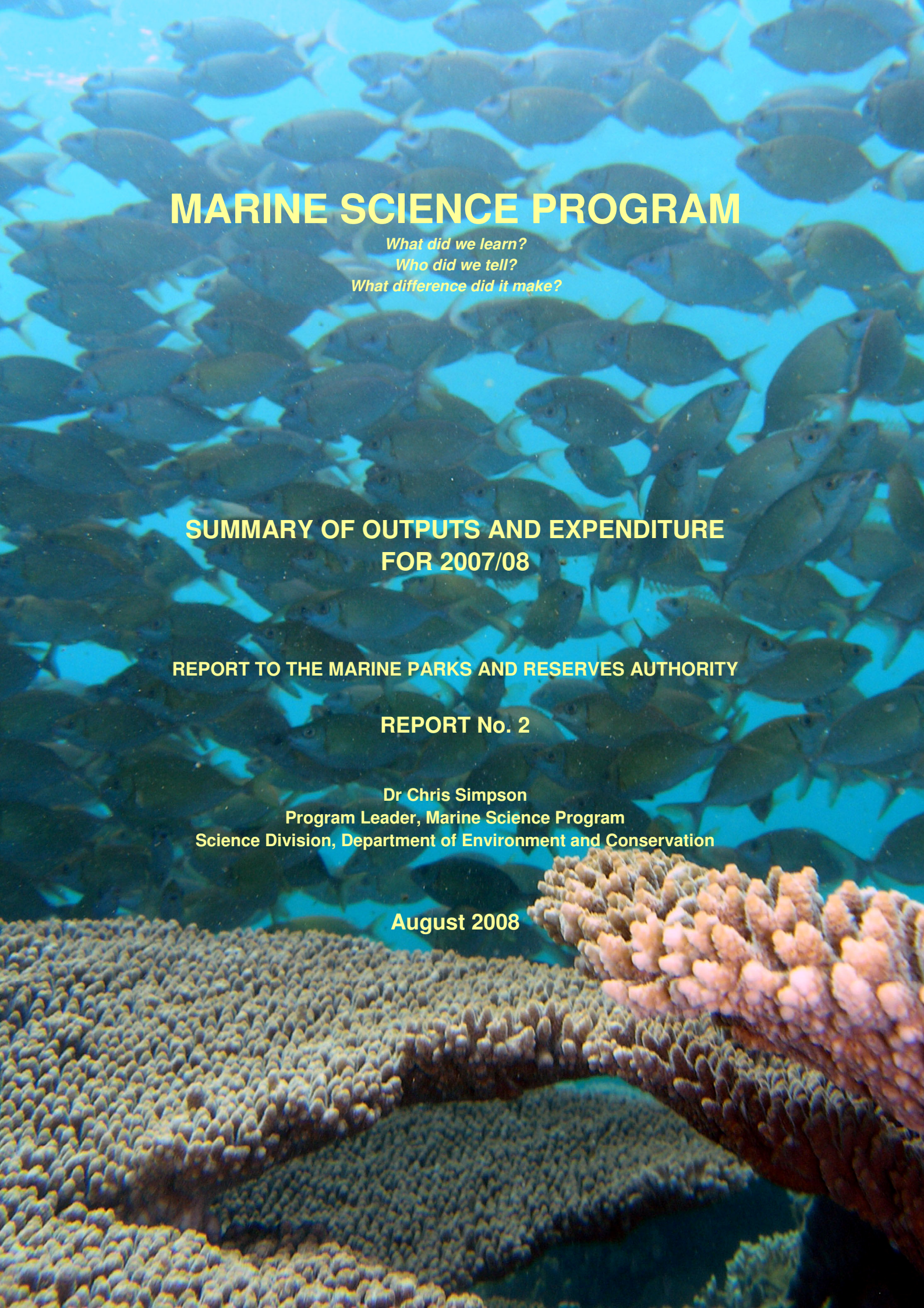

MARINE SCIENCE PROGRAM

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

SUMMARY OF OUTPUTS AND EXPENDITURE FOR 2007/08

REPORT TO THE MARINE PARKS AND RESERVES AUTHORITY

REPORT No. 2

Dr Chris Simpson
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Science Division, Department of Environment and Conservation

August 2008

Cover photo courtesy of Marine Science Program, Science Division, DEC

SUMMARY

This document outlines the performance of the Marine Science Program (MSP) for the 2007/08 financial year and is part of the department's reporting and accountability obligations, under the CALM Act, to the Marine Parks and Reserves Authority. Copies of this report will also be provided to the Director General, Directors and all Regional, District and Specialist Branch Managers of DEC.

The MSP's capacity to undertake marine science projects has continued to be limited as might be expected in the initial phase of establishing an in-house capacity with low staff numbers and limited field and laboratory facilities. The MSP moved into new office accommodation in the new 'southern' demountable late in 2007. This provided significantly improved office accommodation for staff. Following DEC Corporate Executive endorsement of the Marine Science Strategy (MSS) in late 2007, six permanent marine research scientist positions were advertised in February and selection processes are complete. Two existing DEC staff members were appointed and have taken up their positions with the MSP. Four external appointees will take up their new positions by mid-October 2008. Planning and approvals processes to build MSP storage and workshop facilities at the DEC Kensington site are well progressed.

MSP priorities for 2007/08 focussed on continuing to build capacity to undertake marine science, via implementation of the MSS, administering and facilitating the integration of the Ningaloo Research Program (consisting primarily of WAMSI Node 3 and the CSIRO/MU *Wealth from Oceans* Ningaloo Cluster), undertaking priority marine science projects and activities identified in MPA management plans and continuing to develop a better understanding of historical and current marine science relevant to DEC's needs.

Budget expenditure largely met or exceeded individual reserve CF allocations in all cases. The unevenness in expenditure at a reserve level is a reflection of year to year variations in the geographic emphasis of MSP activities (out of necessity) and the small budgets and very high costs of doing marine science in some reserves (e.g. Montebello and Rowley Shoals marine parks). These reserves will require temporary cross subsidies from time to time to achieve appropriate outcomes. Over time these variations will be evened out.

Funding for marine science in DEC occurs in the MSP, regional and specialist branch cost centres. This report focuses primarily on expenditure and outputs for 2007/08 by the MSP and does not include expenditure and outputs on marine science by regions and specialist branches or 'in kind' contributions from collaborating external agencies. Regional and specialist branch will report separately on their marine science outputs and expenditure to the MPRA in 2007/08. However, from 2008/09, the MSP will report to the MPRA on all DEC-supported marine science for that financial year.

Acknowledgements

I would like to thank Dr Neil Burrows, the Director of the Science Division, for his continued assistance, encouragement and support throughout 2007/08 in helping establish the MSP within the Science Division. Also, special thanks Glenda Lindsey and Mark Brabazon for their help and assistance.

Thanks also to the many regional and specialist branch staff who provided considerable assistance on our field trips and senior staff in helping contribute to the implementation of the collaborative approach outlined in the Marine Science Strategy.

Finally, I would like to thank the staff of the Marine Science Program for their continuing commitment to marine conservation and for helping contribute to a productive and enjoyable second year of the Marine Science Program.

1. Introduction

The Marine Science Program (MSP) was established in the Science Division of the Department of Conservation and Land Management (CALM) in May 2006. In July 2006, a workshop was held with staff from the MSP, Regional Services and relevant specialist branches to discuss and agree on a general approach to developing a marine science capacity in CALM. Also in July 2006, CALM and the Department of the Environment were amalgamated into DEC by the WA State Government. A Marine Science Strategy (MSS) was developed and endorsed by the DEC Corporate Executive late in 2007.

This document outlines the outputs and expenditure of the Marine Science Program for the 2007/08 financial year and is part of the DEC's reporting and accountability obligations under the CALM Act to the Marine Parks and Reserves Authority (MPRA).

