MPRA

MARINE PARKS & RESERVES AUTHORITY

Report on
Ten-year Audit and Review

Shark Bay Marine Reserves Management Plan 1996-2006

April 2010

Document Number: MPRA
REVISION: FINAL
DATE ISSUED: 23 June 2010
Custodian: MPRA Executive Officer
Custodian's Signature:

Cover: MPRA review team with Department of Environment and Conservation (DEC) and Department of Fisheries (DoF) staff, and the DoF vessel 'MV Edwards'

Photo: Fran Stanley, DEC

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY OF THE REVIEW: FINDINGS AND RECOMMENDATIONS

This report presents the findings of the MPRA's audit and review of the management plan for the Shark Bay Marine Park and Hamelin Pool Marine Nature Reserve, known collectively as the *Shark Bay Marine Reserves (SBMR).* This is the first ten-year audit review 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 review 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 of the SBMR as implemented under the direction of the management plan. The present management plan contains objectives and strategies but no performance indicators. The review 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 review 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 audit involved an on-site inspection of the SBMR, detailed consultations with staff of both DEC and the Department of Fisheries (DoF), and a number of meetings with both local and Perth-based stakeholders. The people consulted, and their inputs and submissions to the audit are summarised (non-attributed) in the appendices.

The review reports here on the MPRA's assessment of the performance of management against the 20 performance indicators that have been recently developed and applied to the SBMR. The performance assessment has resulted in 19 findings and 17 specific recommendations in relation to present or impending issues that relate to the management of the SBMR.

The review 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 SBMR and the importance of the values that are of World Heritage standard. 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 principal findings of this review are:

a. The reserves are in good condition, with the likely exception of some targeted fish stocks and local areas where land-based sources of runoff may be having detrimental impacts
b. Agency (DEC and DoF) management appears to be efficient and effective within the limits of the allocated financial resources, although it is clear that the management system, despite recent increases, remains substantially under-funded
c. The management plan is outdated and a new plan will need to be developed and gazetted to replace the expiring plan as a matter of priority
d. The existing high-level protection of representative habitats of the Shark Bay ecosystems is inadequate, and the SBMR and World Heritage Property (WHP) boundaries need to be brought into coherence to resolve this and several other pressing management issues
e. Recreation fishing issues need to be actively addressed in a precautionary manner, because the fishing pressure is expected to increase with increased levels of visitation

f. Public acceptance of the SBMR and many of the World Heritage values is high, and there are significant levels of support for extension of the park/reserve to include currently unrepresented habitats of Shark Bay provided that existing commercial fishing grounds are suitably maintained and recreational fishing issues are better managed
g. Camping and foreshore issues and watershed management need to be more fully addressed in the new management plan, and particularly in relation to the improved management of pressures on shallow water near shore ecosystems (including stromatolites)
h. Short term issues need to be addressed through an interim set of transitional management arrangements, pending the development of the full statutory new management plan. Each of the 17 recommendations from this review should be addressed within the short-term transitional arrangements.

TABLE 1: Summary of the findings and recommendations

Finding	*Recommendation*
F1: Management plan outdated and inadequate for management purposes	R1: Commence the process for updating the management plan, with attention to a number of specific deficiencies identified in this report
F2: Commonwealth's role has become unclear, and jurisdictional issues are confusing for stakeholders	R2: Redefine the role of, and revitalise engagement of, the World Heritage Property committee system in the development of the updated management plan
F3: Pastoral leases are degraded in some places	R3: Improve the catchment management programs, by working with the NRM bodies to limit erosion
F4: Coastal camping issues	R4: Camping and access arrangements need to be specifically addressed, to better manage access, pets and wastes
F5: Habitats are not representative	R5: The new management plan should protect samples of all habitat types, and critically sensitive habitats should be secured urgently
F6: Monkey Mia management issues	R6: Management arrangements need to be finalised urgently
F7: Recreational fishing effort is high, and likely to rapidly accelerate	R7: Further park-specific recreational fishing controls need to be urgently put in place, and consideration given to planning for offsets via recreational fishing zones
F8: Commercial fishing is appropriate, although there are compliance issues	R8: Targeted fishing (recreational) at Koks Island on spawning snapper aggregations needs to be removed through the implementation of a sanctuary zone
F9: Fishing at Useless Loop	R9: An improved education and awareness program about park values and fishing regulations to be delivered at Useless Loop, supported by increased compliance surveillance
F10: Traditional hunting of protected species	R10: Clarify the situation in Shark Bay about traditional hunting of protected species by aboriginal people with Native Title rights
F11: Improved focus on management of the MNR	R11: Consider the need for separate planning and management arrangements for the MNR within the main management plan
F12: Access to the MNR cannot be fully controlled by DEC	R12: Initiate amendment of the Mining Act provisions where they over-ride the CALM Act in permitting uncontrolled access to MNR and Sanctuary zones, to require a pre-agreed arrangement.

F13: Carnarvon stakeholders seem unaware of the park and its values	R13: Improve Carnarvon-based education and awareness programs about the park and the MNR
F14: The Shires both appear to have a limited engagement with the park or its management	R14: Both Shires should have standing places on a renewed Management Advisory Committee for SBMR
F15: Monitoring data on park values is highly limited	R15: Priorities for short term research are to develop monitoring for the high risks to park values, followed by the development of monitoring systems focused on each KPI
F16: Funding resource allocation	R16: Both Commonwealth and WA funding levels are currently too low to provide for fully effective and efficient management of the values of the SBMR. This needs to be reviewed in detail within the context of development of the new management plan
F17: The development of a new management plan will take several years before it can become operational. In the interim, a number of high priority issues will require resolution.	R17: There is an urgent need for a transitional management plan of action to address a number of short term high priority issues, prior to the full management plan being developed and implemented.

1.REGULATORY CONTEXT FOR THE STATUTORY TEN-YEAR REVIEW

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 review 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 review 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 reviews of performance of each marine conservation reserve, an audit report to accompany the MPRA Annual Report, periodic audits to provide for mid-term reviews of management performance, and ten-yearly audit and reports of management plans.

This document is the report of the first ten-year review of the Shark Bay Marine Reserves 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 REVIEW

This ten-year review of the Shark Bay Marine Reserves Management Plan 1996-2006 is an independent evidence-based audit and review of management. The scope of the audit is broadly, to consider and report on any aspect of management of the marine reserves, including any specific issue that may be relevant to the management of the Shark Bay Marine Park and the Hamelin Pool Marine Nature Reserve (known collectively as the Shark Bay Marine Reserves - SBMR). Specifically, the review is to;

(a) review and report on management outcomes and achievements in respect to the objectives of the Shark Bay Marine Reserves Management Plan 1996-2006 (Department of Conservation and Land Management and National Parks and Nature Conservation Authority, Plan No 34, 1996);

(b) report on any issues detected, and on management responses/strategies implemented or planned; and

(c) identify changes or future improvements that may be warranted in the management or present implementation system in order to meet the established vision and objectives for the Shark Bay Marine Reserves.

3. REVIEW PROCESS

The review followed the general process of a forensic audit of management issues, followed by preparation of a review report. Evidence was obtained from records, documents, interviews and direct observations, where possible verified with the relevant agency staff. In addition, the views and opinions of agency staff (particularly DEC and Department of Fisheries - DoF), members of the local communities, and the local government agencies were actively sought as part of the audit process.

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

The review proceeded in six stages;

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

In the pre-assessment stage, the available reports/information were collected and reviewed by the Audit Sub-committee. This consisted primarily of a draft Shark Bay Literature Review, prepared by DEC staff and made available to the audit on CD.

The pre-assessment workshop with selected stakeholders provided information and evidence about how the process of engagement with local communities could be best conducted, and how the overlying issues of the World Heritage property interacted with the management of the SBMR.

Prior to the site inspection, to provide an initial focus for the audit, the Audit Sub-committee prepared and submitted to the DEC and DoF staff a list of questions and issues that would form the initial focus for the on-site inspection (Appendix 1).

The on-site inspection was conducted by the MPRA Audit Sub-committee on 22-26 June 2009, and provided local discussions with stakeholders and first-hand information about the management of the SBMR. The evidence collected on the site inspection and the series of meeting with regional stakeholders was complemented by interviews with DEC and other agency staff, pastoralists, tourism operators, local government representatives, scientists and stakeholders to determine what progress is being made towards achieving the strategies and objectives of the SBMR Management Plan.

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

The benchmarks for determining the acceptability of management have been set by consideration of the implicit targets established within the SBMR 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 review consists of the DEC primary submission to the review, comprising input from the DEC Marine Policy and Planning Branch (Fremantle) and the district DEC staff from Shark Bay and Carnarvon. This evidence is heavily based on the annual performance reports for SBMR and on the present-day operational perspective of the district DEC staff. A primary written submission was also sought from DoF (Perth) but was not submitted by the time of conclusion of this report.

The dominant documentary information base for this review therefore consists of the agency submissions, the SBMR Management Plan, the reports of the MPRA annual monitoring review workshops (2006-2008), the contextual information developed prior to SBMR dedication, and the reports of a number of research and monitoring studies conducted by DEC, DoF and external projects within the SBMR or the World Heritage Property.

A substantial amount of direct evidence was also secured through the on-site stakeholder and agency staff interviews. A substantial input on fishing issues has been received from the regional DoF staff during the site inspection. The Audit sub-committee also secured comments and feedback on the management issues from a joint meeting of the World Heritage Property Community Consultative Committee and Scientific Advisory Committee, held in August 2009. 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 management objectives for the SBMR, and provides a summary (from the SBMR Management Plan) for the objectives and strategies used to achieve those objectives. The SBMR Management Plan 1996-2006 was not prepared with measurable outcome-oriented objectives and therefore specific progress against management targets (such as reporting of performance against key Performance Indicators) is not strictly relevant. However, in keeping with the outcome-based management plans that are now the norm for marine park management in WA, management of SBMR is reported in the annual MPRA performance assessment review against a set of performance indicators developed by the operational DEC district staff. The set of indicators, those considered to be Key Performance Indicators, and their relevant values are shown below.

