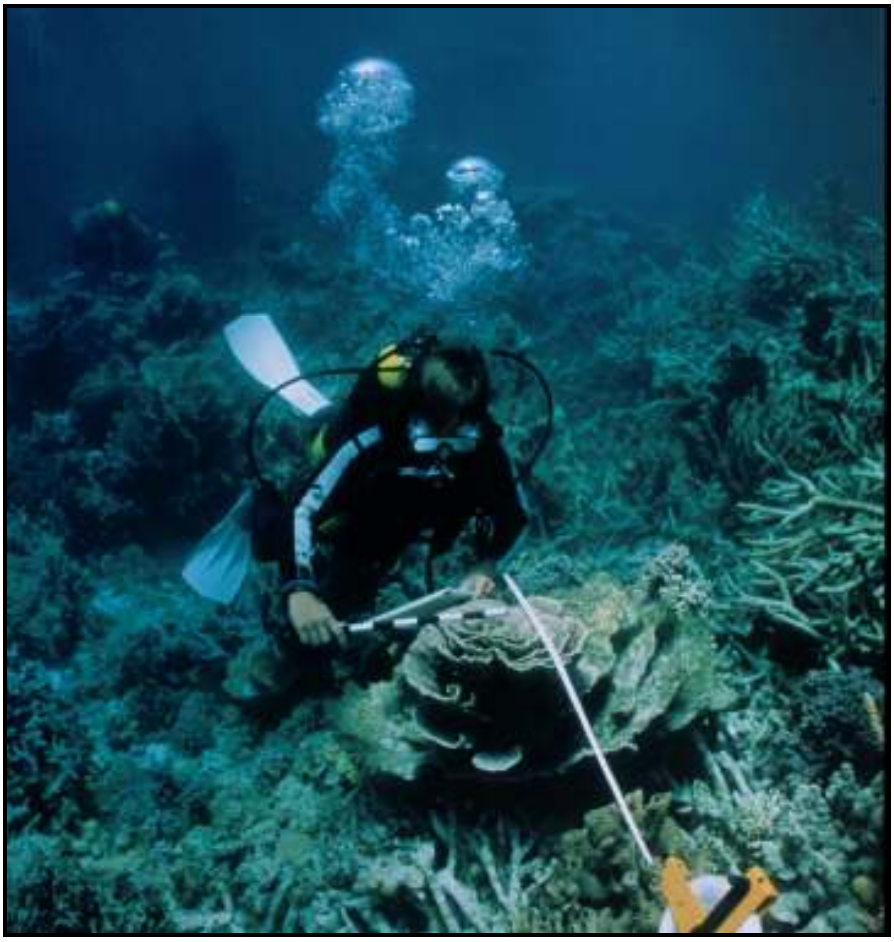
CURRENT AND PROPOSED MARINE RESEARCH PROJECTS RELEVANT TO THE NINGALOO MARINE PARK AND ADJACENT WATERS



Prepared by
Shannon J. Armstrong

June 2006

MARINE SCIENCE PROGRAM
SCIENCE DIVISION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

CURRENT AND PROPOSED MARINE RESEARCH PROJECTS RELEVANT TO THE NINGALOO MARINE PARK AND ADJACENT WATERS

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Attention:

In the event that any relevant projects are not included within this report please advise DEC's Marine Science Program on 08 93340 246 or email shannona@dec.wa.gov.au. This information will be greatly appreciated.

Reminder:

Any research conducted within Marine Protected Areas and/or involving native flora and fauna requires departmental (DEC) licensing.
Contact DEC Wildlife Licensing:
17 Dick Perry Ave, Technology Park,
Kensington, WA 6151
Ph: Danny Stefoni 08 93340 439, or Adrain Coleman 08 93340 433

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17 Dick Perry Ave, Technology Park,
Kensington, WA 6151
Ph: 08 93340 476, or email shannona@dec.wa.gov.au

ACKNOWLEDGEMENTS

This project was funded by the Ningaloo Research Program (NRP) within Node 3 of the Western Australian Marine Science Institution (WAMSI), Office of Science, Technology and Innovation (OSTI) of the Department of Industry and Resources. This report was initiated and reviewed by Dr Nick D'Adamo, Manager of the Ningaloo Research Program and Dr Chris Simpson, Program Leader of the Department of Environment and Conservation's (DEC) Marine Science Program.

CONTENTS

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1. INTRODUCTION

This report contains a comprehensive list of current and proposed research projects that are relevant to the conservation of the Ningaloo Marine Park and adjacent waters. This report was initiated to assist in the deliverance of the Western Australian Marine Science Institution's Ningaloo Research Program (NRP). The NRP is a five million dollar state initiative aimed to underpin protection and management of the Ningaloo coast by providing a good understanding of the conservation needs of the area. The NRP will help sustain Western Australia's long term capacity in fundamental and applied marine research and monitoring relevant to marine management, through the local involvement of academia, state and national research agencies and organisations. The Ningaloo Marine Park is one of Western Australia's premier marine conservation icons. Ningaloo Reef is the largest fringing reef in Australia and due to the unique characteristics of the Leeuwin Current it is one of the only coral reefs to boarder the western edge of a continent. Ningaloo supports a highly diverse marine life and is one of the only places in the world where the world's largest fish, the whale shark, can be predicably found and studied. A recent escalation in the popularity and exposure of Ningaloo Reef has resulted in an increase in tourism and development in the region, which places additional pressure on Ningaloo's associated natural resources. This has lead for the need to increase research and monitoring of the marine park and surrounding areas in order to assist with the future sustainable management of Ningaloo's natural resources. It is important however, that a strategic and collaborative approach be taken towards research at Ningaloo Reef. The aim of this report is to keep track of what research is currently being undertaken at Ningaloo in order to assist scientific and academic organisations to work together towards a collaborative approach to marine research and monitoring at Ningaloo Marine Park.

