MARINE SCIENCE BUSINESS PLAN
July 2007–2010

MARINE SCIENCE PROGRAM
Science Division
Department of Environment and Conservation
May 2007

Cover page: Marine scientist monitoring coral reefs at the Ningaloo Marine Park during a survey undertaken by the DEC Marine Science Program.

MARINE SCIENCE BUSINESS PLAN July 2007–2010

What did we learn?
Who did we tell?
What difference did it make?

Marine Science Program

Science Division
Department of Environment and Conservation
May 2007

SUMMARY

In mid-2006, the Director General of the Department of Conservation and Environment (DEC) directed the Leader, Marine Science Program (MSP), a newly-formed Program in the Department's Science Division, to develop a Marine Science Strategy (MSS) to guide the development of a marine science capacity in DEC to support the department's marine policy, planning and operational management responsibilities. The draft MMS was provided to the Director General for consideration in January 2007. Following consideration of the MSS, the Director General indicated *in principle* support for the MSS and then directed that a plan be developed to outline a specific forward program of activities to be undertaken over the next two to three years.

The Marine Science Business Plan: July 2007-2010 outlines parallel approaches to be undertaken over the next three years: building the internal marine science capacity, as outlined in the MSS, and 'getting runs on the board'. Specific priority marine research, monitoring and science communication projects for 2007/08, to be undertaken in collaboration with DEC regions and specialist branches and external science providers, are outlined. Strategic priorities for 2008/09 and beyond are also detailed.

The proposed major tasks in 2007/08 in relation to building an appropriate marine science capacity in DEC are:

- reaching agreement with regions on collaborative arrangements;
- consultation with external stakeholders;
- appointment of staff; and
- the development of the three research strategies recommended in the MSS.

Specific marine research and monitoring projects to be undertaken in 2007/08 are outlined in Section 5.4 and are grouped in nine categories:

- Statewide;
- Marine Protected Areas;
- WAMSI Node 3;
- Marine science communication;
- Marine fauna;
- Marine biodiversity inventory;
- Marine planning;
- Marine environmental protection; and
- MSP Seed-Funding.

The strategic marine science priorities of DEC beyond 2007/08 are outlined in Section 5.5 and are:

- Better co-ordination of marine science within DEC;
- Building strategic alliances with external research providers;
- Promoting better integration and technology transfer of research outputs;
- Ecosystem research;
- Marine Protected Areas;
- Marine fauna research;
- Climate change;
- Social research;
- Performance assessment; and
- Marine science communication.

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1. Introduction

In mid-2006, the Director General of the Department of Conservation and Environment (DEC) directed the Leader, Marine Science Program (MSP), a newly-formed Program in the Department's Science Division, to develop a Marine Science Strategy (MSS) to guide the development of a marine science capacity in DEC to support the department's marine policy, planning and operational management responsibilities. The draft MMS was provided to the Director General for consideration in January 2007. Following consideration of the MSS, the Director General indicated *in principle* support for the content and direction of the MSS and then directed that a plan be developed to outline a specific forward program of activities to be undertaken over the next two to three years (i.e. Marine Science Business Plan July 2007 - 2010 (MSBP)). The revised MSS and the MSBP are then to be presented to the DEC Corporate Executive for consideration and endorsement.

This document is the MSBP and outlines the marine science activities to be undertaken in 2007/08 and future priorities to be addressed beyond 2007/08. The MSBP has been developed in collaboration with DEC regions and specialist branches.

2. Roles of the Marine Science Program

The roles of the MSP are:

(i) To conduct, or cause to be conducted, scientific research and monitoring programs necessary to manage existing marine parks and reserves; conserve marine biodiversity generally; assist in identifying and planning for new marine parks and reserves; and contribute to regional marine planning;

(ii) To provide policy advice to DEC Corporate Executive and the Minister for the Environment, and scientific and technical advice and support to DEC's regions and branches;

(iii) To provide a strategic focus for scientific and technical liaison with DEC's clients and stakeholders in relation to marine conservation; and

(iv) To assist the Marine Parks and Reserves Authority in the performance of its statutory duties as required.

3. Marine Science: Definitions

Marine science is defined here as: marine *research, monitoring* and *science communication* and refers to both the biophysical and social environments. These are defined as:

- ***Research*** is about increasing the understanding of: (i) the structure and functioning of ecosystems (i.e. fundamental or strategic research) and (ii) human interactions with the natural environment (i.e. applied research). Research has four generic elements: *inventory*, *baseline*, *process* and *prediction*;

- ***Monitoring*** is about measuring trends in the environment, particularly marine resource *condition*, *pressure* and the effectiveness and efficiency of management *responses*. Ecological monitoring includes monitoring of *reference sites* to assess *natural variability*, routine *surveillance* or ecosystem 'health' monitoring and *compliance* (usually by industry) monitoring. Social monitoring is about measuring trends in human use, attitudes and aspirations; and

- ***Science communication*** is about transferring scientific knowledge to improve departmental policy, planning and operational management, positively influencing community attitudes and behaviour towards conservation and sustainable use of the environment and influencing the attitudes of politicians, stakeholders, media and industry groups with an aim of building confidence about governance, regulation and the use of science and technology.

4. Approach of the Marine Science Strategy

An *in principle* agreement on the approach to be adopted for the development of the MSS was reached at a DEC workshop in July 2006. The meeting was attended by regional and specialist branch staff. The agreement was that the MSS would be based on the following principles:

- A collaborative, integrated approach be adopted between the MSP, regions and specialist branches;
- Annual Marine Science Business Plans and project resource allocations are developed collaboratively;
- An agreed level of regional marine science funding is used to support key central (state-wide) functions; and
- Regions retain funds to support an appropriate level of regional involvement.

The above financial arrangements will be negotiated with Regional Managers once the MSS is endorsed by the DEC Corporate Executive.

The purpose of the MSS is to provide a broad blueprint for the development and implementation of a marine science capability within DEC. The Strategy balances the need to influence, collaborate with and support external marine science providers with the need to develop an appropriate 'in-house' marine science capability. The 'in-house' capability is a partnership model based on the development of a centralised marine science capability within the MSP, based in the Science Division, and an operational capability in the Regions. The partnership also includes senior regional staff and key specialist branches within DEC including the Marine Policy and Planning Branch, Marine Ecosystems Branch, Environmental Management Branch, Nature Protection Branch, Species and Communities Branch and the Parks Policy and Services Branch. This approach will ensure that the marine science capability is closely integrated with the marine policy, planning and management activities of the department.

The Strategy proposes the MSP be expanded to form a centralised group of scientists and support staff in three integrated units, a Marine Research Unit, a Marine Monitoring Unit and a Marine Science Communication Unit to support external and internal/collaborative research delivery and departmental marine monitoring, science communication, policy support and advisory functions. This group would, in collaboration with senior Regional staff and specialist branches, provide the technical oversight, co-ordination and implementation for DEC's marine science programs. Regional staff will provide the operational support for internal research and monitoring programs.

Initial priorities will focus on external research delivery (e.g. WAMSI Node 3: Managing and Conserving the Marine State), MPA management plan research, monitoring and science communication requirements and co-ordinating the research and monitoring of threatened marine fauna. The Strategy proposes that the science needs and capabilities for systematic surveys of WA's marine biodiversity, regional and MPA planning and marine environmental protection would be determined over the next year with the appropriate internal and external groups, all of whom have been consulted on this approach.

A Marine Science Co-ordination Committee will be established to promote synergies and ensure integration and co-ordination.

5. The Marine Science Business Plan

5.1. Marine Science Priorities

Science priorities for the MSP will be driven by existing Government/DEC obligations such as the implementation of MPA management plans and marine wildlife programs, Government/DEC policy commitments, such as the Biodiversity Conservation Strategy, MPA establishment and regional marine planning timelines, departmental and MPRA audit requirements and, to some extent, by external influences such as industrial development agendas that impact on the marine environment. Institutional priorities, summarised as the Nature Conservation and Parks and Visitor Services programs Key Result Areas (which are subsets of the above longer-term 'drivers'), will also be a key influence on marine science priorities over shorter timeframes (i.e. 1-3 years). Climate change research needs will be addressed through links with WAMSI Node 2, via initiatives such as the Indian Ocean Climate Initiative and direct interaction with the DEC's Office of Climate Change.

At an ecological value or asset level, science priorities are developed through a risk assessment approach. Marine science priorities are based on relative conservation value, degree of pressure and level of existing scientific knowledge.

5.2. Approach

The MSBP focuses on parallel approaches over the next three years: building a marine science capacity in DEC, as outlined in the MSS, and 'getting runs on the board' by undertaking priority marine research, monitoring and science communication projects in collaboration with DEC regions and specialist branches and external science providers. Longer-term strategic marine science priorities are also outlined.

Collaborative arrangements with the regions are scheduled to be finalised by August 2007 (Table 1). As a result, it is unlikely that additional MSP staff will be 'on board' before early 2008. Consequently, the MSP will continue to have limited capacity for much of 2007/08. The projects outlined in the tables below reflect this situation. Once an appropriate MSP capacity has been established over the next year a more co-ordinated, collaborative and formal approach to marine science planning will be adopted with all relevant groups in the DEC in the 2008/09 and 2009/10 financial years. Collaborative marine science planning for future financial years will begin in November of the previous year to tie in with Departmental planning timelines.