TABLE 2: Key Performance Indicators (KPI)

Values	Performance Indicator (Summary)
1 Seabed Geomorphology	The structural complexity of seabed geomorphology of the park is not significantly altered by human activities
2 Water quality	There is no change in water quality of all reserve waters from 'background' levels, as a result of human activity in the park **(KPI)**
3 Sediment Quality	There is no change in sediment quality of all reserve waters from 'background' levels, as a result of human activity in the park **(KPI)**
4 Intertidal benthic habitats	No loss of intertidal benthic community diversity, or biomass, as result of human activity in the park
5 Subtidal coral communities	No loss of coral diversity, or biomass, as result of human activity in the park
6 Seagrass meadows	No loss of seagrass diversity, or permanent loss of above-ground biomass of perennial seagrass, as result of human activity in the park **(KPI)**
7 Mangrove communities	No loss of mangrove diversity, or biomass, as result of human activity in the park **(KPI)**
8 Microbial communities (stromatolites and algal mats)	No loss of above-ground biomass of microbial communities, or decline in overall health, as result of human activity in the park **(KPI)**
9 Non-targeted finfish	No loss of finfish diversity, or protected finfish species abundance, as a result of human activity in the park **(KPI)**
10 Non-targeted invertebrate communities	No loss of invertebrate diversity, or non-targeted invertebrate biomass, as a result of human activity in the park
11 Targeted finfish	Target finfish diversity and abundance in the park is maintained or increased over current levels **(KPI)**
12 Targeted invertebrates	In sanctuary and special purpose zones target invertebrate abundance is maintained or increased over current levels
13 Seabirds and migratory waders.	No loss of seabird and migratory wader diversity, or abundance, as result of human activity in the park
14 Cetaceans	No loss of cetacean diversity, or marine mammal abundance, as a result of human activity in the park
15 Monkey Mia dolphins	No loss of abundance of bottle-nosed dolphins at Monkey Mia, and no decline in health, as a result of human activity in the park **(KPI)**
16 Dugongs	No loss of dugong abundance as a result of human activity in the park (other than from indigenous take) **(KPI)**
17 Loggerhead turtles	No loss of turtle abundance as a result of human activity in the park **(KPI)**
18 Green turtles	No loss of turtle abundance as a result of human activity in the park **(KPI)**
19 Seascapes	Maintenance of amenity values of designated seascapes in the park **(KPI)**
20 Wilderness	Maintenance of amenity values of designated 'wilderness' in the park **(KPI)**

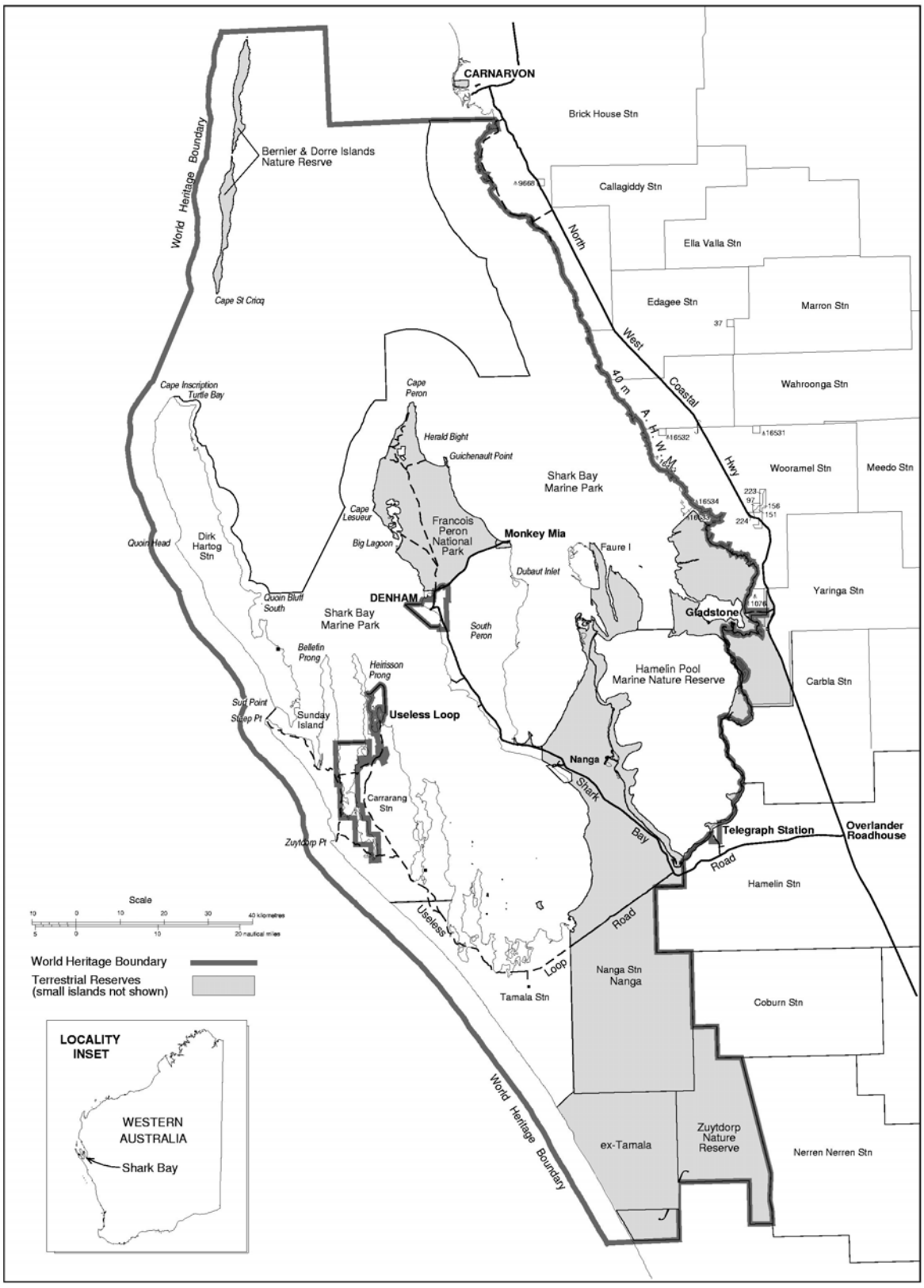

Figure 1: World Heritage Boundaries (Source: *Shark Bay World Heritage Property Strategic Plan 2006-2020*)

6. PLANNING AND MANAGEMENT CONTEXT

6.1 VALUES

World Heritage

Shark Bay is of outstanding global significance, having been inscribed on the World Heritage List in recognition of the area's outstanding universal natural values. Shark Bay was nominated for inclusion on the World Heritage List in October 1990, and at the time of listing in 1991 was one of only 11 places on the World Heritage List to satisfy all four natural criteria. These criteria are that the area contains;

- *outstanding examples representing the major stages of Earth's evolutionary history;*
- *outstanding examples representing significant ongoing geological processes, biological evolution and human interaction with the natural environment;*
- *certain unique, rare or superlative natural phenomena, formations or features of exceptional natural beauty;* and
- *the most important and significant habitats where threatened species of plants and animals of outstanding universal value from the point of view of science and conservation still survive*.

Other places that have satisfied all four natural criteria include Galapagos Islands (Ecuador), Mt Cook and Fiordland National Parks (New Zealand), Yellowstone, Grand Canyon and Great Smoky Mountains National Parks (USA), Tasmanian Wilderness and the Great Barrier Reef. Up to January 2007, there were just 16 sites globally that satisfy all four natural World Heritage criteria.

In addition to Shark Bay there are now sixteen other Australian World Heritage Properties: the Great Barrier Reef, Kakadu National Park, the Willandra Lakes Region, the Lord Howe Island Group, the Tasmanian Wilderness, the Central Eastern Rainforest Reserves, Uluru- Kata Tjuta National Park, the Wet Tropics of Queensland, Fraser Island, the Australian Fossil Mammal Sites (Riversleigh and Naracoorte), Macquarie Island, the Heard and McDonald Island Group, the Greater Blue Mountains area, Purnululu National Park, Royal Exhibition Building and Carlton Gardens and Sydney Opera House.

The Shark Bay World Heritage Area covers approximately 22 000 km^2, is 66% marine and has about 1500 km of coastline. The marine environment is a complex and interlinked set of systems, and many of the features of Shark Bay encompass more than one criterion. The region contains an outstanding example of Earth's evolutionary history in the stromatolites and hypersaline environment of Hamelin Pool. There are significant ongoing geological and biological processes in both the marine and terrestrial environments of Shark Bay. The Faure Sill and Wooramel Seagrass Bank are examples of the many superlative natural phenomena or features to be found in the World Heritage Area. The World Heritage Area also provides habitat for a number of rare and threatened species, and with many at the limit of their geographic ranges. Shark Bay is also noted for its natural beauty and in particular the diversity of its land and seascapes.

Seagrass covers over 4000 km^2 of the Bay, with the 1030 km^2 Wooramel Seagrass Bank being the largest known structure of its type in the world. The 12 species of seagrass in Shark Bay make it one of the most diverse seagrass assemblages in the world. Seagrass has significantly contributed to the evolution of Shark Bay as it has modified the physical, chemical and biological environment as well as the geology and led to the development of major marine features, such as Faure Sill. The barrier banks associated with the growth of seagrass over the last 5000 years have, with low rainfall, high evaporation and low tidal flushing, produced the hypersaline Hamelin Pool and L'haridon Bight. This hypersaline condition is conducive to the growth of cyanobacteria. The

cyanobacteria trap and bind the sediment to produce a variety of marine mats and structures including laminated structures known as stromatolites. Hamelin Pool contains the most diverse and abundant examples of stromatolites found in the world. These are living representatives of stromatolites that existed some 3500 million years ago. Also found at Hamelin Pool are ooid shoals which are limestone sands caused by precipitation of calcium carbonate from hypersaline waters. These are common in ancient geological sequences, but rare in modern seas.

Shark Bay is renowned for its marine fauna. For example, the dugong population, estimated at 10000 animals, is considered to be the second largest in the world. The Bay is considered to be one of the world's most important habitat for tiger sharks. Humpback whales use the Bay as a staging post in their migration along the coast. Green and loggerhead turtles occur in the Bay, with Dirk Hartog Island providing an important nesting site for loggerheads in Western Australia.

The Bay is located near the northern limit of a transition region between temperate and tropical marine fauna. Of the 323 fish species recorded from Shark Bay, 83% are tropical species with 11% warm temperate and 6% cool temperate species. Similarly, of the 218 species of bivalve molluscs recorded in Shark Bay, 75% have a tropical range and 10% a southern Australian range, with 15% being endemic to the west coast. Accumulations of bivalve mollusc shells have, over a long period of time, resulted in spectacular white beaches and ridges such as Shell Beach and coquinas or sedimentary rocks made from the shells. The steep local environmental gradients have also produced genetic variability among populations of marine species. Shark Bay is a focal point for genetic divergence; for example, there is variation between snapper populations inside Shark Bay and those outside, and between the eastern and western gulfs of the inner portion of the Bay.

Cultural Values

Aboriginal occupation has been dated to 30 000 years ago and there is evidence of reliance on the marine resources at Shark Bay in more recent sites investigated. Indigenous cultural heritage includes sites such as shell middens, quarries, rock shelters, artefact shelters, burials, stone arrangements, camps and archaeological sites, as well as language. Aboriginal sites including open shell middens, quarries, rock shelters, artefact shelters, burials and stone arrangements have been recorded for Shark Bay. Most of these sites directly overlook the shoreline or are close to it. There are over 80 known midden sites located along the coastline in the Shark Bay area.