Every effort has been made to ensure that all relevant current and proposed marine scientific research projects have been included into this report, which is current as of June 2006. As of June 2006 there are approximately 43 current and 23 proposed scientific research projects relevant to the conservation and management of Ningaloo Marine Park.

The following process was undertaken to source the information presented in this report.

- Referred to the existing database in the NRP project and funding guidelines.
- Contacted key Western Australian marine research leaders, including researchers from the Australian Institute of Marine Science (AIMS), Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and DEC.
- Contacted academic research leaders from the four main universities in Western Australia.
- Contacted academic research leaders from other Australian universities that have a marine focus such as James Cook University, Charles Darwin University and Southern Cross University.
- Conducted Internet searchers of the web sites of all the above universities and State and Commonwealth government agencies.
- Conducted general Internet searchers using Google and other search engine tools.

2. DATA MANAGEMENT

The database will be stored and updated in both EndNote Version 8 and EXCEL form. EXCEL provides a list of all projects and basic information about each project, whereas ENDNOTE provides a comprehensive bibliographical database that can provide more detailed information on each project such as abstracts or project aims and objectives.

2.1. Report

Hard copies of the report will be held at four locations:

1. Marine Science Program (MSP) Library, Department of Environment and Conservation, Science Division, 17 Dick Perry Ave, Technology Park, Kensington, WA. Ph: (08) 93340 228 (email: shannona@dec.wa.gov.au).

2. Exmouth District Office, Department of Environment and Conservation, Payne St. Exmouth, WA. Ph: (08) 99491676 Fax: (08) 99491580

3. Woodvale Library, Science Division, Department of Environment and Conservation, Ocean Reef Rd., Woodvale, WA. Ph: (08) 94055100 Fax: (08) 93061641

4. Office of Science, Technology and Innovation (DOIR), 1 Adelaide Terrace, East Perth, WA, 6004. Ph: (08) 9222 3333

The Marine Science Program, Exmouth District Office and Office of Science, Technology and Innovation (DOIR) will hold digital copies of this report:

1. On CD-ROM

2. On the DEC Marine Science Program (MSP (see Appendix II for a list of abbreviations)) server, accessible via the following directory pathway: T:\529-CALMscience\Shared Data\Marine Science Program\Current and Proposed Research Projects NMP 2006

3. On the Exmouth District Office server

4. On the Office of Science, Technology and Innovation (DOIR) server, accessible via the following directory pathway: N:\NDAdamo\1_NR&MP_HD\Research Database_Ningaloo Marine Park\Final_NMP Research Database

2.2. Database

The database will be located as follows:

1. On the DEC MSP server, accessible via the following directory pathway: T:\529-CALMscience\Shared Data\Marine Science Program\Ningaloo databases_Current

and Proposed Marine Research Projects Relevant to the Ningaloo Marine Park and Adjacent Waters

2. The Exmouth District Office

2.3. Database Maintenance

Maintenance of the database will be the responsibility of DEC's MSP. Information regarding the development of new projects or project proposals that should be added to the database should be provided to DEC's MSP or District Office at:

1. Marine Science Program, Science Division, 17 Dick Perry Ave, Technology Park, Kensington, 6151: Shannon Armstrong ph 08 9334 0246 email shannona@dec.wa.gov.au or Kevin Bancroft ph 08 9334 0249 email kevinb@dec.wa.gov.au

2. Exmouth District Office, 20 Nimitz Street, Exmouth, 6707 : Jennie Cary ph 08 99491676, email jenniec@dec.wa.gov.au

The database will be updated on a six-month basis. During the updating process completed projects will be removed from the database and entered into the 'Bibliography of Marine Research Projects Relevant to Ningaloo Marine Park and Adjacent Waters' (Armstrong, 2006).

3. LIST OF CURRENT AND PROPOSED MARINE RESEARCH PROJECTS RELEVANT TO THE NINGALOO MARINE PARK AND ADJACENT WATERS

3.1 Current Research Projects

Current Research Projects - Ningaloo Marine Park (2006)

* The NRP has various research programs denoted by the letters in the table e.g. A1.1, as detailed in Appendix 1 (extract from D'Adamo 2005, Ningaloo Research Program - Project and Funding Guidelines).

