining the marine park's ecological and social values and that appropriate monitoring conditions are applied to ensure these outcomes are achieved (DoF, DPI, DEC, MPRA, EPA) **(H)**.										
	3. Ensure operators provide an annual status report on the environmental impacts of aquaculture activity in the marine park in accordance with DoF licence conditions and the MPRA's auditing requirements (ACWA, DEC) **(M)**.										
	4. Ensure equitable access for aquaculture in appropriate areas of the marine park (DEC) **(M)**.										
	5. Provide formal advice to DoF and EPA (as appropriate) in relation to the environmental assessment of proposed aquaculture activity in the marine park (DEC) **(M)**.										
	6. Ensure that DoF licensing processes takes MPRA/DEC audit requirements into account (DoF) **(M)**.										
	7. In collaboration with the ACWA and DoF, assess the existing Codes of Practice and Environmental Management Systems for aquaculture, and modify if necessary, to ensure social and ecological sustainability in the marine park (DEC, DoF, ACWA) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Recreational fishing (SV 9.2.7)	2. Assess the nature, level and potential impacts of recreational fishing on the marine park's values and										
	implement an appropriate monitoring program (DoF, DEC) **(H-KMS)**.										
	3. Prohibit recreational aquarium fish and specimen shell collecting in the marine park (DEC, DoF) **(H)**.										
	4. Identify species that need to be protected from recreational fishing in the marine park and provide the necessary legislative protection to achieve this (DEC, DoF) **(H)**.										
	5. Examine the effects and evaluate the sustainability of recreational fishing activities, including monitoring catch/effort, in the marine park and review management controls as required (DEC, DoF) **(H)**.										
	6. Educate recreational fishers about: ▪ the zoning scheme and other restrictions that may apply to their activities in the marine park; ▪ cumulative impacts of recreational fishing on fish stocks; and ▪ appropriate behaviours and conduct to minimise potential impacts (DoF, DEC) **(H)**.										
	7. Ensure equitable access for recreational fishing in appropriate areas of the marine park (DEC) **(M)**.										
	8. Conduct research on the possible benefits of the zoning scheme for recreational fishing (DEC, DoF) **(M)**.										
Recreational water sports (SV 9.2.6)	2. Assess on a strict need and environmental impact basis any future proposals for development, exploration, production and the establishment of dive wrecks, and refer any proposals likely to significantly impact on the marine park values to the MPRA and EPA for assessment, as appropriate (EPA, CoR, industry, TWA, DoF, DEC) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	3. Ensure that any future sinkings or additions to the 'West Coast Dive Park' have the appropriate lease arrangements with the proponent for the seabed to ensure ongoing maintenance and monitoring, gazettals and proclamations declared governing commercial and recreational use of such sites (EPA, CoR, DEC, DoF, DPI) **(H)**.										
	4. Remove the gazetted water ski area from Shoalwater Bay by 1 July 2008 through liaison with the DPI (DEC, DPI) **(H)**.										
	5. Implement, by 1 July 2008, an eight knot speed limit for motorised vessels in the Shoalwater Bay Special Purpose (Wildlife Conservation) and Seal Island Sanctuary Zones (DEC, DPI) **(H)**.										
	6. Review the south-western boundary of the water ski area in Warnbro Sound (DEC, DPI) **(H)**.										
	7. Educate marine park users about the potential detrimental impacts of recreational water sports on the ecological values of the marine park and appropriate behaviours and conduct to minimise these impacts (DEC, DPI) **(H)**.										
	8. Investigate strategies to separate incompatible water sports in the marine park, as required (DEC, DPI) **(M)**.										
	9. In collaboration with user groups, develop Codes of Practice to minimise environmental impacts of recreational boat and water sports activities, as appropriate (DEC) **(M)**.										
	10. Determine the nature, spatial patterns, compatibility and potential environmental impacts of all existing recreational water sports in the marine park and										
	maintain a database of these (DEC) **(M)**.										
	11. Liaise with DPI to designate speed restrictions, where necessary, for wildlife protection and/or for safety requirements (DEC, DPI) **(L)**.										
	12. Investigate the development of dive and snorkel opportunities by the creation of interpretive nature trails in the marine park (DEC) **(L)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
Coastal and island use (SV 9.2.8)	1. Educate marine park users about the potential detrimental impacts of coastal use on the ecological values of the marine park and appropriate behaviours and conduct to minimise these impacts (DEC) **(H)**.										
	2. Investigate strategies to separate incompatible coastal and island uses, as required (DEC, CoR) **(H)**.										
	3. Determine the nature, spatial patterns, compatibility and potential environmental impacts of all existing coastal and island uses in the marine park and										
	maintain a database of these (DEC) **(M)**.										
	4. Liaise with adjacent land managers to ensure that the management of adjacent landforms is consistent with the maintenance of marine park's values (e.g. appropriate designation of dog-exercise and dog-prohibited areas, recreational vehicles on beaches) (DEC, CoR) **(M)**.										
	5. Identify coastal areas of the marine park that are degraded and implement rehabilitation programs, as required (DEC) **(M)**.										
	6. Actively encourage the recommended access route for private vessels visiting Penguin Island as shown in Figure 4 (DEC, DPI) **(M)**.										
	7. Develop and implement an appropriate patrol and enforcement program, as required (DEC, DPI) **(M)**.										
Seascapes (KPI) (SV 9.2.9)	1. Identify user perceptions on the importance of aesthetic values and sustainable levels of use to ensure that these values do not become significantly degraded (DEC) **(H-KMS)**.										
	2. Identify and determine the key characteristics and spatial extent of the major seascapes of the marine park (DEC) **(H)**.										
	3. Provide formal advice to relevant Government authorities to ensure development proposals both in and adjacent to the marine park do not unnecessarily impact on the seascapes of the marine park (DEC, MPRA) **(H)**.										

VALUE	MANAGEMENT STRATEGY	YEAR									
Social		**1**	**2**	**3†**	**4**	**5**	**6†**	**7**	**8**	**9**	**10‡**
	4. Ensure potential developers are informed of relevant management objectives and targets of the marine park in relation to seascape values (DEC, CoR, DPI) **(M)**.										
	5. Ensure the seascape values of the marine park values are not diminished as a result of human activities in and adjacent to the marine park (DEC) **(M)**.										
Scientific research (SV 9.2.10)	3. Facilitate social research to assess visitor expectations and perceptions of park management (DEC) **(H)**.										
	4. For necessary research, implement a policy of non-destructive sampling in sanctuary and special purpose zones, where possible (DEC) **(M)**.										
	5. Assess research and monitoring permit applications and apply conditions to ensure that research conducted is ethical and ecologically sustainable, as required (DEC) **(H)**.										
	6. Ensure the values of the marine park that are important for scientific research are not diminished as a result of human activities in the marine park (DEC) **(M)**.										
Education (SV 9.2.11)	3. Support local schools who wish to develop a marine education program relating to the marine park (DEC, schools) **(M)**.										
	4. Ensure education programs conducted are ethical and ecologically sustainable (DEC) **(M)**.										
	5. Provide support, where possible, to institutions using the marine park for educational purposes (DEC) **(L)**.										

Key:
Generic (GV), ecological (EV) and social (SV) value reference, see Sections 7-9
† MPRA audit
‡ MPRA audit and management plan review
H = high, M = medium and L = low priority strategies
KMS = key management strategy.

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