The Shark Bay area has being occupied by the Malgana and Yadgalah people with the Nanda people occupying the land south of Shark Bay to Kalbarri. A limited amount of information on the traditional life and customs of these people is available from records of observations of Europeans. Drawings made during the French scientific expeditions of 1801 depict semi-permanent Aboriginal camps on Peron Peninsula. Smoke was seen by navigators on Dirk Hartog Island, Edel Land and the eastern shores of Shark Bay. Since the 1850s, Aboriginal people in the Shark Bay area have been closely involved in the pearling, pastoral and fishing industries, and by the early 1900s had become reasonably well integrated with the Chinese, Malay and British settlers. The local Aboriginal people today maintain a strong involvement in the fishing industry.

Shark Bay was the site of the first recorded European landing in Australia in 1616 by Dirk Hartog. Other explorers followed and several scientific expeditions by the British and French during the 1800s are significant for their observations and collections. Ten shipwrecks are believed to have occurred in Shark Bay between 1841 and 1909 and some associated land camps have been located. The coastline contains many remnant camp sites associated with the pearling and guano industries. Historical artefacts exist within the marine reserves as a result of past pastoral, fishing and sandalwood activities.

Managing the Values

The role of the Western Australian Government is to manage the Shark Bay World Heritage Area to fulfil obligations under the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention). In addition, the Shark Bay Marine Park and the Hamelin Pool Marine Nature Reserve declared under WA legislation lie wholly within the World Heritage Area, and it is a requirement under the CALM Act that management plans be prepared for the marine park and the marine nature reserve.

Adjoining the marine park at the high water mark is the Monkey Mia Reserve (No. 1686) which covers 477 ha. This reserve is jointly vested with the Shire of Shark Bay and the Executive Director of DEC for the purpose of "Recreation" (the *Monkey Mia Reserve Draft Management Plan* recommends the purpose be extended to "Recreation and Conservation of Flora and Fauna"). This reserve contains all public facilities in the area and surrounds an additional Shire Reserve on which the Monkey Mia Resort is located. Because of the strong interaction between the management of the coastal strip and the marine park, it is crucial that management and planning be integrated to ensure the objectives of the two areas are achieved.

Monkey Mia presents a complex range of specific issues such as dolphin feeding and interaction procedures, beach access and usage and the public use of the Information Centre. Because of this complexity a separate draft management plan has been jointly prepared by the Shire of Shark Bay and DEC which specifically addresses these issues. An MOU relating to the management of this reserve by DEC is now in development.

World Heritage Values of Shark Bay
(as expressed in the listing nomination 1990)

Criterion 1: Outstanding examples representing the major stages of the earth's evolutionary history.

- Stromatolites and microbial mats of Hamelin pool
- Hamelin Pool and L'haridon Bight and Holocene deposits

Criterion 2: Outstanding examples representing significant ongoing geological process, biological evolution and man's interaction with his natural environment.

Marine Environment

- Unique hydrological structure, banks and sills, steep salinity gradients, three biotic zones
- Faure sill
- Hypersaline environment of Hamelin Pool
- Microbial communities
- *Fragum eragatum* shell deposits
- High genetic biodiversity (e.g. snapper, venerid clams, bivalves)
- Seagrass meadows, and their role in the evolution of the marine environment
- Wooramel seagrass bank, expanse of meadows and diversity of seagrass species
- Carbonate deposits and sediments
- Northern limit of transition region between temperate and tropical marine environments, resulting in high species diversity (e.g. 323 fish species, 218 bivalve species, and 80 coral species)

Terrestrial Environment

- Botanical province transition zone, most pronounced in the southern parts of Nanga and Tamala
- Range limits (145 plant species at northern limit, 39 species at southern limit, and 28 vascular plant species endemic).
- Isolation of fauna habitats on islands and peninsulas resulting in survival of threatened species

- Range limits and fauna species richness (100 species of herpetofauna – 9 endemics, 230 species of birds representing 35% of Australia's total species)
- Species evolution illustrated in Rufous Hare Wallaby and Banded Hare-Wallaby.

Criterion 3: Superlative natural phenomena, formation or features, for instance, outstanding examples of the most important ecosystems, areas of exceptional natural beauty or exceptional combinations of natural and cultural elements.

- Stromatolites
- Hypersaline environment of Hamelin Pool
- Faure sill
- Wooramel seagrass bank
- Coastal scenery – Zuytdorp cliffs, Dirk Hartog Is, Peron Peninsula, Heirisson and Bellefin Prongs
- Fragum beaches of L'haridon Bight
- Inundated birridas and lagoons such as Big Lagoon.
- Strongly contrasting colours of the dunes/cliffs, beaches and adjacent ocean of Peron Peninsula
- Abundance of marine fauna (dugongs, dolphins, sharks, rays, turtles and fish)
- Annual wildflower season display.

Criterion 4: The most important and significant natural habitats where threatened species of animals or plants of outstanding universal value still survive.

Five out of Australia's 26 endangered mammals (Shark Bay mouse, Banded Hare-Wallaby, Rufous Hare-Wallaby, Western Barred Bandicoot, and Burrowing Bettong) survive in Shark Bay

- Bernier Island subspecies of Ash-grey mouse
- 12 threatened reptiles (e.g. Baudin Island Skink and Woma)
- Endemic Sandhill Frog
- 35 migratory bird species
- Threatened Thick Billed Grasswren
- Endemic Dirk Hartog subspecies of the southern emu-wren
- Dugong (approx. one eighth of the world's population)
- Humpback Whale
- Loggerhead and Green Turtles
- Some threatened flora species

Source: Shark Bay World Heritage Property Strategic Plan 2008-2020

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.

- *World Heritage* – The SBMR are fully enclosed within the Shark Bay World Heritage Property, and hence the reserves are fully subject to all relevant aspects of this legislation. This Act provides the basis for protection and management of the property so that it is managed/maintained consistent with the articles of the World Heritage Convention. The responsibility for delivering an appropriate form and extent of management is subject of a joint agreement between WA and the Commonwealth: *Agreement between the State of Western Australia and the Commonwealth of Australia on Administrative Arrangements for the Shark Bay World Heritage Property in Western Australia*, 12 September 1997 (referred to as the 1997 State-Commonwealth Agreement, see www.sharkbay.org).

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 review 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 management plan, the current impacts and likely increases in recreational fishing, examples of poorly managed fringing lands (including camping grounds and excess soil erosion in the local catchments), the risks to the Hamelin Pool Marine Nature Reserve, and the complexity and inadequacy of the existing tenure and management arrangements at Monkey Mia. Many of these issues have been found in this review to represent risks to the integrity of the marine park and reserve. As a result, a number of findings are documented below, together with recommendations for corrective action.

8. FINDINGS OF THE REVIEW

8.1 MANAGEMENT SYSTEMS

The management systems for SBMR 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 the SBMR. This audit and review is therefore focused on an assessment of the present-day issues and management responses, recognising that these have evolved continuously throughout the 10-year life of the existing SBMR 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 review, there is no timetable or structure for the preparation of a new management plan for the SBMR. This will be critical for the ongoing effectiveness and efficiency of management of the SBMR and the maintenance of world heritage values. Given the timeframe and resourcing needed to prepare and gazette a new management plan for the SBMR, an interim action plan will be needed to permit the orderly development of urgent management responses to the present-day issues.

Recent increases in the recurrent management budget have greatly improved the management capacity. However, additional funds are required to bring the capacity in line with other marine parks in WA, and Australia. The present day (07-08) WA funding of about $460,000 appears to be significantly under-resourcing the management, recognising the size and the world heritage quality of the SBMR assets and biodiversity, and the present and expected recreational pressures. A key aspect of any increased funding would be to provide for an improvement in both DEC staffing and operational funds, and provision for increased recreational fisheries research to address the need for park-specific fishing regulations and research programs.

The management and maintenance of commercial recreation and tourism ventures may need to be supported by the introduction of a small visitor levy, as is the case in many other world heritage properties worldwide. Any such funds should be wholly allocated (net proceeds) to supporting visitor programs.

The recent announcement by the Minister for Fisheries that there will be a new building in Denham to provide for DEC and DoF co-location is a very welcome and positive move towards more efficient management of the SBMR.

A recent review of the economic return from investment into Australia's World Heritage Properties (Gillespie 2008) found that the Shark Bay World Heritage Property contributes a very substantial multiplier return on investment of management resources. Management of the property was estimated (2006-07) to cost $2.6M, and contribute;

- · $4.1 million in annual direct and indirect output or business turnover;
- · $2.7 million in annual direct and indirect value added;
- · $2.1 million in annual direct and indirect household income; and
- · 36 direct and indirect jobs.

Visitation to the Shark Bay WHP (this is a minimal estimate, using the 2006-07 visitor numbers to Monkey Mia alone) was estimated to contribute;

- · $30.5 million in annual direct and indirect output or business turnover;
- · $13.8 million in annual direct and indirect value added;
- · $8.6 million in annual direct and indirect household income; and
- · 247 direct and indirect jobs.

It is outside the scope or resources of this review process to consider in detail the level of funding that will be adequate for the management of SBMR. However, given the observed inadequacies and apparent under-funding of management, and the substantial leverage that good management would appear to provide for the region and the state, a detailed government review of current funding levels for management of the SBMR should be implemented to determine if investment in management can be enhanced beyond current levels and will continue to provide returns similar to those above.

Education and Interpretation

The planned expenditure of education and interpretation has been constrained by a lack of other resources, and this needs to be revived to be consistent with target expenditure. Areas in need of activity are highlighted elsewhere in this report and include, for example, programs to create an increased awareness of SBMR in Carnarvon, and a systematic program to improve awareness of fishing regulations in Useless Loop coupled to compliance patrols and a surveillance program that could be developed in partnership with Shark Bay Resources.

Public Participation

There is no Community Advisory Committee for the SBMR, and this should be established in the short term to assist with the process of developing a new management plan, and then to provide ongoing input to DEC and DoF. As part of this process, a new advisory committee is also needed to assist DEC to address management issues at Monkey Mia.

Patrol and Enforcement
The joint program of patrols and enforcement (DEC and DoF) is a strong feature of the present-day management system in SBMR. There are a number of fine-scale improvements required, but these are expected to be further developed as both experience builds and when the two agencies are co-located in Denham in the new facility. A significant issue impeding more effective compliance patrols is that DoF has not been allocated specific funding for marine park compliance in Shark Bay.

Management Intervention and Visitor Infrastructure
There have been only very limited funds made available for the planning and infrastructure needs at key visitor sites in the SBMR. As a result, at some sites, there are early signs of degradation and environmental impacts that need to be urgently corrected. This involves sites controlled by DEC, pastoral lessees, or local government. Irrespective of ownership/control, funds need to be allocated to the planning and management issues associated with these sites, particularly as visitation is expected to progressively increase over the next 10 years.