2. Report on Activities and Outputs for 2007/08

2.1. Context

The MSP's capacity to undertake marine science projects has continued to be limited as might be expected in the initial phase of establishing an in-house capacity with low staff numbers and limited field and laboratory facilities. The MSP moved into new office accommodation in the new 'southern' demountable late in 2007. This provided significantly improved office accommodation for staff. Following DEC Corporate Executive endorsement of the Marine Science Strategy (MSS) in late 2008, six permanent marine research scientist positions were advertised in February and selection processes are complete. Two existing DEC staff members were appointed and have taken up their positions with the MSP. Four external appointees will take up their new positions by mid-October 2008. Planning and approvals processes to build MSP storage and workshop facilities at the DEC Kensington site are well-progressed. Two senior contract staff left the MSP during the year.

MSP priorities for 2007/08 focussed on continuing to build an in-house capacity to undertake marine science, via implementation of the MSS, administering and facilitating the integration of the Ningaloo Research Program (consisting primarily of WAMSI Node 3 and the CSIRO/MU *Wealth from Oceans* Ningaloo Cluster), undertaking priority marine science projects and activities identified in MPA management plans and continuing to develop a better understanding of historical and current marine science relevant to DEC's needs.

Funding for marine science in DEC occurs in the MSP, regional and specialist branch cost centres. This report focuses on the consolidated funding (CF) expenditure and outputs for 2007/08 by the MSP and does not include expenditure and outputs on marine science by regions and specialist branches or 'in kind' support from collaborating organisations[1]. These data will be included in subsequent reports. Regional and specialist branch will report separately on their marine science outputs and expenditure to the MPRA in 2007/08. However, from 2008/09, the MSP will report to the MPRA on all DEC-supported marine science for that financial year to ensure the funding for marine science for each MPA over the life of the management plan will be consistent with the Government funding allocations.

2.2. Activities and outputs for 2007/08

The major marine science projects, activities and outputs are outlined in the section below. This is largely based on the marine component of the Science Division's Annual Research Activity Report (SDARAR). The SDARAR is published each year in August and widely distributed on request.

[1] For example the Australian Institute for Marine Science provided the research vessel RV Solander for 16 days to assist DEC in the marine biodiversity survey of the Rowley Shoals MPAs. Daily costs of this vessel are ~$15,000 per day.

3. Marine Science Projects, Activities and Outputs

3.1 Building a Marine Science Capacity in DEC

Core Project

Team members
C Simpson (0.3); Total Science Division (0.3)

Context
The Marine Science Program (MSP) was established in the Science Division of DEC in May 2006. A Marine Science Strategy (MSS) was developed in 2006/07 and endorsed by the DEC Corporate Executive in September 2007. The MSS provides a blueprint for building a marine science capacity in DEC and outlines a collaborative approach that will be taken with DEC regions and specialist branches and with external science providers. The objectives, functions outputs and outcomes for the research, monitoring and science communication units within the MSP are outlined as are proposed staff profile, strategic directions and priorities.

Summary of progress and key findings
Staff from the MSP moved into new offices at the Kensington site in November 2007 providing significant additional office space for staff. The MSS was published and was distributed to relevant State and Commonwealth Government departments as well as most marine science organisations and universities within Australia. A pdf version of the MSS was uploaded onto the DEC website *Naturebase*.

Six permanent research scientist positions were advertised and the selection processes for all positions are complete. The new staff will take up these positions early in the 2008/09 financial year. Planning and approvals process to build MSP storage and workshop facilities at the Kensington site are well-advanced. A rigid-hulled inflatable boat, field and scientific equipment have been purchased.

Management implications
Not applicable

Future directions (next 12-18 months)
- The establishment of MSP workshop and storage facilities at the Kensington site
- Purchase of scientific and field equipment
- Acquisition of laboratory space
- Improved office accommodation

DEC Region
All

IMCRA Region
All

NRM Region
All

3.2 Establishing a DEC Marine Science Co-ordination Committee

Core Project

Team members
C Simpson (0.1), S Armstrong (0.1); Total Science Division (0.2)

Context
A Marine Science Co-ordination Committee (MSCC) was established with representation from the MSP, Regions and key specialist branches 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. The Chair of the MSCC is the Marine Science Program Leader.

The MSCC will ensure that all ecological and social marine science projects within DEC (both internally and externally funded) 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 (e.g. AIMS, CSIRO, universities). 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.

Aligns with Corporate Strategies 2007-2009: 1.2, 1.5, 2.3, 7.1, 7.6, 8.1, 8.3, 8.4, 8.5, 8.8; KRAs: KRA1 KRA2

Summary of progress and main findings
- The establishment of the MSCC was supported across all Regions and key specialist branches.
- First meeting held.
- TOR for MSCC finalised.

Management implications
Effective management requires informed decision making. To this end the MSCC will improve management by:
Promoting potential collaborations, minimising duplication and ensuring compliance with DEC Science Division quality control processes.
Ensuring that quality of the science and reporting is high, as well as ensuring data and publications are accessible, appropriately distributed, stored and easily retrieved for future applications.

Future directions (next 12-18 months)
At least two meetings will held each financial year

DEC Region
All (marine related)

IMCRA Region
All (Western Australia)

NRM Region
All (marine related)

3.3 DEC Marine Science Current Projects Database (WA Marine Science Inventory)

Core Project

Team members

S Armstrong (0.05), P van Schoubroeck (0.05); Total Science Division (0.1)

Context
The DEC Marine Science Program (MSP) keeps an updated inventory of State-wide marine science projects - the MSP 'WA Marine Science Inventory' stored on the MSP sever. This information helps to keep track of what research is currently being undertaken relevant to marine conservation management in Western Australia. The database helps to identify gaps in knowledge and provide a rational basis for the prioritization of future marine science project planning. It will also assist scientific and academic organisations to work together towards a strategic and collaborative approach to marine research and monitoring in Western Australia.

Aligns with Corporate Strategies 2007-2009: 1.2, 1.5, 2.3, 7.1, 7.6, 8.1, 8.3, 8.4, 8.5, 8.8; KRAs: KRA1 KRA2

Summary of progress and main findings
- Database created and stored on MSP T drive.
- Database maintenance ongoing.
- Completed Data Report (1).
- Completed Data Report (2).

Management implications
- The database will assist a strategic and collaborative approach toward marine science project planning in Western Australia.

Future directions (next 12-18 months)
- Ongoing database maintenance.
- Database to be uploaded onto the DEC Intranet.

DEC Region
All (coastal)

IMCRA Region
All (Western Australia)

NRM Region
All (coastal)

3.4 NorthWest Marine Research Inventory (NWMRI)

Core Project

Team members
K Waples (0.1); C Simpson (0.1); Total Science Division (0.2)

Context
The Commonwealth has initiated its northwest marine bioregional planning exercises and, in conjunction with WAMSI has generated support for the development of a metadata database of all completed, current and planned research in the marine and coastal environment from Kalbarri to the Northern Territory and extending out to the Economic Exclusion Zone (EEZ). This project has become part of the science plan for Node 3 of WAMSI and, as such is being coordinated by the DEC. A project team from CSIRO are undertaking the work.

Aligns with Corporate Strategies 2007-2009: 8.3, 1.2

Summary of progress and main findings

- Steering Committee to guide research initiated.
- Project proposal approved by steering committee and WAMSI
- Project agreement signed and in place
- Project team developed database to house the metatdata consistent with Australian and international marine metadata standards
- Project team in the process of collecting metadata from research bodies, government and industry

Management implications
The completed database will provide a valuable resource for government agencies to identify what research has been undertaken in the marine environment and who holds the relevant information. This will help direct future research programs to fill gaps rather than repeat existing work.

Future directions (next 12-18 months)
Ensure the database is maintained and made broadly available through an internet site.