Researcher	Project Title	Status	Institution	Supervisor/s	Contact details	Related NRP Project *	Notes
Armstrong, S.	Long Term Monitoring of Ningaloo Marine Park: Status of *Drupella* and shallow water benthic reef communities	Ongoing - 2006 southern NMPMP sites to be established and re-survey of some existing sites	CALM - Marine Science Program	Chris Simpson, Kevin Bancroft	shannona@calm.wa.gov.au, Ph: 93340246, Mob: 0427519622	A1.3, D2	Establishing survey sites at southern NMP and Muirons and Sunday Islands
Brasseur, M.	Population Structure and Management of the Humpback Whale (Megaptera novaeangliae) in Western Australia: Investigation into the Genetic Structure of Antarctic Area Group IV (D Stock).	Finishing in 2006	Edith Cowan University Centre for Whale Research	Dr Glenn Hyndes	Muriel Brasseur Ph: (61 8) 6304 5766, Fax: (61 8) 6304 5509, Email: m.brasseur@ecu.edu.au	A1.4, D1	http://www.ecu.edu.au /chs/cem/humpback
Catlin, J.	Sustainability of the whale shark tourism industry at Ningaloo	2006 - 2009	Curtin University of Technology	Roy Jones	Email: james.catlin@gmail.com	A1.4, D1, B1	PhD, James Catlin
Collins, L.	Climate change and coastal zone management of Carnarvon and Ningaloo coast	2004 - 2005 and continuing (linked with the NRP)	Curtin University/CRC Sustainable Tourism	Lindsay Collins	Email: L.Collins@curtin.edu.au, Ph: 9266 7968	A2, A3	
Collins, L.	Continental Shelf Sediments of the Northwest Shelf	1995 - continuing (linked with the NRP)	Curtin University - Department of Applied Geology	Lindsay Collins	Email: L.Collins@curtin.edu.au, Ph: 9266 7968	C3	
Collins, L.	Geological evolution of Ningaloo Reef	1995 - continuing (linked with the NRP)	Curtin University/CRC Sustainable Tourism	Lindsay Collins	Email: L.Collins@curtin.edu.au, Ph: 9266 7968	A2, A3	
Collins, L.	Ningaloo Coastal Management Project	2002 - 2005 and continuing	Curtin University - Department of Applied Geology	Lindsay Collins	Email: L.Collins@curtin.edu.au, Ph: 9266 7968		
Collins, L.	Evolution and Climate History of the Limestone of the Cape Range	2004 - 2006 and continuing	Curtin University - Department of Applied Geology	Lindsay Collins	Email: L.Collins@curtin.edu.au, Ph: 9266 7968	A3, A1.5	
Davis, J.	Coastal Stewardship in WA	2001 - Ongoing PhD project	Murdoch University	Laura Stocker	Email: L.Stocker@murdoch.edu.au or J.K.Davis@murdoch.edu.au	B	
Featherstone, W. E	Prediction of sea level change around Australia and its calibration and validation by satellite-geodetic measurements	2003 - 2007	Curtin University Western Australian Centre for Geodesy	W. E. Featherstone	Email: W.Featherstone@curtin.edu.au, Ph: 08 9266 2734, Fax: 08 9266 2703	C3	William Featherstone
Fitzpatrick, B.	Spatial and temporal variation in habitat use by demersal tropical fish	2005 to 2007	UWA, AIMS	Dr. Euan Harvey, Dr Russ Babcock, Dr Andrew Heyward	Email: fitzpb02@student.uwa.edu.au or oceanwise@bigpond.com, Ph: 6488 4733	A1.1, A1.2, E	

Researcher	Project Title	Status	Institution	Supervisor/s	Contact details	Related NRP Project *	Notes
Halford, A.	Disturbance effects on fish assemblages at large scales of space and time (Ningaloo, Rowley Shoals, Scott Reef)	To be completed in 2006 (in write up stage)	AIMS, James Cook UNI	Julian Caley AIMS, Geoffrey Jones JCU	Email: j.caley@aims.gov.au	A1.3, E	PhD - Publications to come from this work. Baseline data collection from 1990s to present (A. Halford has left AIMS relocated to Guam)
Humphries, S.	Suspension feeders and energy flow through reefs.	1/10/2005 to 1/7/2009	UWA, Department of Animal & Plant Sciences, Alfred Denny Building, University of Sheffield, Western Bank, Sheffield, UK	Anya Waite, UWA	Ph: +44 118 2220032, Email: s.humphries@sheffield.ac.uk	A1.3, C2, C3	Dr Stuart Humphries
Jenner, C. Jenner, M.	Geographical and temporal boundaries ofF whales of Ningaloo	Ongoing - Commenced 1996/97 (in Ningaloo region)	Centre for Whale Research	Jenner & Jenner	Ph: 0418912669, Email: curtjenner@telstra.com	A1.4, D1	
Keulen, M. v.	Seagrasses and macroalgae of Ningaloo	Started in 2002 - Ongoing	Murdoch University	Mike van Keulen	Ph: 9360 2369, Email: keulen@murdoch.edu.au,	A1.3, A2	Potential PhD project for a student
Kingham, A.	Sustainability of the wilderness experience: a case study in environmental stewardship for campers on WA's Ningaloo Reef	Commenced Feb 2005	Curtin University Social Sciences	Prof Roy Jones	Email: compton@iinet.net.au.	B1, E2	PhD
Kuchling, G.	Daily and Seasonal Cycles of Sand Temperatures on Sea Turtle Nesting Beaches in Western Australia	July 2004 to June 2007	Univerisity of Western Australia	Gerald Kuchling	Email: kuchling@cyllene.uwa.edu.au	A1.4, A3, D1	
Lee, S.	Hydrogeology of the Ningaloo reef region	Ongoing (Commenced mid 2002)	Curtin university	Lindsay Collins	Ph: 9266 3421, Email: Sam.Lee@curtin.edu.au	A1.5, C2	PhD
Long, S.	Long-term monitoring of benthic communities in Bills Bay, impacted by the 1989 coral spawning event	Ongoing - 2006	CALM - Marine Science Program	Chris Simpson, Kevin Bancroft	suzannel@calm.wa.gov.au, 93340198, 0432428855	A1.3, D2	
Lovelock, C., Feller, Ilka.	Nutrient limitation and impact of nutrient enrichment on arid zone mangroves (Mangrove Bay)	Commenced 1999 - Ongoing	University of Queensland, Smithsonian Environmental Research Center, USA.	Cath Lovelock	Ph: 07 3365 2304, Email: c.lovelock@uq.edu.au	A1.3 (Mangroves)	Dr Catherine Lovelock (UQ) and Dr Ilka Feller (Smithsonian Environmental Resaecrh Center, USA)
Lovelock, C., Feller, Ilka., Skilleter, Greg., Joye,	Assessing linkages across arid zone estuarine landscapes	Commenced 2002 - Ongoing	University of Queensland, Smithsonian	Cath Lovelock	Ph: 07 3365 2304, Email: c.lovelock@uq.edu.au	A1.3, A2	
Mau, Roland	Ningaloo community turtle monitoring program	2002 - ongoing	CALM & WWF & Cape Conservation Group	Roland Mau	Ph: 9949 1676	A1.4, D1	
McGregor, K. F.	Trophic ecology of manta rays in and around Bills Bay, Coral Bay (title to be revised).	Commenced June 06	Murdoch University, NWRA	Mike van Keulen, Luke Twomey.	Frazer McGregor, Mob: 0427848655 Email: frazer_mcgregor@yahoo.com.au, M. Keulen, Ph: 9360 2369, Email: keulen@murdoch.edu.au	A1.4, D1	PhD
McGregor, K. F.	Feeding ecology of manta rays at Ningaloo Marine Park: Collection of zooplankton and phytoplankton specimens to assess planktonic food availability in order to determine habitat importance for planktonic grazers and explain the temporal and spatial distribution of Manta Rays	August 2004 - ongoing	Coral Bay Progress Association, CALM, NWRA, Community project	Frazer McGregor - project leader	Mob: 0427848655, Email: frazer_mcgregor@yahoo.com.au	A1.4, D1	pre PhD field work, pilot study