Research
There are major knowledge gaps in relation to ecosystem diversity, and in distribution, structure, and function of key ecological values. There is no systematically compiled map of habitats for the whole of Shark Bay, or the World Heritage Property. Equally, the distribution and significance of recreational uses and anthropogenic pressures are not well known. In particular, the impact of recreational fishing is very poorly understood, and is preventing an appropriate assessment of the condition of the populations of exploitable species, and the development of park-specific management arrangements for fishing that are linked to conservation objectives for the SBMR.

The lack of research on the exploited species and the commercial and recreational fishing impacts is one of the three most critical knowledge gaps currently affecting the management of SBMR and Shark Bay as a whole. The second critical gap in knowledge is the impacts of shoreline camping/access and watershed erosion on the marine habitats. The third critical gap in knowledge is the likely nature and extent of climate change impacts on the shallow water and intertidal marine ecosystems of the SBMR.

Taken together, these three areas of uncertainty underpin the major risks to the maintenance of the assets and biodiversity of SBMR, and should be accorded the highest priority within specific research programs designed to support the management framework and systems.

There are good initiatives underway to compile a centralised system for recording research data from earlier research programs in the bay, and these need to be enhanced to ensure that public funds are efficiently used to inform management issues.

Monitoring
There are major gaps in the performance monitoring program for the SBMR, and although there are contemporary initiatives underway within DEC to resolve these, they will need a considerable focus and ongoing effort. This will include the activities of the DEC Marine Science Program, but also coordination of activities across other agencies, universities, and various other research providers who are currently active in the various areas of SBMR.

At the time of this review, performance monitoring is very limited, and there is only a very limited (mainly qualitative) basis upon which the condition of the assets and biodiversity can be assessed, and hence also upon which the effectiveness of the management system can be assessed.

8.2 MANAGEMENT PERFORMANCE

The audit assesses the outcomes of management of the SBMR by reviewing 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 table.

TABLE 3: Audit assessment summary

Values	Performance Indicator (Summary)	Performance Summary
1 Seabed Geomorphology	The structural complexity of seabed geomorphology of the park is not significantly altered by human activities	There are few significant threats to the seabed geomorphology, and although there is no specific performance report on this indicator, there appears to be no significant issues. The principal issues relates to watershed management and erosion, sea level rise and climate changes.
2 Water quality	There is no change in water quality of all reserve waters from 'background' levels, as a result of human activity in the park **(KPI)**	Coastal and watershed management have permitted significant erosion events that deliver large volumes of sediment and organic materials into the waters of the SBMR. It is not clear if this constitutes change from background levels as a result of human activity. Equally, it is not known if the present-day pattern of sediment delivery to the SBMR will be exacerbated by the expected gradual changes in climate, and therefore what adaptation measures might be feasible/required throughout the proximal and distal watersheds of the reserves. The input of human waste into the bay is also a significant problem, particularly from uncontrolled camp sites and from vessels. The dumping of sullage from vessels should be prohibited in the bay and in state waters.
3 Sediment Quality	There is no change in sediment quality of all reserve waters from 'background' levels, as a result of human activity in the park **(KPI)**	As for water quality, the sediment quality may be affected by watershed issues, but there is no data/information on either existing quality of the sediments or the dynamics of change.
4 Intertidal benthic habitats	No loss of intertidal benthic community diversity, or biomass, as result of human activity in the park	Away from Denham, Monkey Mia and the Useless Loop townsites, the intertidal ecosystems (soft sediment, mangroves, beaches, rocky shores) appear to be in good condition (there are few proximal threats). However, the limited biological data that are available from a range of disparate studies have not been ocalized d to address this indicator.
5 Subtidal coral communities	No loss of coral diversity, or biomass, as result of human activity in the park	As for intertidal benthic habitats, the available (very limited) data have not been ocalized d to address this indicator. Recent habitat mapping has delineated specific coral areas, although there is little information on their condition or dynamics.
6 Seagrass meadows	No loss of seagrass diversity, or permanent loss of above-ground biomass of perennial seagrass, as result of human activity in the	As for intertidal benthic habitats, the available (very limited) data have not been ocalized d to address

	park **(KPI)**	this indicator. Qualitative assessments indicate that the seagrass systems are in good condition, although there is concern that significant areas of seagrass in Shark Bay are not within the SBMR boundaries, and are therefore at greater risk.
7 Mangrove communities	No loss of mangrove diversity, or biomass, as result of human activity in the park **(KPI)**	As for intertidal benthic habitats, the available (very limited) data have not been ocalized d to address this indicator. However, the mangrove communities are under increasing pressure and there appears to be declining condition at a number of localities. The qualitative evidence is that the mangrove systems may be affected by human activity, and so achievement of this KPI could be marginal because of specific impacts in a number of local areas.
8 Microbial communities (stromatolites and algal mats)	No loss of above-ground biomass of microbial communities, or decline in overall health, as result of human activity in the park **(KPI)**	The microbial communities of Hamelin Pool are in good condition, but outside the Nature Reserve, their condition is unsatisfactory. While the impacts are ocalized, and from several sources (un-managed off-road vehicle access, feral animal trampling, sediments derived from coastal lands that have been overgrazed, illegal removal of stromatolites), the physical damage does not recover. Ignoring historic damage, there is a continuing low level of damage to stromatolites outside the nature reserve, and while the damage has not been quantified, achievement of this KPI is marginal.
9 Non-targeted finfish	No loss of finfish diversity, or protected finfish species abundance, as a result of human activity in the park **(KPI)**	The non-target fish communities appear to be in good condition, although there are major concerns about exploited species and the indirect consequences the heavy exploitation has on ecologically related non-target fish species. Amongst other issues, there is concern for the possible direct and indirect impacts of target species fishing on the tiger shark population of the SBMR, which preliminary evidence from the Monkey Mia area indicates may be in decline. Also, serial depletion in the recreational fishery that will convert formerly non-targeted fish populations into targeted fish populations is of increasing concern as recreational fishing pressure rises and permitted catch levels of targeted species decrease. Despite the lack of quantitative data, the risks are significant, and

		achievement of this KPI is probably marginal.
10 Non-targeted invertebrate communities	No loss of invertebrate diversity, or non-targeted invertebrate biomass, as a result of human activity in the park	The non-target invertebrate communities appear to be in good condition, and there appear to be few major pressures.
11 Targeted finfish	Target finfish diversity and abundance in the park is maintained or increased over current levels. In sanctuary and special purpose (scientific reference) zones target finfish diversity and abundance in the park is maintained or increased over current levels **(KPI)**	The condition of target fish varies with species. The whiting population is assessed for production purposes (fishing) as in good condition, while production assessments of pink snapper sub-populations vary from low to depleted. This KPI is poorly formed and will need to be completely revised in the new management plan. Amongst other issues, the inferred performance benchmark ('current levels') remains unspecified, the use of production benchmarks as the assessment basis is not appropriate for biodiversity conservation purposes, trigger levels for action are based on maintaining catches above a CPUE benchmark, which provides almost no basis for effective fishery management for biodiversity conservation purposes. The condition of the populations of targeted fish in SBMR therefore cannot be assessed in this review, but the strong inference (from the production data) is that the biomass (population abundance) of pink snapper, and possibly several other species, is considerably too low to provide for their effective biodiversity conservation in SBMR. The Department of Fisheries is taking strong action to recover pink snapper stocks to acceptable production levels.
12 Targeted invertebrates	In sanctuary and special purpose (scientific reference) zones target invertebrate abundance is maintained or increased over current levels	The condition of the targeted invertebrate species in SBMR (prawns, scallops, crabs) is unknown. There is significant community concern that commercial crab fishing is rapidly increasing and may lead to a major decline in crab population. The basis for limiting the assessment in this indicator to only sanctuary and special purpose zones is also unclear. This indicator is poorly structured, cannot be effectively assessed, and will need to be completely revised in the new management plan to provide for specific indicator(s) that can be measured and relate directly to the conservation of the populations for biodiversity purposes in the SBMR.

13 Seabirds and migratory waders.	No loss of seabird and migratory wader diversity, or abundance, as result of human activity in the park	The condition of the seabird and waders is assessed as good, although there are a range of local pressures that may affect their use of high-tide refuges and specific feeding grounds.
14 Cetaceans	No loss of cetacean diversity, or marine mammal abundance, as a result of human activity in the park	The cetaceans are assessed to be in good condition in the SBMR. While some are migratory, and population impacts are located elsewhere, there are few pressures in cetacean populations from within the SBMR.
15 Monkey Mia dolphins	No loss of abundance of bottle-nosed dolphins at Monkey Mia, and no decline in health, as a result of human activity in the park **(KPI)**	The Monkey Mia (provisioned) dolphins are assessed as being in good condition. There is an intensive program of visitor and Commercial Tourism Operator (CTO) management that has resulted in the maintenance of the dolphins and the contingent visitor experience.
16 Dugongs	No loss of dugong abundance as a result of human activity in the park (other than from indigenous take) **(KPI)**	The dugong population in SBMR is assessed as good. There are some minor pressures on the population, but the quantitative data indicates a stable population is being maintained.
17 Loggerhead turtles	No loss of turtle (loggerhead) abundance as a result of human activity in the park **(KPI)**	Turtle abundance is estimated by the surrogate measure of number of nesting turtles, and this appears to have remained at an acceptable level, despite some local pressures and considerable inter-annual variability. Continuing threat reduction and monitoring of nesting turtles is essential, but at present this KPI appears to have been reasonably achieved.
18 Green turtles	No loss of turtle (green) abundance as a result of human activity in the park **(KPI)**	There are no quantitative data on green turtles, and this KPI cannot be assessed. There are proximal and distal pressures (as for loggerheads) and continued efforts are required to reduce these pressures.
19 Seascapes	Maintenance of amenity values of designated seascapes in the park **(KPI)**	The seascapes are assessed as good, although the Shark Bay Resources facility (which is outside the SBMR) dominates the seascape from many parts of the SBMR. The new management plan will need to articulate a clear policy objective and targets on visual catchment and height restrictions for all future developments in and adjacent to the SBMR.
20 Wilderness	Maintenance of amenity values of designated 'wilderness' in the park **(KPI)**	The wilderness amenity is assessed as good. However, the escalating shoreline camping and other uncontrolled activities (such as boat launching) are

		placing the wilderness amenity under pressure, and this will need to be explicitly articulated as a policy objective and targets in the new management plan.

8.3 MANAGEMENT FINDINGS AND RECOMMENDATIONS

The findings of the review, 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.

Finding 1 (F1)

The SBMR Management Plan No. 34 is outdated and does not provide an adequate basis for responding to the World Heritage values, management of the reserves or reporting on the effectiveness of management. Present-day management arrangements deal with specific management issues as they arise, but there are several examples where the inadequate management plan has hindered the development of appropriate management and reporting of the natural and recreational values.

