



Report on  
Ten-year Audit of  
**Marmion Marine Park  
Management Plan**

**May 2012**



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audit of the implementation of the Marmion  
Marine Park Management Plan 1992-2002**

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## SUMMARY OF THE AUDIT: FINDINGS AND RECOMMENDATIONS

This report presents the findings of the MPRA's audit of the management program and management plan implementation for Marmion Marine Park. This is the first ten-year audit undertaken by the MPRA, consistent with its audit policy as developed in accordance with the requirements of the *Conservation and Land Management Act 1984* (CALM Act) to audit and report on each management plan for any marine conservation reserve vested in the MPRA on its 10 year anniversary.

The purpose of the audit and review was to consider the efficiency and effectiveness of management in Marmion Marine Park as implemented under the direction of the management plan. The present management plan contains objectives, strategies and actions but no performance indicators. The audit considered the historic development of management as guided by the plan as well as present-day strategies for management of the relevant issues. In addition to findings in relation to present-day management, the findings of the audit are intended to provide direction to the Department of Environment and Conservation (DEC) in the matter of the development of a new management plan to replace the expiring plan.

The findings of the audit are intended to provide direction to the Department of Environment and Conservation (DEC) in relation to present-day management as well as in the matter of the development of a new management plan to replace the existing plan.

The audit involved an on-site inspection of Marmion Marine Park from both land and sea, consultations with staff and submissions from DEC and the Department of Fisheries (DoF), and a number of meetings with various stakeholders. The people consulted, and their inputs and submissions to the audit are summarised (non-attributed) in the appendices.

The performance assessment has resulted in 14 findings and 10 recommendations in relation to present or impending issues that relate to the management of Marmion Marine Park.

The principal findings of the review are:

- Despite the urban setting of the marine park and the subsequent pressures acting upon it, the Park is generally in good condition with the exception of targeted finfish.
- Management by DEC appears to be efficient and effective within the limits of the allocated resources.
- The Department of Fisheries receives no funding to undertake marine park specific management activities. Patrols and enforcement is undertaken on an opportunistic basis as part of metropolitan wide compliance activities and this activity focuses on core Fisheries compliance activities in relation to the recreational and commercial abalone, rock lobster and finfish fisheries.

The audit finds that the overall condition of the reserves is good, and the management system operates efficiently despite a significant historical lack of resources. Recent allocations of resources have been much better, but are still inadequate given the scale of the Marmion Marine Park and the importance of the values that are subject to increasing human use. There are a number of management risks that will need to be addressed in the short term, and followed up with longer term and broader scale responses.

The Findings and Recommendations of the Audit are presented in section 8.3 below. Table 1 presents a Summary of the Recommendations.

TABLE 1: SUMMARY OF RECOMMENDATIONS

R1	A new MMP Management Plan, incorporating outcomes based content, should be developed as soon as possible. Until a revised management plan is completed, DEC should continue to manage the area consistent with the relevant standards and targets of the <i>Shoalwater Islands Marine Park Management Plan 2007-2017</i> .
R2	A study should be undertaken with a view to extending the existing MMP to the north, perhaps as far as Two Rocks.
R3	A study should be undertaken to review the existing Sanctuary Zones of the MMP, with a view of increasing their effectiveness and the extent to which they constitute a representative sample of MMP habitats.
R4	The existing Australian Sea Lion monitoring program in the metropolitan region should be extended and relate MMP data to that from other metropolitan sites. In particular, the potential or actual effects of erosion of haul-out sites, entanglements and vessel effects should be assessed. Existing management arrangements for Little Island with respect to time allowed on the island and no boat landings are reviewed to determine if they are still adequate in light of the increased usage in the park. It is further recommended that management arrangements for Little Island are formalised under the <i>Conservation and Land Management Regulations 2002</i> so that they are legally enforceable.
R5	Discussions between The Department of Environment and Conservation, the MPRA and the Water Corporation should be established as soon as possible. The discussions should consider, in the first instance, a number of issues raised by DEC concerning water quality issues associated with the Ocean Reef outfall
R6	Community consultation and involvement in MMP operation and review should be established, either by the establishment of a Management Advisory Committee (MAC) involving broad community representation or a Consultative Committee (CC) involving representatives of peak bodies.
R7	It is recommended that DEC and DoF work closely together, in collaboration with academic institutions to develop appropriate research monitoring programs to determine the ecological impacts on the Park's intertidal areas. The environmental effects associated with the recreational harvesting of targeted invertebrates should be considered by a MAC or CC and involve Department of Fisheries advice.
R8	That DEC continues to allocate appropriate resources for the functioning of the Marine Science Program.
R9	The MAC or CC proposed in R6 should include representatives from community groups concerned with beachfront and foredune issues.
R10	That DEC revise its budgeting systems to enable expenditure to be reported at a park level.

## 1. REGULATORY CONTEXT FOR THE STATUTORY TEN-YEAR AUDIT

The audit function of the MPRA is specified within section 26B (f) of the CALM Act which states that in relation to management plans for lands and waters vested in it, that, as the controlling body, the MPRA is:

- (i) to develop guidelines for monitoring the implementation of management plans by the Department;
- (ii) to set performance criteria for evaluating the carrying out of management plans; and
- (iii) to conduct periodic assessments of the implementation of management plans.

The statutory audit function of the MPRA is established in section 54 of the CALM Act which requires the MPRA to be responsible, in relation to all land which is vested in it whether solely or jointly with an associated body, for (a) the preparation of proposed management plans; and (b) the audit of expiring plans and preparation of further management plans. Expiring plans do not lapse until they are formally revoked by the Minister and replaced with a new plan.

The MPRA has established an MPRA Audit Policy (2008) and endorsed a performance assessment framework to give effect to the audit function (Lloyd *et. al.*, 2005). The Audit Policy provides the framework for annual audits of performance of each marine conservation reserve, an audit report to accompany the MPRA Annual Report, periodic audits to provide for mid-term audits of management performance, and ten-yearly audit and reports of management plans.

This document is the report of the first ten-year audit of the Marmion Marine Park Management Plan, conducted by the MPRA to contribute to the obligations of the MPRA under the CALM Act, consistent with the Audit Policy.

## 2. OBJECTIVES OF THE AUDIT

This ten-year audit of the Marmion Marine Park Management Plan 1992-2002 is an independent evidence-based audit and audit of management. The scope of the audit is broadly, to consider and report on management of the marine park, including any specific issue that may be relevant to the management of the Marmion Marine Park. Specifically, the audit is to;

- (a) audit and report on management outcomes and achievements in respect to the objectives of the *Marmion Marine Park Management Plan 1992-2002* (Department of Conservation and Land Management and National Parks and Nature Conservation Authority, Plan No 23, 1992);
- (b) report on any issues detected, and on management responses/strategies implemented or planned; and
- (c) identify changes or future efforts that could improve the management or implementation system in order to meet the established vision and objectives for Marmion Marine Park.

### 3. AUDIT PROCESS

The audit followed the general process of a forensic audit of management efforts, followed by preparation of an audit report. Evidence was obtained from annual reports (2003 to 2010), records, documents, interviews and direct observations, where possible verified with the relevant agency staff. In addition, DEC and Department of Fisheries (DoF) provided submissions containing data and information pertaining to the implementation of the actions set out in the plan. The views of members of the local communities, and the local government agencies were actively sought as part of the audit process.

The audit has been conducted by the MPRA Audit Sub-committee, under delegation from the full MPRA. The Audit Sub-committee members who conducted this audit were John Penrose (Chair) Trevor Ward, Di Walker and Angus Horwood.

The audit proceeded in six stages;

1. pre-assessment of the documentary evidence;
2. consultation with staff and stakeholders in the local communities;
3. on-site inspection for verification of achievements and inspection of management issues;
4. incorporation of information from the DEC and DoF submissions;
5. preparation of an audit report and circulation of draft for correction of factual errors by both DEC and DoF; and
6. finalisation of the audit process and a audit report.

In the pre-assessment stage, the available reports/information were collected and audited by the Audit Sub-committee.

The Audit Sub-committee prepared and submitted a request for submissions from the DEC and DoF staff, which included a list of questions and issues that would inform the audit process (Appendix 1). The content of the submissions guided the on-site inspection conducted by the MPRA Audit Sub-committee on 7 and 10 January 2011, and provided first-hand information about the management and condition of Marmion Marine Park. Stakeholder input was collected in a series of meetings with DEC and other agency staff, volunteer organizations, local government representatives, fishing groups, scientists and other stakeholders to determine what progress is being made towards achieving the strategies and objectives of the Marmion Marine Park Management Plan.

The audit of documentation, findings from the site inspection, and matters raised by the stakeholders or staff of the agencies and stakeholders forms the knowledge-base for this audit.

The benchmarks for determining the acceptability of management have been set by consideration of the implicit targets established within the Marmion Marine Park Management Plan (specific targets were not set), informal comparison with benchmarks and standard procedures used in the other DEC-managed marine parks and reserves, and by informal comparison with targets set in other Australian/New Zealand marine parks and reserves and scientific best practice.

## 4. EVIDENCE

The initial set of evidence for this audit consists of the DEC primary submission to the audit, comprising input from the DEC Marine Policy and Planning Branch and the district DEC staff from Swan Coastal District. This evidence is heavily based on the annual performance reports for Marmion Marine Park and on the present-day operational perspective of the district DEC staff. A primary written submission was also received from DoF.

The dominant documentary information base for this audit therefore consists of the agency submissions, the Management Plan, the reports of the MPRA annual monitoring audit workshops (2003-2010), the contextual information developed prior to Marmion Marine Park's dedication, and the reports of a number of research and monitoring studies conducted by DEC, DoF as well as other institutions within and near the park.

A substantial amount of direct evidence was also secured through the on-site stakeholder and agency staff interviews. The staff and stakeholders consulted and the sites visited are listed in Appendix 2. Issues raised by the staff and stakeholders are summarised at Appendix 3.

## 5. MANAGEMENT OBJECTIVES

This section summarises the outcomes for the management actions in the Marmion Marine Park Management Plan, and provides a summary of the strategies used to achieve those actions. The *Marmion Marine Park Management Plan 1992-2002* was not prepared with measurable outcome-based objectives and therefore specific progress against management targets (such as reporting of performance against Key Performance Indicators - KPIs) is not strictly relevant. However, in keeping with the outcome-based management plans that are now standard for marine park management in WA, management of Marmion Marine Park is reported in the annual MPRA performance assessment audit against a set of performance indicators developed for nearby Shoalwater Islands Marine Park and adapted by the operational DEC district staff. The set of indicators, those considered to be KPIs, and their relevant values are shown below.

TABLE 2: Long-term management targets for ecological values in Marmion Marine Park

Ecological Value	Long-term management target for value
<b>Finfish (KPI)</b> – <i>A diverse finfish fauna contributes significantly to the biodiversity of the marine park.</i>	No loss of finfish diversity or non-targeted finfish species biomass as a result of human activity in the marine park. Abundance and size composition of finfish species in sanctuary zones and special purpose zones and non-targeted finfish species in other zones to be at natural <sup>a</sup> levels.
<b>Seagrass Communities (KPI)</b> – <i>Sea grass is an important primary producer and the extensive and diverse perennial seagrass meadows are important habitats for invertebrates and finfish.</i>	No loss of seagrass species diversity or perennial seagrass biomass <sup>b</sup> as a result of human activity in the marine park.
<b>Invertebrates</b> – <i>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.</i>	No loss of invertebrate diversity or non-targeted invertebrate species biomass <sup>b</sup> as a result of human activities in the marine park. Abundance and size composition of invertebrate species in sanctuary zones and non-targeted invertebrate species in other zones to be at natural <sup>a</sup> levels. Management targets for targeted invertebrate species to be determined in consultation with DoF and stakeholders.
<b>Intertidal Reef Communities (KPI)</b> – <i>Intertidal reef communities provide shelter for a variety of intertidal organisms, which in turn are a valuable food source</i>	No loss of intertidal reef species diversity or community biomass <sup>b</sup> as a result of human activity in the marine park.
<b>Macroalgal (subtidal reef) Communities (KPI)</b> – <i>Subtidal reefs 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.</i>	No loss of subtidal macroalgal species diversity or community biomass <sup>b</sup> as a result of human activity in the marine park.
<b>Subtidal Soft-bottom Communities</b> – <i>These habitats support a variety of invertebrate species both in and on the sediments</i>	No loss of subtidal soft-bottom species diversity or community biomass <sup>b</sup> as a result of human activity in the marine park.
<b>Australian Sea-Lion (KPI)</b> – <i>The Australian sea lion (Neophoca cinerea) is a threatened species endemic to Australia and specially protected under the Wildlife Conservation Act. It uses the marine park waters to feed and the islands and rocks as haul-out sites.</i>	No loss in abundance <sup>b</sup> of Australian sea lions as a result of human activity in the marine park.
<b>Sea and Shorebirds</b> – <i>The marine park and adjacent nature reserves are important nesting and foraging areas for at least 14 species of sea and shorebirds</i>	No loss of seabird or shorebird diversity or abundance <sup>b</sup> as a result of human activity in the marine park.
<b>Cetaceans</b> – <i>Cetaceans are of special conservation status and five species have been observed in the marine park.</i>	No loss of cetacean abundance <sup>b</sup> as a result of human activity in the marine park
<b>Water and Sediment Quality (KPI)</b> – <i>The maintenance of good water and sediment quality is essential for a healthy marine ecosystem</i>	Maintain water and sediment quality at the current high <sup>c</sup> level, except for designated area where a different level of acceptable change is approved by the appropriate Government regulatory authority.
<b>Geomorphology</b> – <i>A complex seabed and coastal topography consisting of islands, limestone ridges and reef platforms, protected inshore areas and deeper basins, sandbars and beaches</i>	In sanctuary zones: no change in seabed structural complexity and coastal landforms as a result of human activity in the marine park In general use zone: no change in seabed structural complexity or coastal landforms, except in designated areas where some level of acceptable change is approved by the appropriate Government regulatory authorities.

<sup>a</sup> In this context ‘natural’ refers to the abundance that would occur in areas that are undisturbed and/or unexploited by human activities.

<sup>b</sup> In this context a loss or change in ‘abundance’ or ‘biomass’ excludes losses of a minor, transient or accidental nature.

<sup>c</sup> 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).