Researcher	Project Title	Status	Institution	Supervisor/s	Contact details	Related NRP Project *	Notes
McGregor, K. F.	Manta Ray Education and Monitoring Program - Coral Bay (Photo ID database)	2003 - ongoing	Coral Bay Progress Association, CALM, NWRA, Community project	Frazer McGregor - project leader	Mob: 0427848655, Email: frazer_mcgregor@yahoo.com.au	A1.4, D1	
Meekan, M.	Otolith analysis of Reef Fishes at Ningaloo Reef	Ongoing - in write up phase as of May 2006	AIMS	Mark Meekan (AIMS)	Ph: (08) 89209240, Mob: 0429 101 812, Email: m.meekan@aims.gov.au	E1, A1.3	Baseline data collection
Meekan, M. and collaborators	Whale sharks, migration and ecology Movements and behaviour of Whale Sharks with use of acoustic,satellite,PAT,crittercam and genetic tagging.	Ongoing - 2006 to 2009 (at least)	AIMS	Mark Meekan Collaborators: Jeff Polovina (US NOAA), Steve Wilson (UWA), John Stevens (CSIRO Hobart)	Mark Meekan, Ph: (08) 89209240, Mob: 0429 101 812, Email: m.meekan@aims.gov.au Jeff Polovina, Ph: (808)983-5390, Email: jeffrey.polovina@noaa.gov	A1.4, D1.	Just started genetic tagging as of mid 2006 - Jeff Polovina (The US National Oceanic and Atmospheric Administration)
Norman, B.					Ph: 0407980555, Email: ecocean@ozemail.com.au or brad@whaleshark.org	A1.4, D1	Trying to contact (No answer to calls or email)
Parker, J.	Sediment distribution patterns in a back-reef lagoon, Ningaloo Reef, Western Australia.	To be completed in 2006	Dept. Geology & Geophysics, University of WA	David Haig, Annette George, Karl-Heinz Wyrwoll, Brendan Griffin	Ph: 64883474, Email: jparker@geol.uwa.edu.au	A2, A3	PhD
Penrose, H.	Relative contribution of arid zone mangroves and hypersaline microbial mats to the nearshore foodweb	Commenced in 2005, to be completed in 2008	University of Queensland	Dr Catherine Lovelock (UQ), Dr Greg Skilleter (UQ), Dr Diane Walker (UWA)	Ph: 07 3365 2304, Email: c.lovelock@uq.edu.au	A1.3, C1	PhD
Prince, R.	Western Australian Marine Turtle Project- tagging & observation of marine turtles in W.A. - (with relevance to Ningaloo)	1988/89 (Turtle tagging Jurabi coast and Muiron Islands) - ongoing	CALM	Bob Prince	Ph: 94055115, Email: bobp@calm.wa.gov.au	A1.4, D1	
Rodger, K.	Role of science in managing the impacts of wildlife tourism.	2006	Murdoch University - Sustainable Tourism CRC	Sue Moore & David Newsome	Ph: 9360 6081, Email: K.Rodger@murdoch.edu.au	E	PhD
Sleeman, J.	Modelling whale shark distributions on Ningaloo reef with remote sensing and GIS	Started at end of 2004, due to finish mid 2007	Charles Darwin University	Dr Guy Boggs, Dr Mark Meekan (AIMS)	Mark Meekan, Ph: (08) 89209240, Mob: 0429 101 812, Email: m.meekan@aims.gov.au	A1.4, D1	PhD
Smith, Leanne	Evaluating the effectivness of the Jurabi Turtle Centre	2006 - In write up stage	Murdoch University	David Newsome, Dianne Lee	David Newsome Ph: 93602902	A1.4, D1	Honours
Stevens, J.	Movements and behaviour of Whale Sharks	Ongoing 2006-2009 (Collaborated with AIMS)	CSIRO Hobart, Tasmania	(Collaborator: Mark Meekan (AIMS))	Ph: (03) 62325353, john.d.stevens@csiro.au or john.stevens@csiro.au	A1.4, D1	
Taylor, G.	Study of Whale Sharks including non-invasive morphometric measurements				Ph: 97521133, Email: taylor@busseltondoctors.com.au (Busselton Medical Practioners (doctor))	A1.4, D1	On long service leave until the 27th of June (overseas) - Have emailed but no relpy, unsure of the status of his work
Travers, M.	Baseline data on the compositions of fish fauna in more offshore waters of the Pilbara-Kimberley coast, including those over reef and soft substrates.	2006 (in write up stage as of 12-4-06)	Murdoch Univerisity Centre for Fish and Fisheries Research	Ian Potter, Murdoch University. Dr Stephen Newman, Department of Fisheries	Michael Travers Ph: +61 08 9239 8808, Email M.Travers@murdoch.edu.au, Professor Ian Potter Ph: 9360 2524, Email: I.Potter@murdoch.edu.au	A1.3	PhD

