

## WAMSI Research Projects Update – 18<sup>th</sup> May 2007

Project No.	Project Title	Project Leader	Sub-Project/ Major Outputs
1.1	<b>Southwest Australian Coastal Biochemistry</b>	<b>John Keesing CSIRO</b>	<p>1.1.1 Downscaled hydrodynamic models to explore influences on benthic habitat, and the cross-shore and longshore exchange of water, nutrients and particles between the lagoon and shelf regions</p> <p>1.1.2 Coupled hydrodynamic and biogeochemical models and a quantitative nutrient budget for coastal waters at shelf and lagoon scales</p> <p>1.1.3 Improved descriptions and conceptual biogeochemical models for shelf and lagoon waters incorporating seasonal and inter-annual variability and improved representation of benthic primary production and benthic-pelagic coupling</p> <p>1.1.4 Develop simple models for assessing and predicting impacts of physical forcing factors, primarily nutrients, on key benthic functional groups/habitats informed by experiments and observations conducted across a range of naturally varying and anthropogenically altered gradients related to nutrient enrichment</p>
1.2	<b>Coastal ecosystem characterisation, benthic ecology, connectivity and client delivery modules</b>	<b>John Keesing CSIRO</b>	<p>1.2.1 An assessment of the importance of physical forcing and ecological interactions among key functional groups in determining patterns of spatial mosaics in benthic habitats</p> <p>1.2.2 An assessment of key ecosystem processes with particular relevance to contrasting fished and non-fished areas</p> <p>1.2.3 An assessment of likely dispersal patterns for marine organisms based on hydrodynamic and population genetic models</p> <p>1.2.4 Electronic delivery of data and models to management agencies, building on the development of the Data Interrogation and Visualisation Environment (DIVE)</p>
2.1	<b>Dynamics and predictability of the Indo-Pacific Ocean as a global condition on marine climate impacts in WA</b>	<b>Harry Hendon BUREAU OF METEOROLOGY</b>	<p>2.1.1 Assessment of the skill of POAMA for prediction and simulation of large-scale variations of the Indian and Pacific Oceans and their relationship with the Leeuwin Current</p> <p>2.1.2 Assessment and improved understanding of the limits of predictability of large-scale variations of the Indo-Pacific that drive variability of the Western Australian marine environment</p> <p>2.1.3 Understanding the impact of an imperfect ocean observing system in the Indian Ocean basin for predictability and representation of the large-scale Indian Ocean circulation</p> <p>2.1.4 Understanding of the impact of the role of intra-seasonal variability for prediction and evolution of large-scale circulation in Indian Ocean</p> <p>2.1.5 Delivery of experimental seasonal forecasting products tailored to the WA marine environment available on the web</p>
2.2	<b>Dynamics and impacts of the Leeuwin Current on the marine environment off WA</b>	<b>Ming Feng CSIRO</b>	<p>2.2.1 An understanding of the mechanism of warming in the tropical eastern Indian Ocean</p> <p>2.2.2 An understanding of the multi-decadal trends in the Leeuwin Current</p> <p>2.2.3 An improved understanding of the response of the Leeuwin Current system to inter-annual climate variability by using BLUELink model simulations</p> <p>2.2.4 An understanding of the role of the Leeuwin Current eddies in cross-shelf transport</p> <p>2.2.5 Projected future changes in the Leeuwin Current system</p> <p>2.2.6 Model-data archive and report on downscaled, regional (10 km) climate change scenario of the marine environment</p>
2.3	<b>Oceanic conditions at Ningaloo Reef – analysis of downscaling ocean climate into the Ningaloo Reef Tract</b>	<b>Richard Brinkman AIMS</b>	<p>2.3.1 A robust model of the circulation within the Ningaloo Marine Tract (NRT)</p> <p>2.3.2 Understanding of the interaction of the circulation in the NRT and the Leeuwin Current system under present and project future climate conditions</p> <p>2.3.3 Report on the impacts of projected climate change scenarios downscaled from ocean basin to spatial scales relevant to the Ningaloo Reef ecosystems</p>