5.3. Building a DEC Marine Science Capacity

The MSS provides a blueprint to develop an enhanced marine science capacity within the DEC. The major tasks and their associated timelines to do this are outlined in Table 1.

As outlined in the MSS, DEC funding for marine science for the 12 existing MPAs is in the MSP (~47% in 2007/08) and five regional cost centres (~53%; Appendix 2a, 2b). There is also significant funding for non-MPA marine science in other specialist branch cost centres within DEC. The MSS proposes that most of the MSP funding, with an agreed financial contribution from regions and specialist branches, is used to support specified regional and cross-regional (i.e. state-wide) functions. Regions and specialist branches will retain the remainder of the funding to support regional operational staff involvement and the operational costs of mutually-agreed marine science projects. These funding arrangements are administratively complex and will require significant co-operation and goodwill to ensure efficient and effective use is made of the available public funding to DEC for marine science. The arrangements will be negotiated with Regional Managers and an MOU between the MSP and each region will be developed by August 2007 (Table 1).

The MSBP is based on the assumption that a mutually-agreed collaborative approach will be reached. On that basis, the MSBP proposes that MSP funding is used to employ additional scientific and support staff in permanent positions as outlined in Appendix 1. Because many of these staff are unlikely to be 'on board' before early 2008 at the earliest (see Table 1), salary and on-costs for 2007/08 will total ~$730,000 out of an MSP consolidated fund budget of >$1M. Funds for salaries are also available for WAMSI Node 3 administration and significant additional marine science funding for proposed MPAs (Appendix 2a, 2b) is likely to be available in 2008/09 and beyond.

Appointment of remaining MSP staff (Appendix 1) will depend on the outcomes and timing of negotiations and agreements with regions as these positions are proposed to be funded by regional marine science funding. Assuming this happens as planned, it is unlikely that the MSP will not have a full complement of staff before late in the 2007/08 financial year (Table 1).

As a result, the MSBP is largely based on the existing staff of five with some provision for new staff for the latter part of the 2007/08 financial year. The MSBP outlines specific projects and allocations for 2007/08 and provides an indicative list of priority areas for 2008/09 and 2009/10 and beyond. The MSBP will be reviewed in early 2008 following finalisation of the MOU with regions and specialist branches.

Following approval of the MSS and the MSBP by the DEC Corporate Executive, the major tasks in 2007/08 in regard to building the marine science capacity in DEC are:

- reaching agreement with regions and specialist branches on collaborative arrangements (point 4 and 5 in Table 1);
- consultation with external stakeholders (point 6);
- appointment of MSP-funded staff (point 7);
- appointment of non-MSP funded positions (point 8); and
- the development of the three strategies recommended in the MSS (points 9, 10 and 11).

TABLE 1: TASKS AND TIMELINES TO BUILD A DEC MARINE SCIENCE CAPACITY

Major Tasks	Timing	Responsibility	Status	Nominal 2007/08 budget ('$000s)	Comments
1. Revise MSS and develop three-year Marine Science Business Plan.	May 2007	MSP (CSI)	Current		Memo from DG to Director of Science Division in April 2007.
2. DG decision on office accommodation and facilities to be available for MSP.	June 2007	MSP (CSI)	Current		Memo to DG from Director of Science Division in May 2007.
3. Corporate Executive endorsement for MSS and MSBP.	June 2007	MSP (CSI)			
4. Consult with and reach agreement with RMs on collaborative arrangements.	July- Aug 2007	MSP/Regions/ specialist branches (CSI)	On-going		From *in principal* agreement in MSS; Need to agree on: Minimum marine science funding forward estimates for next three financial years (see Appendix 2a,2b); Level and cost of staff involvement; Operational funds available; and funding contribution to central MSP functions.
5. Finalise MOUs with Regions and Specialist Branches (re: point 4 above).	Aug 2007	MSP/Regions/ specialist branches (CSI)			See above.
6. Consultation on MSS and MSBP with external marine science stakeholders.	July-Dec 2007	MSP (CSI)	Current		DG interaction with heads of CSIRO (marine) and AIMS; CS briefings to WAMSI 'Show and Tell' and MPRA; informal discussions with universities; Will undertake formal consultation with AIMS, CSIRO, local unis, interstate conservation agencies; NRM groups, RMP groups, NGOs, peak industry bodies (e.g. WAFIC, APPEA, Recfishwest) etc.
7. Develop JDFs, advertise and appoint MSP-funded positions (see Appendix 1 for positions to be advertised from existing MSP budget).	Sept- Mar 2008	MSP (CSI)			Salary + salary on-costs for MSP for 2007/08 financial year will be ~$700 K out of a CF budget of ~$1M; additional existing funds available for WAMSI Node 3 administration; further MPA funding is likely in 2008/09.
8. Develop JDFs, advertise and appoint non-MSP funded positions (see Appendix 1).	Sept- Mar 2008	MSP (CSI)			Will depend on agreement with RMs
9. Develop Marine Planning Research Strategy and forward to DEC Corporate Executive for consideration and endorsement.	Nov 2007	MSP/MPPB (CSI/PDA)			Recommendation from MSS is to develop a fully-costed strategy with MPPB to ensure timely delivery of the ecological and social information needed for MPA and regional marine planning; Links with point 10; November timing is related to 2008/09 budget process.
10. Develop Marine Biodiversity Survey Strategy and forward to DEC Corporate Executive for consideration and endorsement.	Nov 2007	MSP/WAH/WAM/ DoF (CSI)			Recommendation from MSS is to develop a fully-costed strategy with WAM, DoF, WAH etc to undertake a long-term, systematic program to document the State's marine biodiversity; Links to point 9 and 11; November timing related to 2008/09 budget process.
11. Develop Marine Environmental Protection Research Strategy and forward to DEC Corporate Executive for consideration and endorsement.	Nov 2007	MSP/MEB/EMB (CSI/RMA/ACO)			Recommendation from MSS is to develop a fully-costed strategy with MEB and EMB to ensure timely delivery of ecological and social information needed for marine environmental protection, particularly EIA; Links with point 10; November timing is related to 2008/09 budget process.
12. Review MSBP for 2008/9 and 2009/10 in light of the above.	May 2008	MSP/Regions/ specialist branches (CSI)			
SUB-TOTAL 1				**100**	

Key: MSP = Marine Science Program (DEC); WAH = Western Australian Herbarium (DEC); WAM = Western Australian Museum; DoF = Department of Fisheries; Dept of Environment and Water; SLO= Suzanne Long; KBA = Kevin Bancroft; SAR= Shannon Armstrong; CSI=Chris Simpson; PDA=Peter Dans; RMA=Ray Masini; ACO=Andrew Costen.

5.4. Marine Science Projects in 2007/08

As outlined above, the 2007/08 component of the MSBP is based on MSP staff levels remaining functionally static for most of 2007/08, assumptions about MSP staffing levels for 2008/09 and beyond and reaching agreement with DEC regions and specialist branches on the collaborative arrangements outlined in the MSS to effectively and efficiently deliver marine science in DEC. Consequently, the MSBP outlines specific marine science projects that will be undertaken in 2007/08 and a broad indication of priority areas over the following two years. The MSBP will be reviewed and revised in early 2008 once the arrangements with the regions and specialist branches have been finalised. Projects for 2008/09 and 2009/10 and beyond will be finalised prior to 31 March 2008.

A preliminary survey undertaken in early 2007 indicated that there are over 60 current marine science projects being undertaken or wholly/partly financed by DEC regions and specialist branches (Appendix 2) in the 2006/07 financial year. Most of these projects, and other science projects to be initiated by regions in 2007/08, are not included in the current MSBP. A more comprehensive list of DEC-supported projects will be developed, and an evaluation of these projects will be undertaken, in 2007/08 (see Project 3 in Table 2).

The annual MSBPs should and will, in future years, include all marine science projects that are supported by DEC funding so that cash and in-kind support can be accounted for, project progress can be tracked and high quality and timely science outputs are delivered. Having a consolidated list of DEC-supported marine science projects in the MSBP each year will also provide a record of what marine science has been/is being done to ensure integration (both internally and externally) and delivery of outputs, avoid duplication and provide a rational basis for future marine science planning. All DEC marine science projects will be required to conform to the quality assurance policies and practices (i.e. Science Project Plans, review by Senior Management Team, etc) of the Science Division. The formation and operation of the Marine Science Co-ordination Committee will have a major role in ensuring the quality of the science and reporting is high, as well as ensuring the data and publications are accessible, appropriately distributed, stored and easily retrieved for future applications.

Specific marine science projects to be undertaken in 2007/08 are outlined in Tables 2-10 below.