TABLE 3: Management objectives for social values in Marmion Marine Park

Social Value	Management Objectives
<b>Seascapes (KPI)</b> – <i>Panoramic vistas of azure waters, offshore islands, reefs and beaches are major aesthetic attractions of the marine park</i>	Ensure the aesthetic values of the marine park are not degraded by human activities and minimize visual intrusions on seascape and coastal vistas in and adjacent to the marine park with no reduction in the spatial extent of the major seascape qualities and no significant loss of aesthetic values as a result of human activity in the marine park.
<b>Aboriginal Heritage</b> – <i>The area has significant Aboriginal heritage value, including oral recall of fish trap usage, possibly at Mettams Pool.</i>	Ensure that, in collaboration with local Aboriginal people and the relevant management authorities, human activities do not significantly impact sites of significance to Aboriginal people in the marine park. Involve local aboriginal people in the management of the marine park and raise awareness and knowledge of Aboriginal relationships with the marine environment.
<b>Maritime Heritage</b> – <i>The marine park has a significant maritime heritage and at least one historic shipwreck (the Centaur, wrecked 1874) is located in the marine park.</i>	In collaboration with the Western Australian Maritime Museum, ensure that human activities do not significantly impact historical sites or shipwrecks in the marine park and increase awareness of the maritime heritage within the local community and among visitors
<b>Marine Nature-based tourism</b> – <i>The marine offers a wide range of attractions and opportunities for visitors to the area, which support a marine nature-based tourism industry.</i>	Manage marine nature-based tourism in a manner that is consistent with maintaining the marine park’s values and maintain the ecological and social values of the marine park that are important to the marine nature-based tourism industry.
<b>Commercial Fishing</b> – <i>The marine park is important for commercial fishers targeting rock lobster, abalone, and a variety of fish species through beach seine netting.</i>	In collaboration with the industry and DoF, ensure that commercial fishing activities in the marine park are managed in a manner consistent with maintaining the marine park’s values and to maintain the ecological values of the marine park that are important to commercial fisheries.
<b>Recreational Fishing</b> – <i>Line fishing, netting and spearfishing methods target a variety of pelagic and reef finfish species, crabs, rock lobster and other invertebrates</i>	In collaboration with the industry and DoF, ensure that recreational fishing activities in the marine park are managed in a manner consistent with maintaining the marine park’s values and to maintain ecological values of the marine park that are important for maintaining quality recreation fishing opportunities.
<b>Recreational Water Sports</b> – <i>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.</i>	Ensure recreational water sports are managed in a manner that is consistent with maintaining the marine park’s ecological and social values and minimizes conflict between users.
<b>Coastal and Island Use</b> – <i>The coastline (including beaches, dunes and rocky shorelines) in and adjacent to the marine park provides for a range of recreational uses.</i>	Ensure that coastal uses are managed in a manner that is consistent with maintaining the marine park’s ecological and social values and ensure integration of marine, coastal and terrestrial management.
<b>Scientific Research</b> – <i>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.</i>	Provide access and opportunities for ecological and social research and to ensure ecological and social research is ethical and ecologically sustainable in the marine park
<b>Education</b> – <i>The unique array of ecological and social values in the marine park combines 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.</i>	Promote and facilitate the use of the marine park for marine education, ensure that the educational programs are ethical and ecologically sustainable and maintain the ecological values of the marine park that are important for marine education.

[illegible]

## 6. PLANNING AND MANAGEMENT CONTEXT

### 6.1 VALUES

Marmion Marine Park is within State Waters of the Central West Coast marine bioregion adjacent to the northern Perth Metropolitan beaches between Trigg Island and Burns Rock. The Park extends from high water mark to approximately 5.5 kilometres offshore. The Park covers an area of approximately 9,500 hectares and has been recognised as having outstanding conservation and recreational value. Marmion Marine Park is considered to be broadly representative of the central west coast limestone reef system, which is a major marine ecosystem within the Central West Coast IMCRA bioregion. The offshore reef system in Marmion Marine Park is an ancient shoreline that now protects lagoons and smaller limestone reef outcrops closer to shore.

The marine flora and fauna of Marmion 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 are diverse habitats within the marine park, including seagrass meadows, subtidal and intertidal macro algal limestone reefs. These varied habitats are home to a diverse range of finfish, invertebrates and a variety of wildlife including several species of sea and shore birds and marine mammals such as bottlenose dolphins (*Tursiops truncatus*) and Australian sea lions (*Neophoca cinerea*).

Marmion Marine Park's Mediterranean climate and sheltered waters in close proximity to Perth make it 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 waters are popular for commercial and recreational fishing activities. The species and habitat diversity within the marine park also contribute to high scientific research and educational value, particularly as they are easily accessible to Western Australia's major research institutions. Panoramic vistas of azure waters, offshore islands and beaches make these areas a pleasant place to live and visit, and access to this coastal resource is highly valued by the community. Walking / cycling paths along much of the MMP coast are extensively used throughout the year making the shoreline boundary of the park a very significant community resource.

Ecological values are the intrinsic physical, chemical, geological and biological characteristics of an area. The key ecological values are identified according to their biodiversity significance and their importance in maintaining the structure and function of the ecosystem. The identified ecological values include:

- Species and communities that have special conservation status (e.g. Australian Sea lions);
- key species endemic to the Reserves (if known);
- key structural components of the ecosystem (e.g. seagrass, macro-algae and benthic communities);
- exploited species and communities (e.g. targeted fish 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 uses of the area. Social values may be either 'passive' (e.g. wilderness or seascape values) or 'active' (e.g. fishing, tourism) uses. 'Passive' social values are treated, for conservation planning purposes, as quasi-ecological values because these 'uses' do not impact on the natural environment in the same way as the

‘active’ social values do. By contrast the ‘active’ social values are those activities that have potential to impact on the ecological values.

### ***Managing the Values***

The role of the Western Australian Government is to manage the Marmion Marine Park in accordance with the CALM Act. Specifically, management plans must be prepared and implemented for the marine park.

## **6.2 REGULATORY AND POLICY CONTEXT**

### ***State Legislation***

- *Conservation and Land Management Act 1984* – provides the mechanisms by which marine parks and reserves are established, vested and managed; establishes MPRA and functions.
- *Wildlife Conservation Act 1950* - provides legislative protection for flora and fauna across the State’s lands and waters.
- *Conservation and Land Management Regulations 2002* - provide a mechanism to manage human impacts in marine parks and reserves, through enforcement and licensing.
- *Wildlife Conservation Regulations 1970* - regulate interaction with fauna and flora through a licensing system.
- *Fish Resources Management Act 1994* - management and regulation of recreational and commercial fishing and aquaculture in marine parks and reserves by the Department of Fisheries.
- *Fishing and Related Industries Compensation (Marine Reserves) Act 1997* provides the mechanism by which the holder of an existing authorisation for commercial fishing, aquaculture and/or fish processing may seek compensation if the commercial value of the authorisation is apparently diminished.
- *Western Australian Marine Act 1982* and *Navigable Waters Regulations 1958* regulate boating in all State waters.
- *Shipping and Pilotage Act 1967* and *Shipping and Pilotage (Mooring Control Areas) Regulations 1983* – allow for the establishment of mooring control areas.
- *Environmental Protection Act 1986* – assessment of any development that may have a significant effect on the environment in or adjacent to a marine park or reserve by the Environmental Protection Authority.

Other relevant State legislation includes;

- *Aboriginal Heritage Act 1972*;
- *Acts Amendment (Marine Reserves) Act 1997*;
- *Heritage of Western Australia Act 1990*;
- *Land Administration Act 1997*;
- *Maritime Archaeology Act 1973*;
- *Marine and Harbours Act 1981*;

- *Pearling Act 1990; and the*
- *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998*

### **State Policy**

- *New Horizons: the way ahead in marine conservation and management 1998* - provides guidance for the establishment and management of marine parks and reserves to protect representative and special marine ecosystems; commitment to a high level of public participation.
- *State Water Quality Management Strategy 2004 and Environmental Quality Management Framework* - provide a framework for water and sediment quality management to maintain high levels of water, sediment and biota quality by managing and controlling the impacts of waste discharges to the marine environment.
- *Strategy for Management of Sewage Discharge from Vessels into the Marine Environment 2004* – applies three zones to State waters for discharge of sewage.

### **Commonwealth Legislation**

- *Environment Protection and Biodiversity Conservation Act 1999* - 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. This Act also provides for delivery of planning and management requirements for World Heritage Properties in accordance with the Australian World Heritage Management Principles.
- *Native Title Act 1993* – defines onshore and offshore places; defines creation of a marine park or reserves as a future act, requiring that certain criteria be met to ensure protection and continuation of native title rights and interests.

### **Commonwealth Policy**

- *Intergovernmental Agreement on the Environment* - conservation of marine biodiversity, maintenance of ecological processes, and the sustainable use of marine resources through national strategies including *National Strategy for Ecologically Sustainable Development* (1992), the *National Strategy for the Conservation of Australia's Biological Diversity* (1996), *Australia's Oceans Policy* (1998), and the *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A Guide for Action by Australian Governments* (1999).
- *Representative System of Marine Protected Areas* – being developed cooperatively by government agencies responsible for conservation, protection and management of the marine environment with the primary goal being to establish and manage a comprehensive, adequate and representative (CAR) 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.

### **International Conventions and Agreements**

- *Convention on Biological Diversity 1994* - the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.
- *Convention on Migratory Species 1979* – intergovernmental agreement that aims to conserve terrestrial, marine and avian migratory species throughout their range.
- *Japan-Australia Migratory Bird Agreement 1974, China-Australia Migratory Bird Agreement 1986 and Republic of Korea-Australia Migratory Bird Agreement 2002* - agreements on migratory bird conservation and a basis for collaboration on the protection of migratory shorebirds and their habitat.

## **7. MATTERS RAISED BY STAKEHOLDERS**

The staff and stakeholders consulted (Appendix 2) raised a number of matters with the audit team. These matters are listed in Appendix 3, in no specific order of priority.

The dominant issues raised were matters relating to the gross inadequacy of the present zoning scheme, the out-dated nature of the present management plan that is not in an outcome based format and contains many strategies that are no longer relevant, the potential impacts of the recreational abalone fishery on intertidal reef platforms, the potential impacts of the Beenyup Wastewater Outfall on the ecological integrity of the park, the impacts of increased disturbance on Australian Sea Lions and the need to manage this issue carefully as well as to better understand the basic ecological requirements of this species, and the need for better coordination between DEC and local councils to facilitate integrated management of the coastal strip.

## **8. FINDINGS OF THE AUDIT**

### **8.1 MANAGEMENT SYSTEMS**

The management systems for Marmion Marine Park have been continuously refined by DEC and DoF to meet the everyday challenges. While there are broad strategies for management, and a considerable set of objectives are provided in the Management Plan, these have been continuously updated to reflect both current expectations of management and the current management contexts set by available management resources and developing pressures on the assets and biodiversity of Marmion Marine Park. This audit is therefore focused on an assessment of the present-day issues and management responses, as well as an assessment of the implementation of the existing Marmion Marine Park Management Plan.

It is clear from the annual performance reports (DEC submission) that there have been a number of important developments and achievements, and there are important initiatives that are in progress. The assessment here of the implemented management systems integrates the history of achievements with an assessment of the present-day situation.

#### ***Management and Administration Framework***

At the time of this audit, there is no timetable or structure for the preparation of a new management plan for Marmion Marine Park. This will be a critical step for achieving optimal management effectiveness and efficiency and the maintenance of Marmion Marine Park's values. As a result, DEC has been managing the area consistent with the relevant standards and management targets of the nearby Shoalwater Islands Marine Park.

### ***Funding, Staff and Expenditure***

Table 4 provides a park level summary on total expenditure (actual and budgeted), expenditure by management program and staffing levels (i.e. full-time-equivalents (F.T.E)) for the statutory life of the current management plan for the Swan Coastal District of DEC. It should be noted that since the 2007/08 financial year DEC has combined expenditure records for all Metropolitan Marine Reserves. Therefore from 2007/08 onwards the records below represent combined data from the Swan Estuary Marine Park, the Shoalwater Islands Marine Park, the Carnac Islands Nature Reserve as well as the Marmion Marine Park. DEC has advised that expenditure for Marmion Marine Park has not increased much beyond what was the average recorded for the five previous years (\$225,000).

**Table 4: Resource input for implementation of the Marmion Marine Park Management Plan 1992-2002 across each management program and year [Region/district resource allocation only]**

<b>MANAGEMENT PROGRAM</b>		<b>2009/10</b>	<b>2008/09</b>	<b>2007/08</b>	<b>2006/07</b>	<b>2005/06</b>	<b>2004/05</b>	<b>2003/04</b>	<b>2002/03</b>	<b>1992</b>
<b>Management Framework</b>	Allocation	348,260	350,625	182,212		100,456	91,837	88,440	117,000	145,200
	Expenditure	414,700	424,827	343,933	128,727	173,179	124,703	86,444	96,732	
	Variance	+66,440	+74,202	+161,721		+72,723	+32,866	-1,956	-20,261	
<b>Visitor services and user infrastructure</b>	Allocation	100,923	111,594	46,993		17,502	5,398	5,398	3,000	10,000
	Expenditure	148,885	165,584	116,496	8,674	20,616	38,516	17,001	5,206	
	Variance	+47,962	+53,989	+69,503		+3,114	+33,118	+11,603	+2,206	
<b>Education and interpretation</b>	Allocation	135,249	129,923	151,728		25,149	28,619	28,619	33,500	30,000
	Expenditure	58,289	80,179	56,122	16,077	54,394	72,019	28,619	34,534	
	Variance	-76,960	-49,742	-95,606		+29,245	+43,400	0	+1,034	
<b>Community participation</b>	Allocation	17,157	4,018	28,915		11,732	7,578	7,578	5,000	10,000
	Expenditure	32,445	3,620	11,352	608	8,234	5,825	851	2,147	
	Variance	+15,288	-398	-17,563		-3,498	-1,753	-6,727	-2,853	
<b>Patrol and enforcement</b>	Allocation	108,635	100,664	60,215		32,336	30,925	30,925	45,000	35,000
	Expenditure	48,451	46,815	62,975	29,187	0	28,617	40,309	44,194	
	Variance	-60,184	-53,848	+27,600		-32,336	-2,308	+9,384	-806	
<b>Research</b>	Allocation	19,953	21,857	28,302		3,502	0	0	0	10,000
	Expenditure	15,024	8,245	6,000	0	0	400	0	0	0
	Variance	-4,929	-13,612	-22,302		-3,502	+400	0	0	0
<b>Monitoring</b>	Allocation	50,185	51,893	78,732		26,227	8,476	8,476	12,000	15,000
	Expenditure	54,326	45,697	48,734	3,815	14,558	8,882	4,446	9,803	
	Variance	+4,051	-61,95	-29,998		-11,669	+406	-4,030	-2,197	
<b>TOTAL FTE's</b>		<b>7</b>	<b>7</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	
<b>TOTAL ALLOCATION</b>		<b>782,073</b>	<b>770,557</b>	<b>577,097</b>		<b>216,905</b>	<b>172,833</b>	<b>169,436</b>	<b>215,500</b>	
<b>TOTAL EXPENDITURE</b>		<b>772,120</b>	<b>774,971</b>	<b>641,185</b>	<b>187,088</b>	<b>270,981</b>	<b>278,962</b>	<b>196,060</b>	<b>192,623</b>	<b>255,200</b>
<b>TOTAL VARIANCE</b>		<b>-9,953</b>	<b>+4,394</b>	<b>-68,515</b>		<b>+54,076</b>	<b>+106,129</b>	<b>+26,624</b>	<b>-22,877</b>	

**Notes:**

- The total expenditure for 1992 was a summary drawn from historical records without any detail. The records the information was drawn from have now been destroyed and could not be consulted for further details
- The records for financial expenditure prior to 2002 are not available due to these records being destroyed and no digital records being available.
- In 2007/08 reporting for all three metropolitan marine parks (Marmion, Shoalwater Island and Swan Estuary) were combined. The totals viewed in 2007/08, 2008/09 and 2009/10 are totals of all three marine parks combined. It can be asserted that the expenditure for Marmion Marine Park has not increased much beyond what was the average recorded for the five previous years (\$225,000) due to the fact that the majority of the increase in expenditure was directed to Shoalwater Islands Marine Park due to this park being gazetted in 2007 and a presence being established in the southern metropolitan region.

## **8.2 MANAGEMENT PERFORMANCE**

The audit assesses the outcomes of management of the MMP by auditing the levels of achievement against the performance indicators, taking account of the management systems and strategies as they have been implemented and available resources. The audit assessment is summarised in the following section.