Researcher	Project Title	Status	Institution	Supervisor/s	Contact details	Related NRP Project *	Notes
Underwood, J.	Larval dispersal, gene flow and disturbance in two coral species in northern Western Australia	2004 - 2007	School of animal biology - UWA , AIMS	Mike Johnson (UWA), Luke Smith (AIMS), Madeline van Oppen (AIMS)	Jim Underwood Ph: 08 64881483 (uni), 08 93317498 (home)	C1	PhD
Waayers, D.	Developing a tourism optimisation model, with particular emphasis on marine turtle tourism	2004-2006	Murdoch University	David Newsome, Dianne Lee	David Newsome Ph: 93602902	D1, A1.4	PhD
Walker, D.	Key Informant survey on whale shark tourism management in Ningaloo Marine Park, Western Australia.	2006 May to Dec	James Cook UNI - CALM	Associate Professor Peter Valentine and Dr. Alastair Birtles (JCU)	Ph: (+617) 4771 3092, Mob: 0416 95 45 51	A1.4, D1	Masters
Webster, F.	Effect of algae, herbivores and nutrients on the settlement and survival of coral.	Commenced 2004	Murdoch University	Mike van Kuelen - Murdoch, Russ Babcock - CSIRO, Luke Smith - AIMS	Email: 30300414@student.murdoch.edu.au.	A1.3, E1, E2, E3	PhD
Wood, D.	Estimating the Economic, Social and Environmental Value of Tourism in Protected Areas	Commenced 1999	Curtin University of Technology - Division of Humanities	David Wood	Email: d.wood@curtin.edu.au Ph: (61) 8 9266 7280, Fax: (61) 8 9266 2594, Mob: 0412203630	B1, D2	Dr David Wood, Executive Dean - Division of Humanities, Curtin University of Technology
Wyatt, A.	The biological oceanography of Ningaloo Reef: Coastal plankton as a food source for the reef. Assessing the vulnerability of Ningaloo Marine Park to Pollution.	Starting October 2006	UWA, Centre for Water Research	Anya Waite	Email: waite@cwr.uwa.edu.au, Ph: 6488 3082, Fax: 6488 1015	C1	PhD

3.2 Proposed Research Projects

Research Projects in Proposal stage - Ningaloo Marine Park (2006)

* The NRP has various research programs denoted by the letters in the table e.g. A1.1, as detailed in Appendix 1 (extract from D'Adamo 2005, Ningaloo Research Program - Project and Funding Guidelines).

Researcher	Project Title	Status	Institution	Supervisor/s	Contact details	Related NRP Project *	Notes
Gilmore, J.	Coral demography and connectivity in relation to Ningaloo	Will commence with NRP funding (2006)	AIMS	Luke Smith, Andrew Heyward	AIMS Ph: 94334440 (Luke Smith)	D2	Linked with NRP project D2
Hutchins, B.	Checklist of fishes of Ningaloo Reef	On hold due to lack of funding as of 2006	WA Museum	Barry Hutchins	Email: Barry.Hutchins@museum.wa.gov.au	A1.3	
Johnson, M.	Study of the genetic structure, demography & recruitment of several species of marine invertebrates	Potential project	Dept. Zoology - UWA	Mike Johnson	Email: msj@cyllene.uwa.edu.au, Ph: 6488 2244	A1.3	
Keulen, M. v.	Metabolic consequences and vulnerability to stress during reproduction in spawning corals	Potential project	Murdoch University	Mike van Keulen	Mike van Keulen, email: keulen@murdoch.edu.au, PH:9360 2369	A1.3, C1	Potential PhD project for student, yet to be formalised
Meekan, M.	Ningaloo Ecosystem Tagging project: Sonar tagging of elasmobranchs and reef fishes	In application phase as of May 2006	AIMS, Collaboration with CSIRO	Mark Meekan (AIMS)	Email: m.meekan@aims.gov.au, Ph: (08) 89209240, Mob: 0429 101 812	A1.4, D1	Lead proponent CSIRO
Pandolfi, J. Greenstein. B.	Ecological effects of climate change on regional diversity patterns of Western Australian coral reefs	April 2006 in process of hiring post doc to work on project specific to Ningaloo	University of Queensland.	John Pandolfi	Email: j.pandolfi@cms.uq.edu.au	C3	Some support maybe sourced through WAMSI node 2
Waite, A., G. Ivey, and C. Oldham	Interactive coastal oceanography including linkages with the cape range caves	Project currently under discussion (April/ May 2006)	UWA - Centre for Water Research	Anya Waite	Email: waite@cwr.uwa.edu.au Ph: 6488 3082 Fax: 6488 1015.	A1.5, A3, C1	

3.2.1 Wealth from Oceans Flagship – Ningaloo Cluster Projects

Wealth from Oceans Flagship - Ningaloo Cluster Research Projects

* The NRP has various research programs denoted by the letters in the table e.g. A1.1, as detailed in Appendix 1 (extract from D'Adamo 2005, Ningaloo Research Program - Project and Funding Guidelines).