TABLE 2: STATE-WIDE MARINE SCIENCE PROJECTS FOR 2007/08

Project title	PI	Collaborators	DEC Region	No. of years	End date	Nominal 2007/08 Budget ($'000s)				Comment
						MSP	Regions and specialist branches	External	Total	
1. Establish DEC Marine Science Co-ordination Committee	MSP (CSI)	Regions/Specialist Branches	ALL	On-going	NA	5	5	0	10	Seek representation on MSCC; draft TORs; hold two meetings in 2007/08.
2. Identify DEC/DoF R&M implementation gaps in MPA mgt plans (IDC project)	MSP (KWA)	Regions, DoF	All	1	Dec 2007	10	10	0	20	Project will identify research, monitoring and science communication/education strategies in current MPA mgt plans that are not being addressed by current or proposed programs; Recommendations of ways to implement these will be made to IDC.
3. Update DEC marine science current projects database	MSP (SAR)	Regions/Specialist Branches	ALL (regions with marine)	1	Sep 2007	5	5	0	10	Undertake a more comprehensive survey of current DEC marine science projects; evaluate the utility of current projects.
4. A review of current and historical monitoring programs in WA MPAs	MSP (TBD)	Regions/Specialist Branches	ALL (regions with marine)	3	Dec 2007	40	100	0	140	Small contracts to specialists for each 'region'; Project focus on methods and utility of historical data; 2007/08 focus on MPA KPIs and 2007/08 project needs; Link to NW Research Inventory project and NHT marine indicator projects. Will begin when Monitoring Co-ordinator position is filled.
5. A review of current and historical marine fauna monitoring programs in WA	MSP (TBD)	Regions/Specialist Branches	ALL (regions with marine)	3	Dec 2007	30	100	25	155	Small contracts to specialists for each species/groups of species; Project focus on methods and utility of historical data; 2007/08 focus on threatened marine fauna, particularly turtles; link to NW Research Inventory project.; Link to Commonwealth marine mammal project. Will begin when Marine Fauna position is filled.
6. NW Research Inventory: Kalbarri to NT border	MSP (KWA)	NOO, WAMSI HQ	Mid-West, Pilbara, Kimberley	1	Jun 2008	10	5	200	215	External contract to develop a bibliography and meta database of all marine science projects undertaken in tropical WA. See project 23 Table 4.
7. Development of a DEC Marine Science Training Manual for Operational Staff: Phase 1	MSP (TBD)	Regions/Specialist Branches, DEC training	ALL (regions with marine)	2	June 2009	20	20	0	40	Contract to find, assess and compile existing training material from all sources into a manual to help build marine science capacity in regions; link to Grad. Recruit training program. Will begin when Science Co-ordinator position is filled.
8. Develop and implement Marine Science Data Management Plan for MSP	MSP (TBD)	Regions/Specialist Branches	ALL (regions with marine)	1	June 2008 and on-going	40	20	0	60	Will begin when MSP data manager position is filled.
9. Develop and implement Marine Science Communication Plan for MSP	MSP (TBD)	Regions/Specialist Branches	ALL (regions with marine)	1	June 2008 and on-going	40	20	0	60	Will begin when MSP science communication position is filled.
SUB-TOTAL 2						**200**	**285**	**225**	**710**	

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TABLE 3: MARINE PROTECTED AREA MARINE RESEARCH & MONITORING PROJECTS FOR 2007/08

Project Title (Management Plan reference)	PI	Collaborators	DEC Region	No. of years	End date	Nominal 2007/08 Budget ($'000s)				Comment
						MSP	Regions and specialist branches	External	Total	
10. Comparative survey of marine biodiversity of Rowley Shoals MPAs (7.6 (1); 7.6 (4); 7.6 (5); 7.6 (6); 7.7 (1) + 7 more)	MSP (SLO)	Region, AIMS, WAH, DEW, WAM, DoF etc	Kimberley	2	June 2009	150	50	TBD	200	Major collaborative survey with AIMS and others in November 2007 to investigate status of selected species in relation to regional and local, past and present human impacts; will provide comparison of effectiveness of past management arrangements to protect biodiversity; regional benchmark data and initial data set for on-going resource condition monitoring of each reef.
11. Distribution and patterns of the major benthic communities of the Montebello/Barrow Is. MPAs (7.6 (2); 7.6 (4); 9.1.3 (5); 9.1.4 (3); + 6 more)	MSP (KBA)	Region and others (AKE)	Pilbara	3	June 2010	150	150	TBD	300	First year of a three year program to develop a comprehensive map of the major benthic habitats of the MPAs as a precursor to detailed biodiversity surveys; will include some characterisation of the physical environment at a local scale.
12. Assessing the condition of major benthic communities in the proposed Dampier Archipelago/Cape Preston MPAs (7.1.4 (2); 7.1.5 (2); 7.1.6 (2); + 5 more)	MSP (SAR/ CSI)	Region and others (AKE)	Pilbara	3	June 2008	50	50	TBD	100	First year will focus on coral reef communities; will provide 'before' data (re BACI) for comparison after MPA is established. Draft management plan used for references Funding from NMP funding (to be returned).
13. Three–yearly Ningaloo *Drupella* survey (7.1.4 (9))	MSP (SAR)	Region (AKE/RMA)	Pilbara	Every three years	June 2008	50	20	TBD	70	Routine survey of *Drupella* every three years as per mgt plan.
14. Coral Bay Reef Recovery Study/ Annual Coral Spawning Observations (7.1.4 (12); 7.1.4 (13))	MSP (SLO/ CSI)	Region (AKE/RMA)	Pilbara	Annual	June 2008	30	20	TBD	50	Continue the study documenting the recovery of the coral reef communities in Coral Bay following the major disturbance in 1989. Above study timed to co-incide with the routine annual observations of the autumn mass coral spawning in Ningaloo MP: monitoring a key ecological process to build on the existing 20 year d/base.
15. Mapping the coral reef communities of the Shark Bay Marine Park (5.3 (1); 5.5.1 (2))	MSP (KBA)	Region (TGR)	Mid-west	1	June 2008	25	10	TBD	35	Will improve the information base for the revision of the mgt plan and the extension and on-going mgt of the SBMP.
16. Identifying marine science priorities for Shark Bay MPAs (11.0 (1); 11.1 (1); 11.1 (3))	MSP (CSI)	Region (TGR)	Mid-west	1	June 2008	2	5	TBD	7	Undertake a risk assessment to identify science gaps and priorities; will also provide a basis for the revision of the SB MPAs' mgt plan.
17. Analysis of existing monitoring data in Jurien Bay Marine Park (8.4 (1); 8.4 (3); 8.5 (1))	MSP (KBA)	Region (KCR)	Mid-west	1	Jun 2008	10	10	TBD	20	Collation, analysis and presentation of all ecological and social data to support R&M planning, MPRA audit processes and reporting on progress of Govt science commitments of JBMP.
18. Annual monitoring of KPIs and SZ effectiveness in metropolitan MPAs (7.11 (3); 7.6 (1); 7.9 (1))	MSP (SAR/ CSI)	Region (JED)	Swan	On-going	On-going	20	108	TBD	128	Continue monitoring program, incl. assessment of existing data, established by K Ryan and others (e.g. Water Corp; DEC etc); Link with proposed DoF SZ study. Draft SIMP management plan used for references
SUB-TOTAL 3						**487**	**423**	**TBD**	**910**	

Key: MSP = Marine Science Program (DEC); TBD= to be determined; WAH = Western Australian Herbarium (DEC); WAM = Western Australian Museum; DoF = Department of Fisheries; DEW=Dept of Environment and Water; SLO= Suzanne Long; KBA = Kevin Bancroft; SAR= Shannon Armstrong; CSI=Chris Simpson; TGR= Tim Grubba; AKE= Alan Kendrick; RMA=Roland Mau; KCR= Kevin Crane

TABLE 4: WAMSI NODE 3 PROJECTS FOR 2007/08

Project Title (All Node 3 science projects are directly linked to NMP and JBMP management plan strategies)	PI	Collaborators	DEC Region	No. of years	End date	Nominal 2007/08 Budget ($'000s)				Comment
						MSP	Regions and specialist branches	External	Total	
19. Science integration and administration of Node 3 Science Plan; integration with other WAMSi Nodes.	MSP (KWA/CSI)	Region (AKE); WAMSI HQ	Pilbara	4	On-going	60	20	60	140	Need to integrate Node 3 activities with Ningaloo Cluster and core Ningaloo research programs of AIMS, CSIRO, unis etc. Will produce an integrated d/base of all marine science projects in Ningaloo over next five years.
20. Development and implementation of a Node 3 marine data management plan	MSP (TBD)	Region (AKE); Node 3 scientists; WAMSI HQ	Pilbara	4	Jun 2008	20	10	20	50	Will begin when MSP data manager position is filled.
21. Development and implementation of a Node 3 marine science communication plan	MSP (TBD)	Region (AKE); Node 3 scientists; WAMSI HQ	Pilbara (AKE)	4	June 2008 and on-going	20	10	20	50	Will begin when MSP science communication position is filled.
22. Finalise SRFME carry-over projects for Jurien	MSP (KWA)	Region (KCR); WAMSI HQ	Mid-west	1	Dec 2007	10	5	0	15	Ensure MSP/Region has complete set of all technical publications.
23. Identify DEC/DoF R&M implementation gaps in MPA mgt plans (IDC project)	(KWA)	DOF								See IDC project 2 Table 2.
SUB-TOTAL 4						**110**	**45**	**100**	**255**	