**TABLE 5. Summary of Current Status of Report Card Ratings of KPI values (2009/10).**

KEY VALUE	CONDITION	PRESSURE	RESPONSE	ASSESSMENT CONFIDENCE - CONDITION	ASSESSMENT CONFIDENCE - PRESSURE	PRESSURE
ECOSYSTEM STRUCTURE/ PHYSICAL-CHEMICAL COMPONENTS						
Water Quality – MMP	SATISFACTORY	HIGH	SATISFACTORY	MEDIUM	MEDIUM	INCREASING TREND
Sediment Quality – MMP	SATISFACTORY	MODERATE	SATISFACTORY	MEDIUM	LOW	INCREASING TREND
Seagrass Meadows – MMP	SATISFACTORY	MODERATE	SATISFACTORY	MEDIUM	MEDIUM	INCREASING TREND
Intertidal reef platform communities – MMP & SIMP	SATISFACTORY	HIGH	SATISFACTORY	LOW	LOW	INCREASING TREND
Subtidal reef communities – MMP	GOOD	MODERATE	GOOD	MEDIUM	LOW	INCREASING TREND
Targeted invertebrates – MMP	SATISFACTORY	MODERATE	SATISFACTORY	MEDIUM	MEDIUM	INCREASING TREND
Non-targeted finfish – MMP	GOOD	MODERATE	SATISFACTORY	LOW	MEDIUM	INCREASING TREND
EXPLOITED/ THREATENED MARINE FAUNA						
Australian sea-lion – MMP, SIMP & SEMP	GOOD	MODERATE	GOOD	HIGH	MEDIUM	INCREASING TREND
Targeted finfish – MMP	UNSATISFACTORY	HIGH	SATISFACTORY	MEDIUM	MEDIUM	INCREASING TREND

### LEGEND

CONDITION <sup>1</sup>	PRESSURES	RESPONSE	ASSESSMENT CONFIDENCE <sup>2</sup>	MANAGEMENT EFFECTIVENESS <sup>3</sup>	PRESSURE <sup>4</sup>
EXCELLENT	LOW	GOOD	HIGH	HIGH	DECREASING TREND
GOOD	MODERATE	SATISFACTORY	MEDIUM	MEDIUM	CONSTANT
SATISFACTORY	HIGH	UNSATISFACTORY	LOW	LOW	INCREASING TREND
UNSATISFACTORY					
POOR					

<sup>1</sup> Quantitative data is required to assign either the EXCELLENT or POOR rating, while quantitative data &/or qualitative information can be used to assign GOOD, SATISFACTORY or UNSATISFACTORY ratings.

- **EXCELLENT** – Management targets met. Data indicates strong trend in desired direction
- **GOOD** – Management targets met. Moderately strong trend in desired direction &/or low levels of historical pressures are likely to give a low impact on the condition.
- **SATISFACTORY** – Management targets met. Weak trend in desired direction and/or only moderate levels of historic pressures are likely to have had only moderate impacts on the condition
- **UNSATISFACTORY** – Management targets not met. Weak to moderate trend in non-desired direction and/or other information indicate historical pressures are likely to have had a major negative impact on the condition.
- **POOR** – Management targets not met. Data indicates a strong trend in non-desired direction

<sup>2</sup> Level of certainty in the assessment process

<sup>3</sup> The level of effectiveness of the management response in regards to managing pressure/s and improving condition status

<sup>4</sup> The anticipated pressure in the next three years

**TABLE 6: Assessment of Current Status of KPI Values (2009/10)**

Value	Long-term Management Target	Condition Pressure Response Summary
Water Quality	Maintain water quality at the current high <sup>c</sup> level, except for designated area where a different level of acceptable change is approved by the appropriate Government regulatory authority.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. Park water quality is assessed as SATISFACTORY as (i) Park waters are generally well flushed by oceanographic processes; &amp; (ii) only localised impacts in the vicinity of municipal drains &amp; Hillarys Boat Harbour &amp; (iii) there have been no known toxicant spills in or adjoining the marine park.</li> <li>2. The water quality within the “footprint” of the DoW outfall is of a low quality.</li> </ol> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. Current pressures are assessed as HIGH as there are potential sources of nutrients/toxicants/pathogens from (i) regulated discharge from the Ocean Reef outfall; (ii) unregulated discharge from municipal stormwater drains; (iii) continued use of septic systems in coastal areas; (iv) coastal development; &amp; (v) increased levels of coastal &amp; water based activities (e.g. vessels).</li> <li>2. Pressure is assessed as INCREASING as urban and industrial development increases increasing potential sources of litter &amp; other inputs.</li> </ol> <p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as SATISFACTORY as DEC (i) continued to participate in the development of a MoU for the better management of the Ocean Reef outfall in the context of Park management; &amp; (ii) managed monitoring programs of large scale developments to ensure minimal impact on the Parks.</li> </ol>

<b>Sediment Quality</b>	Maintain sediment quality at the current high <sup>c</sup> level, except for designated area where a different level of acceptable change is approved by the appropriate Government regulatory authority.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. Park sediment quality is assessed as SATISFACTORY as (i) Park waters are generally well flushed by oceanographic processes; (ii) there were no reported breaches in EPA sediment quality targets for the Ocean Reef outfall “footprint”; &amp; (iii) only localised impacts in the vicinity of municipal drains &amp; Hillarys Boat Harbour.</li> </ol> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. Current pressures are assessed as MODERATE as (i) continued regulated discharge from the Ocean Reef outfall; (ii) there is continued unregulated discharge from municipal drains; (iii) continued use of septic systems in adjoining urban areas; &amp; (iv) continued urban development along the coast increases potential sources of litter &amp; other inputs..</li> <li>2. Pressure is assessed as INCREASING as urban development increases increasing potential sources of toxicants.</li> </ol> <p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as SATISFACTORY as DEC continued to participate in the development of a MoU for the better management of the Ocean Reef outfall in the context of Park management.</li> </ol>
<b>Seagrass Communities</b>	No loss of seagrass species diversity or perennial seagrass biomass <sup>b</sup> as a result of human activity in the marine park.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. Seagrass meadow condition in MMP is assessed as SATISFACTORY as (i) there are no current major pressures; (ii) minor pressures (due to moorings, anchors &amp; water degradation) are localised.</li> <li>2. The assessment is made in the absence of a long term data set. A number of research projects &amp; long-term monitoring sites have been established to provide data in subsequent years to validate this assessment.</li> </ol> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. Current pressure in MMP is assessed as MODERATE as (i) there are no current major pressures; (ii) localised minor pressures due to water degradation; (iii) localised minor pressures due to vessel anchors.</li> <li>2. Pressure is assessed as INCREASING as (i) localised water degradation likely to increase; &amp; (ii) increased vessel &amp;</li> </ol>

		<p>urban/industrial development.</p> <p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as SATISFACTORY as (i) no major pressures are identified; (ii) research &amp; monitoring are being undertaken to quantify anthropogenic impacts on seagrass meadows; (iii) provides input in to the EIA process for coastal developments; &amp; (iv) long term monitoring sites have been established by DEC.</li> </ol>
<b>Intertidal Reef Communities</b>	No loss of intertidal reef species diversity or community biomass <sup>b</sup> as a result of human activity in the marine park.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. On the basis of current knowledge the diversity and abundance of species making up intertidal reef platform communities is assessed as SATISFACTORY but there are significant management concerns and our knowledge base is poor.</li> </ol> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. Current pressure is assessed as HIGH as continued (i) high levels of access to intertidal areas; (ii) high extraction &amp; fishing effort of target species (e.g. abalone); (iii) unregulated discharges from municipal stormwater drains, &amp; (iv) no historical change in diversity of species recorded over time.</li> <li>2. Pressure is assessed as INCREASING as there are continued (i) increases in people accessing intertidal reef platforms; &amp; (ii) increases in fishing effort &amp; extraction.</li> </ol> <p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as SATISFACTORY as (i) quantitative data shows that there has been no historical change in diversity of species over time; &amp; (ii) studies undertaken indicate that current management techniques are effective.</li> </ol>
<b>Subtidal Reef (Macroalgal ) Communities</b>	No loss of subtidal macroalgal species diversity or community biomass <sup>b</sup> as a result of human activity in the marine park.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. Subtidal macroalgal community condition is assessed as GOOD as (i) there are no current major pressures.</li> </ol> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. Current pressure is assessed as MODERATE as (i) there is no current major pressures; (ii) localised minor pressures due to water degradation; &amp; (iii) localised minor pressures due to vessel anchors.</li> </ol>

		<p>2. Pressure is assessed as INCREASING as (i) localised water degradation likely to increase; &amp; (ii) vessel usage likely to increase.</p> <p><b>Response</b></p> <p>1. The management response is assessed as GOOD on the basis of current understanding of condition and pressures as (i) no major pressures identified; &amp; (ii) research &amp; monitoring is being undertaken to collect data on human impacts on &amp; natural variation of subtidal macroalgal communities.</p>
<b>Targeted Invertebrates</b>	Abundance and size composition of invertebrate species in sanctuary zones to be at natural <sup>a</sup> levels. Management targets for targeted invertebrate species in other zones to be determined in consultation with DoF and stakeholders.	<p><b>Condition</b></p> <p>1. The status of target invertebrate stocks (rock lobster &amp; abalone) is assessed as SATISFACTORY but requires quantitative validation. The recreational &amp; commercial fishery of the two species are regulated by DoF using licences &amp; size limits, bag limits, gear limits &amp; fishing seasons.</p> <p><b>Pressure</b></p> <p>1. Current pressure is assessed as MEDIUM as there is intensive fishing for rock lobster &amp; abalone during their regulated fishing seasons.</p> <p>2. Pressure is assessed as INCREASING as commercial &amp; recreational fishing are likely to continue to increase.</p> <p><b>Response</b></p> <p>1. The management response is assessed as SATISFACTORY as DEC &amp; DoF conduct (i) regular patrols (enforcement &amp; education) during the rock lobster and abalone fishing seasons; &amp; (ii) conduct baseline research to characterise invertebrate diversity &amp; abundance.</p>
<b>Non-target Finfish</b>	No loss of finfish diversity or non-targeted finfish species biomass as a result of human activity in the marine park. Abundance and size composition of finfish species in sanctuary zones and special purpose zones and non-targeted finfish species in other zones to be at natural <sup>a</sup> levels.	<p><b>Condition</b></p> <p>1. Non-target finfish stocks are assessed, as GOOD as current &amp; historic pressures (take due to by-catch) is likely to be low.</p> <p><b>Pressure</b></p> <p>1. The current pressure on non targeted fishes is assessed as MODERATE as no current major pressures identified and minor pressures are considered low.</p> <p>2. The pressure on non targeted fishes is assessed as INCREASING as fishing effort continues to increase.</p>

		<p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as SATISFACTORY as DEC &amp; DoF conduct (i) regular patrols (enforcement &amp; education); &amp; (ii) conduct baseline research to characterise invertebrate diversity &amp; abundance.</li> </ol>
<b>Target Finfish</b>	No loss of finfish diversity or non-targeted finfish species biomass as a result of human activity in the marine park. Abundance and size composition of finfish species in sanctuary zones and special purpose zones and non-targeted finfish species in other zones to be at natural <sup>a</sup> levels.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. Category 1 fish stocks are assessed with a precautionary rating of UNSATISFACTORY on the basis that human usage data indicates that fishing for Category 1 is highest in the waters west of the Park. This may be an indication that the abundance/size of Category 1 fish in the Park is low and that there has been historic overfishing in the Park.</li> <li>2. Category 2 &amp; 3 fish are assessed as SATISFACTORY.</li> <li>3. Status to be confirmed with DoF.</li> </ol> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. The current pressure is assessed as HIGH as (i) target finfish are considered to be fully or over exploited; (ii) Fishers targeting category 1 fish travel offshore outside of the Park; &amp; (iii) it appears that fishing effort for category 2 &amp; 3 fish is high.</li> <li>2. The pressure is assessed as MINOR INCREASE as (i) fishing effort for category 1 fish in the Park is not increasing (low stocks in the Park); (ii) redirected fishing effort outside the Park; &amp; (iii) increasing trends in fishing effort for category 2 &amp; 3 fish in the Park.</li> </ol> <p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as SATISFACTORY as DEC &amp; DoF conduct (i) regular patrols (enforcement &amp; education); &amp; (ii) conduct baseline research to characterise invertebrate diversity &amp; abundance.</li> </ol>
<b>Australian Sea-Lion</b>	No loss in abundance <sup>b</sup> of Australian sea lions as a result of human activity in the marine park.	<p><b>Condition</b></p> <ol style="list-style-type: none"> <li>1. The condition of Australian sea-lions in the Park is assessed as GOOD as (i) average number of sea lions observed at haul-out sites (such as Little Island, Burns Rocks, Carnac and Seal Island) was more or less steady compared to previous years (despite natural potential for large annual variations); &amp; (ii)</li> </ol>

		<p>animals appear healthy</p> <p><b>Pressure</b></p> <ol style="list-style-type: none"> <li>1. The current pressure is assessed as MODERATE as (i) continued visitation to areas used by Australian sea-lions; &amp; (ii) continued interaction with Australian sea-lions.</li> <li>2. The pressure is assessed as INCREASING as trends in visitation &amp; interaction are expected to continue to increase.</li> </ol> <p><b>Response</b></p> <ol style="list-style-type: none"> <li>1. The management response is assessed as GOOD as considerable DEC resources are spent on pro-active &amp; re-active Australian sea-lion management.</li> </ol>
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TABLE 7. Summary of 10 Year Assessment of KPI values

LEGEND

CONDITION	PRESSURES	RESPONSE	ASSESSMENT CONFIDENCE <sup>1</sup>	MANAGEMENT EFFECTIVENESS <sup>2</sup>	PRESSURE <sup>3</sup>
EXCELLENT	LOW	GOOD	HIGH	HIGH	DECREASING TREND
GOOD	MODERATE	SATISFACTORY	MEDIUM	MEDIUM	CONSTANT
SATISFACTORY	HIGH	UNSATISFACTORY	LOW	LOW	INCREASING TREND
UNSATISFACTORY					
POOR					

Quantitative data is required to assign either the EXCELLENT or POOR rating, while quantitative data &/or qualitative information can be used to assign GOOD, SATISFACTORY or UNSATISFACTORY ratings.

**EXCELLENT** – Management targets met. Data indicates strong trend in desired direction.

**GOOD** – Management targets met. Moderately strong trend in desired direction &/or low levels of historical pressures are likely to have given a low impact on the condition.

**SATISFACTORY** - Management targets met. Weak trend in desired direction and/or only moderate levels of historic pressures are likely to have had only moderate impacts on the condition.

**UNSATISFACTORY** - Management targets not met. Weak to moderate trend in non-desired direction and/or other information indicate historical pressures are likely to have had a major negative impact on the condition.