*Recommendation (R1): The **management plan should be fully revised** and updated to be consistent with the modern DEC outcome-based management systems. The new plan should recognise and respond to the following aspects:*

a. Recognise and provide for implementation of all of the high priority actions identified in the Shark Bay World Heritage Property Strategic Plan 2008-2020 that are relevant (either directly or indirectly) to the marine habitats and ecosystems of the whole of Shark Bay;

b. The marine park should include the full range of representative habitats, with samples meeting at least the scientific expectations for levels of protection outlined for reserves accredited as part of the NRSMPA (<www.uq.edu.au/spatialecology/mpaguidelines>);

c. The boundaries of the marine park should be extended to match the marine boundaries of the World Heritage Property, which would permit the habitats to be more fully protected, provide for a clearer jurisdictional setting for stakeholders and agencies, and give effect to the intention of several tenure changes proposed in the Shark Bay Regional Strategy (1997);

d. Specifically recognise the adjacent land-based activities and catchment management as threats to the values of the reserves, and provide for specific resourced mechanisms for an integrated approach to managing these land-based sources to avoid impacts on the reserves;

e. Recognising and providing for the increasing intensity of recreational fishing effort, provide a series of special purpose (recreational fishing) zones within a General Use zone where a range of fishing experiences are created within various boating distances from Carnarvon township, These zones should be designed to attract fishing effort away from sanctuary zones and other sensitive areas, and to offset for increased areas of the Bay where fishing may be removed through new sanctuaries or other fishing restrictions;

f. To constrain excessive recreational effort, the use of set nets to be prohibited in all zones of the Park (beach haul and throw nets permitted in General Use zones only);

g. Spearfishing and the carriage of spearguns should be prohibited in all zones of the reserves, including General Use zones;

h. Commercial fishing for prawns and scallops, together with limited commercial seine-net fisheries and crab potting may be permitted within the park, within identified zones;

i. *Provision for sullage pump-out at key locations around the Bay (particularly Monkey Mia, Denham and Canarvon) or effective on-board treatment systems, and increased controls on vessels transiting and berthing at Useless Loop to prevent dumping of sullage in the bay or in state waters;*

j. *Creation of specific zones for recreational and tourism opportunities, such as controlled dive sites near Dirk Hartog Island;*

k. *A Management Advisory Committee (MAC) should be established for the Marine Park and Marine Nature Reserve, with involvement from relevant stakeholder groups and agencies, consistent with the DEC guidelines on park advisory groups;*

l. *A series of Key Performance Indicators, each with a matched monitoring and reporting system that is resourced to deliver an appropriate level of information in a timely manner for management reporting and review.*

Finding 2 (F2)

There is confusion about the different jurisdictional boundaries of the WHP and the marine reserves, and the specific roles of the Commonwealth, the State and the local government agencies is unclear to stakeholders. This appears to be mainly the result of the lack of coherence of the WHP boundaries with the marine park boundaries, the joint vesting of the majority of the seabed of Shark Bay with the Minister for Transport under the Marine and Harbours Act (1981), and the extent of the Port of Carnarvon.

Recommendation (R2): The ***Commonwealth's role*** *and contribution to managing the Bay should be more properly formalised and recognised to provide increased opportunities for synergies between the WHP and the SBMR. This should be provided through an enhanced recognition and role of both the* Shark Bay World Heritage Property Community Consultative Committee *and the* Scientific Advisory Committee *in the updated management plan, and specifically in providing for more coordination and increased resourcing of project-based initiatives related to the strategic marine management issues of the property (and see R1). Issues related to the joint vesting of land/waters also need to be resolved to clarify jurisdictional responsibilities.*

Finding 3 (F3)

The pastoral lands bordering the marine reserves appear to be, in some places, highly degraded, and are likely to result in accelerated erosion and increasing impacts on the marine waters of the park and the nature reserve. The Strategic Plan indicates that the stromatolites are 'at risk', even though the majority are contained within WA's only Marine Nature Reserve and intended for the highest level of protection.

Recommendation (R3): ***Control catchment impacts****: there is an urgent and pressing need for integrated management arrangements for the near shore and upper catchments to reduce the erosional impacts and indirect impacts on the reserves. This should be established in conjunction with the NRM bodies of the region, be properly reflected in the management plan discussed in R1, and directly involve the Pastoral Lands Boards and local government.*

Finding 4 (F4)

Uncontrolled camping and access in some areas has accelerated to a level that now requires specific control and management measures to be implemented; these will need to control access to, and impacts on, the park.

<u>Recommendation (R4):</u> ***Buffer zones****: the new management plan should address the issue of buffer zones for the reserves, and deal with camping issues specifically through bi-lateral negotiations with existing holders of pastoral leases and the shires (and see R3).*

Finding 5 (F5)

The habitat types represented in the sanctuary zones and other zones of the reserves are not representative of the habitats of the Shark Bay ecosystems. Some key sensitive habitats of high biodiversity value in Shark Bay (such as further areas of stromatolites) remain unprotected.

<u>Recommendation (R5):</u> ***Key areas of each representative habitat*** *should be brought within the reserves' boundaries prior to the establishment of the new management plan.*

Finding 6 (F6)

There are a number of complex management issues in the Monkey Mia area that require urgent management attention. These involve the issues surrounding access to the 'provisioned' (hand-fed) dolphins, tourism access to various zones of the park, and clarity of management responsibilities between DEC, local government and the private sector operators. In particular, issues to be resolved surround the recent zoning changes within the separately vested Monkey Mia Reserve, creation of the Monkey Mia Conservation Park (vested in the Conservation Commission), the expansion of the reserve boundaries for the existing resort, the creation of an additional lot for the subsequent development of a second resort, and the creation of a reserve for aquaculture and associated tourism purposes that may adversely impact on the park values. The lack of a vessel pump-out facility at Monkey Mia (and anywhere else in the Bay) is a matter of significant concern, given the low nutrient status of the ambient waters and the high proportion of short stay overseas tourists. Raw sewage continues to be dumped from many (possibly all) vessels, and this poses a significant risk to the Bay from both the nutrient and microbiological impact perspectives.

<u>Recommendation (R6):</u> ***Monkey Mia****: the outstanding MOU on the management of the Monkey Mia reserve area needs to be finalised urgently. Consideration should be given to subsequent management of the area based on a special purpose area established for the purposes of recreation and conservation, derived and implemented prior to the process discussed in R1 above. Consideration should also be given to amalgamation of all interests (including the Conservation Commission) with the creation of a tourism precinct, an expanded Monkey Mia community advisory committee, and development of further park awareness/educational material for distribution within the Denham/Monkey Mia area.*

Finding 7 (F7)

Recreational fishing and boating (other than for pink snapper) appears to currently be at an acceptable but increasing level of effort, although the condition of fish stocks is poorly known. Every stakeholder consulted (and the agencies) predict a rapid increase in fishing effort because of increased restrictions imposed on recreational catch in the west coast waters. This is expected to result in the northward displacement of recreational fishers to Shark Bay and to create a rapid expansion in recreational fishing. The situation for pink snapper remains poor—one major stock

that has failed to recover from intensive overfishing of spawning aggregations, and the remaining stocks, while apparently recovering, also remain at levels too low for the achievement of conservation objectives of the park. Evidence was presented indicating concern for serial depletion of recreationally targeted fish stocks. Observations from one researcher suggest that there may be a progressive decline in size and numbers of tiger sharks occurring in SBMR.

Recommendation (R7): ***Recreational fishing constraints*** *need to be increased within Shark Bay. This is intended to reduce the impacts of recreational fishing on fish populations that are important elements of the biodiversity of SBMR. Consideration should be given to preparation of additional park-specific fishing rules, and particularly reduction of the existing possession limits. These limits may need to be tightened considerably to permit populations in SBMR to rebuild to levels consistent with conservation standards. Tiger sharks (currently a Bag Limit of 2 applies) should be considered for declaration as a 'Totally Protected' species within the SBMR. Together with the other recreational fishing constraints identified in R1, the intention of this recommendation is to restore levels of exploited fish populations within the park to acceptable minimum conservation standards while retaining commercial fishing within the Bay and providing for enhanced recreational fishing opportunities through the strategic location of zones specifically for recreational fishing purposes (see R1).*

Finding 8 (F8)
Commercial fishing is at an acceptable level, although targeting of spawning aggregations of pink snapper within the Bay (Koks Island) remains a critical issue to be resolved. Gross violations of the park regulations (trawling in the sanctuary zones) need to be fully and effectively prosecuted to the full extent of the regulations, and it is not clear if this has been the case in one recent incident.

Recommendation (R8): ***Spawning aggregations*** *of any targeted species occurring within the park should be protected within sanctuary zones as an urgent and precautionary measure to protect both recreational and commercial fishing opportunities in the bay and nearby coastal waters. Also, the sanctuary zones need to be enlarged and provided with clear and explicit boundaries upon which successful prosecutions for compliance violations can be based.*

Finding 9 (F9)
The recreational fishing based in Useless Loop township, particularly in respect of short term contractors, appears to be not well managed, and made more difficult by the isolation of the township and the minesite situation.

Recommendation (R9): ***Useless Loop****: an improved education/awareness program for park and fishing issues should be developed within the Useless Loop townsite, particularly at the school and as an adjunct to the workforce (temporary and permanent) working conditions. More regular unannounced land-based patrols by fisheries compliance officers are also required.*

Finding 10 (F10)
The traditional hunting of dugong, 6 species of turtle and 2 species of crocodile is permitted in all WA lands/waters (possibly including nature reserves and parks) under provisions of the Wildlife Conservation Act 1950, and the 1970 Wildlife Conservation Regulations. However, within the SBMR (and the Bay generally) this traditional take of species is only permitted by Aboriginal people who are holders of the rights to take such species consistent with Section 211 of the Native Title Act 1993 (Cmwlth).

Recommendation (10): ***Traditional take****: people entitled to take protected species from the different zones of the SBMR — identified holders of Native Title rights, in terms of the various provisions of the Native Title Act 1993—need to be clarified before the new management plan is developed.*

Finding 11 (F11)
Management of the Hamelin Pool Marine Nature Reserve (HPMNR) is of the utmost priority. There may be a case for establishing an individual subset of objectives within a new management plan that are specifically focused on the management needs of the HPMNR, matched to an appropriate level of management resources.

Recommendation (R11): ***HPMNR:*** *during the development of the new management plan, consideration should be given to a separate management planning identity for the HPMNR within the overall plan, together with specifically allocated management resources.*

Finding 12 (F12)
Access to the HPMNR needs to be tightly controlled. Access to the MNR under the *Mining Act 1978* for any purpose without case-by-case approval of DEC is inconsistent with maintaining the MNR values.

Recommendation (R12): ***Mining Act****: as a matter of urgency, DEC should seek to have the provisions of the Mining Act amended in relation to access to marine sanctuaries and nature reserves, so that DEC staff can confidently engage with all entrants and all forms of access to Marine Nature Reserves for any purpose. The intention should be to enable DEC staff to establish pre-agreed arrangements for access that is authorised under the DMP regulations.*

Finding 13 (F13)
Stakeholders in Carnarvon seem to be poorly aware of the park and its values.