DEC Region
Kimberley, Pilbara, Midwest

IMCRA Region
North West, Central West

NRM Region
Rangelands

3.5 A Communication Plan for the Marine Science Program

Core project

Team members:
S. McKenna (0.2), Kelly Waples (0.1), Chris Simpson (0.1); Total Science Division (0.4)

Context
The WA government invests significant funds into research that will support the conservation of marine biodiversity in WA. The Marine Science program within the DEC is responsible for ensuring that this research is well planned and directed so that it will underpin the decision making process and management of WA's marine protected areas and marine resources.

While research and monitoring is undertaken by the MSP and by some DEC regions, the majority of marine research is undertaken by external agencies including Universities and national research bodies (e.g. CSIRO, AIMS).

The MSP has a key role in ensuring that the science community is aware of the management needs and issues that arise in marine parks and also in the communication of important research findings to decision makers and the general public.

Aligns with Corporate Strategies 1.2, 7.1, 8.1, 8.3, 8.5,

Summary of progress and main findings

- Draft Communication Plan for the Marine Science Program

Management implications

- Recognition within the research community of the scope of research currently underway in Western Australia
- Integration of research programs and linkages established between research teams and projects
- Broader recognition of the useful research undertaken through the DEC and how outcomes may be developed into improved management

Future directions (next 12-18 months)
- Implementing the communication plan within the DEC

DEC Region
All

IMCRA Region
All (within WA)

NRM Region
All

3.6 Comparative Marine Biodiversity Survey of the Rowley Shoals MPAs

SPP[2] No.: To be allocated

Team members
S Long (0.70), S Armstrong (0.05), S McKenna (0.05); Total Science Division (0.80)

Context
Due to their isolation and protection from most human impacts, the Rowley Shoals are likely to be amongst the most pristine coral reef environments remaining in the world. As coral reefs continue to degrade worldwide, careful management of the Rowley Shoals will be required to establish and maintain them as regional and potentially global benchmarks for coral reef biodiversity conservation.

Successful management requires informed decision-making. Information trends in marine biodiversity over time is essential for assessment of effectiveness of the different management regimes in effect (or shortly to be in effect) across the three shoals. Monitoring of human impacts as manifested in changes in marine biodiversity over time will facilitate best possible management of the Rowley Shoals.

DEC was one of the two major collaborative partners in a major marine biodiversity survey that ran from 1-17 December 2007. The results and outputs produced by DEC and collaborators will be of direct relevance to management of sharks and benthic assemblages (including commercially important invertebrates), not only at the Rowley Shoals but elsewhere in tropical Western Australia.

Aligns with Corporate KRAs: NC 2B, 2E, 2F, 2G, 2I, 2J.

Summary of progress and main findings
- Draft SPP and field program prepared; Survey completed; Metadata report in progress.
- Keyword-searchable database of WA Museum collections from WA's oceanic shoals in draft and on schedule.
- Draft basic photo ID field guides for algae and soft corals (to be used by DEC monitoring teams working in WA's tropical marine environments).

[2] SPP No.= Science Project Plan Number

- Positive media coverage for DEC and AIMS associated with cruise.

Management implications
- Increased public awareness of conservation value of the Rowley Shoals.
- Increased awareness in federal agencies (DEWHA, Coastwatch) of need for vigilance against poaching.

Future directions (next 12-18 months)
- Positioning of the Rowley Shoals as global marine biodiversity conservation benchmarks, through DEC-led publication of a book describing the results of recent research at the Rowley Shoals.
- Science planning for investigations into causes of apparent coral pathology at the Rowley Shoals

DEC Region
Kimberley

IMCRA Region
Offshore Oceanic Shoals

NRM Region
Rangelands

3.7 Distributions and Patterns of Major Benthic Communities of the Montebello/Barrow Islands MPAs

SPP No.: To be allocated

Team members
K Bancroft (0.35), S McKenna (0.05); Total Science Division (0.40).
A Kendrick (0.10), C Samson (0.05); Total Pilbara Region (0.15).

Context
The Montebello/Barrow Islands marine protected areas (MBIMPA) were gazetted in April 2007. Coral reef communities, mangroves, and macroalgal and seagrass communities are identified as key performance indicators in the management plan. However, the current understanding of marine ecological communities in the Montebello/Barrow islands marine protected areas (MBIMPA) is limited. The existing marine benthic habitat map was developed for the reserve planning process, at a resolution that is too broad to determine patterns in distributions and diversity.

This project will further develop a better understanding of marine biodiversity patterns within the MBIMPA. New data, in the form of field surveys, high resolution bathymetry, ortho-aerials and modelled benthic habitat will be used in conjunction with existing remote sensing and ground truth habitat data, to determine the distribution and diversity of major marine benthic communities in the MBIMPA. The data gathered and compiled through this project will form an essential information layer, to assess the appropriateness of existing management zoning, to assist in the environmental impact assessment of future development and to assist decision making for the ongoing management of the MBIMPA.

Aligns with Corporate Priorities 2007-2009: 1.2, 2.3 and KRAs 1, 2, NC priorities 3, 4 and PVS priorities 2A

Aim
To improve the understanding of the distribution and diversity of the major marine benthic communities in the Montebello/ Barrow Islands marine protected areas.

Summary of progress and main findings

- Ongoing liaison with Apache Energy Ltd and Chevron Australia Pty Ltd in regards to long-term monitoring data exchange and access to the spatial data such as habitat ground-truth data,
- Provided advice to the Environmental Management Branch on benthic habitat mapping and classification, and dredging monitoring program for the proposed gorgon Gas development;
- Analysis of benthic community data collected during the December 2006 survey was completed;
- Data Report for the December 2006 survey is being finalised;
- Management tools presented as a series of maps are being prepared. The series includes an enhanced ortho-aerial map, one-metre bathymetry map and a benthic habitat ground truth map;
- A presentation on the regional significant reef complex within the MBIMPA was given at the Australian Coral Reef Society Conference in Oct 2007;
- Contributed to the draft National Intertidal/Subtidal Benthic Habitat Classification Scheme as part of the Australian Coastal Vulnerability Project, supported by the Australian Greenhouse Office and the National Land and Water Resources Audit;
- Participated in a collaborative survey for *Porites* colonies in the Montebello/barrow Islands MPAs, West Pilbara islands and Ningaloo Marine Park where colonies were identified for the possible inclusion in an intensive west coast coring program to be undertaken by the Australian Institute of Marine Science;
- Further habitat data was collected during the above survey; and
- A DEC matters news article on the above survey was published online in February 2008.

Management implications

- The provision of information that assist in addressing Montebello/Barrow Islands Marine Conservation Reserves Management Plan 2007-2017 strategies: 7.6 (2); 7.6 (4); 9.1.3 (5); 9.1.4 (3); 9.1.5 (4); 9.1.6 (3); 9.1.6 (6); 9.1.7 (3); 9.1.7 (5)*;* 9.1.8 (5)*;* 9.1.9 (4)*;* and 9.1.9 (5);
- Increase understanding on the condition of the coral reef, reef fish and corallivorous invertebrates communities of the Montebello/ Barrow Islands marine protected areas;
- Increase understanding on the distributions of marine benthic communities of the Montebello/ Barrow Islands marine protected areas;
- The identification of *Porites* coral colonies suitable for effects of climate change research to be undertaken by AIMS.

Future directions (next 12-18 months)

- Completion and distribution of the December 2006 survey Data Report;
- Completion and distribution of the map series for use as a management tool;
- Preparation of a technical report.
- Development of generic approach to habitat mapping (including the development of an agreed habitat classification) and marine biodiversity inventory surveys
- Undertake further benthic habitat data acquisition.