**POOR** - Management targets not met. Data indicates a strong trend in non-desired direction.

<sup>1</sup> Level of certainty in the assessment process

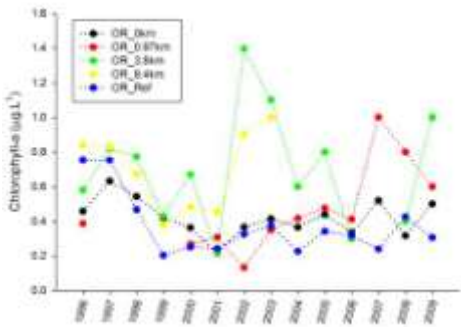
<sup>2</sup> The level of effectiveness of the management response in regards to managing pressure/s and improving condition status

<sup>3</sup> The anticipated pressure in the next three years

**NOTE:** No information available for Condition Reporting prior to 2002

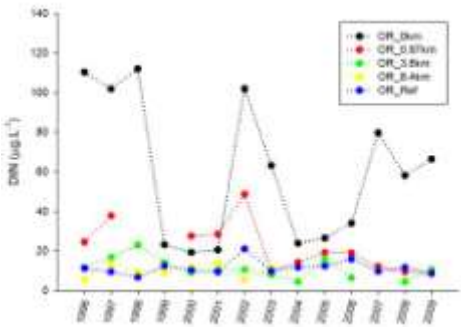
Ecological value	Management objective	Management Targets	Performance measures													
Water Quality		Maintain water quality at the current level or better.		CONDITION REPORTING (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
					PRESSURE	NOT ASSESSED	NOT ASSESSED	MODERATE	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
				10-year Predicted Pressure Trend		NOT ASSESSED	NOT ASSESSED	MODERATE INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND

Chlorophyll a conc. in seawater: Ocean Reef outfall



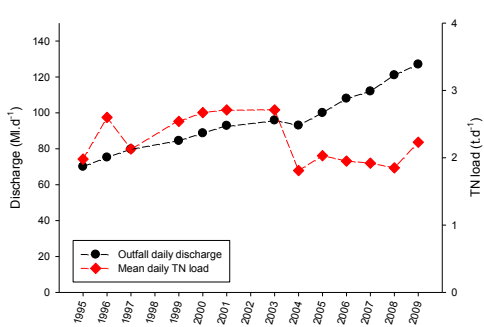
CONDITION  
(Department of Water/Oceanica data)

Total inorganic Nitrogen conc.:Ocean Reef outfall



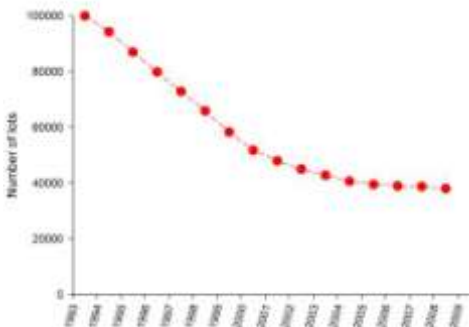
CONDITION  
(Department of Water/Oceanica Data)

Nutrient/toxicant/pathogen loading from Ocean Reef outfall



PRESSURE  
(Department of Water/Oceanica data)

Houses with septic tanks in Metropolitan Perth

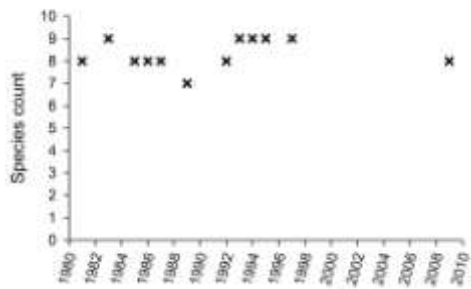


PRESSURE

Ecological value	Management objective	Manageme nt Targets	Performance measures													
Sediment Quality		Maintain sediment quality at the current level or better.	Nutrients, toxicants, pathogens and litter	CONDITION REPORTING  (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	PROVISIONAL SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
					PRESSURE	NOT ASSESSED	NOT ASSESSED	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
				10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	MINOR INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND

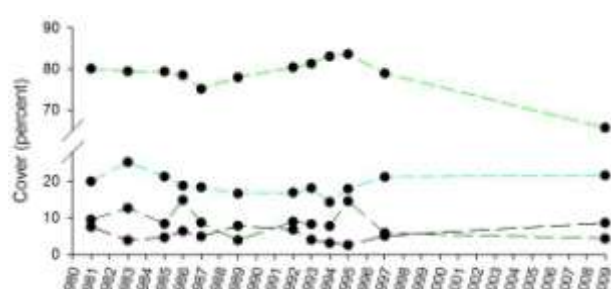
Ecological value	Management objective	Management Targets	Performance measures													
Seagrass Meadows		No loss of seagrass species diversity or perennial biomass as a result of human activities in the marine park	Diversity and Biomass	CONDITION REPORTING  (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	PROVISIONAL SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
					PRESSURE	NOT ASSESSED	NOT ASSESSED	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	MODERATE INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	

Seagrass Diversity: Marmion A transect



(Kirkman 81-97, Kirkman and Friedman, 2009)

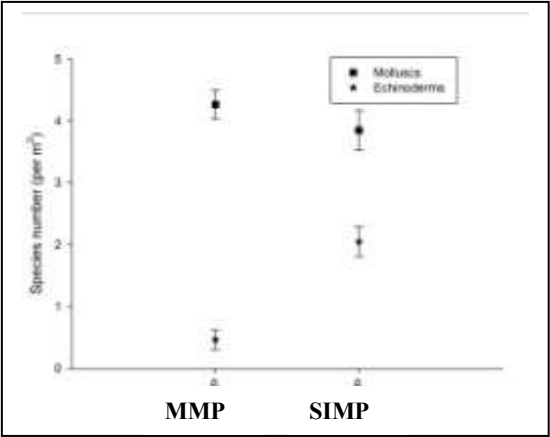
Seagrass areal extent: Marmion A Transect



Light Green: All *Posidonia*, Blue: All *Amphibolis*, Dark Green: Other seagrass, Black: Bare ground and rock.

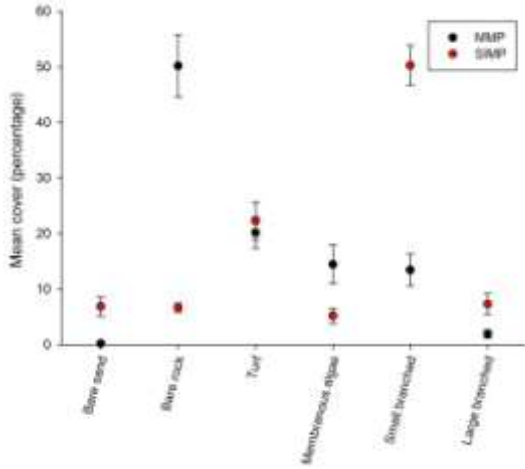
Ecological value	Management objective	Manageme nt Targets	Performance measures													
Intertidal Reef Platforms		No loss of intertidal reef species diversity or community biomass as a result of human activities in the marine park	Diversity and Biomass	CONDITION REPORTING (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	PROVISIONAL SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
					PRESSURE	NOT ASSESSED	NOT ASSESSED	MODERATE	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	LOW	LOW	LOW	LOW	LOW
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
				10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	MODERATE INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND

Diversity: DEC reef platforms study 2009/2010



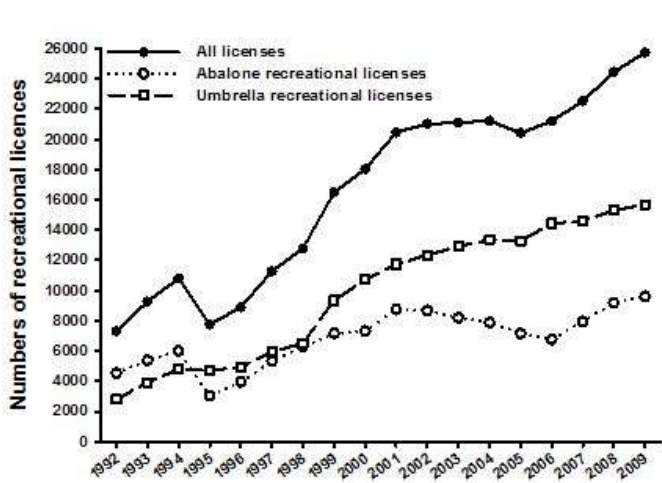
CONDITION

Percent cover: DEC reef platforms study 2009/2010



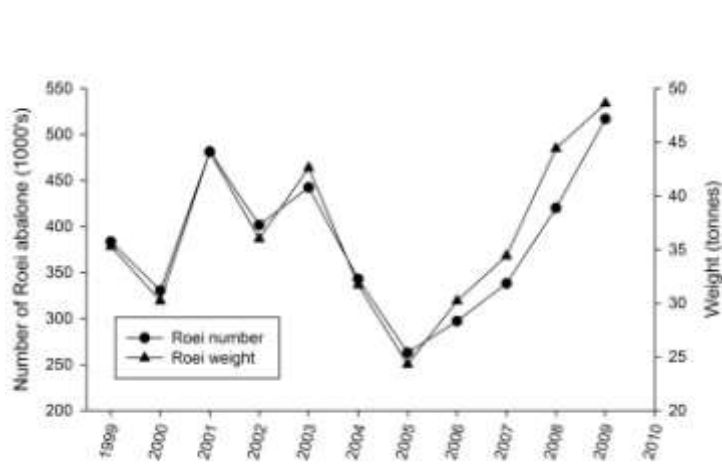
CONDITION

Commercial & recreational Roes abalone fishing effort



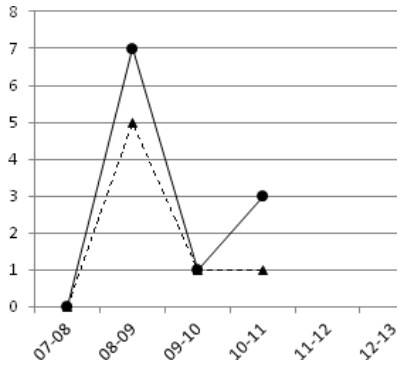
PRESSURE

Annual recreational catch of abalone (number/weight)



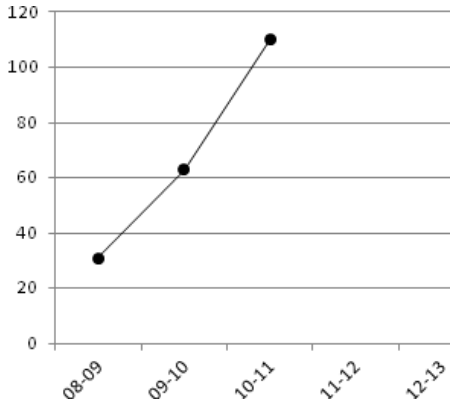
PRESSURE

Number of Abalone infringements/cautions for MMP and SIMP



RESPONSE

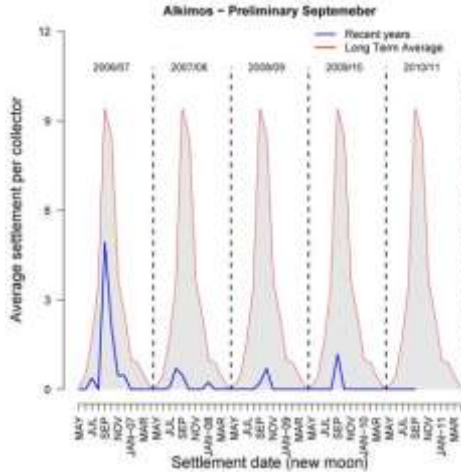
Number of Abalone contacts for MMP and SIMP



Ecological value	Managem ent objective	Managem ent Targets	Performance measures													
Subtidal Reef (Macroalgal) Communities		No loss of Macroalgal species diversity or community biomass as a result of human activities in the marine park	Diversity and Biomass	CONDITION REPORTING  (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
					PRESSURE	NOT ASSESSED	NOT ASSESSED	MODERATE	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
				10-year Predicted Pressure Trend			NOT ASSESSED	NOT ASSESSED	MODERATE INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND

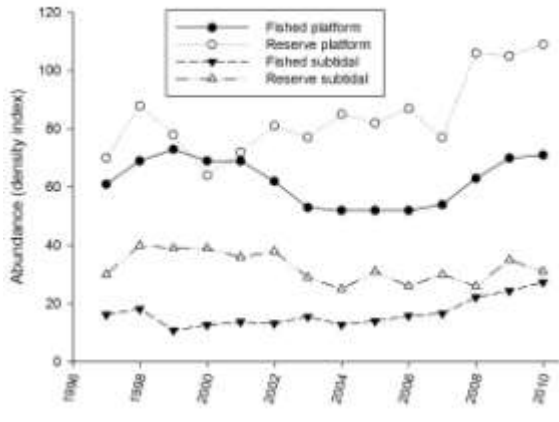
Ecological value	Management objective	Management Targets	Performance measures													
Targeted Invertebrates		No loss of invertebrate diversity or species biomass as a result of human activities in the marine park.	Diversity and Biomass	CONDITION REPORTING  (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
					PRESSURE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
				10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND

Abundance of rock lobster index: predictive indicator based on juvenile settlement rates



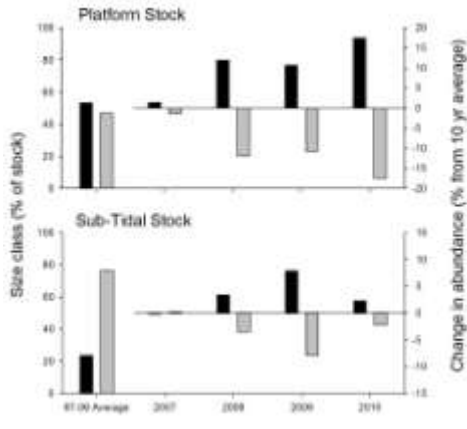
CONDITION

Abundance of Roe's Abalone



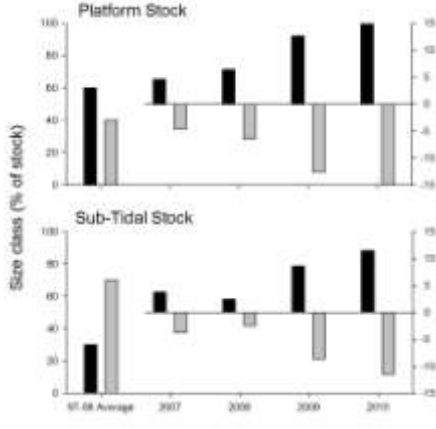
CONDITION

Change in abalone (<60mm and 60+mm shell size classes) in protected areas in Marmion



CONDITION

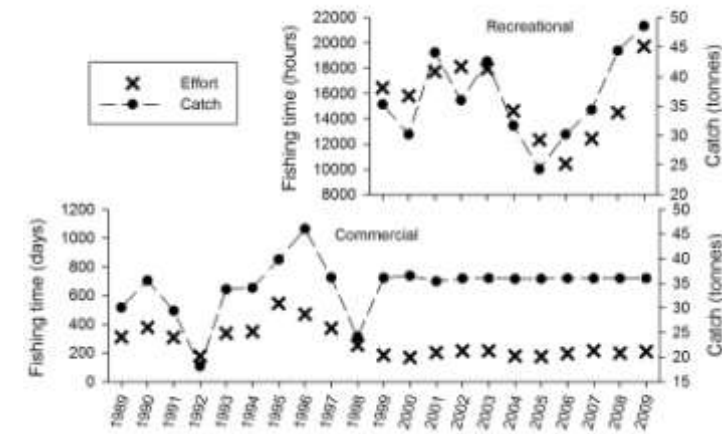
Change in abalone (<60mm and 60+mm shell size classes) in fished areas in Marmion



CONDITION

Annual commercial and recreational catch and effort for Roes abalone in the Metro area