Researcher	Project Title	Status	Component Leader/s	Key Researchers	Contact details	Related NRP Project *	Notes
Lonergan, N.	Wealth from Oceans Flagship - Ningaloo Cluster (Components:)	In final stages of confirmation			Cluster leader - Professor Neil Lonergan (Murdoch University) Ph: 93606453, Email: N.Lonergan@murdoch.edu.au		
	1) Biophysical Environment: Fringing Reef Ocean to Organism Nutrient Fluxes – a multi-disciplinary, multi-scale approach (REEFLUX)	2006 - 2009	Dr Anya Waite, University of Western Australia	Dr Anya Waite, Dr Stuart Humphries (University of Sheffield), Dr Christine Hanson, Dr Glenn Hyndes (Edith Cowan University)	Email: waite@cwr.uwa.edu.au, Ph: 6488 3082, Fax: 6488 1015.	A1.3, C1, C2	
	2) The bathymetry, habitats and biodiversity of Ningaloo coastal lagoon areas in relationship to resource use, biophysical environment and access points	2006 - 2008	Dr Halina Kobryn, Dr Mike van Keulen		Mike van Keulen, Email: keulen@murdoch.edu.au, Ph:9360 2369. Halina Kobryn, Email; H.Kobryn@murdoch.edu.au, Ph: 93602411	A1.3, B1	AIMS will be providing hyperspectral survey data -available to collaborators by Sept 2006. Merv Lynch from Curtin Uni is analysing the hyperspectral data
	3) High resolution studies of human activities and use of the Ningaloo reef (Human use)	2006 - 2009	Associate Professor Lynnath Beckley	Dr Halina Kobryn, Dr Sue Moore	Lynnath Beckley, Email: L.Beckley@murdoch.edu.au, Ph: 93606392	B1, E2	
	4) Social and economic assessment of tourism along the Ningaloo coast: a dynamic modelling approach	2006 - 2009	Associate Professor David Wood, Curtin University of Technology	Professor Sherry Saggers, Dr Susan Moore, Professor Jack Carlsen, Professor Roy Jones	Email: d.wood@curtin.edu.au Ph: (61) 8 9266 7280 Fax: (61) 8 9266 2594 Mob: 0412203630	B1, (Develop modelling systems to assist in the determination of; E1, E2, E3)	
	5) Estimation and integration of socio-economic values of human use of Ningaloo in the MSE model structure.	2006-2009	Associate Professor Michael Burton	Associate Professor Burton, Dr Atakelty Hailu, Dr Ben White (University of Western Australia); Dr Quentin Grafton, Dr Tom Kompas (Australian National Univeristy)	Michael Burton, Email: mpburton@agric.uwa.edu.au, Ph: 64882531	B1, (Bioeconomic modelling)	

3.2.2 Expressions of Interest – Ningaloo Research Fund

Expressions of Interest - Ningaloo Research Fund

* The NRP has various research programs denoted by the letters in the table e.g. A1.1, as detailed in Appendix 1 (extract from D'Adamo 2005, Ningaloo Research Program - Project and Funding Guidelines).