DEC Region
Pilbara

IMCRA Region
Pilbara Offshore

NRM Region : Rangelands

3.8 Establishing a Long-term Monitoring Program for the Proposed Dampier Archipelago Marine Park

SPP No.: SPP2008/002

Team members
S Armstrong (0.3), S long (0.05), Alicia Edwards (0.01); Total Science Division (0.36); Adam Williams (0.01), Geoff Kregor (0.01), Brad Daw (0.01) Alan Kendrick (0.05); Total Pilbara Region (0.08)

Context
The Dampier Archipelago is located off the north-west coast of Western Australia approximately 1,650 km north of Perth and is the site of the proposed Dampier Archipelago Marine Park (DAMP). The area comprises of a wide range of marine habitats that support diverse marine biota, including more than 736 fish species and 230 scleractinian coral species, making the Dampier Archipelago the second most diverse site in Western Australia for hard corals. The marine environment of the area has considerable regional ecological and social conservation significance and is subject to increasing human use, including major offshore oil and gas production and associated port development. The region is also subject to a range of commercial and recreational fishing activities and the Dampier area has the highest per capita boat ownership in Western Australia.

Trends in resource condition over time are essential for assessment of the effectiveness of the proposed management regime for the DAMP. This project has established long-term monitoring sites, using a BACI design, to obtain data on the abundance of selected finfish species and the cover of benthic reef communities 'before' the zoning scheme is implemented. These data will provide estimates of the current condition of the reef and reef finfish populations at selected sites to compare with future data following the establishment of the DAMP and the implementation of the zoning scheme (i.e. comparisons between sanctuary and non-sanctuary zones). The data will also be compared to historical data to provide a longer-term temporal perspective.

Aligns with Corporate Strategies 2007-2009: 1.2, 2.3, 2.4, 7.1, 7.6, 8.1, 8.4, 8.5; KRAs: KRA1 KRA2

Summary of progress and main findings
- Concept Plan, Project Plan and Field Operations Plan completed.
- Two field surveys completed.
- Data analysis completed.
- Data Report draft completed.
- Pilbara News newspaper article.
- DEC Conservation News article.
- LANDSCOPE article completed.

Management implications
- The project will provide information trends in resource condition over time for assessment of the effectiveness of the proposed management regime.
- Increase understanding on the condition of Dampier Archipelago coral reef communities.
- Increase understanding on the condition of Dampier Archipelago reef fish communities.
- Increased public awareness of conservation value of the Dampier Archipelago.

Future directions (next 12-18 months)

- Complete statistical analysis of data.
- Complete data report
- Complete technical report/ paper.

DEC Region
Pilbara

IMCRA Region
Pilbara Nearshore

NRM Region
Rangelands

3.9 Three-yearly *Drupella* Survey in Ningaloo Marine Park

SPP No.: SPP2008/002

Team members
S Armstrong (0.2), Total Science Division (0.2); Claire O'Callaghan (0.05), Alana Whitford (0.05), Huw Dilley (0.02), Brooke Halkyard (0.01), Matt Smith (0.01), Roland Mau (0.01); Total Pilbara Region (0.15)

Context
Between the mid 1980s and early 1990s, the feeding activity of unusually high densities of the corallivorous gastropod *Drupella cornus* resulted in massive coral damage along at least 100 km of Ningaloo Marine Park (NMP), with coral mortality approaching 100% at some areas. The density of *D. cornus,* the area and severity of associated coral damage and longevity of the outbreak itself that occurred at NMP during this event was on a greater scale than recorded on other reefs elsewhere in the world to date.

As the health of coral communities is a key performance indicator of management of NMP and the Muiron Islands Marine Management Area (MIMMA), it is essential to keep a watching brief on spatial and temporal changes to *D. cornus* densities and cover of associated corals in these conservation reserves. Adhering to this management need, the aim of the Ningaloo Marine Park *Drupella* Long-term Monitoring Program (NMPDMP) is to monitor long-term changes in the density of *D. cornus* and cover of associated coral communities at the NMP and the MIMMA. Monitoring of *D. cornus* at NMP has produced a long-term data set with information describing the status of *D. cornus* populations and coral communities dating back to 1987.

A strategy in the Ningaloo Marine Park Management Plan 2005-2015 requires that *D. cornus* abundance and the health of coral communities be surveyed at least every three years. A major survey was due and undertaking in 2008.

Aligns with Corporate Strategies 2007-2009: e.g. 1.2, 2.3, 2.4, 7.1, 8.1, 8.4, 8.5; KRAs: KRA1 KRA2

Summary of progress and main findings
The results of the surveys indicate that between 1987 and 2008 the direction and amplitude of change in *D. cornus* density and percent cover of live hard coral has varied considerably between locations. Overall however, relative to the outbreak densities recorded during the late 1980s and early 1990s, *D. cornus* densities have been low to moderate since 1994 and have not greatly affected coral cover at the NMP and MIMMA. The findings of the 2008 survey support this trend and suggest that current *D. cornus* densities represent no immediate threat to NMP and MIMMA coral communities.

Outputs

- Concept Plan, Project Plan and Field Operations Plan completed.
- 2008 major field survey completed.
- Current *D. cornus* densities represent no immediate threat to coral communities at NMP or MIMMA.
- Pilbara News newspaper article.
- Landscope magazine article.
- Northern Guardian newspaper article.
- Exmouth Expression community newspaper article.
- Google Earth layer drafted.
- Presentation at the Australian Coral Reef Society Conference
- Presentation at the 2007 Annual Ningaloo Symposium
- DEC media release
- Radio broadcast – ABC NW Karratha
- Radio broadcast – ABC Midwest Wheatbelt Geraldton

Management implications

- *D. cornus* populations pose no immediate threat to coral communities at NMP or MIMMA.
- Mechanical damage to corals (e.g. during boating and diving activities) may attract *D.cornus*: It is recommended that a simple education pamphlet be developed and distributed by Exmouth District as soon as possible to encourage more sustainable diving and boating practices to address this issue.

Future directions (next 12-18 months)

- Complete data and statistical analysis.
- Complete Data Report, technical report and paper.
- Complete Google Earth layer.

DEC Region
Pilbara

IMCRA Region
Ningaloo

NRM Region
Rangelands

3.10 Coral Bay Reef Recovery Study/Annual Coral Spawning Observations

SPP No.: To be allocated

Team members
S Armstrong (0.1), S Long (0.01), Total Science Division (0.11); R Syme (0.5), C O'Callaghan (0.01), A Whitford (0.01), M Smith (0.01), Total Pilbara Region (0.53)

Context
In 1989, a novel form of disturbance *was recorded at Bills Bay* in *WA*: unusually calm wind and sea conditions coincident with mass coral spawning caused a dystrophic crisis as the respiratory demand of the spawn slick followed by its decomposition depleted available oxygen in the water column and sediments. Up to 100% of corals, fishes and reef invertebrates died at some sites during this event, including colonies up to 50 years old, indicating that a mass mortality of this magnitude had not occurred for at least four to

five decades. Anecdotal reports of less severe anoxic events at Bill's Bay coincident with coral spawning on several occasions since 1989 indicate that such events may not be uncommon in this location. Since 1989, the recovery of coral reef communities at Bill's Bay has been monitored. Findings from a survey in 2006 indicated that recovery of pre-disturbance levels of coral cover occurred within 10 years, and recovery of pre-disturbance type acroporid-dominated coral communities was achieved at one site within 17 years. Most recovering near-shore sites had not yet reached this successional stage by 2006.

In March 2008, the most severe anoxic event to occur since 1989 was recorded at Bills Bay. Hundreds of dead fish washed up along the shore at Bill's Bay and an estimated 30 to 60% of corals bleached over an area of approximately 1.3km^2. A major field survey will be undertaken at Bills Bay in mid 2008 to determine the extent of coral mortality from this event.

Aligns with Corporate Strategies 2007-2009: 1.2, 2.3, 8.4, 8.5; KRAs: KRA1 KRA2

Summary of progress and main findings

- Field survey completed.
- Data Report draft completed.
- Two draft papers completed.