Recommendation (R13): *Much* ***better community education programs*** *about the reserves are required. They should include activities aimed at visitors and residents of Carnarvon to inform them about what is protected and why, including fishing issues and the new terrestrial additions to Dirk Hartog Island and Edel Land, as increased land access will impact on the marine reserves. Education and participation programs should be targeted at park users based at Carnarvon and Useless Loop, and as far as practical, to the foreshore-camping users of the park*

Finding 14 (F14)
Shires' engagement and recognition of the reserves and their values seems limited.

Recommendation (R14): *Both* ***shires should be given significant roles*** *(Shire of Shark Bay and Shire of Carnarvon) in the Management Advisory Committee to be established under R1.*

Finding 15 (F15)
There is a very limited database from which conclusions about the health of the natural ecosystems and their values can be drawn. The exceptions to this are data on dugongs, and some information

on sharks and dolphins. Inferences about the condition of the Shark Bay ecosystems and species must therefore be drawn from assessments of the presumed significance of risk factors.

Recommendation (R15): ***Short term priorities for research and monitoring*** *should be focussed on providing information to inform reduction of the known threats, while developing medium term assessment and reporting protocols to assess the condition of the natural assets at the species, habitat and ecosystem level, including selected physical and ecological processes important for the ongoing maintenance of the values of the marine nature reserve. Also, in the medium term, define specific monitoring and reporting protocols to report on each KPI in the updated management plan.*

Finding 16 (F16)

The overall allocation of financial resources to Shark Bay Marine Reserves appears to be inadequate given the very large spatial scale and the values and complexity to be managed. There is no simple formula for overall funding of marine reserve management, but compared to other reserves in WA (and elsewhere in Australia), the total DEC contribution to management appears to be very limited (Figure 2). Equally, the Commonwealth's project-based funding of the WHP is limited—an annual average of about $500,000, of which only a proportion is allocated to marine management. The Commonwealth's funding of the Shark Bay WHP ranks 8th out of 10 amongst the state-managed world heritage properties (State of the Environment Reporting 2006 Indicator NCH-11), which appears to be very low given the breadth and extent of the terrestrial and marine values and issues to be managed at Shark Bay compared to a number of the other properties. The proportional allocation of the WA funds across the management areas within SBMR (compared to the other reserves - Figure 3) is appropriate except that the allocation to public education and participation appears to be low (see R13).

Recommendation (R16): A detailed government review of current funding levels for management of the SBMR should be implemented to determine if investment in management can be enhanced beyond current levels, recognising the substantial economic multipliers that all investments into increasing management activity in SBMR will bring to the local region. *Enhanced Commonwealth engagement should be sought for the development of improved education and participation programs, and for the development of the new management plan. Also, case by case, specific Commonwealth support should also be sought in the bidding for Commonwealth program funds for the high priority research projects related to land-based sources of impacts, fishing issues and climate-change adaptation in Shark Bay.*

Finding 17 (F17)

It is likely that an updated plan of management will take several years to develop and bring into operation. This means that the urgent actions required now may take a number of years to bring to fruition.

Recommendation (R17): ***A transitional plan of action*** *is required for implementation of urgent strategies and actions during the period of development of a new management plan for the marine reserves. This plan should address the urgent recommendations and provide the planning basis for the process of developing the updated full management plan. These matters include:*

a. adoption of park-specific recreational fishing measures, including research on the development of suitable fishing zones to provide for recreational fishing opportunities;

b. finalisation of Monkey Mia tenure and management issues;

c. development of camping and recreational access controls;

d. development of effective catchment management programs to control erosion in the major catchments;

e. implementation of temporary buffer zones within pastoral leases;

f. constitution of a MAC to advise on interim changes to management and prepare for the development of the new management plan;

g. provision of lawful authority to DEC to control access to Marine Nature Reserves and sanctuary zones under the Mining Act;

h. finalisation of habitat mapping to inform selection of representative habitats for high protection and special purpose fishing zones in the new plan;

i. revitalisation of the World Heritage Committee system to engage in the development of the new marine plan; and

j. provision of a strict sunset clause for the transitional plan of action, set at 3 years from inception or earlier in the event that a new management plan is gazetted.

8.4 AUDIT PROCESS

Finding 18.

There was a very high level of excellent and professional DEC and DoF support/engagement in the process of audit.

Finding 19

There was a high level of recognition and acceptance of the audit process by many of the stakeholders, including the tourism operators and researchers.

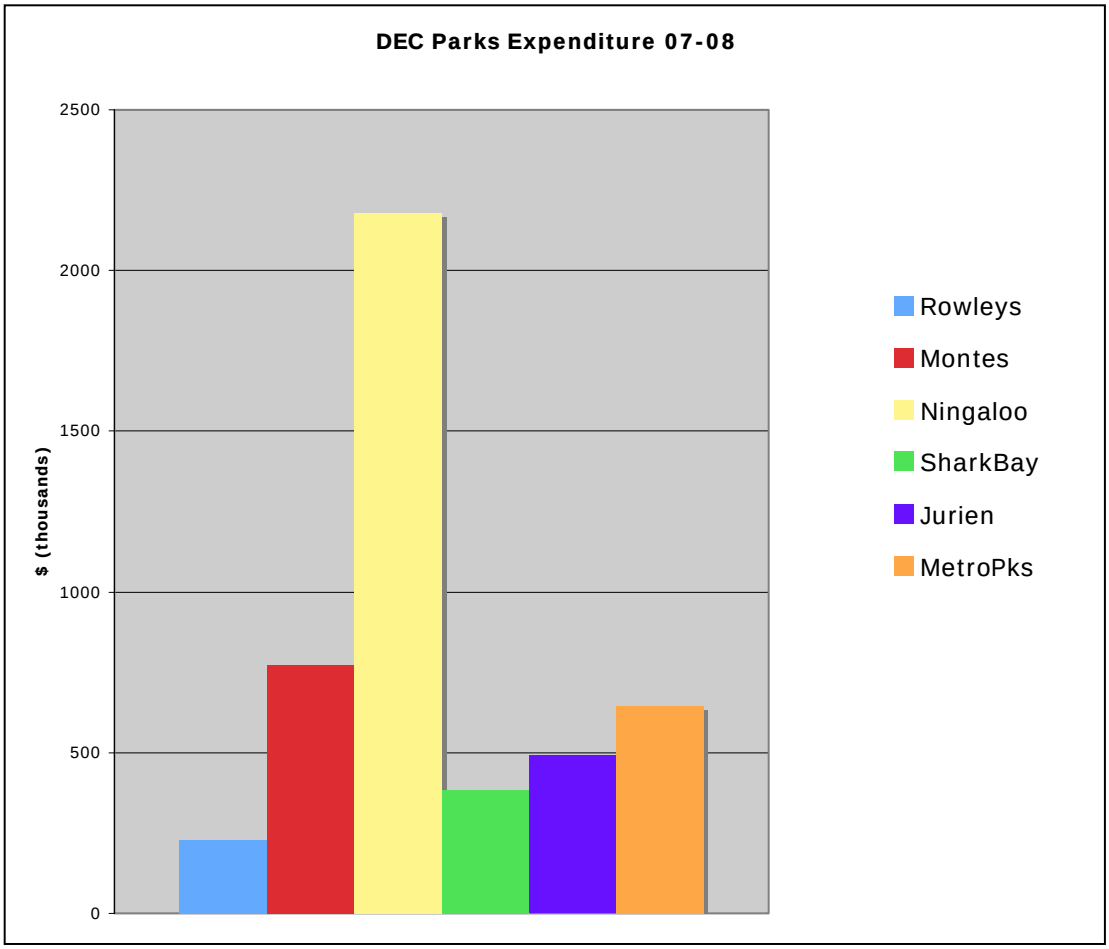

Figure 2: DEC resource allocation (2007-2008) amongst the six marine reserve reporting entities.

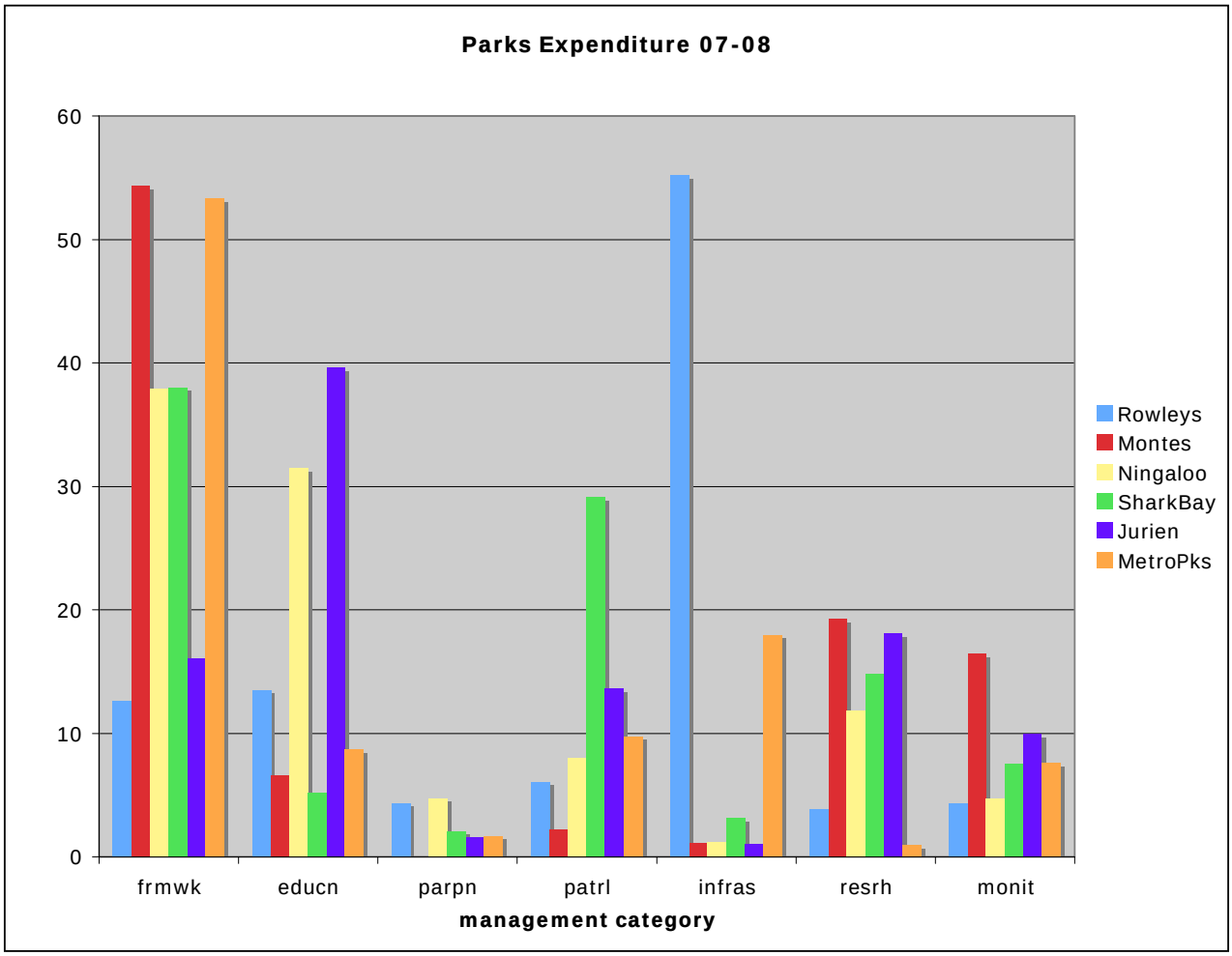

Figure 3: Relative distribution of DEC funds (2007-2008) by management category within each of the six marine reserve reporting entities.