Project Leader	Project Title	Status	Lead Institution/ Organisation	Partner organisations	Key Project Personnel	Contact details	Related NRP Project *
Andrew Heyward	Deeper water habitat mapping and biodiversity assessments	2005/06 and continuing on a long - term basis, survey completed for first year	AIMS	UWA (Dr Euan Harvey), Curtin Uni (Dr Rob McCauley), WA Museum (Dr Jane Fromont)	Andrew Heyward	Email: a.heyward@aims.gov.au, Ph: 9433 4440	A1.1, A1.2, A1.3
Andrew Heyward	Shallow water biodiversity inventories - stock assessments fro targeted invertebrate species	A single year project	AIMS	To be determined	Andrew Heyward	Email: a.heyward@aims.gov.au, Ph: 9433 4440	A1.3
John Stevens	Diversity, abundance and habitat utilization of sharks and rays with reference to the NMP management zones	2006-2008	CSIRO	AIMS (Dr Ian Poiner), Murdoch (Kellie O'Toole), Dept Fisheries (Dr Nick Caputi)	Dr Peter Last (CSIRO), Dr Mark Meekan (AIMS), Dr william White (Murdoch), Mr Rory McAuley (Dept of Fisheries WA)	Email: john.d.stevens@csiro.au, Ph: 03 62 325353	A1.4 (i)
Mark Meekan	Local and regional migratory patterns of whale sharks at Ningaloo Reef, Western Australia	2006-2007	AIMS	CSIRO (Tim Moltman)	Dr John Stevens (CSIRO), Dr John Keesing (CSIRO)	Mark Meekan, Ph: (08) 89209240, Mob: 0429 101 812, Email: m.meekan@aims.gov.au	A1.4 (ii)
Bill Humphreys	Cape Range-Ningaloo groundwater-estuary ecosystem: management implications	2006 - 2008	WA Museum	Curtin Uni (Lindsay Collins), Water Corporation (Sarah Goater)	Dr Lindsay Collins (Curtin), Dr Steve Cooper (South Australian Museum), Dr Andrew Holmes (University of Sydney), Ms Sarah Goater (Water Corp), Jennie Cary (CALM Exmouth), Dr A Q Rathur (Curtin)	Email: bill.humphreys@museum.wa.gov.au	A1.5
Eric Paling	Water and sediment quality within the Ningaloo Marine Park and Muiron Islands	2006-2007	Murdoch University - Marine and Freshwater Research , Environmental Science	None - but close liaison with AIMS (Andrew Heyward) and CALM	Dr Eric Paling, Dr Mike van Keulen, Ms Celeste Wilson (all Murdoch)	Email: E.Paling@murdoch.edu.au, Ph: 93606121	A2
Lindsay Collins	Geomorphology, Growth History and Surface Sediments of Ningaloo Reef	2006 to mid 2008 (A 2.5 year study from the date of initial funding)	Curtin University of Technology	None	Assoc Prof Lindsay Collins, Dr Mehrooz Aspandiar, Ms Alexandra Stevens, Miss Emily Twiggs (all Curtin)	Email: L.Collins@curtin.edu.au, Ph: 9266 7968	A3, C3
Chari Pattiaratchi	Circulation and Mixing in the Ningaloo Marine Park	2005/06 - 2009	UWA	CSIRO, UWA, AIMS	Dr Graham Symonds (CSIRO), Prof Chari Pattiaratchi (UWA), Dr Richard Brinkman (AIMS)	Email: graham.symonds@csiro.au	C1,C2.C3
Andrew Heyward	Long-term monitoring of the health of Ningaloo Reef	Long term basis	AIMS	CALM, UWA	Dr Alan Kendrick (CALM), Dr Robert Black (UWA), Luke Smith (AIMS)	Email: a.heyward@aims.gov.au, Ph: 9433 4440	D2, See J. Gilmores coral project proposal
Russ Babcock	Ecosystem and fisheries effects of zoning	2005/06 - 2008	CSIRO	Edith Cowan University (Dr Charles Thorne), UWA (Mrs Christine Casey), AIMS (Dr Ian	Dr Glenn Hyndes (ECU), Dr Euan Harvey (UWA), Dr Andrew Heyward (AIMS)	Email: russ.babcock@csiro.au, Ph: 93336535, Mob: 0408944961	E1,E2,E3, A1.3
David McDonald	Integration for management of Ningaloo's marine environmental resources	Long term application	CSIRO	UWA (Michael Burton)	Dr Fabio Boschetti (CSIRO), Dr Atakelty (UWA), Dr Rich Little (CSIRO)	Email: david.mcdonald@csiro.au, Ph: 03 9239 4674	F1

Note: There will be a range of generic projects that are complementary to WAMSI node 3, coordinated by AIMS and funded by BHP Billiton. The first of which is the hyperspectral flight data.

4. APPENDICES

APPENDIX I: Research framework project details (source: D'Adamo, 2005)

Project A Bio-physical inventories

A1 Habitat mapping and biodiversity assessment.

A1.1 Deepwater broadscale habitat mapping (2.1, 2.2, 2.3, 6.1)

- *Develop a broadscale habitat map of the deepwater component of the reserves (offshore of the fringing reef), with emphasis on fine scale bathymetry, texture and hardness in the context of providing surrogate information for broadscale biodiversity assessments.*

A1.2 Deepwater biodiversity assessments (2.1, 2.2, 2.3, 6.1)

- *Undertake a broadscale characterisation of the biodiversity of the deepwater habitats of the reserves (offshore of the fringing reef), based on historical information and that to be provided through deepwater broadscale habitat mapping.*
- *Characterise the diversity and abundance of filter feeding communities in the reserves, particularly in the deeper waters (offshore of the fringing reef).*

A1.3 Lagoon and fringing reef biodiversity assessments (2.2, 2.3)

- *Characterise finfish and invertebrate diversity and abundance in the reserves and support the development of management targets for commercially and recreationally targeted species.*

A1.4 Large marine fauna biodiversity assessments (1.1, 1.2, 1.4, 1.5)

- *Characterise shark and ray diversity and abundance in the reserves and support the development of management targets for shark and ray species.*
- *Develop a program of international cooperative research in whale shark conservation, through the facilitation and support of studies into local and regional migratory patterns of whale sharks, as relevant to Ningaloo.*

A1.5 Subterranean aquatic fauna biodiversity assessments (2.4, 2.5)

- *Characterise the diversity and abundance of subterranean aquatic fauna, their habitats and ecological linkages with the marine park and, in context;*
- *Undertake research to improve knowledge of the coastal groundwater system.*

A2 Mapping: water and sediment quality (3.3, 3.4)

- *Undertake water and sediment quality surveys at appropriate control sites and in areas of the reserves that are, or have been, exposed to contaminant inputs, particularly in relation to the diffuse or direct entry of wastewater, hydrocarbons and anti-fouling materials.*

A3 Mapping: Geomorphology and surficial sediments (2.6, 3.5, 7.2)