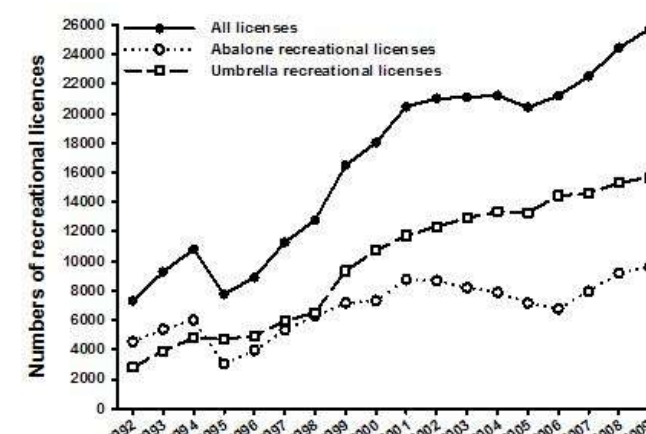
Annual commercial and recreational catch and effort for Roes abalone in the Metro area



PRESSURE

Recreational fishing licences in WA

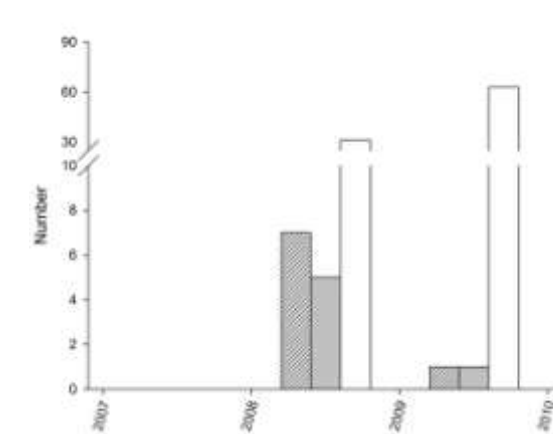
Recreational fishing licences in WA



PRESSURE

Patrol data related to invertebrates and reef platform issues: abalone related

Patrol data related to invertebrates and reef platform issues: abalone related



RESPONSE

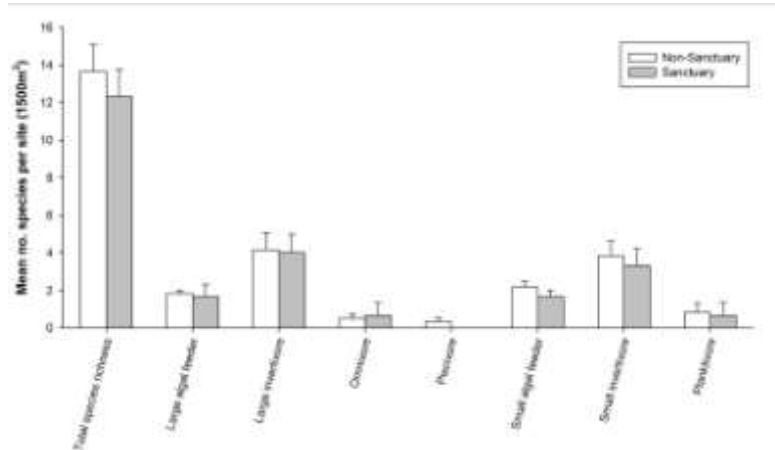
Ecological value	Management objective	Management Targets	Performance measures													
Non-targeted finfish		No loss of finfish diversity or species biomass as a result of human activities in the marine park.	Diversity and Biomass	CONDITION REPORTING  (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
					PRESSURE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	

Ecological value	Management objective	Manageme nt Targets	Performance measures													
Targeted finfish		No loss of finfish diversity or species biomass as a result of human activities in the marine park.	Diversity and Biomass	CONDITION REPORTING  (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY	UNSATISFACTORY
					PRESSURE	NOT ASSESSED	NOT ASSESSED	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	UNSATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY	SATISFACTORY
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	LOW	NOT ASSESSED	LOW	LOW	LOW	LOW	LOW	LOW
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	MODERATE INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	

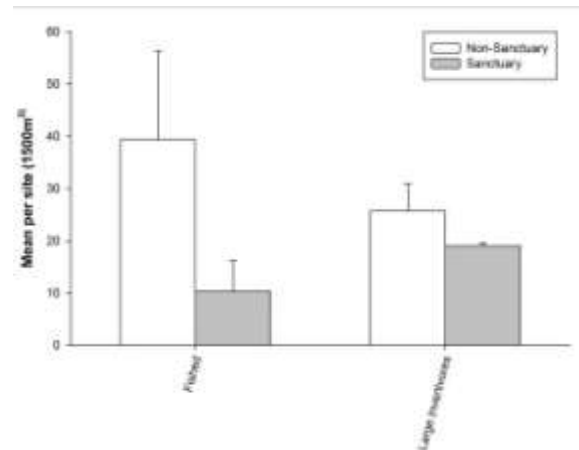
Diversity of finfish: Marmion fish diversity

Abundance index targeted fish 'group': Marmion

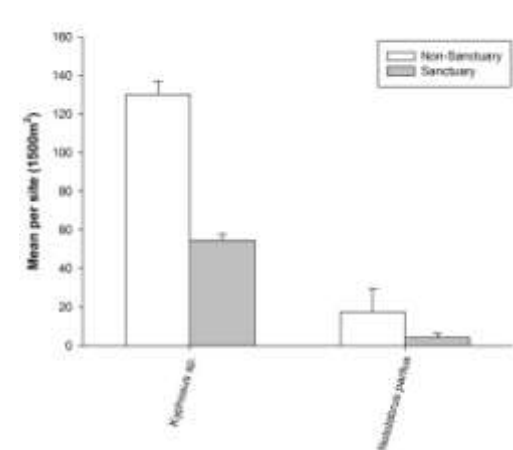
Abundance index non-targeted fish 'group': Marmion



CONDITION

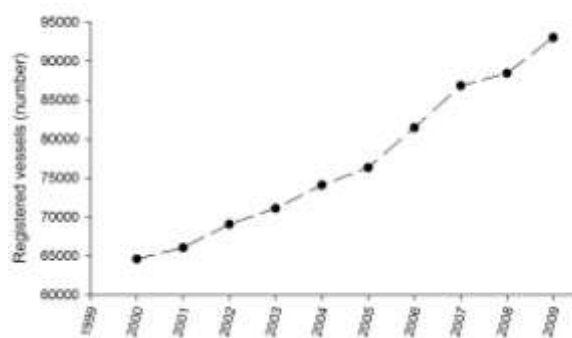


CONDITION



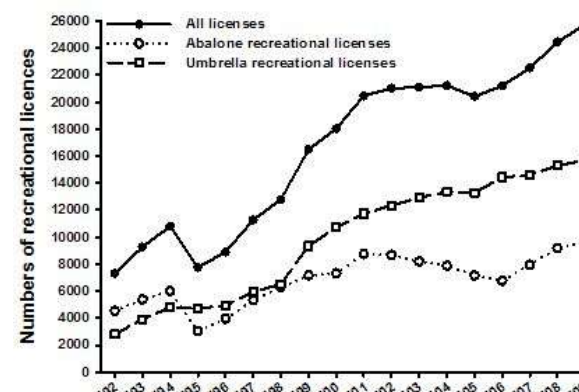
CONDITION

Boat index: vessel registration in Western Australia



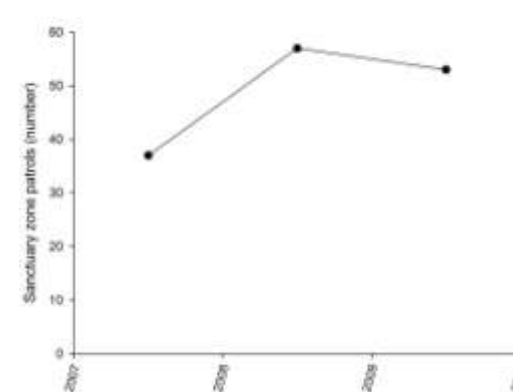
PRESSURE

Commercial & recreational fishing effort



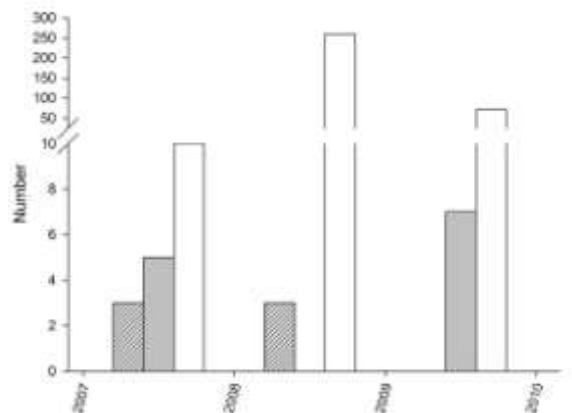
PRESSURE

Patrols of sanctuary zones



RESPONSE

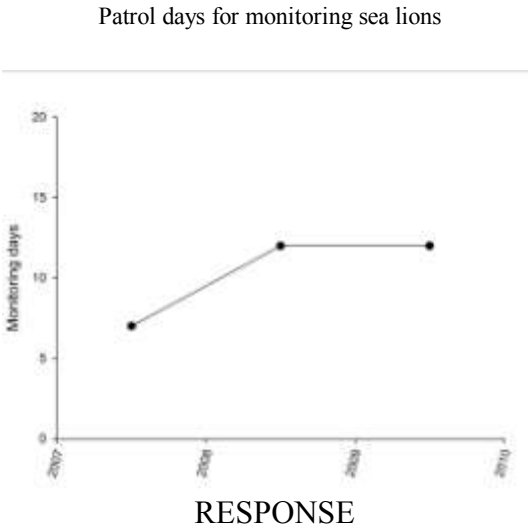
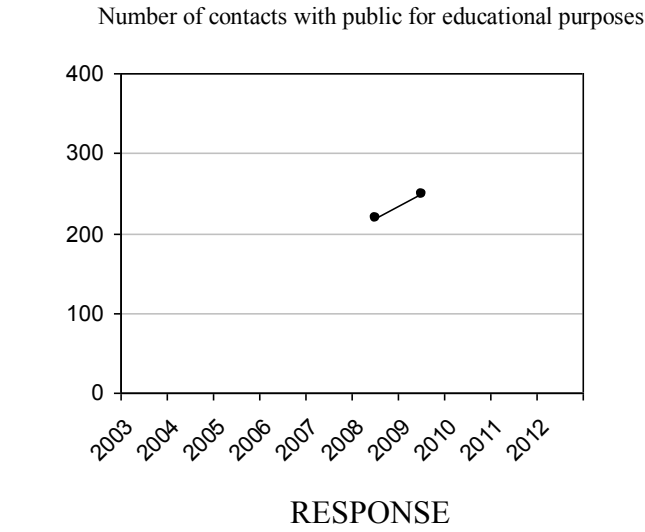
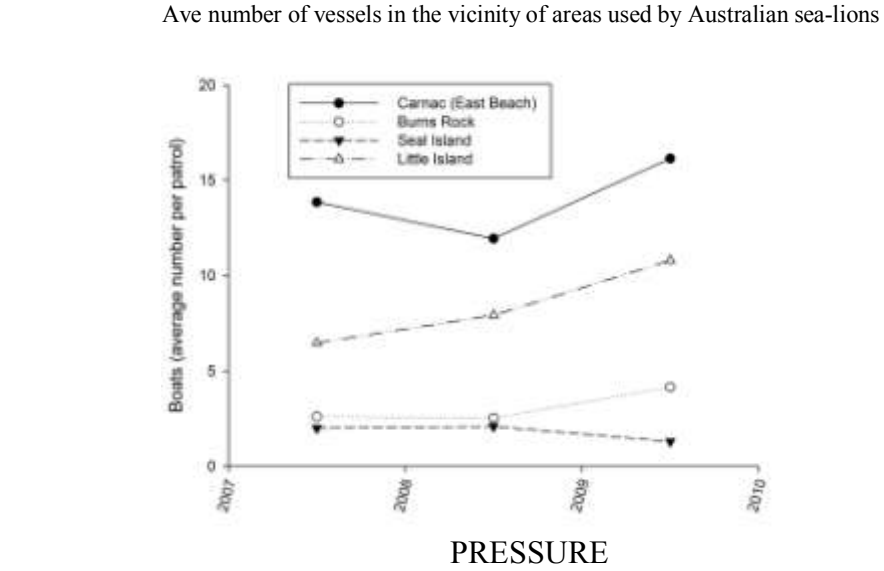
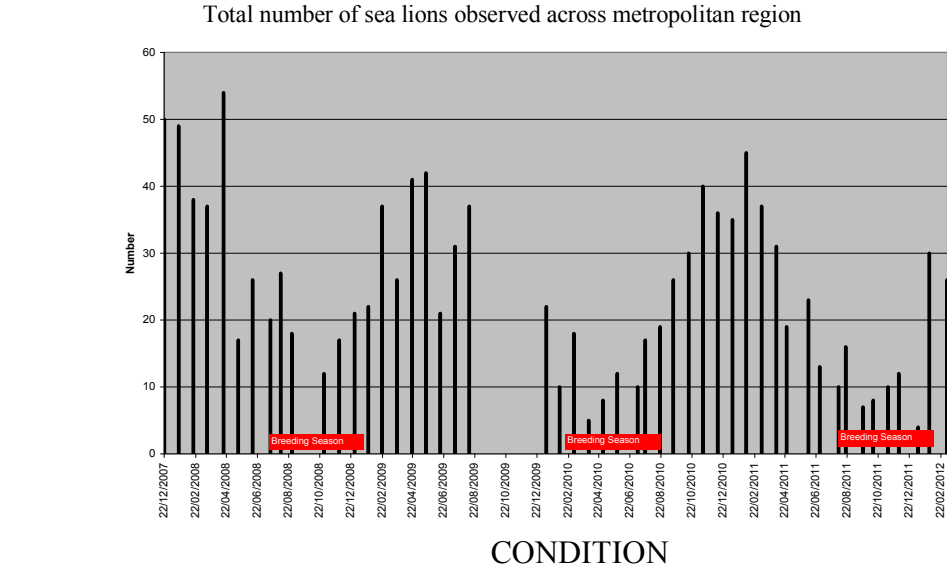
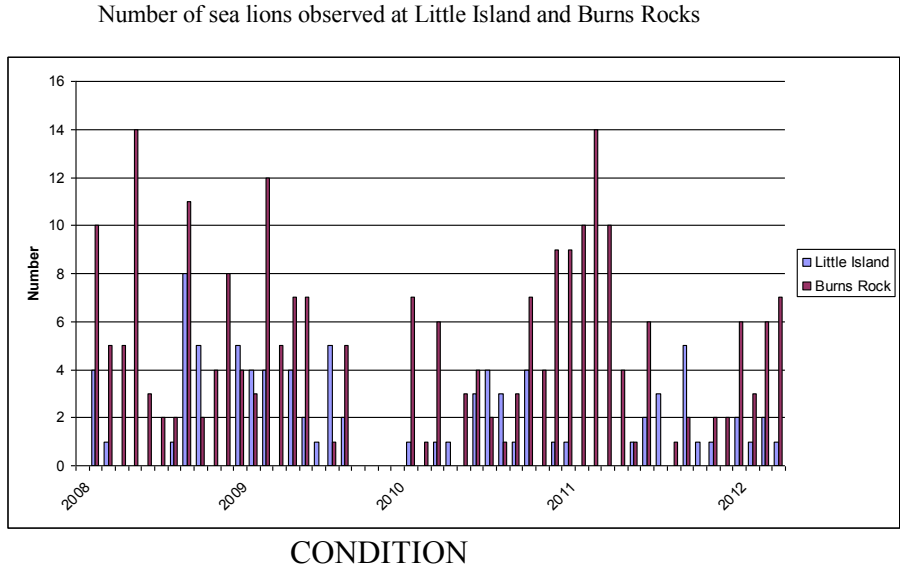
All Patrol data related to finfish issues



CONDITION

(DEC data: DEC data: total infringements (hatched), cautions (grey), contacts (white)).