9. DOCUMENTARY SOURCES PROVIDED TO THE REVIEW

The sources available for the Review can be accessed on request to DEC.

10. APPENDICES

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

1. Unlike recent outcome-based management plans (such as the Jurien Bay MP Management Plan), the Shark Bay Marine Reserves Management Plan 1996-2006 includes broad management strategies instead of specific and measurable objectives. Would you say this has impacted on the management of the marine park? Are there any specific examples of issues this may have created?

2. In your opinion is there adequate interaction between the State and Commonwealth Governments over the shared management of the Shark Bay Marine Reserves and the Shark Bay World Heritage Property? Is there an adequate process to develop integrated management strategies for the Shark Bay World Heritage area, Shark Bay Marine Park and Shark Bay Terrestrial Reserve?

3. The Monkey Mia area is managed separately to the rest of the Shark Bay Marine Reserves. Does this specific focus for management affect the management of broader issues and commercial tour operators of the Shark Bay Marine Reserves outside of Monkey Mia?

4. To what extent does the Shark Bay Marine Reserves Management Plan consider the potential impacts of marine management strategies on the adjacent terrestrial reserve and vice versa?

5. How has the limited amount of available quantitative data impacted on the management of the ecological values of Shark Bay Marine Reserves? Is there a plan to increase the amount of research and monitoring occurring within the Marine Park?

6. What are the biggest threats to the values of the Shark Bay Marine Reserves?

7. Is there adequate community engagement regarding the management of the Shark Bay Marine Reserves? Should a Management Advisory Committee specific to the SBMP be established? What other techniques could be used to develop or improve community engagement? Does the web site appropriately inform visitors of the recreational and educational opportunities and responsibilities?

8. Are there any current commercial and recreational fishing issues occurring within the Shark Bay Marine Reserves? Do these issues impact on the values of the marine park? What are the better fisheries that operate within the Reserves?

9. Are the existing marine park boundaries and zoning scheme adequate to ensure the effective management of the values of the Shark Bay Marine Reserves? How workable are the existing zone boundaries for both those responsible for policing them and those who are required to abide by them?

10. Have any marine pests been identified within the Shark Bay Marine Reserves? Are there any strategies that might be effective in managing the threat of introduced marine pests in the marine park?

11. There have been some reports of damage to the stromatolites at Hamelin Pool Marine Nature Reserve from trampling and 4WD vehicles. Are there any strategies that might be effective in

managing visitor access to the stromatolites to minimize further damage?

12. Does the allocated budget and resourcing for the Shark Bay Marine Reserves allow for adequate management?

13. Has the establishment of the Shark Bay Marine Reserves been well received and benefited the local community or has it been detrimental? Has it positively affected the marine environment of Shark Bay?

14. Are there any suggestions that should be considered for the future management of the Shark Bay Marine Reserves?

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

Location	Date	Name
Perth	*19Jun09*	*Department of Fisheries* Laurie Caporn Mervi Kanga Errol Sporer
		Mike Heithaus, *Florida International University, USA*
		Lindsay Collins, *Curtin University*
		Shark Bay Resources Hirofumi Matsuyama Anita Sarich
		Graham Stewart, Shark Bay prawn fishery representative Kane Moyle, RecfishWest Hamish Ch'ng, Shark Bay scallop fishery representative
		Jill StJohn, The Wilderness Society (email submission)
Carnarvon	*22Jun09*	Keith Van Dongen, Compliance Manager, Acting Gascoyne Regional Manager, Department of Fisheries
		Tony Kirwin, Department of Agriculture and Food, Carnarvon
		Cheryl Cowell, Shark Bay District Project Officer World Heritage, DEC
		Tony Dowling, Planner, Shire of Carnarvon
		Paul Burt, Owner/Manager of Brickhouse Station
		Ray Ellis, representative of Carnarvon Yacht Club
Denham	*23Jun09*	Kelly Gillen – Gascoyne Regional Manager, DEC Brett Fitzgerald – Shark Bay District District Manager Dave Holley – Shark Bay District Marine Park Coordinator Ross Mack – Shark Bay District Marine Reserves Officer Wayne Moroney – Shark Bay District Marine Ranger Colleen Sims – Shark Bay District Manager, Project Eden Linda Reinhold – Shark Bay District Project Officer Ryan Bellotti – Shark Bay District MATES Trainee Shannon Vasyli – Shark Bay District Reserves Officer Tricia Sprigg – Shark Bay District, District PVS Coordinator Arlo Ireland – Department of Fisheries
	24Jun09	Geoff and Kieran Wardle, Owners and Managers of Dirk Hartog Island Station
		Brian and Mary Wake, Owners of Hamelin Station
		Robert Morgan, Manager – Blue Lagoon Pearls
		Errol Francis, Red Cliff Bay Pearls
		Peter Gale, Snapper Fisherman's Association representative
		Jock Mullen, Site Manager – Shark Bay Resources (by phone)
		Janet Mann (plus students Eric, Jean and Kate) Dolphin researcher – Georgetown University.
		Benny Bellotti, Chairman, Yadgalah Aboriginal

		Corporation
Monkey Mia	*25Jun09*	Greg Ridgley, Monkey Mia Yacht Charters Robert Morgan, Blue Lagoon Pearls Rebecca, Monkey Mia Boat Hire
		Kelvin Matthews, CEO, Shire of Shark Bay
Subsequent written and oral submissions		Geoff Wardle, Dirk Hartog Island Station Robert Burne, Australian National University Harvey Raven, owner/operator of 'Shotover'
		World Heritage Property Joint Committee Meeting, August 2009
		Jeremy Green, Maritime Archaeology, WA Museum (short comments by email)

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

A good model for new management plan would be that of Ningaloo MP
A review of the pastoral lease process is planned to allow for multiple use of the pastoral land (e.g. tourism).
Access to Useless Loop via road or air can be an issue. The roads are often closed after rain which restricts access for general supplies etc. Suggestion to establish 'water taxi' service to Useless Loop which would require traversing the SBMR.
Additional special purpose and sanctuary zones are required to restock targeted finfish populations. There has been a noticeable decline in fish stocks over recent years
All commercial fisheries have been reduced in effort
All offal from farm operations is taken to landfill (pearl oyster flesh is sold overseas).
Areas to consider for inclusion in SBMR including; new coral communities, waters surrounding Pelican Island, east coasts of Dorre and Bernier Islands
Areas where recreational fishing pressure is high include; Surf Point and Sandy Point
Artificial reefs – tyre reefs, operate very well as recreational fishing spots: 3 mile off Denham, Nanga, Lady Joyce
Bag limits have limited effectiveness, high-grading is a very common problem
Bernier and Dorre islands need large sanctuary zones around; and also on the west side of Dirk Hartog
Best recreational fishing areas are the artificial reefs at Lady Joyce, out the front of Nanga, and at 3 mile
Biggest threat to the SBMR is tourism – impacts of 4WD access to coast and unregulated coastal camping
Bitterns disposal is a significant issue; disposal to the NE side of the mining operation at Useless Loop
Blue Lagoon pearl farm exists over seagrass meadows in a depth of 4-8m
Blue Lagoon pearls have now started a small tourism operation with catamaran tours out of Monkey Mia
Both eastern and western gulfs of Shark Bay are closed to commercial fishing of pink snapper but this is acceptable because most of the larger fish stocks occur further out to sea in Commonwealth waters
Carnarvon Yacht Club holds approximately 50 berths; expansion of 20 additional berths is planned for the next 12 months
Coastal access to the SBMR via Hamelin Station has declined during recent years: visitors now access the coast (Hamelin Pool) at the Telegraph station area (where the caravan park and boardwalk exist).
Coastal excision areas that are to be included in the 2015 pastoral lease renewals
Co-management (DEC and DoF) works well in SBMR
Commercial charter fishing (2 boats) operations all operate outside the bay (also commercial snapper fishing) because the fish densities no longer available inside the bay
Concern regarding the planned expansion of the Monkey Mia Resort and the associated impacts of increase visitor numbers. Suggestion to improve education program to minimize impacts
Condition of pastoral leased land adjacent to SBMR and the associated issues of run-off flowing into the SBMR: Hamelin and Carbla stations
Crab fishing is conducted with dropnets, and these have habitat impact and bycatch issues
Currently there is about 18 prawn vessels and about 14 scallop vessels
DEC visits Useless Loop occasionally to inspect the property for general environmental issues (not Marine Park staff).
Development of a tourism development on Dirk Hartog in relation to the potential impacts on the seascapes/landscapes value featured in the SBMR management plan.
DoF occasionally visit the Useless Loop jetty area and on the water to hand out brochures on recreational fishing information.
Fishing charters are mainly bottom fishing and operate outside of Shark Bay because his customers are more likely to catch fish out there
Garden Point and Red Cliff area are sensitive and delicate, should be better managed
General support from Yadgalah for DEC and DoF and their co-management of the SBMR
Good local cooperation between DEC and DoF; to be enhanced by co-location in Denham
Good quality and maintained moorings are required where there is visitor pressure
Good relationship between regional DEC staff and Yadgalah people through the dugong program and early involvement in the marine park and other planning processes (including DEC and DoF Aboriginal Trainee Program).
How are KPIs for seascapes and landscapes being operationalised
If the boundary of the SBMR was extended to Dorre and Bernier Island there would not be much opposition from the commercial snapper fishery because the boats fish further out
Impact of further restrictions on recreational fishing on West Coast (effort will move further north). inevitable