- *Characterise the surficial sediments of the shallow waters (ie lagoonal), and the coastal geomorphology and seabed geomorphology of the deeper reserve areas (ie offshore of the fringing reef), the reserve areas of Exmouth Gulf and the coastal environs.*

Project B Human usage inventories

B1 Assessment of the nature and levels of human usage (5.1, 5.2, 6.5, 6.7, 6.8)

- *Review and analyse existing information on the nature, patterns and trends in human activities (across commercial and recreational uses) at spatial and temporal scales sufficient to resolve existing and potential impacts of human activities on the health of Ningaloo's marine ecological and social values. This program will also involve a review of the utility of relevant tools, such as numerical or conceptual models, for the prediction of the nature, patterns and trends in human usage. In particular, the program is to facilitate research on:*
  - *The ecosystem effects of recreational fishing on coral reef communities (ie trophic cascades);*
  - *The effectiveness of the reserves' zoning scheme for integrated management of targeted fish stocks in the marine reserves, with particular emphasis on Sanctuary Zones;*
  - *The nature, level and potential impacts of human activities on shoreline intertidal reef communities; and*
  - *The nature, level and potential impacts of human activities on large marine fauna (including Indigenous hunting).*

Project C Key ecological processes

C1 Lagoonal, fringing reef and shelf scale biological oceanography (2.6, 3.1, 3.2, 3.3, 3.4, 6.9)

- *Undertake characterisation and modelling of the biological oceanography of the reserves and adjacent waters, as relevant to characterising the relationships between the spatial and temporal variability in biophysical variables, the marine biodiversity and key ecological processes (eg nutrient supply and productivity, recruitment and connectivity).*

C2 Lagoonal, fringing reef and shelf scale hydrodynamics (2.6, 4.1, 3.3, 3.4, 6.9)

- *Undertake characterisation and modelling of the circulation and mixing of the reserves' waters, particularly in relation to key ecological processes (eg nutrient supply and productivity, recruitment and connectivity) and the provision of a risk assessment capacity for threatening substances (eg contaminant discharges and spills).*

C3 Impacts of climate change. (7.1, 7.3)

- *Undertake research to assess current and potential impacts of climate change, with particular emphasis on coral reef communities in relation to factors including rising sea temperature (and bleaching), acidification, sea level rise, and alterations to the nature and patterns of oceanographic and meteorological energetics.*
- *Under the motivation of potential climate-related changes to physical processes, characterise the morphology and growth history of the reef system and identify growth characteristics as relevant for the maintenance of Ningaloo's marine biodiversity. This research will have relevance to vulnerability assessments in relation to the geomorphological stability of habitats and, in turn, the health of related marine communities.*

Project D Management targets, indicators and monitoring protocols

D1 Assessment of the effectiveness of large marine fauna management programs (1.1, 1.3, 5.3)

- *Evaluate the effectiveness of large marine fauna monitoring programs for management and investigate any necessary revisions or modifications that may be required.*

D2 Cost-effective reef health indicators and monitoring protocols (6.1, 6.2, 6.3, 6.4)

- *Develop a long-term monitoring program, based on cost-effective monitoring protocols, to estimate coral recruitment within the reserves. This project has strong links with projects A and C.*
- *Develop a long-term monitoring program, based on cost-effective monitoring protocols, to estimate coral reef fish recruitment within the reserves. This project has strong links with projects A and C.*
- *Characterise the level and nature of herbivory in the reserves and develop a long-term monitoring program, based on cost-effective monitoring protocols, for this process in the reserves. This project has strong links with projects A and C.*

Project E Ecosystem impacts of human usage

E1 Ecosystem effects of recreational fishing (5.1, 5.2, 5.3, 6.8)

- *Undertake research and monitoring to assess the ecosystem effects of recreational fishing on coral reef communities (ie trophic cascades) and assess the appropriateness of current management controls.*

E2 Effectiveness of zoning for biodiversity conservation, with particular emphasis on Comprehensiveness, Adequacy and Representativeness (CAR) principles (5.2, 6.6, 6.7)

- *Undertake research and implement related monitoring, commencing with baseline studies, to assess the effectiveness of the reserves' zoning scheme for biodiversity conservation and, in relation to CAR principles, the degree to which the reserves satisfy these principles, with particular emphasis on the sanctuary zoning scheme.*

E3 Impacts of human activities on shoreline intertidal reef communities (3.3, 3.4, 6.5, 6.9)

- *Undertake research and monitoring to assess current and potential impacts of human activities on shoreline intertidal reef communities.*

Project F Integration for management

F1 Integration, performance assessment and adaptive management through Management Strategy Evaluation (8.1)

- *Integration of the results of Projects A to E, in response to management's key informational needs, including application of a Management Strategy Evaluation approach, as relevant, to support performance assessment and adaptive management in the reserves.*

APPENDIX II: List of Abbreviations

AIMS – Australian Institute of Marine Science
CALM – Department of Conservation and Land Management
CSIRO – Australian Commonwealth Scientific and Research Organisation
DEC – Department of Environment and Conservation
DOIR – Department of Industry and Resources
ECU – Edith Cowan University
JCU – James Cook University
MSP – Marine Science Program
NMP – Ningaloo Marine Park
NMPMP – Ningaloo Marine Park (Long-term) Monitoring Program
NRF – Ningaloo Research Fund
NRP – Ningaloo Research Program
NWRA – North West Research Association
OSTI – Office of Science, Technology and Innovation
UQ – University of Queensland
UWA – University of Western Australia
WAMSI – Western Australian Marine Science Institution
WWF – World Wildlife Fund