Ecological value	Management objective	Management Targets	Performance measures													
Australian Sea Lion		No loss in abundance of the Australian Sea Lion as a consequence of human activities in the marine park	Number of reported Australian Sea Lion injuries and deaths and reported disturbances	CONDITION REPORTING (as per annual status reports)		1992	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Summary 10-year assessment
				Based on quantitative and qualitative information	CONDITION	NOT ASSESSED	NOT ASSESSED	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
					PRESSURE	NOT ASSESSED	NOT ASSESSED	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
					RESPONSE	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
				ASSESSMENT CONFIDENCE	Condition	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
					Pressure	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	MEDIUM	NOT ASSESSED	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				MANAGEMENT EFFECTIVENESS	Response	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
				10-year Predicted Pressure Trend					NOT ASSESSED	NOT ASSESSED	MODERATE INCREASE	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND	INCREASING TREND



### 8.3 MANAGEMENT FINDINGS AND RECOMMENDATIONS

The findings (Fx) of the audit, informed by the agency submissions, issues raised by stakeholders, and direct observations of the audit team are as follows. Each finding, where it requires a management response, is matched to a recommendation (Rx). The recommendations are summarised in the introductory section of this report.

**Finding 1 (F1)** Despite the urban setting of the marine park (the MMP) and the subsequent pressures acting on it, the park is generally in good condition, with the exception of the topics listed below in F5.

**(F2)** Of the 134 actions listed in the *Marmion Marine Park Management Plan 1992 – 2002*, 128 of them, representing 95% of actions have been fully implemented while a further three have been partially completed. Only three actions have not been completed. One is a review of the Management Plan (see R1) and a second is the formation of a Management Advisory Committee or Consultative Committee (see R6).

Of the 113 actions that are DEC's responsibility, 111 of them have been implemented.

Of the 21 actions that are DoF's responsibility, only one action has not been implemented. 14 actions have been fully implemented, three actions are not consistent with current government policy on the management of those issues but the intent of the action has been implemented while a further three have been partially completed.

**F3.** The Department of Fisheries (DoF) receives no specific funding to undertake MMP management activities. Patrols and enforcement are undertaken on an opportunistic basis as part of metropolitan wide compliance activities and these activities focus on core DoF compliance activities related to recreational and commercial abalone, rock lobster and finfish fisheries. The DoF metropolitan regional office considers that the level of compliance with fishing restrictions within the MMP is very high. DoF staff advise that relatively few instances of illegal spearfishing in the MMP have been noted. This is in part due to a reduction in the population of popular target fish in the park compare to some decades ago.

**F4 / R1.** The MMP Management Plan is in urgent need of being updated. It has now been in existence for almost 20 years, during which time planning practices for the marine estate have significantly advanced. A new management plan, incorporating outcomes based content, should be instituted as soon as possible.

**F5 / R2.** The growth of the Northern Perth Metropolitan Area since the inception of the MMP in 1992 has been dramatic. This growth has included the development of a number of marinas and harbours on the coast, which has helped to accelerate boating activity in and around the MMP. As a companion activity to the development of a new management plan (Recommendation R1), a study should be undertaken with a view to extending the MMP to the north, perhaps as far as Two Rocks.

The habitats, values and ecosystem processes in this area are similar to the existing marine park boundaries and extension of the park boundaries to the north would provide a higher level of protection to this important area that is now under far greater anthropogenic pressure than when the Marmion Marine Park was first declared. An extension of the park boundaries to the north would also make it easier create sanctuary zones of an appropriate size and location while minimising impacts on existing users.

We note that such an extension would be consistent with the range of the Perth Canyon component of the proposed Commonwealth Marine Bioregional Plan for the South –west Marine Region. The growth of population and associated pressures influencing the MMP is leading to increasing impacts from human related pressures. The values of greatest concern in relations to these pressures are Water Quality (see R5), Targeted finfish , Targeted invertebrates (see (R7) and intertidal reef platforms (see R7). There is also the potential for longer term pressures related to climate change impacts on the system, especially concerning the effects of a changing physio-chemical environment on primary producer communities (algal and seagrass communities).

**F6 / R3.** The zoning scheme for the existing MMP is in need of review. This particularly concerns sanctuary zones (SZ). The existing SZs are too small to confer adequate protection for fish and are not representative of all habitat types within the marine park being generally centred on rocky reef habitats. The juxtaposition of reef and seagrass habitats is also likely to be an important characteristic of ecosystems in the MMP. The existing SZs are located inshore so key processes, which are associated with offshore reefs where depths are greater and temperatures are cooler in summer and rates of herbivory are low, are not presently represented in SZ coverage. The MMP SZs should be reviewed as part of the development of a new MMP Management Plan. The Waterman’s Reef Observation Area, comprising all waters within 300 metres of the high water mark between the northern side of Elsie Street and the southern side of Malcolm Street Waterman, limits fishing to rod and line operation from the shore. It is noted that this area, previously adjacent to the DoF centre at Waterman, is now adjacent to the UWA Oceans Institute and to the offices of RecFishwest. This valuable area should be included for review in the recommended SZ review.

**F7 / R4.** The MMP provides a significant resting and foraging habitat for the Australian Sea Lion. With the very substantial increase in boating activity in and around the MMP since its inception, there is a need to sustain and enhance the existing ASL monitoring program, in particular to assess if the erosion of haul-out sites, entanglement and vessel effects are impacting the ASL population in the MMP. ASL research should be undertaken on a metropolitan scale to relate MMP data to other metropolitan ASL populations, notably those associated with Carnac and Seal Islands. Management arrangements currently in place at Little Island to minimise disturbance to sea lions include prohibiting the landing of boats on the island, restricting the time spent on the island to view sea lions to ten minutes and prohibiting all other activities including picnicking and sunbathing. These arrangements however have not been formalised under the *Conservation and Land Management Regulations 2002* and hence are not legally enforceable. There is also little to no understanding of the key foraging habitats of the Australian Sea Lions that use the park. Therefore it is not possible to assess if there are pressures acting on the population with respect to the foraging requirements of this species. A new management plan for the MMP should consider the issue of legal control of access to Little Island.

**F8 / R5.** The total load of treated wastewater from the Ocean Reef outfalls into the MMP was approximately 130 ML per day. The load of total Nitrogen in 2010 was approximately 2.4 tonnes per day. This load is now similar to that in the period between 1999 and 2003, that is, before treatment was upgraded to advanced secondary in 2003/4. Since 2004 mean daily discharge rates have steadily increased as has the TN load. The current discharge rates may be having measurable effects on water quality up to at least 8.4 km from the outfall. It is expected that discharge rates will continue to increase. As a matter of some urgency, discussion between DEC/MPRA and the Water Corporation should be implemented, focussing on a series of questions that DEC has prepared.

**F9 / R6.** Significant public participation during the life of the existing Management Plan for the MMP has not been achieved. The current review has encouraged public input, with some success. A

Management Advisory Committee (MAC) or Consultative Committee (CC) should be established, in particular as a new MMP Management Plan is developed. In view of the very large community of potential stakeholders for the MMP, a CC mechanism incorporating representatives of peak bodies with an independent Chair, may be appropriate.

**F10.** Over recent decades, several sites in the MMP have experienced limestone collapse events, notably Trigg Point and Little Island. Sediment movement in the MMP is continuous; at the time of this review, significant erosion is apparent at Waterman's Bay and at the site of the Marmion Angling and Aquatic Club and some accretion is taking place at Ocean Reef. While such changes are significant they do not appear to call for a specific response concerning the MMP.

**F11 / R7.** A number of respondents to the review expressed concern about the environmental impacts associated with recreational harvesting of targeted invertebrates, notably abalone. These impacts include damage to intertidal reef platforms and, in some cases, damage to shoreline vegetation and fencing during the brief but intense harvesting periods. It is recommended that DEC and DoF work closely together, in collaboration with academic institutions to develop appropriate research monitoring programs to determine the ecological impacts on the Park's intertidal areas. We note that the DoF has an on-going program concerned with abalone fishery management. A MAC or CC should have DoF representation to assist in the management of abalone issues, amongst others.

**F12 / R8.** There exist a number of signs along the MMP foreshore, some of which draw attention to the MMP. In association with the development of a new Management Plan, and in particular if the MMP is extended and has revised Sanctuary Zones, a full audit of all signage along the relevant foreshore should be undertaken, in association with DoF and the local authorities involved, with a view to developing an integrated visual statement emphasising the values of the MMP.

**F13 / R9.** Community feedback to the audit included spoken and written comment concerning beachfront issues. While formally the MMP extends shoreward only to the high water mark, issues such as signage, stormwater run-off and foredune vegetation and beach erosion impact on the MMP. The MAC or CC proposed in R6 should include representatives from community groups concerned with beachfront and foredune issues.

**F14 (R10).** The current DEC budgeting system combines expenditure across all three metropolitan marine parks at Marmion, Shoalwater and Swan Estuary. This means it is not possible to track expenditure specifically to the Marmion Marine Park. It is recommended that DEC revises its budgeting systems to enable expenditure to be reported at a park level.

## 9. APPENDICES

### Appendix 1: List of initial questions put to DEC marine park management staff

#### Questions for Marmion Marine Park Stakeholders

1. What do you value about Marmion Marine Park?
2. What is your view on progress in implementing the actions in the *Marmion Marine Park Management Plan 1992-2002*? [see [www.dec.wa.gov.au/pdf/nature/management/marmion.pdf](http://www.dec.wa.gov.au/pdf/nature/management/marmion.pdf)]
3. What do you see as the key achievements over the last 10 years of implementation and what are the key areas that require increased effort?
4. What is your view of the condition of the environmental values of the park? You might like to consider marine water quality, habitats such as limestone reefs, and wildlife of the park such as Australian Sea Lions, finfish, and sea-birds. Is the condition the same as ten years ago in your view?
5. What is your view of the quality of social uses and values of the park? You might like to consider the quality of experiences such as fishing, diving and snorkeling, marine mammal interaction, surface water sports and boating. Is the condition/ quality the same as ten years ago in your view?
6. What do you see as the biggest threats to the values of the park, if any?
7. What do you see as the key management challenges or issues you would like to see addressed?
8. Do you have any comments on community liaison, public education and/or compliance with park rules provided by the Department of Environment and Department of Fisheries?
9. Do you have any recommendations to improve management for the park, including for possible inclusion in a future management plan?
10. Any final comments?

## Appendix 2: Consultation schedule, and the staff and stakeholders consulted.

Location	Date	Name
<i>Fremantle</i>	<i>28 October 10</i>	<i>Perth Region NRM</i> Kate Sputore
		<i>City of Wanneroo</i> Chris Round
		<i>City of Stirling</i> Daniel Rajah
		<i>Stirling Natural Environment Coastcare</i> Roe Kolb Georgina Lambert Dave Hampton
		<i>Whitfords Sea Rescue</i> Geoff Sparrow
		<i>Recfishwest</i> Frank Prokof Andrew Matthews
		<i>OceanNet/WAFIC</i> Neil MacGuffie
		<i>Department of Transport</i> Charlie Bicknell
		<i>Joondalup Community Coastcare Forum</i> Mike Norman
<i>Trigg</i>	<i>11 November 10</i>	<i>Friends of Marmion Marine Park</i> Marjorie Aphorpe, Judy Arnold, Don Poynton, Sharon McArthur
<i>Trigg</i>	<i>1 December 10</i>	<i>Bruce Phillips (ex CSIRO WA Marine Head)</i>
<i>Trigg – Hillarys walk</i>	<i>7 January 11</i>	<i>MPRA and DEC personnel; met MAAC for first visit</i>
<i>Marmion</i>	<i>24 November 11</i>	<i>Marmion Angling and Aquatic Club. MAAC Management Group</i>
<i>City of Joondalup</i>	<i>17 February 11</i>	<i>City of Joondalup. Keith Armstrong</i>
<i>City of Wanneroo</i>	<i>11 March 11</i>	<i>City of Wanneroo. Mayor Jon Kelley and staff.</i>
<i>Department of Fisheries</i>	<i>21 April 11</i>	<i>Department of Fisheries, Hillarys.</i> Todd A'Vard, Cameron Dawes-Smith
<i>Hillarys – Mindarie boat trip</i>	<i>10 January 11</i>	<i>MPRA and DEC staff</i>
<i>Various</i>	<i>April 2012</i>	<i>Western Australian Museum (Maritime) and the Northern Suburbs Reconciliation Group. Staff and representatives.</i>
<i>Written Submissions</i>		<i>Department of Environment and Conservation, including material from the DEC Marine Science Program</i>
		<i>Department of Fisheries</i>
		<i>University of Western Australia</i>

		<i>Curtin University</i>
		<i>CSIRO</i>
		<i>Stirling Natural Environment Coastcare</i>

## **Appendix 3: Matters raised by stakeholders and staff who were consulted**

### **Values**

Good water quality

Tremendous diversity in marine species and habitats (2)

There continues to be good fishing sites, despite increased use.

Extent and range of marine park usage is very high - huge social and recreational values for a variety of groups

The Marmion Marine Park is unique in that it provides significant resting and foraging habitat for the Australian Sea Lion, a species that is considered *Rare* under South Australian legislation where it has received full legal protection since 1964, and has *Special Protected Species* status in Western Australia where it has been legally protected since 1892. The species has also been protected under national Australian legislation since 1975. The Australian Sea Lion was hunted to near extinction in the late 19<sup>th</sup> century and early 20<sup>th</sup> century, and its recovery since this period is uncertain. Because of the species' status, uncertainty in the recovery of the species, and the significance of the habitat in the Marmion Marine Park to the livelihood of the species, it is important the Marmion Marine Park fulfils its conservation function.

Among other marine mammals occurring in the Marmion Marine Park are bottlenose dolphins (Indo-Pacific bottlenose) which occur year round, as well as New Zealand fur seals which appear to be extending their habitat northwards, the seasonal migration of humpback whales, and the occasional visitation of right whales with their calves. As pressure increases on these species from a multitude of sources, conservation functions of marine parks such as the Marmion Marine Park become increasingly important for these species.

The value in the marine park is its unique biodiversity and ecological communities. Biodiversity is the most important value of all, then use (snorkeling, swimming).

The total beauty and interest of the area. The geology, the biodiversity, open space, scenery, for all, people swimming, dog swimming, naturalness, wildness, untamed, challenging places and spaces. Rhythmic sound of the sea, storms, artistry of the natural uncontrolled elements. Ever surprising, ever changing. Always something to learn and experience. MMP provides benefits to both the immediate and wider Perth community's physical and mental health. The manner in which MMP is looked after reflects the community health. More interpretation is needed to highlight all natural values. The dual use pathway, (currently outside the MMP, allows views for walkers to enjoy. As do adjacent cafes with views across the MMP.