increase in recreational fishing effort in Shark Bay area due to additional restrictions further south
Impact of over-grazed pastoral land on the SBMR (potential flood run-off plooms from the Wooramel and Gascoyne rivers
Impact of the developing crab fishery in Shark Bay – this fishery not on the DoF Vessel Monitoring System (VMS).
In 1998, there was a major seagrass die-off from an anoxic event in the Monkey Mia basin
Increasing demand for a marina facility in Carnarvon: increase in trailer boats in the past year and a new annual fishing competition
Indigenous take of dugong and turtle (Yadgalah) is sustainable: one or two dugong calves annually
Is there an opportunity for more than one visit to dugong bank per day to allow for more than one tour per day?
Issue of no longer allowing for cruise ships to access Monkey Mia. The visiting cruise ships (2 per annum) provided local economic benefit. Suggestion to allow cruise ship access once again
Issue with dolphin interaction in the proposed new pearl lease area
Issues concerning the source and species of fish being fed to dolphins (non-local fish).
Key recreational fishing areas include; Cape Inscription, Turtle Bay and Cape Levillian (Withnell Point), Bernier. Targeted species include; baldchin grouper, tuskfish, coral trout, and red emperor
Lack of State/Common wealth Government interaction/consultation with the Shire; eg tourism leases
Large vessels have been observed to dump/exchange ballast water at the heads, with accompanying very bad smells indicating long-lived water discharged form the tanks
Larger sanctuary zones are required to assist management (both DEC and DoF).
Loggerhead turtle research (satellite tagging) indicates that turtles are resident to the Monkey Mia area outside of nesting season
Main threats to the management of SMBR include; access, limited coastal strip management (particularly at Hamelin Pool) and catchments runoff.
Main threats to the SBMR are from recreational fishing
Maintenance of safe corridors for migration and movement around the bay is an important conservation consideration for a lot of the species
Major threats to dolphins include; over fishing, serial depletion and by-catch
Mangrove communities require better management and should be represented in sanctuary zone areas (currently not represented in SZ).
Marine park funds not available to DoF, therefore hard to justify fisheries management
Marine pests are a key problem and ever-present threat
More sanctuary zones are needed to allow for fish stocks to continue. This will require increased compliance and management resources to be effective.
Most popular recreational fishing area is over the Lady Joyce wreck site and artificial reef (created in the mid-1990's from several sunken vessels and tyre pyramids) approximately 10-15km SW of Carnarvon
Most visiting vessels anchor/moor in the estuary; there are no pumpout facilities
Much more detailed monitoring is needed in the western gulf to determine the condition of species – could be linked to world heritage property funding
Need CAC for the MP to overcome a lack of consultation
Need flexibility for fisheries management to protect stocks
Need stronger protocols for visitor management (particularly scientists) to visit the HPMNR
Need to improve communications between DEC and stakeholders
Need to install additional moorings at Dirk Hartog to address increasing recreational vessel visitation pressure and minimize anchor damage
Need to manage Hamelin Pool separately from SBMP because of separate marine values: separate operational budget etc to give relative priority to management/protection needs
Needs to be more education and awareness done in Carnarvon, and maybe friends of Bernier and Dorre.
Noticeably hight impacts from recreational fishing pressure at Steep Point
Number of recreational boats accessing SBMR has significantly increased in recent years
Oceanica have recently conducted monitoring programs for sea grass and ballast water exchange at Useless Loop
Pink snapper stocks: oceanic ~40% by 2014; inner gulf and Denham >40%; Freycinet stock still very weak
Possession limits considered to be ineffective tool for control of recreational fish catch
Possible opportunity to expand the Monkey Mia jetty to allow for public viewing and boat access
Potential nutrient issues from Uendoo creek flowing into the SBMR – currently no management to keep cattle and/or sheep stock out of the creek area.
Probably need a transition strategy in the interim while a new plan of management is developed and gazetted
Protocols need to be established for volunteer DEC rangers to welcome important visitors e.g. scientists to the

Hamelin Pool area
Raw sewage continues to be dumped into the bay, because there are no pumpout facilities; the requirement for holding tanks should be replaced with the requirement for on-board treatment prior to discharge
Recreational fishing is very popular in Useless Loop (salt mine town); Approximately 25% of the workforce has boats and travel to areas from Steep Point to Northern end of Dirk Hartog Island.
Research has shown that the provisional dolphin feeding at Monkey Mia is affecting the animals' ocean foraging, reproduction and behaviours. The dolphins have smaller foraging areas and restrict the nursing of their young during provisional feeding times
Restrict numbers accessing areas rather than bag limit reductions because people are currently exploiting/exceeding possession limits
Restrictions on the access to western side of Hamelin Pool for CTO should be relaxed, so that more area is open to tourism without the expense of accompanying DEC staff or E class licence
Sanctuary zones around Dorre and Bernier Islands
Scientific research for management purposes is not being effective, is not properly focused, provided to managers or utilizable
Shallow area north of monkey Mia is a hotspot for a range of species, including sharks, turtles, dolphins and dugongs
Shire issues on Denham foreshore area (adjacent to the SBMR) including; sea grass build-up, boat traffic and moorings. There is a need to consider the potential flow-on effects of tourism on the Shire with regards to demand for/access to facilities etc
Shore birds at Cape Peron are decreasing in abundance, and better research an monitoring is required to examine trends in population sizes
Should 'rotate' recreational fishing zones to manage people-pressure and assist DoF fishing management.
Should use the 'captive audience' during dolphin feeds to educate visitors about dolphin behaviour, research and the other marine values of SBMR
Snapper Fisherman's Association retains the right to access and move through the SBMP.
Steep Point is a highly valued recreational fishing area
Strategies in the new SBMR management plan to be worded using positive, park user-friendly language. The use of 'protect' implies exclusion and is therefore perceived as negative
Stronger dolphin education programs required at Monkey Mia regarding recreational fishing and boat etiquette. Especially during school holiday periods
Suggestion to improve fish cleaning/offal disposal facilities at Monkey Mia. Currently, recreational fishing boats dump offal on their return to Monkey Mia which is attracting tiger sharks close to the resort beach (potential risk to swimmers and kayakers etc).
Suggestion to introduce fishing closure areas and rotate these areas seasonally
Suggestion to move boat moorings to the northern side of the boat hire area to allow for safe visitor swimming area between the dolphin interaction zone and the boat hire area
Suggestion to re-establish the Monkey Mia Advisory Committee and expand the membership to include industry representatives.
Surf Pt needs full protection, ban net fishing
Swimming is impacting the stromatolites – not a controlled activity in the MNR management plan
The biggest threat to the SBMR is recreational fishing. It is often difficult to manage such a large marine area with so few DEC and DoF staff.
The closed lagoons are also important geological formations, need management
The commercial crab fishery is rapidly expanding and could be approaching overexploitation; increased 5 fold in last few years, and is now the states biggest crab fishery
The DEC E Class licensing system for charter tour operators at Monkey Mia should be reviewed. The impacts of research vessels on dolphin behaviour should be researched and compared to the impacts of sail boats
The distinction between collection of live and dead shells is unclear, and needs to be resolved
The dolphin feeding time window at Monkey Mia needs a review and close monitoring because the beach attendance by dolphins seems to be decreasing
The dugong management zone east of Monkey Mia needs to be reviewed as there is little dugong activity in these deeper waters, but the management zone permits only one trip per day by the CTO, and there is other wildlife that could be interpreted/attractive for visitors in the dugong zone to the east
The EOI process for selecting CTOs was fundamentally flawed, should be more transparent with a change in the way criteria are selected and applied. Specific failings of the CTO process for Monkey Mia have been catalogued in the submission to the review.
The filming permit arrangements are unnecessary in some instances, expensive and involve cumbersome application procedures

The fishing effort for prawns has been reduced to about half since 1996
The general consensus amongst Yadgalah people is that the marine values of SBMR need to be protected and conserved. The Yadgalah people act accordingly
The impact of a new boat launching facility at Carnarvon (increased access to SBMR)
The management of the licensed CTOs with respect to wildlife interaction (specifically dolphins) is unsatisfactory, and the commitment by DEC to conduct research on the use of habitats by the dolphins in relation to CTO vessel impacts has not been implemented.
The Monkey Mia jetty is operated by the Shire. There is an issue regarding conflict between the commercial tour operators and commercial fishers using the jetty. There is also an issue of visitors standing on the jetty (human traffic) to watch the dolphin feeding
The Pastoral Lands Board controls the uses permitted on leases
The pastoral lease conditions and expiry differ between Shires of Carnarvon and Shark Bay.
The proportion of sanctuary zones in the MP is too low; needs to be brought up to the emerging standard (30%)
The recent change from farming sheep to cattle in the Gascoyne region.
The tight controls on recreational fishing for pink snapper is widely regarded as resulting in serial depletion of associated species
The traditional take of dugong is accelerating; could be up to a couple of hundred each year calves taken
There are inadequate provisions for tour booking offices to enable a competitive charter tourism market at Monkey Mia. The location of the new booking office is not obvious to visitors.
There are large areas of good quality coral that need sanctuary zone protection near Dirk Hartog east coast
There are major information gaps in relation to the condition of species and habitats, these are preventing good management, and inhibiting proper evaluation of condition
There are no indigenous issues that are being complained about – good working relation ship with trainee with DEC
There are well-controlled access systems, requiring permits etc to get into HPMNR
There has been a private proposal (Graeme Robertson) to establish an accommodation and marina facility on Knight Terrace (Denham).
There is a 200m excision zone to be imposed on pastoral leases in 2015, but only in Shark Bay Shire, not Carnarvon
There is a declining long term trend in the tiger shark population, although is possibly cyclical
There is a need for better information at Monkey Mia about what activities are and are not permitted in what zones – jet skis have been observed in locations where they are prohibited
There is an annual fishing competition, the data is recorded by DoF
There is an urgent need to resolve the issue of the jetty and possible floating pontoon at Monkey Mia, including the proposal by the shire to close the jetty to public access
There is no clear interest in management of this coastline strip from any agency – to small to be effectively managed
There is very low visibility of DoF officers at useless Loop
There should be a return to the original licence conditions at Monkey Mia; the selection process for a preferred operator has not worked out well, and not resulted in a good sharing of the tourism resource
There was a very substantial and deliberate incursion by a number of trawlers into the Steep Pt sanctuary zone in 2007; was prosecuted (but outcomes not presented to the audit)
Tiger shark research (Mike Heithaus) has indicated that the average size of tiger sharks in the Monkey Mia area has decreased in recent years.
Total population in Useless Loop is about 100 to 120 permanents; no public access
Tourism hotspots need to be managed better, specifically Shell Beach there are a lot of stromatolites that are outside the HPMNR that also should be brought within high protection zones
Two commercial snapper fishing boats operate out of Denham. The others operate out of Carnarvon
University research results indicated that there was no impact to seagrass meadows from the pearl farm
Unregulated camping at Bush Bay and new Beach, and other shoreline locations: Shire vs DEC vs pastoral lease holder. Shire vs DEC vs pastoral lease holder.
Useage monitoring is not good; needs a regional approach to visitation monitoring and control
Useless Loop primary school is unaware of the Shark Bay Marine Park. However, they take part in terrestrial projects with DEC (biosphere project).
Verbal agreements made between certain officials and certain pastoralists during establishment of world heritage property have not been kept or reflected in the management plan
Wooramel and Flint Creek have severe sediment runoff issues