WAMSI Node 3 Leader: Dr Chris Simpson; WAMSI Node 3 Science Co-ordinator: Dr Kelly Waples

TABLE 5: MARINE SCIENCE COMMUNICATION PROJECTS FOR 2007/08

Project title	PI	Collaborators	No. of years	End date	Budget ($'000s)				Comment
					MSP	Regions and specialist branches	External	Total Project cost	
24. Consultation with external stakeholders on Marine Science Strategy	MSP (CSI)	NA	1	Jun 2008	10	0	0	10	See point 6 Table 1.
25. Annual Ningaloo Symposium	MSP (KWA/CSI)	MU, AIMS etc	On-going	On-going	5	3	5	13	Annual joint symposium with Ningaloo Cluster researchers and others undertaking research in Ningaloo MP; Some funding from WAMSI. 24-25 July 2007
26. Pilbara Region staff/community briefings on Ningaloo research program	MSP (KWA/CSI)		On-going	On-going	5	3	0	8	11-13 July 2007
27. Jurien Research symposium	MSP (KWA/CSI)	Moora District	1	Jun 2008	3	3	2	8	Will review need for symposium after DoF WRL workshop in August 2007. Some funding available from WAMSI.
28. A career in Marine Biodiversity Science DVD	See comment		1	Jun 2008	13	5	TBD	15	Will begin when Marine Science Communication Co-ordinator position is filled; DVD to promote a career in DEC to university students.
29. WAMSI Node 3 Communication Plan									See Project 21 Table 4
SUB-TOTAL 5					**36**	**14**	**7**	**54**	

TABLE 6: MARINE FAUNA RESEARCH AND MONITORING PROJECTS FOR 2007/08

Project title	PI	Collaborators	No. of years	End date	Budget ($'000s)				Comment
					MSP	Regions and specialist branches	External	Total Project cost	
30. Dugong									See Table 10
31. Turtles									See Table 10
32. Australian Sea-lions									See Table 10
33. LittlePenguins									See Table 10
34. Monkey Mia Dolphins									See Table 10
35. Bunbury Dolphin Study									See Table 10

TABLE 7: MARINE BIODIVERSITY INVENTORY RESEARCH FOR 2007/08

Project title	PI	Collaborators	No. of years	End date	Budget ($'000s)				Comment
					MSP	Regions and specialist branches	External	Total Project cost	
36. Develop Marine Biodiversity Inventory Research Strategy	MSP	WAM, DoF, UWA,	1	Nov 2007					See Table 1 Point 10. Fully costed strategy to undertake long-term research to understand the distribution and patterns of WA's marine biodiversity; To be developed in collaboration with the WAM, DoF, UWA etc.

TABLE 8: MARINE PLANNING RESEARCH FOR 2007/08

Project title	PI	Collaborators	No. of years	End date	Budget ($'000s)				Comment
					MSP	Regions and specialist branches	External	Total Project cost	
37. Develop Marine Planning Research Strategy	MSP	MPPB	1	Nov 2007					See Table 1 Point 9. Fully costed strategy to ensure the ecological and social information needs for MPA and RMS planning are provided in a timely manner; To be developed in collaboration with the Marine Policy and Planning Branch.
38. Broke Inlet Fish Study									See Table 10
39. Pilbara Dugong Study									See Table 10

TABLE 9: MARINE ENVIRONMENTAL PROTECTION RESEARCH PROJECTS FOR 2007/08

Project title	PI	Collaborators	No. of years	End date	Budget ($'000s)				Comment
					MSP	Regions and specialist branches	External	Total Project cost	
40. Develop Marine Environmental Research Strategy	MSP	MEB, EMB	1	Nov 2007					See Table 1 Point 11. To be developed in collaboration with the Marine Ecosystems Branch and the Environmental Management Branch.

TABLE 10: CURRENT DEC MARINE SCIENCE SEED-FUNDING PROJECTS.

Project	Institution	Principal Investigator	DEC Region	DEC Funding Commitment	Budget ($'000s)				Duration	Comments
					MSP	Regions/ Branches	External	Total		
Little Penguin Study	MU	Dr Belinda Cannel	Swan	$27,500	8	TBD			2006/07-2009/10	Cost-effective monitoring protocol to measure LP population abundance and reproductive output.
Broke Inlet Fish Study	MU	Dr Fiona Valesini	Warren	$18,227	10	8			2006/07	Assist with resource assessment for MPA planning; MPPB also providing $8K.
Beach use patterns at three high use areas in NMP	MU	A/Prof Lynnath Beckley	Pilbara	$1870	2	TBD			2007/08	Assist in developing visitor risk assessment profile.
Australian Sea-lion Study	ECU	Dr Richard Campbell	Mid-West	$50,000 (Director of NC) $20,000 (one-off: Director of SD) $20,000 (in-kind: Moora District)	3	90			2007/08 2007 2006/07	Contribute to ASL research; development of a Pinniped Wildlife Management Plan; development of cost-effective monitoring protocols.
Pilbara Dugong Study	ECU	David Holley	Pilbara	$8000 from SCB	3	8			2007/08	Distribution, abundance and critical habitats of dugong along Pilbara/Kimberley coast; will assist with MPA resource assessment.
Monkey Mia Dolphin Study	MU	Dr Lars Bejder	Mid-West	$15,000 up to $25,000 pa for six years	3	15			2006/07-2012/2013	Will assess effectiveness of management intervention by DEC (will measure dolphin abundance and reproductive output).
JBMP Zone Effectiveness Study	UTas	Dr Graeme Edgar	Mid-west	$48,000 pa	5	43			On-going	Effectiveness of zoning scheme; part of larger study of temperate MPAs in Australia; progress to be reviewed in 2007/08.
Bunbury dolphin Study	MU	Dr Lars Bejder	Southwest	$10,000 pa	10	0			2007/09	Will help develop generic population viability analysis models for use on other marine fauna in WA.
History of fish populations (Ningaloo MP)	UWA	Dr Angela Gaynor	Pilbara	$5,000	5	0			2006/07	Will retrospectively construct time-series data on changes in abundance/size of targeted fish.
Condition of the coastal area at Coral Bay, WA	MU	Dr Halina Kobryn; Luisa D'Andrea	Pilbara	$1,985	2	0			2007	Will assist assessment of impacts of ROVs on coastal vegetation of NMP etc.
Capes MPA Zone Effectiveness Study	UWA	Dr Mark Westera	Southwest	$5,000	5	0			2006/07	Effectiveness of proposed zoning scheme; NHT-funded project.
Capes Abalone Study	MU	Dr Neil Loneragan	Southwest	$75,000	3	75			2007	Funded from DEC HQ. via MPPB
NW Research Inventory (Kalbarri to NT border)	TBD	TBD	Mid-west, Pilbara, Kimberleys	$15,000	15	0			2007/08	Funding from NOO, DEC, DoF, WATC?, DOIR?, DPI? Bibliography of Marine R&M.
Collation and summary of unpublished WAM research of the Rowley Shoals	WAM	Dr Di Jones	Kimberleys	$60,000	60	0			2007/08	Will assist major planned collaborative survey by DEC/DEW/AIMS in November 2007.

Ecological interaction in coastal marine communities: fish communities in the JBMP	MU	Dr David Fairclough	Mid-west	$20,000 one-off	1	20				Top up existing SRFME project in JBMP.
Ecophysiology of benthic primary producers in the JBMP	ECU	Dr Paul Lavery	Mid-west	$8000 one-off	1	8				Top-up of existing SRFME project in JBMP.
Taxonomy of marine algae in WA	WAH/MU	Dr Kevin Theile	All	$50,000 pa for three years	15	0			07/08 to 09/10	0.5fte contribution to Dr John Huisman's salary at WAH; additional $35K pa from SD.
SUB-TOTAL 10					**152**	**259**				

MSP Seed-Funding Co-ordinator: Dr Suzanne Long

5.5. Marine Science Program Strategic Directions

This section outlines the strategic marine research priorities of DEC over the next five years. These directions will be addressed via internal marine science programs, collaborations and through influencing the strategic priorities of external research organisations.

5.5.1. Better co-ordination of marine science within DEC

A preliminary assessment of marine science projects supported by regional offices and branches within DEC but external to the Science Division, found there were over 60 projects being wholly/partly funded by the Department. This estimate is likely to be significantly under estimated but nonetheless represents a significant investment of public money in marine science by DEC. At present there is no co-ordination of this activity across the Department. A high priority is to develop an integrated meta database of all recent past and current marine science projects being wholly/partly funded by the Department.

A Marine Science Co-ordination Committee (MSCC) will be established with representation from the MSP, Regions and key specialist branches. DoF marine science programs in CALM Act MPAs will also be included in this co-ordination process. The MSCC will ensure that all ecological and social marine science projects within DEC are planned and implemented in a strategic and co-ordinated manner and duly consider historical and current research programs of external research providers in WA. The MSCC will also provide a mechanism to discuss and consider emerging DEC science needs as well as ensuring science communications support departmental policies and operational programs. The MSCC will promote potential synergies, minimise duplication and ensure compliance with DEC Science Division quality control processes (e.g. Science Project Plans). This will ensure the quality of the science and reporting is high, as well as ensuring the data and publications are accessible, appropriately distributed, stored and easily retrieved for future applications.