### **Implementation of the management plan**

Found it difficult to determine if actions had occurred because they were very vague plan was very dated in its language use; a new plan would be helpful

People are becoming acutely aware of the environment and the regulatory system is effective, people generally follow rules and regulations. Making people aware of the park, and letting them know what they can do to help protect it.

Important to inform people about the sensitivity of area and recognition that it is a marine park – coast care groups have been instrumental in delivering this message

Voluntary support is very important to the city in achieving its goals, with at least 50 dedicated people.

Inadequate monitoring for anything.

Frustrations that DEC and DoF still have conflicts

Some objectives have been reached, some have not been addressed at all.

While establishing the Marmion Marine Park is a step forward in terms of the conservation of marine mammals, there is little known about these marine mammals (hence the park's effectiveness in protecting these species and their critical habitats). In terms of marine mammals, there is still very little known about their status, key prey items and foraging locations, their interactions with humans and effect of disturbance, their health status, and entanglement rates. As top predators, marine mammals are good indicators of the health and balance of an ecosystem, and as such are a good species to monitor closely.

As a fishery, not much has changed re: management, in the past 10 years. There is increasing recreational fishing pressure on the park (rock lobster, octopus, abalone) but no re-adjustment for the number of people collecting animals from the MMP.

This Review and Audit of Marmion Marine Park highlights the importance of original values and 'Action' recommendations. These values need to be expanded upon and actions strengthened. In fact those 'actions' in the original plan needed to be given much greater recognition and strength and used to more tightly consolidate and to reflect all the pressures of projected population increase outlined in the Perth 2030-50 projections and recommend how to achieve that change and to ameliorate unavoidable change.

## **Achievements**

Fishing regulations have been an achievement

Fishers and other people who use the park a lot are more aware of the qualities and rules of the park

People are becoming acutely aware of the environment and the regulatory system is effective,

People generally follow rules and regulations.

Making people aware of the park, and letting them know what they can do to help protect it.

Speargun ban has been really helpful for improving fish presence in the area.

Observed low levels (only 2 people) of abalone poaching. They are surprised at the high level of compliance.

Is pleasantly surprised about the minimal impacts of Hillary's boat harbor.

No apparent environmental degradation from Rottneest ferries. They use the gap in the reef when it is calm.

Stakeholder hasn't noted much change in 15 years of working in and around MMP, except an increase in popularity, increase in boat size.

Revegetation and weeding has of foreshore and reserve areas has been very successful thanks to ongoing and intensive efforts by volunteer groups (6)

Pollutant input is minimal in this environment, good to see.

SNEC values the foresight and effort of DEC planners to in 1992 finally have MMP designated a Marine Park. This decision continues to be favourably confirmed as excellent. .

Water quality appears unchanged which is encouraging.  
Sanctuaries zones have been implemented – achievement.

Additionally the restrictions on spear fishing including action by the City of Stirling is likely to have strongly assisted conservation of fish stocks in the Park.

Sanctuaries zones also will allow comparative change to be considered.

Early interpretative signage was good however now needs replacing and updating.

## **ISSUES/CONCERNS**

### **Marine Mammals**

Currently, the rate of entanglements and mortality of marine mammals appears to be on the increase. It is unclear whether the cause of the increase is due to human behaviours and activities, changes in numbers passing through high entanglement risk areas, or a combination of factors. The conservation value of these species is evident in the attraction they provide for the local community as well as tourists.

The status of the Australian Sea Lions is still not clear, and the effectiveness of the Marine Park on protecting Australian Sea Lions has not been monitored. A key example of the importance of the effectiveness of management regulations to be monitored and evaluated is the case of Carnac Island. Carnac Island is a class "A" Reserve. The pressures from human disturbance are high from the high human visitation occurring on the beaches where sea lions haul out and rest (Orsini, 2004; Salgado Kent and Crabtree, 2007). Because of the perceived similar pressure at Penguin Island, recreational access to the Island was prohibited. The effectiveness of these two different management regulations has not been evaluated in terms of how resting behaviour, their energy budget, and other factors (such as rate of entanglements, etc.) has changed. By re-evaluating the effectiveness of implementing these regulations (and further understanding how sea lions use these haul out sites), regulations such as these can either be justified or re-evaluated and adjusted if necessary.

There continues to be inappropriate and unlawful behaviour towards marine mammals, most likely due to a limited understanding of impacts of disturbance and leaving fishing line and other rubbish in the marine environment.

Greater understanding of the marine mammals in the area and their dependence on the habitats within the Marmion Marine Park is needed.

### **Coastal Reserves and Coastal Adjacency Issues**

Need more attention; they suffer from a serious weed problem, which community groups have worked hard on but there is still much to do.

Star swamp looks good but not getting enough attention: lots of degradation to coastal reserves as people access the marine park - there needs to be a higher level of integration

Volunteer groups (Friends of Marmion, West Coast Coastcare, and Stirling Natural Environment Coastcare) are very vigorous and are doing a lot to improve the coastal natural areas. They are doing more than the shires to improve nature reserves and terrestrial areas adjacent to the marine park

Coastal access impacts – pathway closures cause people to make their own tracks and cause more erosion. It is important to improve access points in appropriate places and ensure access to proper infrastructure to prevent creation of additional trails.

Maintenance is very important – revegetation projects are falling short on long term performance.

High dependence on volunteers to maintain coastal areas

Some areas to the north of the marine park are being damaged by unregulated use, trampling in Yanchep Lagoon etc. – there is a conflict between swimmers and fishers at North Beach

Problems from ORVs making new tracks through the dunes etc. There needs to be better management

Burns Beach to Mindarie - very little use but many users are trying to open up the area – it is currently a wilderness beach but sought after by 4x4 drivers – this would be damaging to the area and ruin the unique quality of having a ‘deserted’ or ‘wilderness’ beach so close to the city. There are also issues of mixed ownership

Concerns that the conservation areas (terrestrial, coastal foreshores) were not being taken care of in an appropriate manner. They are semi-natural along the cycle path, with some regeneration and revegetation but lacked the ability to provide ongoing monitoring and care. Coastcare’s interest is integrating the foreshore to the marine environment, working with the cities.

Little Island – DoF had asked about 5 years ago to report if there were people on the island. They anchor offshore and access the island particularly in the summer.

Community groups are having difficulties working with the city – huge amount of natural areas to look after and the coastal areas are just one aspect and they don't have the resources to properly handle them.

City has trouble with continuity on re-vegetating and weeding so the community groups have stepped in, in the southern MMP and to the south in the dunes.

Weed mapping is underway, not quite done yet. Judy Fisher is working on it. Might be available. Done by a profession and outside source.

Weed problems are really really bad in the City's re-planting areas because there has been no follow-up

They have battled weeds such as Victorian tea tree. City is not revegetating developed areas with natives and giving ongoing care to ensure the weeds are kept at bay.

It takes a frustratingly long time to get the city to act, to move on improvements.

Hasn't seen any harassment of wildlife, but has not seen sea lions on the island when there have been people on the island.

There is a need for more presence to protect vegetation on abalone harvest weekends because people trample vegetation and make social trails to access rocky benches in harvest.

Destruction of land based limestone cliffs due to people movement is a problem. People make formal and informal access paths - eg North Beach headland targeted for infrastructure development on headland.

Social value at North Beach headland and popular swimming beach has decreased due to the four year delay in the reinstatement of toilet/changeroom facilities and mess at the bottom of the headland.

Vegetation on the coastal zone – the management plan does not contain sufficient detail in this area and corrections need to be made.

Action plan has not been carried through

### **Water Quality/Pollution**

Degradation from storm water draining directly to beach and ocean – recommends that there should be more pressure on local governments to control storm water output

Inability to swim by outfall

Ocean outfalls polluting in the area of the MMP, particularly the Brighton outfall that is out in the ocean.

Need for storm water discharge impacts from some outlets – high faecal coliform from boat discharges.

There is no pump out facility for boats and a lot of boats not fitted with holding tanks.

Concerns about the water outfall pipes and the toxins that come out of them. Watercorp produced a report on the outfall. They are getting gross pollutant screens put on all the outfalls.

Issues with big surf clubs that are still on septic – 30% of houses, Mullaloo and Sorrento surf club, and some public toilets. City is working on getting them all on to deep sewerage. Also getting rid of drainage into the dunes.

Beach litter survey, occurs every year in cooperation with Friends of MMP. Issues with plastic pellets, not sure how common, have implications to marine life because they can introduce toxins to marine organisms that accidentally eat them – bioaccumulation.

Water quality is quite good despite being under the influence of the Fremantle Port (TBT), and probably other effluent/road run-offs inputs (e.g. Cottesloe).

Algal growth is observed in very localised areas in the littoral zone, probably due to leaking septic tanks.

Drainage and discharge ... "only a few locations in City of Joondalup and Stirling" are a concern. Does anyone really know what is being discharged into the Marine Park? These outfalls need to be changed and budgeted for by these local governments.

The beach litter survey recently undertaken revealed many cigarette butts. Smoking on beaches is now prohibited in the City of Joondalup but this is not reflected in the annual survey which is a concern.

Storm water drains – erosion – storm damage threatens not only shore line – contributes to erosion of beach, infrastructure and services – signage re water quality after storm damage – monitoring minimal – results unknown – beaches have been closed for swimming due to eroded stairways and access paths. Amenities being withdrawn eg

North Beach headland and known problems with Waterman's Bay.

Litter still a problem see FOMMP surveys.

### **Infrastructure in and adjacent to marine park**

Jetty is in need of re-shoring but they want to reduce the structures on the jetty as a precautionary avoidance.

Coastal access impacts – pathway closures cause people to make their own tracks and cause more erosion. It is important to improve access points in appropriate places and ensure access to proper infrastructure .

Design and placement of infrastructure should consider aesthetics (seascapes) and ecological impacts in addition to utilitarian values.

Toilets/changerooms are scarce. Clash with overall MMP values and Department of Planning and Infrastructure (DPI) 'Visual Landscape Planning in WA' Nov 2007. The DPI representative could

not see a problem putting a toilet on the highest point of North Beach headland. MPRA somehow needs to be able to express an opinion when landscape values are threatened .

Parking is scarce from Trigg Island to Beach Road.

The MPRA's influence should extend further inland than the high tide mark which is current eastern boundary to MMP maybe by way of recommendations on planning matters which are adjacent to the MMP.

Parking (away from the coast) and ride – would seem needed along the stretch.

Dual use path along West Coast Drive – on weekends and holidays overcrowded with both pedestrians and people on bikes – quite often riding them too fast. Local governments are at loss to solve this problem and change seems unlikely to occur until accidental deaths help give the case urgency.

Coastal launch and beaching sites need to be better demarcated and sign posted.

North Beach Jetty needs a fish cleaning facility nearby

North Beach Dog beach needs dog wash facilities

Old bricks and rubble on North Beach Dog beach need to be removed. They have been present for many years.

Asbestos has been reported in dunes for last couple of years, needing careful removal.

The fragmentation of the biodiversity of the remnant coastal foreshore vegetation is of particular concern through lack of remediation and follow-on work

Storm water erosion - needs to be redirected away from coast.

All drains are of concern. Water quality monitoring appears infrequent and overall inadequately being dealt with. Action as a result of University studies are not known and steps to track culprits not known. Stirling Alliance appears to be addressing this in a very narrow way and not at the level the City's coast requires action to address.

Climate change and the projected sea level rise impacts

Achieve an increase for a contingency repairs budget for local coastal foreshore managers with sufficient staff to realistically monitor and supervise these projects so they do not run over such long timeframes.

Local government need to have a faster response to minor maintenance issues. E.g. Surfers access stairs have been closed for 18 months due to minor maintenance issues and this has caused increasing problems over whole length of access due to users continuing to access from that point in spite of chains and heavy large obstruction to main entrance. Reluctance to quickly address these type of issues and to continue to refuse to acknowledge potential for increase in damage by neglecting to reinstate access quickly to popular sites is an ongoing concern. There is no overarching body to appeal to for having these situations addressed. Other stairs (access paths) end up being frequently closed off with similar concerns and increase in damage. Proactive winter paths are not marked out as Cof S is concerned about hazards and people management responsibilities so

instead many paths are potentially formed instead of one better managed. E.g. Watermans Bay to North Beach .

## **Fishing**

Concerned about what monitoring is done for fish stocks in the marine parks

Concerned about intensity of harvest in abalone recreational fishery and effects on other associated species and habitat degradation

Abalone season is problematic because there is so much removal and trampling

North Beach jetty is still an important and highly used fishing site.

Concerned about threats to rec fishing and desires for public to have ownership of the MMP and its rules.

They view the abalone fishery to be well managed but our concerned with the method DoF is using. They want direct counts instead of an effort measurement.

Concerned that the fishery is run by compliance. Recfishwest wants to extend the period to monthly Sundays instead of consecutive.

Other mollusks could be protected by the rules also, such as turbans.

Need to look at distribution of gametes to determine what the harvest effects are.  
Want clear hierarchy of risks – imposex in whelks and abalone (Monique Ganion's study)

Consistency issues with what they are trying to achieve – perceived double standard with fishing.

Concerned about spear fisher's view that they are being un-fairly banned and singled out.  
Fisheries Concerns in MMP – serial depletion issues, don't like buff bream protections, behavioral data – do fishermen high grade, do they change their behaviour or location.

Tagging projects, community support. Want to measure fishing to inform us. Want to get community buy in for conservation. Monitoring human behaviour.

Recommends a greater level of catch and release.

Reckons fishing quality hasn't changed much since 1992, but it has varied.

Fisheries excluded from general use zone – the specimen and aquarium fisheries – would like to discuss the possibility of opening up the general use areas to these fisheries.

WAFIC would not be interested in increase workload. Specimen collectors have approached DEC about accessing Ningaloo and Shoalwater for specimen collecting with the limitations and guidelines that they developed. They were allowed to do so.

WAFIC wondering if the MMP might expand. In regards to the potential of MMP's expansion, WAFIC is not seeing an expansion affecting commercial fishing. Rock lobster fishery being more carefully managed.

Rec fishing from vessels is on the increase and its take is largely unknown. Commercial fisheries are much better monitored and regulated. The fishing from boats licence has been helpful. Rec fisheries toys are becoming more similar commercial fishers' equipment.

Impact of abalone fishing – concerned about the large number of people making their own tracks, breaking down fences etc., and then trampling the reef. Closure due to presence of dead whale coincided with an improvement in reef community quality. Iluka – Ocean Beach platform has major issues.

In the past 10 years, many new species of (semi-)tropical fish have appeared in the MMP. These are probably larval settling brought by warm currents, with these young fish not surviving winters. However, their presence will have an influence on the ecological balance of the MMP.

If the MMP is to be used as a conservation environment, then the ecological integrity should be preserved by the ban of ALL collections, including abalone, octopus, rock lobster, etc.

The abalone population is extremely depleted at Trigg following the abalone season, which surely would have an influence on the ecology of this environment. There are no marine snails to be seen on this reef either in the past 5 years.

Anecdotally, attempts were made by one person at contacting Fisheries Officers when suspected illegal fishing was observed however, no action followed. Twice. Disappointing.

I believe that Clause 19.2 should be changed. Collecting abalone is really bad for the coastal reserves as these once a year seasonal visitors to our coast do so much damage. Abalone collectors damage fences and the coastal natural vegetation, and no doubt also do great damage to the reefs.