Management implications

- Appropriate management can facilitate recovery of reefs from disturbances such as mass mortality events. Vulnerable reefs need to be protected from anthropogenic disturbances. Provides insights into potential response of Ningaloo coral reefs to climate change.

Future directions (next 12-18 months)

- Finalise Data Report, publish technical reports/papers.
- Undertake major field survey in mid 2008.

DEC Region
Pilbara

IMCRA Region
Ningaloo
NRM Region
Rangelands

3.11 Mapping the Coral Reef Communities of the Shark Bay MPAs

SPP No.: To be allocated

Team members
K Bancroft (0.15), S McKenna (0.02); Total Science Division (0.17)
T Grubba (0.10), W Moroney (0.10); Total Shark Bay District (0.20)

Context

While the Shark Bay Marine Reserves Management Plan 1996-2006 (Department of Conservation and Land Management 1996) is anticipated to be reviewed within the next year, The Shark Bay Terrestrial Reserves Management Plan 2000-2010 (Department of Conservation and Land Management 2000) and the Shark Bay World Heritage Property Strategic Plan (Department of Environment and Conservation 2006) are currently being reviewed. This planning activity provides a window of opportunity for increased technical

understanding to immediately inform management, for example, by identifying areas of high conservation value as well as potential human interactions with these values.

The distributions of perennial seagrass meadows in the Shark Bay marine protected areas (SBMPA) are reasonably well understood, there are very few data on ephemeral seagrasses and mangals, and no data on other important benthic communities such as coral reefs, filter-feeders, stromatolites, subtidal reef platforms, beaches, rocky shore or intertidal shoreline reef. Although marine ecological communities are of high conservation value in the SBMPA and the proposed extensions, our understanding of their distributions is limited. The spatial scale of the existing marine benthic habitat map is inadequate for MPA management.

New data obtained by this project, in conjunction with existing aerial photogrammetry and satellite imagery, will increase the current understanding of the distribution and diversity of coral reef communities in the SBMPA. The data gathered and compiled through this project will be presented as GIS information layer for use in the planning phases and the ongoing management of the SBMPA and the proposed extensions.

Aligns with Corporate Priorities 2007-2009: 1.2, 2.3; KRAs 1, 2; NC priority 3; PVS 1A; 2A.

Aim
To improve the understanding of the distribution and diversity of coral reef communities in the Shark Bay marine protected areas.

Summary of progress and main findings
- A collaborative field program with the Shark bay District, was undertaken to collect data on the distribution and diversity of coral reef communities in the Shark Bay MPAs;
- The collected ground-truth data has been analysed and databased in the Habitats database;
- Preparation of a data report is underway, and
- A draft Landscope article has been submitted and is planned for the Spring 2008 issue.

Management implications
- This project directly addresses Shark Bay Marine Reserves Management Plan 1996-2006 (Department of Conservation and Land Management 1996) management strategies: 5.3 (1); 5.3 (3); 5.5.1 (2) and 11.0 (6); and
- Increase understanding on the distribution patterns of the coral reef communities of the Shark Bay marine protected areas.

Future directions (next 12-18 months)
- To finalise and distribute the Data Report for the February 2008 survey;
- Complete and distribute map highlighting the coral reef communities data;
- The completed Landscope article of the February 2008 survey published in the Spring issue; and
- Undertake ongoing benthic habitat data acquisition in [particular at Bernier and Dorre Islands.

DEC Region
Mid West

IMCRA Region
Shark Bay

NRM Region: Rangelands

3.12 Analysis of Historical and Current Monitoring Programs in the Jurien Bay Marine Park

Core Project

Team members
K Bancroft (0.15), S McKenna (0.05); Total Science Division (0.20)
K Crane (0.20), Total Moora District (0.20)

Context
A significant amount of research and monitoring has occurred in the Jurien Bay Marine Park (JBMP) since the beginning of the reservation planning process in 1996 and the gazettal of the park in 2005.

At the launch of the park in 2005, the State Government made commitments to:

- Undertake research to examine the impacts of the rock lobster fishing on the biodiversity of the marine park; and
- Undertake research that would contribute to an understanding of the effectiveness of management zoning.

Since gazettal, there have been numerous research and monitoring projects that have been undertaken by scientists based in State and Commonwealth departments or agencies and several universities, such as WA Museum, Department of Fisheries and the Department of Environment and Conservation, University of Tasmania, University of Western Australia, Edith Cowen University, Murdoch University and CSIRO. A $10 million joint State Government and CSIRO initiative "*Strategic Research for the Marine Environment*" (SRFME) involved research that investigated fauna and flora distributions, coastal processes, physical and biological oceanography, nearshore water quality, benthic communities, commercial and recreation fishing impacts/trends, passive human usage patterns and effectiveness of management zoning. A continuation of SRFME has been incorporated into the $21 million Western Australian Marine Science Institute (WAMSI) as a component of Node 1 "*Strategic research on Western Australian marine ecosystems*".

Activities of this project will include the collation of specific literature relevant to JBMP, recent and current research, and the collation and analysis of appropriate data. This project will provide monitoring information suitable to feed into the marine park management reporting framework for delivery to the Marine Parks and Reserves Authority (MPRA) audit process and the opportunity to assess the gaps in knowledge and to target research and monitoring in priority areas.

Aligns with Corporate Priorities 2007-2009: 1.2, 2.3; KRAs 1, 2; NC priorites 3, 4; and PVS priority 2A.

Aim
- To identify all ecological and social research that has been undertaken in the reserve in recent years; and
- To analyse these data, to provide monitoring information suitable to feed into the marine park management reporting framework for delivery to the Marine Parks and Reserves Authority (MPRA) audit process.

Summary of progress and main findings
- Developed a metadatabase for research and monitoring relevant to the Jurien Bay Marine Park;

- Contribution and liaising with the Jurien bay District to prepare the Draft MPRA Audit report card;
- The analysis of data is nearly finalised and the preparation of a Technical Report is underway;
- Provided input to the draft report on the scientific basis for and the role of marine sanctuaries in marine planning, a report to the expanded Inter-Departmental Committee on Management of the State's Marine Protected Areas; and
- Contributions to the 2007 report on the JBMP biodiversity monitoring are being provided to the University of Tasmania.

Management implications

- Addresses the JBMP Management Plan 2005-2015 (Department of Conservation and Land management 2005) management strategies: 8.4 (1); 8.4 (3); and 8.5 (1);

- Provision of more quantitative data input describing the condition, pressure and management response relative to the values of the JBMP (the JBMP report card to the MPRA); and

- Provision of current resource condition data into the MPRA audit process, will also assist in the prioritisation of further research and monitoring in JBMP.

Future directions (next 12-18 months)

- The finalisation and distribution of the Technical Report;
- The finalisation and distribution of the University of Tasmania 2007 report; and
- The completion of a Technical Report and/or paper on Jurien Bay water quality.

DEC Region
Mid West

IMCRA Region
Central West Coast

NRM Region
Northern Agricultural Catchment

3.13 Annual Monitoring of KPIs and Sanctuary Zone Effectiveness in the Metropolitan MPAs

Core project

Team members
S Armstrong (0.07); Total Science Division (0.07); P Sutton (0.02); Total Swan Coastal District (0.02)

Context

A strategic framework for marine monitoring in the metropolitan marine parks was developed by DEC in January 2005. During this process the conservation and socio-economic significance of the values of the Parks were prioritized using a value/threat framework. Values identified as having the highest priority and most threatened by anthropogenic impacts were classified as Key Performance Indictors (KPIs). The conditions of KPIs are a measure of the overall effectiveness marine park management. For each KPI there are short-term and long-term targets, which can be audited.

An evaluation of existing metropolitan marine park monitoring projects in terms of method suitability and data usefulness needs to be undertaken in order to successfully design

and implement a long-term monitoring program for these marine parks. This monitoring program will then provide the quantitative data necessary to identify trends in KPIs over-time and assess whether established management targets are being met.