5.5.2. Building strategic alliances with external research providers

A priority for the MSP will be to continue to build strategic alliances with organisations that have marine science interests in common with DEC. Mechanisms to promote enhanced collaborative arrangements will be developed with State Government agencies (e.g. particularly WA Museum and the Department of Fisheries), regional NRM groups, local and some interstate universities and Commonwealth research agencies (e.g. AIMS, CSIRO, Geoscience Australia, Bureau of Meteorology). Alliances with key WA industry groups (e.g. oil and gas) will also be developed as appropriate as many of these industries have had a significant role in marine research and environmental management in WA for decades. Alliances will also be developed with State conservation/NRM agencies in other States and the Northern Territory. The MSP will also maintain links with international programs through the Inter-governmental Oceanographic Commission/UNESCO (Perth office) and with national initiatives such as the Integrated Marine Observing System.

5.5.3. Promoting better integration and knowledge transfer of research outputs

A priority for the MSP over the next few years will be to promote better integration of research programs of interest to DEC. These include major research programs within WAMSI, core research programs of AIMS, CSIRO and local and interstate universities and numerous Natural Heritage Trust projects (e.g. WA Marine Futures, Capes MPA Zone Study). This integration will maximise the benefits of available funding and provide a better basis to identify gaps to assist with marine science planning within DEC.

The transfer of scientific outputs to support departmental programs will also be a priority for the MSP. In particular, assisting the development of the Marine Strategy Evaluation (MSE) tool, as a key mechanism to integrate much of the Ningaloo research effort and transfer this knowledge into operational management will be a major priority. Facilitating the development of other Decision Support Systems for conservation planning and management is also a priority.

The transfer of scientific knowledge will be promoted via the development of formal guidelines to inform marine policy development, marine protected area planning, regional marine strategy planning, marine fauna conservation planning and operational MPA management. These guidelines will be developed in collaboration with the recipient groups in DEC.

5.5.4. Future marine research priorities

Much of 2007/08 will be focused on completing an audit of recent historical, current and proposed marine research in WA that is relevant to DEC objectives. Once this is completed it will be possible to assess these activities against the research priorities outlined in the MPA and marine fauna management plans to identify critical gaps. These gaps and other emerging priorities will be then used to develop, in early 2008, the longer-term research priorities of the MSP beyond 2007/08.

Current research priorities are outlined below.

Ecosystem Research

A long-standing priority is to better document the distribution and patterns of marine biodiversity in Western Australian marine ecosystems and how and why these systems change over time. As well as evaluating the results and outcomes of the ecosystem process studies being undertaken within WAMSI over the next five years, the following specific priorities will be pursued:

- The development of a dedicated cost-effective state capability to systematically survey WA's marine biodiversity (akin to the existing terrestrial biodiversity survey capability) to provide the information needed for MPA planning, regional marine planning and marine environmental protection.
- A high resolution seabed topography map of the entire State waters to support the above program;
- Marine biodiversity surveys in both existing and proposed MPAs and areas of the Pilbara and Kimberleys under increasing pressure from industrial development. Initially, the focus will be on mapping the major marine habitats and marine fauna distributions followed by detailed species level biodiversity surveys;
- Geographical priorities include the Montebello/Barrow islands MPAs, the proposed MPAs in the Dampier/Archipelago/Cape Preston, 'SW Capes' region, the Shark Bay and Marmion marine parks, the proposed MPAs in the west Kimberley/Pilbara and state waters off the Kimberley coastline; and
- The development of key surrogate indicators for monitoring change in marine biodiversity patterns and distribution.

Marine Protected Areas

Implementation of the marine science strategies in MPA management plans is a major priority for the MSP. The initial focus will be understanding the distribution and patterns of marine biodiversity in WA MPAs, how and why these systems change over time (see above) and the development of indicators of resource condition, threats and the management response.

Before major DEC programs of MPA research and monitoring can be developed, an assessment of historical, current and proposed research in WA MPAs by external providers (e.g. WAMSI etc) is required to identify gaps. This is necessary because of the extensive existing marine science programs currently being undertaken /proposed in WA MPAs over the next few years. Once completed, research and monitoring programs will be implemented to address these gaps.

Marine Fauna

Key priorities will be drawn from marine fauna management/recovery plans. Initial priorities for marine fauna research, including assessing existing data, are quantifying the status, dynamics and forcing factors (bio-physical influences and human threats) of the population structure, distribution and abundance of:

- Turtles (green, leatherback, flatback, loggerhead, hawksbill) off the Gascoyne, Pilbara and Kimberley coastlines;
- Dugong off the Pilbara and Kimberley coastlines;
- Australian sea-lions off the central west coast of WA;
- Seabirds in the Ningaloo MP and the Pilbara MPAs;
- New Zealand Fur Seals off the south coast of WA;
- Migratory birds in Roebuck Bay and the Swan Estuary; and
- Little Penguin populations off the metropolitan coastline.

A key focus for the above research is the development of cost-effective protocols for monitoring the condition of the above marine fauna populations.

Another important marine fauna research priority is the development of generic conservation management tools, such as Population Viability Analysis (PVA) models, to assist in the conservation and management of a range of marine fauna. The Murdoch University research program on the ecology of the dolphins of Koombana Bay is such an example (see Table 10).

Climate Change

Knowledge about the potential impacts of climate change on WA marine ecosystems is a major current gap and research is needed to address this deficiency. Initial priorities include the establishment long-term monitoring programs including a state-wide network of temperature recorders and quantitative descriptions of the marine biodiversity and key ecological processes (e.g. acidification, carbon flux, recruitment, herbivory etc) through time in representative ecosystems in the major zone of biogeographic overlap in WA (i.e. between North West Cape and Cape Leeuwin). Changes are likely to be more obvious in this overlap zone and these studies will provide a better

basis to understand the potential impacts of climate change on WA's marine biodiversity. Baseline studies of coral disease on WA coral reefs, the on-going study of the recovery of the coral reef communities at Coral Bay (Ningaloo Marine Park) and retrospective studies examining changes in coral growth over the past 100 years (e.g. in *Porites*) are also priority research areas in regard to the potential impacts of climate change on WA coral reefs.

Social Science
Social research priorities include developing a framework to provide operational expressions for 'wilderness' and 'seascape' values, particularly in the Jurien Bay, Ningaloo and Rowley Shoals marine parks; identifying indicators for social and economic benefits of marine conservation programs and using oral and recorded histories, including indigenous knowledge, to reconstruct marine environment resource condition trends in WA.

5.5.5. Performance Assessment
The establishment of a state-wide system of marine protected areas has accelerated over the past few years and this impetus will continue. The planning for WA's first regional marine strategy has also begun on the south coast. There is a need for on-going development of the existing performance assessment systems that measure the effectiveness of these management measures, at system (e.g. CAR), MPA (e.g. KPI) and 'asset' (e.g. condition, pressure, response) level in mitigating threats to conservation values and in measuring the social and economic benefits to the community. A similar need exists to measure the performance of threatened marine fauna recovery/management prescriptions. Two parallel research priorities in this regard are: the identification of appropriate ecological (e.g. resource condition) and social indicators and the development of cost-effective methodologies to monitor these indicators. The development of remote sensing techniques will be a priority in a state as large as WA, as well as maintaining links with the recently established Integrated Marine Observation System.

The development and implementation of state-wide MPA and marine fauna monitoring programs to support departmental performance assessment and MPRA audit processes are a major priority for the MSP over the next three years. Links will be established with regional NRM groups, particularly NHT monitoring and evaluation programs.

5.5.6. Developing and implementing marine science communication programs state-wide
Science communication is about transferring scientific knowledge into improved policy, planning and operational management, positively influencing community attitudes and behaviour towards conservation and sustainable use of the environment and influencing the attitudes of politicians, stakeholders, media and industry groups with an aim of building confidence about governance, regulation and the use of science and technology.

The development of a comprehensive state-wide marine science communication plan will be a priority and will be integrated with section 5.5.3 (above): *Promoting better integration and knowledge transfer of research and monitoring outputs.*

6. Budget Summary for 2007/08

Table 11 provides a summary of proposed funding for marine science activities in DEC in 2007/08.

TABLE 11: 2007/08 BUDGET SUMMARY FOR THE MARINE SCIENCE PROGRAM

MARINE SCIENCE PROJECT AREAS	Budget ($'000s)				Comment
	MSP	Regions and specialist branches	External	Total	
1. Building a marine science capacity	100	0	0	100	
2. State-wide	200	285	225	710	Mostly related to MPA marine science.
3. Marine Protected Areas	487	423	TBD	910	
4. WAMSI Node 3	110	45	100	255	Mostly related to Ningaloo and Jurien Bay MPAs
5. Marine science communication	36	14	7	57	Some in 4
6. Marine fauna	-	TBD			Included in 10
7. Marine biodiversity inventory	-	TBD			Included in 1
8. Marine planning	-	TBD			Included in 1
9. Marine environmental protection	-	TBD			Included in 1
10. Seed-funding[1]	77	231		305	
TOTAL	**1010**	**998**	**332**	**2340**	

[1] Seed-funding projects total in Table 11 does not match with Table 10 as funds for some projects have been provided in the 2006/07 financial year. Seed-funding total in Table 11 is for 2007/08 only and only for projects identified in this business plan; Approx. 40 other marine science projects where funds or *in kind* support is being provided by DEC regions and specialist branches in 2007/08 will be included when this information is available. External contributions will be also added when known.