Concerns about abalone fishing and secondary effects of trampling impacts on inshore reef structure

Potentially stop take of abalone

The state of the inshore reefs has deteriorated. This may be in part due to the cumulative trampling effect associated with the intense abalone harvesting season.

Is there a science based view that the fish stocks used by the rare Australian Sea Lion need greater protection?

Habitats such as limestone reefs are threatened by Abalone fishing and the state of other life in and off inshore reefs seems to be declining

## **Administrative**

Sanctuary zones should be bigger

MMP needs more active management and enforcement presence - the marine park seems to be under supervised which enables some users to disregard the rules and regulations

Concerned about interactions between kitesurfers and other users

Management plan should use careful management with well established expectations

Recommends stricter guidelines

Concerned about long term planning for the marine and coastal areas not keeping in step with residential planning and population growth

Little Island is becoming an increasingly popular surf destination. Increased number of surfers, water craft, jet skis etc. Potential need to limit boats and address anchoring and rubbish issues

Recfishwest has been concerned about the management plans lengthy lapse since 2002.

Politics and social values have changed. Happy process is happening.

MMP reflects changes in public attitude.

There is a lack of anchoring regulation.

Concerns about jet skiers and their high proportion of offences.

Concerns with wind surfers and a few negative interactions with fishermen.

Users are often uninformed about the sanctuary zones.

Marker buoys at sanctuary zones need to be larger to for safety's sake, to avoid boat interactions.

Not inclined to be worried about the number of boats at Little Island, especially if people are anchoring in sand and seagrasses but anchoring guidelines could be helpful.

User conflicts – kite surfer vs. yacht. Issues of speed don't enable other users to avoid kite surfers. This is an issue in high traffic areas

Jet ski activity is much too close to the shoreline, endangering snorkelers and swimmers, and probably disturbing marine mammal activities as well. There is never a patrol in sight when jet skis are transgressing boundaries.

Jet skis are a concern because noise and proximity to swimmers is intimidating. There have been sightings of jet skiers coming into beaches into coastal bays.

More efficient cooperation among DEC, DoF, Marine and Harbours (now DoT?), and the cities of Stirling, Wanneroo, and Joondalup is necessary

The MMP Consultative Committee, or a similar committee, should be revived with revised structure and membership as necessary.

Co-ordinated management of the land adjacent to the MMP needs to occur

Can money generated through infrastructure and commercial activities be accessed to support and be invested in the management of the natural values of MMP. These natural values enhance the ability of commercial activities to succeed. How much money from eg Hillary's ..... comes back directly to MPRA for help in raising the level of management. If this cannot be done – where can extra ongoing secure funding be sourced.

A total promotional package needs to be developed for Marmion Marine Park. The package should include the two large natural coastal A class reserves. I.e. Trigg Bushland and Star Swamp Bushland, the Mt Flora Regional Museum in Elvire Street Watermans Bay. The history of the areas along the coast needs greater integration into the Marine Park experience.

All objectives of the management plan appear not to have been followed through, they are weak and not science based

DEC officers have been very pleasant and helpful when contacted.

### **Erosion and Coastal Processes**

Identified major erosion issues in some years with accretion occurring some years, but generally to a lesser extent – coast is very dynamic

Watermans Bay erosion – significant erosion over past years without the historical extent of accretion. The last winter has been quiet and not much accretion. Sand (3,000 m<sup>2</sup>) was brought from Ocean Reef marina dredge. High cost!

Waterman's is the worst affected by sediment loss, 2 more mentioned.

Net loss of sediment from southern bays potentially as a result of the construction of Hillary's

Difficult to ascertain influences of climate change on local area – doesn't see immediate effects of climate change because of other processes

Issues with navy and TBT potential dredging impacts in MMP

Issues with coastline's erodability - areas without rock are at risk of erosion especially. Coastal erosion protection works will occur in the future. Issues at Waterman's are likely to become issues at other locations.

Bob Gozzard did a geological survey of sites likely to have erosion issues. Southern part of MMP is most likely to have issues with erosion.

Erosion is not unforeseeable and there is a way to plan for and manage for these impacts.

Plans to have a new marina at Alkimos that will be comparable in size to Hillary's

Work with Ian Elliot to define sediment cells and develop sediment budgets for this area of the coast. This would be a useful tool for coastal developments and could help integrate terrestrial and marine planning. This is a long way off.

No plans to expand Hillary's, it hasn't ever needed dredging.

Ocean Reef may be re-developed but it has a long way to go. Dredging occurs with a back hoe 3 to 5 k m<sup>2</sup>. The dredged material used to go terrestrial, but the latest proposal is to re-deposit the dredged material in the winter back into the marine park.

Concerns about the sediment issues and sediment transport changes that would occur with developments at Ocean Reef marina.

Erosion of shoreline is also an important issue, as it brings more sediment to the benthic area, altering the environmental conditions prevailing on the submerged limestone rocks.

## **Education/Interpretation**

Public education and interpretation needs to be improved so that most locals know that it is a marine park, what the implications are and who manages it. Appreciates the lack of visual pollution

There is a perception that marine parks are going to restrict people from doing things they have done in the past

Problems in lack of education or misinformation

It is important to educate new users about coastal conditions, dangers, and regulations

General public may not be aware of these values, but rather see this as an area to recreate

There is signage for the public to be aware of the resources, but more informative signage and maps of the extent of the park would be helpful. The ones that are there are not very obvious

City is conscious of visual pollution – a solution would be to put signage near main car parks. That information needs to be readily available and the first access point.

Use of ‘consolidated signs’ minimized sign forest effect.

Signage can be helpful to reduce risk and alleviate liability. Inadequate education.

Local residents do not have an understanding of the local shores and nearshore environment. There is a need to inform more of the locals.

It seems that there are limited resources allocated to monitoring compliance and educating the public as to the regulations for interacting with marine fauna.

The biggest threat to the values of MMP are a limited understanding of (i) key species and the habitats they depend on, and (ii) the level of effects of human usage on these species and their habitats.

General public is not aware of what research has been done

MMP – Interpretative signage needs updating – good at one time, but now inadequate. It should be update to be similar to that on the Kalbarri Coast.

MMP signage needs overall co-ordination along whole areas linking local and overall stories.

More ‘in depth’ information backed up by web site and hard copy.

Research activity in MMP needs to be linked in. e.g. WBMC.

Educational side of the MMP should be emphasized more heavily – biodiversity, endangered species, research availability, interpretation for schools and adults as well.

### **Suggested Improvements**

Update management plan

Vegetation conservation and dune restoration opportunities exist from near Ocean Beach Boat Harbour to the northern boundary of the MP

Consideration should be made for the marine park to be extended to the north because of the expansion of the northern corridor, expected population growth and proposed new infrastructure – huge new development is being planned (see structure plan released, Nicola Howe is contact)

Management plan needs to be updated and made current

Need to get a better understanding of sediment transport processes.

It would be useful for local governments to have a guide informing them what activities/information would be of interest to the MPRA

Do more to make people aware of the park, and letting them know what they can do to help protect it.

Would be great to have a body that coordinates support in and around the MMP between DEC, Fisheries, and local governments and volunteer groups.

The south section of MMP to be marketed as a safe snorkeling area. Easy access/safe. Would be a good potential spot for sanctuary zone to promote fish abundance and encourage snorkeling. Possible extension of marine park to connect with existing one.

Need to package this info and make it more available with tourism marketing.

Website featuring MMP is educationally shallow. In depth information needed including informative booklet/s and further studies required.

MMP needs to be packaged to the level it deserves. A person such as Claire Savage should be engaged to create the interpretative package for Marmion Marine Park at the professional level warranted. All the raw material is there to put together a superb interpretative package to highlight the diverse values of the area.

*Management plan needs to be drastically revised with regard to the terrestrial areas with the following in mind:*

- Integrated weed management
- Potentially develop a MOU with coastal managers to achieve goals in adjacent foreshore and local government (Refer to Dave Hampton on technical aspects)

- Storm water drainage
- Informal paths
- Protection of limestone cliff infrastructure
- Fossil preservation
- Potentially pursue a section 16 (DEC manages someone else's land)
- Reduce risk to Aus Sea Lion by local users.

Leafy sea dragons, swan river sea horses, and lampreys should be protected because of their iconic status.

Sanctuary zones should have specific objectives that can be measured, be designed in size and position that is appropriate for a specific conservation purpose.

Sanctuary areas – although they are fairly well marked, the buoys need to be larger. There has been a boat interaction.

Would like further clarification of what the MMP is trying to accomplish and clear goals. What is the MMP trying to protect? What are the threats? What are the realistic targets?

Expansion of park could be helpful if we were seeking to curb rec fishing and it would probably not affect commercial fishing provided they can access the general purpose areas.

Marine parks should not be so concrete in their boundaries; a more adaptive approach to management with adjustable boundaries to adjust to changing circumstances would be preferable.

Additional interpretive signage would be helpful to inform public about biodiversity values that are present in the MMP to be placed at look out points

Would like to see sewerage best practice facility included in Ocean Beach Boat Harbour development should it occur.

More frequent information and signage would be good. What about judicious noticeboards too

The establishment of the Marmion Marine Park has provided a key framework for building an effective plan for conserving an ecologically significant area. The key in its success is to monitor closely its effectiveness and implementing modifications to the plan so that its effectiveness can be improved as more knowledge is gained on the ecology of the system and the changing pressures to the marine park. It is important that the establishment of the park is seen to be effective.

Increased emphasis should be placed on reducing fishing effort for key species especially rock lobster, octopus, as these animals do play a role in the ecosystem balance. If constantly removed, the role of these animals will be lacking from the ecosystem, creating imbalances. Also required is the prevention of shoreline erosion due to increasing severity of storm events, and increasing wave action – and probably increasing sea levels.

Potentially a television advertising campaign could provide further outreach to the broad public about how to take care of the marine environment and the regulations for interacting with marine fauna. A large number of people watch television (whereas fewer tend to read sign posts).

Increase an understanding of marine mammals and their key habitats through research, and the effectiveness of regulations to the conservation value of these species.

Increase education to the community on appropriate and lawful behaviour within the marine park and around marine mammals (through very accessible media outlets).  
Cease all fishing, recreational and commercial.

Prevent all jet skis from getting even close to the MMP.

A program should be developed to assess the physical and biological attributes of the region using airborne hyper spectral sensing surveys. Outcomes would be detailed digital bathymetry, a benthic classification of the reef and a water optical attenuation coefficient, which would contribute to a highly detailed digital record of the marine ecosystem at a point in time. This enables any changes to the system over time, whether from climate change, sea level rise or industrial / commercial activities, to be assessed. Further, the data acquired from the survey have been used by other marine researchers engaged in the project to identify priority marine areas for more detailed *in situ* investigation, to identify like-regions and also unique habitats and to plan and establish transects in sensitive areas that will be repeat surveyed by divers into the future. Further, the bathymetric data have been assimilated into CSIRO's hydrodynamic model for use in assessing coastal currents, impact of sea level rise, sediment transport etc. All the data products we have produced are stored on iVEC and being made available free of charge to agencies, researchers and industry.

Sanctuary zones need to be larger and more strategic. E.g. protection to allow demersal fish e.g. Dhufish, Snapper to 'breed up'/replenish and re-colonise.

The management plan should include in strategy that boat storage/clean up/repair facilities be planned and developed wherever possible inland, away from the coast, into light industrial or industrial areas.

Sanctuary zones around north of Trigg Island, Mettams Pool and the reef area adjacent to Hamersley Street (Centaur monument) may encourage a real snorkelling park attraction particularly for less experienced swimmers. Such a development could be a real attraction and accomplishment for the MPRA, DEC and the City of Stirling. Additionally the Observation Zone around WBMC should be extended and designated an area for more advanced shore based snorkelers?

Visual Landscape Planning assessments must be carried out for any projects along the shore of Marmion Marine Park. DPI and EPA should have the authority to request that visual landscape evaluation be compulsory not just recommended.

Local native plant species should be used in all new and renewed infrastructures' landscaping especially in the coast setback area to support continuity of coastal vegetation. Use of known weed and/or potential weed species should be illegal.

Processes need to be put in place to redirect storm water out of the dunes and off the beaches. If need be short term with the intention of recycling or re-using the water in the future.

Assessment and positioning of both signage and formal and informal access tracks needs assistance of external consultants. Interpretation stories/plaques need to be discreet not positioned to take over and from the natural appeal of the coastal scenery.

In the zoning process sanctuaries are chosen under the CAR (comprehensive, adequate and representative) principle to protect biodiversity assets and to act as a baseline from which the

activities of visitors can be assessed in the General Purpose Zones. This submission is based on 3.5 years of field work undertaken as part of a PhD thesis.

1. The few small sanctuary zones in Marmion Marine Park are unlikely to provide long term conservation. This significant shortfall can be addressed by amending the zoning scheme according to the following recommendations:

a. Marine conservation and fisheries objectives of the sanctuaries need to be clearly identified by managers such that the purpose of the current zoning scheme is modified.

b. Design criteria such as number, size and location of sanctuary zones should be specific to the management objectives for Marmion Marine Park. What is the purpose of the sanctuaries? How will they meet the CAR principle? How they be used to assess the status of the marine habitats in the whole marine park? These design changes will help to ensure that all marine flora, fauna and habitats are represented in sanctuary zones.

c. The sanctuaries need to be much larger and more numerous to have long term conservation benefits.

d. **Number of Sanctuaries:** The number of sanctuary zones needs to be increased. The ecological assemblages within each level of wave exposure are distinct. Thus for each assemblage type, the current reserve design only has one sanctuary in each of 3 separate wave exposures. Such a design does not offer any ‘insurance’ in the event of isolated impacts affecting a particular zone. Multiple sanctuary zones are necessary, part of the planning criteria and will better spread risks (and costs). To this end, a minimum of two sanctuary zones per wave exposure level is recommended. This would be a doubling of present sanctuaries.

e. **Additional Representative Sanctuaries:** There is no protection from fishing of the more exposed, outer margins of the offshore reef systems (for example, at Three Mile Reef). Thus, additional sanctuaries at the more exposed, deep regions of the Park should be implemented.

f. **Size of Sanctuaries:** The size of the sanctuary zones should be increased. The extremely small size of the sanctuaries has limited their conservation effectiveness. The small size of the sanctuaries is too limited relative to the movement of fishes to adequately protect stocks of many targeted species. Increasing the size of the sanctuaries and protection of all habitat types used by targeted species, including adjacent seagrass areas and deep-water habitat, is more likely to provide permanent refuge from exploitation at Marmion Marine Park. Increasing the size of the sanctuaries will also address the current impediments to scientifically test for the effectiveness of the zoning scheme. The power of statistical tests in this study to detect effects of zoning was limited by the extremely small size of the sanctuaries and their lack of replication within each level of wave exposure.

g. **Overfishing:** Observations made during Ryan’s research suggest overfishing. Few large, sexually mature lobsters were observed. Large, predatory fish species were virtually absent. Very low abundances of fish species traditionally targeted species were recorded, that fishers reported to be once abundant and common, and the fish assemblages are dominated by weedy, fast-growing species. MPA zoning affected the size of *Coris auricularis* (Western King Wrasse), a low-quality eating species that is currently being targeted by fishers, but has not been targeted traditionally. The observations are supportive of anecdotal reports of changes to the fish assemblages over time.

Clearly, the existing sanctuaries in the Marmion Marine Park are not meeting the conservation outcomes required across many fronts. I recommend you increase both size and number of sanctuaries and investigate the overfishing issue as soon as possible.