Aligns with Corporate Strategies 2007-2009: 1.2, 2.3, 8.4, 8.5; KRAs: KRA1 KRA2

Summary of progress and main findings

- Concept Plan completed
- Evaluation of existing projects methods and data underway.

Management implications

- The project will undertake strategic planning and evaluation to design a long-term monitoring program that will provide scientifically robust data on KPIs of management of the Metro MPAs.
- The second phase of the project will be to undertake this monitoring to provide information trends in resource condition over time for assessment of the effectiveness of the Metro MPA management regimes.

Future directions (next 12-18 months)

- Continue the evaluation process of existing project methods and data.
- Complete "way forward for Metro MPA monitoring" guideline paper.

DEC Region
Swan

IMCRA Region
Central West/Leeuwin Naturalist

NRM Region
Swan Catchment /South West Catchment

3.14 Science Coordination and Administration of WAMSI Node 3 and Integration across WAMSI and with the *Wealth from Oceans* Collaboration Flagship Project: the Ningaloo Cluster

Core project

Team members
K Waples (0.55); C Simpson (0.2); Total Science Division (0.75)

Context
In 2005 the Premier allocated $5 million to undertake research at Ningaloo Marine Park that would underpin its management. A Ningaloo Research Program (NRP) was developed in consultation with marine resource managers and scientists to address key strategies in the Ningaloo Marine Park Management Plan. In 2007 a joint research body, the Western Australian Marine Science Institution was formed and provided with substantial government funding. Research within WAMSI was divided into several themes, each with a lead agency. The DEC is the leader of Node 3 of WAMSI which addresses research in marine biodiversity and conservation. The NRP was accepted as the initial science plan for Node 3 of WAMSI and the $5million allocated to this research was made part of the government support to WAMSI.

At the same time as the development of the NRP, CSIRO Wealth From Oceans Flagship program created a research program around Ningaloo marine Park called the Ningaloo Cluster. This research program is designed to complement the NRP and fill in research

gaps. In addition, AIMS has a number of research projects underway at Ningaloo as part of their core research.

The DEC is working together with AIMS and representatives from the Ningaloo Cluster to ensure that the planned research takes place, is directed so that it will meet management needs and is properly integrated and communicated so that this body of research will be recognised and taken up in future management and planning initiatives as well as within the science community.

Aligns with Corporate Priorities: 7.1, 7.6, 8.4, 8.5 and KRA2 NC2E

Aim
To ensure effective coordination and administration of the research program conducted under Node 3 of WAMSI.
To ensure the integration of this research program with other research within WAMSI and with external programs relevant to the Ningaloo Marine Park.

Summary of progress and main findings

- Node 3 Science Plan complete and approved
- 7 project agreements in place and projects underway
- Milestone reports received from the projects underway demonstrate that research is on track and is producing relevant findings on sanctuary zones, biodiversity, oceanographic processes and habitats.
- The Ningaloo Research Coordinating Committee established to address integration of research, data management and science communication for WAMSI, the CSIRO Wealth from Oceans Flagship program: the Ningaloo Cluster and AIMS
- Ningaloo Research Database updated and 2007 report prepared
- The Ningaloo website created jointly with the CSIRO
- Numerous presentations of the Node 3 science plan and specific research projects at various fora

Management implications
A key role of this project is to ensure that outcomes of the research both within the NRP and from external research programs is reviewed and used in refining and updating management of the Ningaloo Marine Park through changes to policy, management activities and planning exercises where relevant.

Future directions (next 12-18 months)

- Continue to monitor progress of the various research projects and communicate findings and information as it becomes available
- Continue to interact with the NRCC and develop joint communication activities to further integrate the research programs.
- Development of a knowledge transfer framework to facilitate better transfer of the science into policy, planning and management of the Ningaloo Marine Park.

DEC Region
Pilbara

IMCRA Region
Ningaloo

NRM Region
Rangelands

3.15 Development of a Ningaloo Research Program Communication Plan

Core Project

Team members
S McKenna (0.2); K Waples (0.1); C Simpson (0.1); Total Science Division (0.4)

Context
In 2005 the Premier allocated $5million to undertake research at Ningaloo Marine Park that would underpin its management. A Research Program was developed in consultation with marine resource managers and scientists to address key strategies in the Ningaloo Marine Park Management Plan. This body of research is being undertaken in part through Node 3 of WAMSI.

A complementary program of research is simultaneously underway through the CSIRO Wealth From Oceans Flagship program created: the Ningaloo Cluster. In addition, AIMS has a number of research projects underway at Ningaloo as part of their core research. These research programs are collectively known as the Ningaloo Research Program (NRP).

Communication is a key factor for the NRP as it is essential to ensure:
(i) full integration of research projects from various disciplines;
(ii) knowledge transfer occurs between scientists and resource managers/decision makers;
(iii) the development of linkages between projects and scientists; and
(v) the community are aware of research findings and their value to management.

To address the need for good communication and the involvement of a number of organisations and institutions, a Ningaloo Communications Committee has been formed and a joint Communication Plan drafted.

Aligns with Corporate Strategies: 7.1, 7.6, 8.5 and KRA2 NC2E

Aim
To ensure the NRP is fully integrated and recognised by the broader community.
To ensure the knowledge transfer occurs between scientists and resource managers/policy makers
To demonstrate to government that investment in marine science in WA is worthwhile.

Summary of progress and main findings

- Ningaloo Communication Committee formed
- Joint Ningaloo Research Communication Plan prepared and agreed
- Communication Plan provided to Ningaloo scientists

Management implications
Good communication will enhance knowledge transfer which is critical for informed management.

Future directions (next 12-18 months)

- Ongoing communication activities under the plan
- Develop support material to append to the plan to assist scientists and the NRCC in communication activities.

DEC Region

Pilbara

IMCRA Region
Ningaloo

NRM Region
Rangelands

3.16 SRFME Carry-over Projects

Core Project

Team members
K Waples (0.03); C Simpson (0.01); Total Science Division (0.04)

Context
At the conclusion of the Strategic Research Fund for Marine Environment (SRFME), there were 6 projects that remained unfinished. The majority of these addressed biodiversity issues at Jurien Bay Marine Park and included studies on ecological interactions in the marine park, primary production and fish communities as well as final documentation and archiving of the data. These projects were handed over to the DEC to manage to completion under the coordination of the Marine Science Program. Although several projects have experienced delays due to personnel issues, all projects are due to be completed by December 2008.

Aligns with Corporate Priorities: 8.4, 8.5

Summary of progress and main findings
- Final reports for two projects received
- Final reports for the remaining four projects expected by Dec 08

Management implications
The milestone and final reports for each project will be reviewed for their implications to management and changes recommended to management practices, policies and planning activities where relevant.

Future directions (next 12-18 months)
- Continue to monitor progress of the various research projects and communicate findings and information as it becomes available

DEC Region
Mid West

IMCRA Region
Central West Coast

NRM Region
Northern Agricultural Catchment

3.17 Annual Ningaloo Research Symposium

Core Project

Team members
K Waples (0.15); C Simpson (0.05), S McKenna (0.05); Total Science Division (0.25)

Context
The WA State government has invested $5million in research at Ningaloo Marine Park over four years to improve our knowledge and understanding of marine resources within the park and their management. The commonwealth government invested $2.2 million through the CSIRO Wealth From Oceans Collaboration Flagship Program: the Ningaloo Collaboration Cluster for similar reasons. This initial funding has attracted co-investment and research support from a number of research agencies (e.g. AIMS, CSIRO) and Universities (Murdoch, UWA, Curtin, ECU) and has developed into a program of research worth $30million over 4 years.