APPENDIX 1: SALARY AND SALARY ON-COSTS FOR THE MSP FOR THE NEXT THREE FINANCIAL YEARS.

Position	Level	Salary + on-costs ($ '000)			Position	Funding source[2]
		07/08	08/09	09/10		
Program Leader	L8	123	123	123	Existing position (P)	MSP
Administrative assistant	L2	51	53	54	New position (P)	MSP
Marine Research Unit Co-ordinator	L7	100	104	107	New position (P)	MSP
Marine Monitoring Unit Co-ordinator	L7	100	104	107	New position (P)	MSP
Marine Science Communication Unit Co-ordinator	L6	86	89	92	New Position (P)	MSP
Research Scientist (Tropical ecology)	L5/6	86[3]	89	92	Existing position (C to P)	MSP
Research Scientist (Temperate ecology)	L5/6	86	89	92	New position (P)	MSP
Research Scientist (Biodiversity patterns)	L5/6	86	89	92	Existing position (P)	MSP
Research Scientist	L2/4	57	61	66	Existing position (C to P)	MSP
Research Scientist	L2/4	51	54	57	New position (P)	MSP
Research Scientist	L2/4	51	54	57	New position (P)	MSP
Marine Operations Officer	L5	74	76	79	New position (P)	MSP
Marine Data Officer	L5	74	76	79	New position (P)	MSP
Sub-total 1		**1025**	**1,061**	**1,097**		
Research Scientist (Fish)	L6	86	89	92	New position (P)	RS
Research Scientist (Marine fauna)	L7	100	104	107	New position (P)	RS
Research Scientist (Social)	L6	86	89	92	New position (P)	RS
Technical Officer	L2	51	53	54	New position (P)	RS
Technical Officer	L2	51	53	54	New position (P)	RS
Technical Officer	L2	51	53	54	New position (P)	RS
Marine Community Monitoring Officer	L5	74	76	79	New position (P)	RS
Sub-total 2		**499**	**517**	**532**		
TOTAL	**20**	**$1,524**	**$1,578**	**$1,629**		

[2] Proposed funding sources to support these positions are shown: MSP = Marine Science Program cost centre; RS = regional cost centres (following agreement with RMs)

[3] Level5/6 position salaries are costed at L6

APPENDIX 2A: FORWARD ESTIMATES OF FUNDS FOR MARINE RESEARCH AND MONITORING.

Funding[4]	**RESEARCH & MONITORING ($,1000s)**			
	Actual[5] **2006/07**	**2007/08**	**2008/09**	**2009/10**
Marine Science Program	875 [6]	1007[7]	1087[8]	1087
WAMSI	100	100	100	100
Sub-total 1	**975**	**1107**	**1187**	**1187**
Existing MPAs				
RSMP	48	48[9]	48	48
MB/B Is	135	185[10]	185	185
NMP	555	555[11]	555	555
SBMP	46	70[12]	88[12]	88
JBMP	138	190[13]	190	190
Metro MPAs	56	108[14]	200[15]	200
Sub-total 2	**978**	**1156**	**1266**	**1266**
Proposed MPAs				
DA/CP	-	210[16]	210	210
Capes	-	200[16]	200	200
W/N I	-	52[16]	52	52
Sub-total 3	**0**	**462**	**462**	**462**
TOTAL[17]	**$1.953M**	**$2.725M**	**$2.915M**	**$2.915M**

[4] Agreement to be reached with RMs on forward estimates , level and cost of RS staff involvement etc (see point 4 Table 1)

[5] From 2006/07 regional and MSP Business Plans

[6] 2006/07 CF allocation for the Marine Science Program includes$300K transferred from MCB budget, $415K from original Ningaloo MP allocation, $60K for RSMP and $100K for MB/B Is.

[7] Includes further allocation from Oct 2006 ERC budget decision (see DG memo 15 Dec 2006); does not include future allocations for the Dampier, Capes or Walpole MPAs.

[8] Includes further allocation from Oct 2006 ERC budget decision and assumes 2007/08 allocation for RSMP is $52K; does not include future allocations for the Dampier, Capes or Walpole MPAs.

[9] Based on 2006/07 regional allocation.

[10] Based on 2006/07 regional allocation plus further allocation from Oct 2006 ERC budget decision (assumes MSP and regional R&M budget is 30% of total budget of $860K (DEC) + $290K (DoF).

[11] Based on 2006/07 regional allocation and on Govt approved budget (assumes MSP and regional R&M budget is ~30% of total budget of $3M (DEC) + $500K (DoF).

[12] Includes further allocation from Oct 2006 ERC budget decision and assumes R&M (MSP and district allocations) is 30% of budget of $390K for 2007/08 and $560K for 2008/09 and on-going; does not include MMia Trust funds etc.

[13] Based on Govt approved budget.

[14] Includes further allocation from Oct 2006 ERC budget decision. Total R&M (incl. MSP ($40K) and district (above)) allocation is 20% of 3 metro MPAs budget of $732K for 2007/08.

[15] Includes further allocation from Oct 2006 ERC budget decision and assumes total R&M (MSP ($80K) and district (above)) allocation is 30% of 3 metro MPAs budget of $932K for 2008/09 and on-going.

[16] Assumes the overall approved Govt budget will be ~70% of the requested budget in DEC forward estimates (Oct 2004).

[17] Does not include $70K and $50K for 07/08 and 08/09 financial years to Dr Richard Campbell or $15-20K pa funding to Dr Bejder for dolphin monitoring at Monkey Mia or other marine science funding in SD, NC and PVS divisions or external marine science funding to DEC (eg NHT).

APPENDIX 2B: FORWARD ESTIMATES FOR STRATEGIC EDUCATION/SCIENCE COMMUNICATION.

Funding	Allocation for education/communication ($'000s)		Proposed allocation for strategic education/communication[18] ($)		
	2006/07[19]	2007/08[20]	2007/08	2008/09	2009/10
Existing MPAs					
RSMP	14	29	5,000	5,000	5,000
MB/B Is	10	252	38,000	38,000	38,000
NMP	706	706	91,500	91,500	91,500
SBMP	10	73	11,000	17,000	17,000
JBMP	168	110	16,500	16,500	16,500
Metro MPAS	106	146	22,000	28,000	28,000
Sub-total 1	**$1,014,000**	**$1,316,000**	**$184,000**	**$196,000**	**$196,000**
Proposed MPAs					
DA/CP	-	140	21,000	21,000	21,000
Capes	-	133	20,000	20,000	20,000
W/N I	-	35	5,000	5,000	5,000
Sub-total 2	**0**	**$305,000**	**$46,000**	**$46,000**	**$46,000**
Total	**$1,014,000**	**$1,621,000**	**$230,000**	**$242,000**	**$242,000**

[18] Assumes 3% of total education budget (usually 20% of total MPA budget) is allocated for strategic education/science communication. Assumes the overall budget of proposed MPAs will be 70% of the requested budget in DEC forward estimates (Oct 2004) to DTF. Includes further education allocations (determined as above) from Oct 2006 ERC budget decision (see DG memo 15 Dec 2006)

[19] From 2006/07 regional Business Plans and includes further allocations from Oct 2006 ERC budget decision

[20] From 2006/07 regional allocations and/or Govt approved budgets and includes further allocations from Oct 2006 ERC budget decision

APPENDIX 3: NOMINAL ALLOCATIONS OF MARINE SCIENCE PROGRAM STAFF TIME (FTES).