The research program, called the Ningaloo Research Program (NRP) was developed in consultation with researchers and resource managers and generally addresses the key management strategies and priorities outlined in the Ningaloo Marine Park Management Plan, along with a series of projects that take into account socio-economic and regional issues. The success of this program of research depends upon its integration, including interaction information sharing between research scientists and communication between resource managers and the science community. To enhance the integration of this research program and the linkages between projects, a Symposium will be held each year of the NRP as a forum to present and discuss recent research findings, their implications for management and ongoing operational issues associated with the research.

Aligns with Corporate Strategies: 7.1, 7.6, 8.4, 8.5

Aim:
To enhance integration of the Ningaloo Research Program and ensure that knowledge transfer occurs between scientists and resource managers.

Summary of progress and main findings

- Initial Ningaloo Research Symposium held on 24-25 July 2007 at Murdoch University co-hosted with Murdoch, CSIRO Wealth From Oceans Collaboration Flagship program; WAMSI
- Symposium attended by more than 80 scientists and resource managers with a key interest in the Ningaloo Marine Park
- Second Annual Ningaloo Research Symposium held on 28-29 May 2008 at Murdoch University, co-hosted with Murdoch, CSIRO Wealth From Oceans Collaboration Flagship program; WAMSI.
- The second symposium was attended by more than 100 scientists and resource managers with a key interest in research and management of the Ningaloo Marine Park and regional area.
- Both symposia produced proceedings including abstracts of all presentations.
- The symposia have been generally successful in bringing the research and management communities together and encouraging integration of research programs and knowledge transfer to management outcomes.

Management implications
The Symposia provide a forum for the exchange of information and ideas. They will be one mechanism to ensure that knowledge transfer takes place between the research community and resource managers to ensure that the vast body of research that comprises the NRP is used to make a difference for Ningaloo Marine Park.

Future directions (next 12-18 months)

- The next annual symposium will be planned for May 2009 and will have a strong focus on the mechanisms to ensure knowledge transfer

DEC Region

Pilbara

IMCRA Region
Ningaloo

NRM Region
Rangelands

3.18 Pilbara Region Staff/Community Briefings on the Ningaloo Research Program

Core Project

Team members
K Waples (0.1); C Simpson (0.05), S McKenna (0.05); Total Science Division (0.2)

Context
In 2005 the Premier allocated $5million to undertake research at Ningaloo Marine Park that would underpin its management. A Ningaloo Research Program (NRP) was developed in consultation with marine resource managers and scientists to address key strategies in the Ningaloo Marine Park Management Plan. In 2007 a joint research body, the Western Australian Marine Science Institution was formed and provided with substantial government funding. Research within WAMSI was divided into several themes, each with a lead agency. The DEC is the leader of Node 3 of WAMSI which addresses research in marine biodiversity and conservation. The NRP was accepted as the initial science plan for Node 3 of WAMSI and the $5million allocated to this research was made part of the government support to WAMSI.

This program of research is currently underway and is coordinated through the Marine Science Program. To ensure that the NRP is meeting the needs of the regional community and will be accepted as providing successful outcomes for the Ningaloo Marine Park, the Node 3 Leader and Science Coordinator plan to visit the region at least once per annum to provide briefings and presentations on the Node 3 science plan and research progress. These visits will also provide the opportunity for feedback from the region and will enhance integration of the research program and knowledge transfer.

Aligns with Corporate Strategies: 7.1, 8.1, 8.5.

Aim
To enhance integration of the Ningaloo Research Program and ensure knowledge transfer occurs between scientists and resource managers and with the local community.

Summary of progress and main findings
- Node leader and science coordinator visited the Exmouth District in December 2007.
- Three presentations were made to community groups and Regional/District staff.
- Presentations were all well received with much interest in the Ningaloo Research Program, potential for involvement and implications for longer term management of the NMP.
- Discussions on DEC structure relevant to marine science and research and monitoring activities. This process was used to identify key roles, responsibilities and communication pathways.

Management implications
The research program underway at the NMP has profound implications for future management of the region. It is essential that regional staff and local community groups

are kept abreast of research programs and outcomes so that they will supportive of new management initiatives.

Future directions (next 12-18 months)

- Continue to provide relevant information and updates to regional staff and local community groups
- Conduct annual visits to the region

DEC Region
Pilbara

IMCRA Region
Ningaloo

NRM Region
Rangelands

4. CURRENT COLLABORATION WITH ACADEMIA

DEC Officer	Student	Project Title	Degree/ level	Duration (yr - yr)	University Academic	University
Chris Simpson	B Fowles	Creating historical baselines of finfish in the Ningaloo Marine Park	Hons	2007	Dr Andrea Gaynor	University of Western Australia
Long, Suzanne	L D'Andrea	Using hyperspectral data to map vegetation cover and condition of the coastal area at Coral Bay, WA	MSc	2007	Dr Halina Kobryn	Murdoch University
Long, Suzanne	J Neiman	Diurnal variability in beach use patterns at Bundegi, Turquoise Bay and Coral Bay, Ningaloo Marine Park	MSc	2007	Prof L Beckley	Murdoch University
Chris Simpson	D Holley	Northwest dugong population and habitat use	PhD	2007-2009	Dr Paul Lavery	Edith Cowan University
Chris Simpson	A Hill	Marine Protected Area Planning in Western Australia: An analysis	PhD	2006-2009	Dr Syd Shea	Notre Dame University

5. EXTERNAL PARTNERSHIPS

Partnership Name	Project	Cash funding and source ($)	DEC Involvement (in kind)
WA Fisheries, WAMSI	Pinniped management plan and implementation of sea lion monitoring	$50k from NC, $20k from SD, $30k from JBMP	R Campbell (0.5)
AIMS	Marine biodiversity survey of the Rowley Shoals marine protected areas		S Long (0.10)
WAM	Inventory and databasing of marine faunal records from the NW atolls	$60k for 2007/08 (all MSP CF)	S Long (0.01)
Murdoch University	Population viability analysis of the Perth metropolitan population of the little penguin. ARC Linkage	$7.5k in 2006/07 $20k top-up in 2006/07 $7.5k for 2007/08 (all MSP CF)	C Simpson (0.01), S Long (0.01)
Murdoch University	WA Marine Flora	$50k pa 3 years 07/08 to 09/10	J. Huisman; K. Thiele
Murdoch University	An ecosystem approach to estimating the viability of bottlenose dolphin populations. ARC Linkage	$30k for 3 years 2006/07/08 (all MSP CF)	C Simpson (0.01)
Murdoch University	Relationships between habitat types and fish assemblages at Broke Inlet	$9.3k in 2006/07 (all MSP CF)	C Simpson (0.01)
UWA	Benchmark study on marine communities of the Southwest for long-term monitoring	$5k in 2006/07 (all MSP CF)	K. Bancroft (0.01)
AMSA WA	Rottnest Young Scientist Workshop	$500 sponsorship (all MSP CF)	C Simpson(0.01), S Armstrong (0.01)
UWA	Quaternary foraminifera of Ningaloo Reef	$3k MSP $5k WAMSI node 3 to publish PhD	C. Simpson
CSIRO	NW Shelf Research Inventory	$15,000	K Waples (0.05) C Simpson (0.05)
Murdoch University	Capes Abalone Study	$75,000 (via MPPB)	C Simpson (0.01)

6. SUMMARY OF RESEARCH PROJECTS BY DEC AND NRM REGIONS

DEC Region	***NRM Region***	Project Title
All	*All*	Building a DEC Marine Science Capability
All	*All*	Establish DEC Marine Science Co-ordination Committee
All	*All*	Update DEC marine science current projects database
Pilbara, Kimberley, Mid west	*Rangelands*	North West Marine Research Inventory
Pilbara	*Rangelands*	Distributions and patterns of major benthic communities of the Montebello/Barrow Islands marine protected areas
All	*All*	Develop and implement Communications plan for the MSP
Kimberley	*Rangelands*	Comparative marine biodiversity survey of the Rowley Shoals
Pilbara	*Rangelands*	Establishing a long term monitoring program for the proposed Dampier Archipelago Marine Park
Pilbara	*Rangelands*	Status of coral reef communities at Dampier Archipelago
Pilbara	*Rangelands*	Three yearly Ningaloo Drupella cornus survey
Pilbara	*Rangelands*	Coral Bay coral community recovery and annual coral spawning observations
Mid west	*Rangelands*	Mapping of the coral reef communities of Shark Bay marine protected areas
Mid west	*Northern Agricultural*	Analysis of existing monitoring data on Jurien Bay Marine Park
Swan	*Swan*	Annual monitoring of KPIs and sanctuary zone effectiveness in metropolitan Marine Protected Areas
Pilbara	*Rangelands*	Science coordination and administration of WAMSI Node 3 science plan and integration across WAMSI and with Ningaloo Cluster
Pilbara	*Rangelands*	Development of a Ningaloo Communication Plan
Mid west	*Northern Agricultural*	SRFME carry-over projects
Pilbara	*Rangelands*	Annual Ningaloo Symposium
Pilbara	*Rangelands*	Pilbara Region staff/community briefings on Ningaloo research

7. STUDENT PROJECTS – PROGRESS REPORT

Scientist: **C Simpson**
Student: Ms Luisa D'Andrea

Project title

Using hyperspectral data to map vegetation cover and condition of the coastal area at Coral Bay, WA

Progress report
Luisa has completed her Masters thesis and a copy is held by the Marine Science Program. This study used hyperspectral imagery to map vegetation cover and condition in the Coral Bay area. It has potential use as a baseline dataset for the monitoring of vegetation condition and changes in ground cover in this coastal area. Areas of particular management concern for DEC (degraded dunes etc in places likely to return to DEC management under early release agreements made with local pastoralists) in the vicinity of Coral Bay. The results will not only increase DEC understanding of the condition of the coastal region of Ningaloo Marine Park, but will facilitate rapid management response to address degraded areas.

Scientist: **C Simpson**
Student: Ms Brooke Fowles

Project title

Shifting baselines in commercial and recreational fisheries at Ningaloo Marine Park

Progress report
Brooke has completed her Honours, a copy of which is held by the Marine Science Program. This study used physical records and interviews with fishermen to examine fishers' perceptions of what constitutes a 'good catch' and how this has changed over the past 4 decades. Insight into changes in targeted fish communities over time will assist with management of Ningaloo Marine Park.

Scientist: **C Simpson**
Student: Mr Dave Holley

Project title

Development of dugong (*Dugong dugon*) research capacity through use of innovative tracking technology

Progress report
This project is currently underway with a recent field trip leading to the successful tagging of 2 dugong in the northwest. The project is developing collaboration with indigenous groups in the Kimberley and has involved the Bardi-Jawi Sea Rangers in the recent field exercise. Further tagging expeditions are planned for later this year.

Scientist: **C Simpson**
Student: Ms J Neiman

Project title

Diurnal variability in beach use patterns at Bundegi, Turquoise Bay, and Coral Bay, Ningaloo Marine Park

Progress report
Jody has completed her thesis, a copy of which is held by the Marine Science Program. A science publication is currently in preparation by Jody Neiman and Dr Lynnath Beckley. Her research was also funded through the CSIRO Wealth from Oceans Flagship and will be incorporated into Project 2 of the Ningaloo Collaboration Cluster. This information will assist with planning for minimal impact of visitors to beaches in Ningaloo Marine Park.

8. SUMMARY OF SIGNIFICANT ACHIEVEMENTS ANTICIPATED FOR 2007/08

Anticipated achievements
Increased output of publications of results of recent research
Improved capacity to undertake marine research within the Marine Science Program
Development of integrated tropical and temperate marine research plans
Development of an integrated marine monitoring plan for WA MPAs
Development of a framework to facilitate better transfer of science into policy, planning and management

9. PRIORITIES AND ANTICIPATED KEY OUTCOMES OR ACHIEVEMENTS OVER THE NEXT TWO TO THREE YEARS

Anticipated outcomes or achievements
Continue to build capacity in the Marine Science Program
Progressive implementation of integrated tropical and temperate marine research plans across WA
Progressive implementation of a statewide marine monitoring program in WA MPAs
Implementation of the knowledge transfer framework
Coordination and finalisation of the Ningaloo Research Program
Initiate a major program of marine research in the Kimberley region.
Building strategic alliances with outside research providers
Increase community involvement in DEC marine science programs through community monitoring and NRM groups

10. Marine Science Program 2007/08 budget expenditure

Activity/Project Title	DEC Region	Expenditure ($)
Administration	*All*	$156,756
Equipment	*All*	$137,612
Marine Science Communication	*All*	$30,803
Building a DEC Marine Science Capability	*All*	$83,272
Establish DEC Marine Science Co-ordination Committee	*All*	$19,481
Update DEC marine science current projects database	*All*	$10,318
North West Marine Research Inventory	*Pilbara, Kimberley, Mid west*	$38,523
Distributions and patterns of major benthic communities of the Montebello/Barrow Islands marine protected areas	*Pilbara*	$38,772
Develop and implement Communications plan for the MSP	*All*	$38,342
Comparative marine biodiversity survey of the Rowley Shoals	*Kimberley*	$103,365
Establishing a long term monitoring program for the proposed Dampier Archipelago Marine Park	*Pilbara*	$51,792
Status of coral reef communities at Dampier Archipelago	*Pilbara*	$9,234
Three yearly Ningaloo Drupella cornus survey	*Pilbara*	$16,512
Coral Bay coral community recovery and annual coral spawning observations	*Pilbara*	$8,684
Mapping of the coral reef communities of Shark Bay marine protected areas	*Mid west*	$15,971
Analysis of existing monitoring data on Jurien Bay Marine Park	*Mid west*	$13,248
Annual monitoring of KPIs and sanctuary zone effectiveness in metropolitan Marine Protected Areas	*Swan*	$3,367
Science coordination and administration of WAMSI Node 3 science plan and integration across WAMSI and with Ningaloo Cluster	*Pilbara*	$87,405
Development of a Ningaloo Communication Plan	*Pilbara*	$46,735
SRFME carry-over projects	*Pilbara*	$10,776
Annual Ningaloo Symposium	*Pilbara*	$33,342
Seed-funding	*All*	$51,635
TOTAL		**$1,005,945**[3]

[3] Original MSP CF budget for 2007/08 was $1.01M. A budget reduction during the year accounts for the slight discrepancy between this figure and total expenditure (above).

11. MARINE SCIENCE PROGRAM: SUMMARY OF BUDGET ALLOCATION AND EXPENDITURE FOR 2007/08

Budget expenditure largely met or exceeded individual reserve CF allocations in all cases (see below). The unevenness in expenditure at a reserve level is a reflection of year to year variations in the geographic emphasis of MSP activities (out of necessity) and the small budgets and very high costs of doing marine science in some reserves (e.g. Montebello and Rowley Shoals marine parks). These reserves will require temporary cross subsidies from time to time to achieve appropriate outcomes. Over time these variations will be evened out to comply with Government allocations for each reserve.

MPA	Allocation ($'000s)	Adjusted Allocation[4] ($'000s)	Expenditure ($'000s)	Adjusted Expenditure[5] ($'000s)
Rowley Shoals Marine Park	52	102	116	181
Montebello/Barrow Is MPAs[6]	160	210	113	179
Ningaloo MPAs	415	465	203	403
Shark Bay MPAs	40	90	29	95
Jurien Bay Marine Park	0	50	14	80
Metro MPAs	40	90	3	68
Statewide	303	0	528	0
Total	**$1,010**	**$1,010**	**$1,006**	**$1,006**

[4] includes even split of statewide allocation across all MPAs

[5] includes uneven split of statewide expenditure across all MPAs (i.e. Ningaloo 40%; rest 12% each)

[6] includes expenditure in proposed Dampier Archipelago MPAs