Position	Level	Research		Monitoring	Science Communication	Advice/ Policy	Position (permanent/ contract position)
		External	Internal				
MARINE SCIENCE PROGRAM							
Program Leader: Senior Principal Research Scientist	L8	0.2	0.2	0.2	0.2	0.2	Existing position (P)
Administrative assistant	L3	0.3	0.3	0.2	0.1	0.1	New position (P)
Marine Research Unit Co-ordinator	L7	0.5	0.2	0.1	0.1	0.1	New position (P)
Marine Monitoring Unit Co-ordinator	L7	-	-	0.8	0.1	0.1	New position (P)
Marine Science Communication Unit Co-ordinator	L6	-	-	-	1.0	---	New position (P)
Research Scientist (Fish)	L6	0.2	0.4	0.2	0.1	0.1	New position (P)
Research Scientist (Social)	L6	0.3	0.3	0.2	0.1	0.1	New position (P)
Research Scientist (Marine fauna)	L7	0.25	0.25	0.35	0.1	0.05	New position (P)
Research Scientist (Tropical ecology)	L5/6	0.15	0.5	0.2	0.1	0.05	Existing position (C to P)
Research Scientist (Temperate ecology)	L5/6	0.15	0.5	0.2	0.1	0.05	New position (P)
Research Scientist (Biodiversity patterns)	L5/6	0.3	0.4	0.15	0.1	0.05	Existing position (P)
Research Scientist	L2/4	-	0.5	0.4	0.1	-	Existing position (C to P)
Research Scientist	L2/4	-	0.5	0.4	0.1	-	New position (P)
Research Scientist	L2/4	-	0.5	0.4	0.1	-	New position (P)
Technical Officer	L2	-	0.3	0.6	0.05	0.05	New position (P)
Technical Officer	L2	-	0.3	0.6	0.05	0.05	New position (P)
Technical Officer	L2	-	0.3	0.6	0.05	0.05	New position (P)
Marine Data Officer	L5	-	0.5	0.5	-	-	New position (P)
Marine Community Monitoring Officer	L5	-	-	0.5	0.5	-	New position (P)
Marine Operations Officer	L5	-	0.4	0.6	-	-	New position (P)
REGIONAL SCIENTIFIC INVOLVEMENT							
Regional Manager	L8	?	?	?	?	?	Existing position
District Manager	L7	?	?	?	?	?	Existing position
Regional PVS Leader	L7	?	?	?	?	?	Existing position
Regional NC Leader	L7	?	?	?	?	?	Existing position
Regional Marine Ecologist	L6	?	?	?	?	?	Existing position
District NC Leader	L5	?	?	?	?	?	Existing position
District PVS Leader	L5	?	?	?	?	?	Existing position
Marine Park Co-ordinator	L5	?	?	?	?	?	Existing position
REGIONAL OPERATIONAL INVOLVEMENT							
Marine NC Officer	?	?	?	?	?	?	Existing Position
Marine PVS Officers	?	?	?	?	?	?	Existing Position
Marine Rangers	?	?	?	?	?	?	Existing Position
Marine Rangers	?	?	?	?	?	?	Existing Position
Other District staff	?	?	?	?	?	?	Existing Position

APPENDIX 4: DRAFT PROCESS FOR MARINE SCIENCE PROJECTS SUPPORTED BY DEC

The process outlined below has been in place in the Science Division for a number of years and has been developed to ensure science funding to DEC is used efficiently and effectively. The process includes all marine science projects that are partly or wholly supported by DEC (e.g. cash and/or '*in kind*' contributions such as staff time, equipment, cars, boats etc). The process has been instituted to promote opportunities and synergies, avoid duplication, maintain records of historical and current research, assist accountability for marine science funding and ensure high quality and timely science outputs. The principal investigator/project leader of each project is responsible for ensuring that this process is adhered to.

1**. Science Project Concept Plan** (~2 pages)

The first step is to fill out the standard Science Division 1-2 page Science Project Concept Plan (SPCP). The purpose of the SPCP is to provide a broad overview of the key elements (e.g. specific objectives, expected outputs, duration, budget etc) of the project with the aim of allowing an assessment of the need, relevance, priority and the technical and logistical feasibility of the project to be made. The SPCP will also ensure that collaborators/potential collaborators have an agreed understanding of the project before detailed project planning begins.

The SPCP will be approved by the Science Division senior management team (SMT) on advice from the Marine Science Co-ordination Committee (MSCC). The SPCP will be posted on the DEC website to facilitate communication of the details of science projects to internal and external stakeholders.

All marine science projects that are partly or wholly supported by DEC (e.g. cash and/or '*in kind*' contributions such as staff time, equipment, cars, boats etc) will require a SPCP to be developed and submitted for approval by the SMT. If approved, the SMT, on advice from the MSCC, will indicate whether a Marine Science Project Proposal is required.

2. Marine Science Project Proposal (~10 pages)

The scientific rationale of the project must be fully explained in the Marine Science Project Plan (MSPP). The MSPP is a modified version of the standard SPP used by the terrestrial science programs of the Science Division and:

- Ensures that the project leader devises detailed science plans that address the study objectives, methods, outputs and relevance to departmental activities;
- ensures that the data can be robustly analysed;
- ensures the project leader is accountable for the delivery of the project outputs and outcomes, on time and on budget;
- enables the SMT to assess the proposal and answer the following questions:
  a) does the design address the study aims specifically?
  b) are the methods scientifically robust? Will the data lead to robust conclusions?
  c) does the design maximize the information obtained about the research question(s)?
  d) does the proposal complement or duplicate other research activities elsewhere in WA?
  e) how will the results improve management of WA's marine environment?
- will include a broad overview of field operations, demonstrating that the objectives can be achieved given time, budget, personnel, equipment and safety constraints.

Marine science projects where over 50% of the total budget is provided by DEC (including cash and/or '*in kind*' contributions such as staff time, equipment, cars, boats etc) will automatically require a MSPP to be developed and submitted for approval by the SMT. The SMT, on advice from the MSCC, will advise on the need for a MSPP for marine science projects where less than 50% of the total budget is provided by DEC. Where an MSPP is not required, science project plans (or equivalent) will be required from external research providers for all projects where the DEC is contributing resources.

3. Field Operations Program

Once the MSPP is approved a Field Operations Program (FOP) will be required to provide a detailed outline of proposed field work. The FOP is aimed at ensuring field operations are conducted in the most efficient and effective manner with due regard to departmental boating and SCUBA diving policies. Once completed, the Field Operations Program can be attached to the Marine Science Project Proposal and distributed to relevant DEC managers as well as SDCA, and archived. The Project Leader is responsible for ensuring the implementation of the FOP.

4. Reporting

The project leader is responsible for reporting of results in the manner described in the Marine Science Project Proposal and ensuring data management complies with Science Division policies and practices.

For any project, the reporting requirements will consist of all or some of the following:

- A **data report**, within three-six months of the field work finishing, containing at minimum a brief introduction, aims, methods, summarised results and tabulated raw data;
- a summary of **science communication** outputs;
- a departmental **Technical Report** (if appropriate)[21] in the standard scientific format;
- publication of a **peer-reviewed paper** in an appropriate scientific journal; and
- policy, planning and management **guidelines** resulting from the marine science project.

Distribution of copies of reports/papers and archiving of all data, in both hard copy and digital form, according to departmental protocols are the responsibility of the Project Leader.

[21] Departmental technical reports would be produced if the results and conclusions of the research are needed urgently. Local peer review would be a minimum requirement.

Department of Environment and Conservation
Science Division

Marine Science Project Concept Plan

1. Project title:

   Rationale:

   Objectives:

2. Expected outcome:

3. Proposed period of the project:

4. Expected collaborations:

5. Strategic context (in relation to Corporate Plan, Business Plan and relevant marine park management plans):

6. Staff (FTEs):

	Year 1	Year 2	Year 3
Scientist			
Technical			

7. Indicative Operating Budget ($):

	Year 1	Year 2	Year 3
Consolidated Funds (DEC)			
External Funds			
Total			

8. Proponent Date

9. Supported by Program Leader Date

10. Forward to Director, Science Division

11. Forward to Director of NC or SFM

Considered at SMT Meeting No. …./….

Decision: ☐ Rejected (return to proponent)

☐ Approved subject to approval of SPP (forward to Biometrician for allocation of Concept Plan Number. Copy to proponent).

Comment ……
……..

Director …….. Date …….

Concept Plan No (Biometrician): ……..

Science Project Plan Received: …… Date …….

(**Note**: SPPs not received within 3 months of the Science Project Concept Plan being approved become void)

This is the Marine Science version of the controlled document available on the DEC web.
Printed versions of this document may not be current.
Last amended May 2007.

Department of Environment and Conservation
Science Division

Marine Science Project Plan

Important: Refer to the *Explanatory Notes* (Staff Guideline No. 7) when preparing an SPP.

PART A: Title and Location

SPP Number: [allocated by Biometrician]
Request No: [allocated by WASPP]
Concept Plan No: [allocated by Biometrician]

1. Project Title:

2. Science Division Program:

3. Staff [Names and estimates of percentage of time]:

   Supervising Scientist:
   Other Scientists:
   Technical Officers:
   External Collaborators:
   Volunteer(s):

4. a) Output Program:

   b) Relevant Departmental KRAs:

5. a) IMCRA Region(s):

   b) NRM Region(s):

   c) CALM Region(s)/District(s):

   d) Geocode(s):

6. Related SPPs:

7. Proposed commencement date: and proposed completion date:

8. Date of submission of this Plan and signature of Supervising Scientist:

9. Nomination of an external scientist capable of providing expert advice on the scientific merit of the SPP:

PART B: Endorsements

10. List the relevant Regional Ecologist(s) and Nature Conservation Leader(s) whom you have consulted about the SPP: *What opportunities exist for collaboration with other Science Division Programs, other Departmental Staff, Universities, other Government agencies, Industry, traditional land owners and the broader community? Explain how these linkages were investigated/developed.*

11. Biometrician:
Return comments to Program Leader

12. Animal Ethics Committee: (If applicable)
Return comments to Program Leader

13. Program Leader, Flora Conservation and Herbarium (If applicable; see Point 22 below):
Return comments to Program Leader

14. Program Leader:
Program Leader arranges that a copy of the SPP is sent to the nominated external scientist (See No. 8) for a confidential assessment if required.

15. After endorsement please forward to Biometrician:
Biometrician to load approved SPP on WASPP, arrange filing at Directorate, publish in Science Communications, send photocopy of completed SPP to Supervising Scientist, copy cover sheet to Regional Manager, District Manager and relevant Program Leader (for their information)

PART C: Relevance and Outcomes

16. Background and literature review (help us to understand why the proposed research is important):

17. Project aims (state these very clearly):

18. Anticipated project outcome(s) including benefits to DEC. Include specific reference to management plan KPIs, or similar indications that this is a high priority area for research.

19. Who are the anticipated users of the knowledge to be gained? How will they access the information?

20. Milestones [Detailed timeline or Gantt Chart describing milestones (including reports) and when they will be completed]:

21. References

PART D: Study Design

22. Detailed methods [including statistical analysis]:

PART E: Data management and reporting

23. Estimated number of vouchered specimens:

24. Data management including data custodian [how and where are raw data being archived/maintained? - see Guideline No 16]:

25. Reporting (how will this research help improve DEC's marine policy, planning and/or management? Describe with specific reference to outputs listed in C20):

PART F: Budget

26. Budget Estimate [anticipated expenditure]:

Consolidated Funds (DEC)

	Year 1 ($)	Year 2 ($)	Year 3 ($)
FTEs – Scientist			
FTEs – Technical			
Equipment			
Vehicle/Vessel			
Travel			
Other			
TOTAL			

External Funds

	Year 1 ($)	Year 2 ($)	Year 3 ($)
Salaries/Wages/Overtime			
Overheads			
Equipment			
Vehicle/Vessel			
Travel			
Other			
TOTAL			

PART G: Operational scope

27. Maps (if not already provided):

28. Mode of field operations (will operations will be vessel- or land-based? Camping or town accommodation? What kinds of vehicles/vessels will be required?):

29. Approximate duration of field operations (days per field trip if multiple operations):

30. Approximate number of personnel that will be in the field for this project, and their roles (eg Dive Supervisor, Coxswain, Project Leader, Field Assistant):

31. Safety (indicate how relevant DEC boating, diving and communications policies/codes will affect field operations):

PART H: Marine science communication/education

32. What science communication products/activities will be associated with this project (specify audience in each case)?

APPENDIX 5: PROJECTED MARINE SCIENCE PROGRAM OUTPUTS FOR 2006/07

Primary Author	Co-authors	PROJECT TITLE	OUTPUT		
			Science *What did we learn?*	**Communication** *Who did we tell?*	**Knowledge transfer** *What difference did it make?*
CSI	SLO	Marine Science Program pamphlet	• MSP Pamphlet	• Pamphlet on DEC Website • Distributed widely to internal and external stakeholders • Article in Conservation News	NA
CSI		Marine Science Strategy	• Report	• July 2006 DEC 'Marine Science Strategy' workshop • Survey of NRM agencies in Australia re: meeting their marine science needs • Draft provided to DG in Jan 2007 • Draft sent to RMs and marine staff in May 2007 • SD presentation • MPRA presentation • WAMSI presentation • AMSA presentation (SAR) at young marine scientists workshop • Presentation (SLO) to ED of GBRMPA and MPPB	• Resulted in proposed workshop at AMSA conference in July to discuss interstate collaboration in marine science.
CSI		Marine Science Business Plan: July 2007-2010	• Report	• Distributed for comment to DEC RMs and managers of specialist branches in May	NA
CSI		Fishing compliance in Western Australian marine protected area: The interaction between compliance and science: A discussion paper	• Report	• Circulated to DoF, MPPB and regions; discussions with DoF-decision to form WG	• Improved compliance programs for 2007/08

Primary Author	Co-authors	PROJECT TITLE	OUTPUT		
			Science *What did we learn?*	**Communication** *Who did we tell?*	**Knowledge transfer** *What difference did it make?*
KBA	CSI, SAR, SLO	Establishing a long-term benthic community monitoring program in the Montebello/Barrow Islands marine protected areas	• Field Program Report (August) • Data report (August) • Field Program Report (December) • Data Report (December) • Scientific note submitted to "*Coral Reefs*" re: coral reef complex (SLO, CSI, KBA, AKE)	• Media statement (August survey) • Media statement (December survey) • Media quality DVD provided to SDCA for Communication & education usage (SAR)	• Video clip of coral reef footage provided to EPA re: Gorgon assessment • Advice provided to MPRA re: humpback whale entrapment in pearling lease in Montebello Is. • Operational Guideline: Recommendations for the conservation of *Scylla* spp. in the Montebello/Barrow Islands Marine Protected Areas (PVA,SLO)
AED	KBA	Rowley Shoals Marine Park Marine Research and Monitoring Projects Database	• Report (Bibliography of historical R&M) • Report (Current and proposed marine R&M projects)		
DLI (SCD)	KBA, KFI	Metro Marine Parks Marine Research and Monitoring Projects Database	• Report (Bibliography of historical R&M) Report (Current and proposed marine R&M projects)		
SLO	CSI	Coral Bay Coral Communities Recovery survey 2006	• Field Program Report • Data Report • Scientific paper submitted to "*Coral Reefs*" re: methods • Scientific paper submitted to "*Coral Reefs*" re: recovery of reef communities	• Radio interview	
SLO		Coral Spawning Observations: Coral Bay April 2007		• Television interview • Scientific advice provide to DEC and DPI staff and contractors re: construction of small boat facility at Moncks Head • Public presentation at community workshop	• Sediment curtain to confine suspended sediment plume was fixed
SLO		Comparative marine biodiversity survey of the Rowley Shoals	• Prospectus (Concept Plan) • Draft SPP	• Media release announcing that survey will take place, timed to coincide with gazetting of zones in RSMP	• Nigel Higgs is writing media release based on prospectus
SLO		Marine Image Library edition 1.0	• Database	• Keyword-searchable database of images relevant to marine science in WA, on CD	• Many images already in use on DEC websites etc
PVA	SLO	Disturbance history of coral reef communities in Bill's Bay, Ningaloo	• Data Report		

Primary Author	Co-authors	PROJECT TITLE	OUTPUT		
			Science *What did we learn?*	**Communication** *Who did we tell?*	**Knowledge transfer** *What difference did it make?*
		Marine Park, 1975-2007			
SAR		Survey of *Drupella cornus* (coral eating marine snail) at Ningaloo Marine Park and Muiron Islands Marine Management Area	• Field Program Report • Data Report • Scientific paper (draft completed)	• LANDSCOPE article (December edition 07) • Article in Conservation News (May edition 07) • AMSA student presentation July 06 • DEC Park Note (Exmouth District)	
SAR		Winter coral bleaching survey at Ninagloo Marine Park	• Data Report	• Article in Northern Guardian (25/4/07) • Article in Conservation News (June edition 07)	• Improved understanding of a poorly understood process by managers
SAR		List of state-wide DEC-related marine research and monitoring projects for 06/07 financial year	• Access database on MSP T-drive (continuously up-dated) • Report		• Assisted with the development of the Marine Science Strategy and MSP 07/08 Business Plan
SAR	PVA	WA Marine Science Inventory	• Access database on MSP T-drive (continuously up-dated)		• Assists with planning of future marine R&M projects by providing DEC marine managers with an up-to-date list of current and completed state-wide marine research and monitoring projects
KWA	CSI	WAMSI Node 3 Science Plan	• Science Plan	• Presentation to Ningaloo Cluster workshop • Presentation to Ningaloo Tourism workshop • Point source article • Distributed to WAMSI Node and Project Leaders	
SAR	KBA, JDA	WAMSI Node 3: Ningaloo Marine Park Marine Research and Monitoring Projects Database	• Report (Bibliography of historical R&M) • Report (Current and proposed marine R&M projects) • Bibliographic paper in "Conservation Science" journal	• AMSA student presentation July 06 • Provided to: DEC Marine Policy and Planning Branch; DEC District and Regional Managers; Ningaloo Research Program project leaders (WAMSI Node 3).	• Improved knowledge of what information is/ will be available • Better integration of research effort in WAMSI Node 3
KWA	CSI	Node 3 Project plans and Project agreements	• Project Plans • Project Agreements	• WAMSI website	
KWA		Database of current research in Ningaloo Marine Park and their relevance to management objectives	• Excel database on MSP T-drive (continuously updated)	• Provided to DEC district staff, and external collaborating institutions and departments.	

Primary Author	Co-authors	PROJECT TITLE	OUTPUT		
			Science *What did we learn?*	**Communication** *Who did we tell?*	**Knowledge transfer** *What difference did it make?*
KWA		Data and Information Management Plan, WAMSI Node 3	• Interim plan for the storage and management of marine data gathered through WAMSI research projects	• Provided to WAMSI project leaders	

Key: CSI= Chris Simpson; SLO= Suzanne Long; KBA= Kavin Bancroft; KWA= Kelly Waples; AKE= Alan Kendrick; SAR= Shannon Armstrong; AED= Alicia Edwards; JDA= Judy Davidson; PVA= Peter Van Schoubroeck; DLI= David Lierich (Swan Coastal District); KFI= Kate Fitzgerald.