3.1	<b>Biodiversity assessment and development of cost-effective monitoring protocols.</b>	<b>Luke Smith AIMS</b>	3.1.1 Deepwater Communities at Ningaloo Reef 3.1.2 Methods for Monitoring the Health of Benthic Communities 3.1.3 Stock Assessment of Target Invertebrates at Ningaloo Reef 3.1.4 Local and Regional Migratory Patterns of Whale Sharks 3.1.5 Habitat and biodiversity surveys in the deep waters of the Ningaloo Marine Park 3.1.6 Physical oceanography of the Ningaloo Marine Park
3.2	<b>Biodiversity assessment, ecosystem impacts of human usage and management strategy evaluation.</b>	<b>Russ Babcock CSIRO</b>	3.2.1 Diversity, abundance and habitat utilisation of sharks and rays 3.2.2 Ecosystem impacts of human usage and the effectiveness of zoning for biodiversity conservation 3.2.3 Management Strategy Evaluation 3.2.4 Impacts of human usage, oceanography and management strategy evaluation
3.3	<b>Characterisation of water and sediment quality.</b>	<b>Eric Paling MURDOCH UNIVERSITY</b>	3.3.1 Characterisation of water and sediment quality at Ningaloo Reef
3.4	<b>Characterisation of geomorphology and surficial sediments.</b>	<b>Lindsay Collins CURTIN UNIVERSITY</b>	3.4.1 Characterisation of geomorphology and surficial sediments
3.5	<b>Characterisation and modelling of oceanographic processes and biodiversity assessment.</b>	<b>Charitha Pattiaratchi UWA</b>	3.5.1 Characterisation and modelling of oceanic processes 3.5.2 Spatial and temporal variation in habitat use by demersal tropical fish
3.6	<b>Biodiversity conservation, education and communication.</b>	<b>Chris Simpson DEC</b>	3.6.1 Biodiversity assessment of subterranean aquatic fauna 3.6.2 Assessment of the nature and levels of human usage 3.6.3 Assessment of the effectiveness of large marine fauna monitoring programs 3.6.4 Communications program 3.6.5 Post-graduate seed funding program
3.7	<b>Jurien Bay: Ecological Interactions in coastal marine ecosystems</b>	<b>Paul Lavery &amp; Glen Hyndes ECU</b>	3.7.1 Ecological interactions in coastal marine ecosystems: trophodynamics 3.7.2 Ecological interactions in coastal marine ecosystems: rock lobster 3.7.3 Ecophysiology of benthic primary producers
3.8	<b>Jurien Bay: Biodiversity of marine fauna on the Central West Coast</b>	<b>Jane Fromont WA MUSEUM</b>	3.8.1 Biodiversity of marine fauna on the Central West Coast
3.9	<b>Jurien Bay: The fish communities &amp; main fish populations of the Jurien Bay Marine Park</b>	<b>David Fairclough MURDOCH UNIVERSITY</b>	3.9.1 Ecological interactions in coastal marine ecosystems: the fish communities & main fish populations of the Jurien Bay Marine Park
3.10	<b>NW Region Inventory Collation Project</b>	<b>Chris Simpson DEC</b>	3.10.1 Inventory of Scientific Research on Western Australia's Marine and Coastal Environments, from Kalbarri to the WA/NT border
3.11	<b>Social Science PhD Project</b>	<b>Abbie McCartney UWA</b>	3.11.1 The policy relevance of Choice Modelling: an application to Ningaloo Marine Park [WAMSI top-up scholarship]
4.1	<b>Applying the EBFM Framework</b>	<b>Dan Gaughan WA FISHERIES</b>	4.1.1 Conceptual framework for Ecosystem Based Fisheries Management [EBFM] 4.1.2 EBFM linkages
4.2	<b>Assessment of Community structure, biodiversity, habitat and climate change and the</b>	<b>Jessica Meeuwig UWA</b>	4.2.1 Development of bioregional level assessments of the status of community structure based on fishery dependent and/or fishery independent data

	<b>impact of anthropogenic influences</b>		4.2.2 Establishment of Indicator regions for long term monitoring and assessment 4.2.3 Establishment of fishery-dependent indicators of climate change 4.2.4. Cost effective ongoing, general biodiversity and habitat monitoring methods
<b>4.3</b>	<b>Trophic interactions and ecosystem modelling</b>	<b>Neil Loneragan MURDOCH UNIVERSITY</b>	4.3.1 Trophic interactions 4.3.2 Ecosystem modelling
<b>4.4</b>	<b>Captured species assessments</b>	<b>Rod Lenanton WA FISHERIES</b>	4.4.1 Assessment and monitoring methods for bycatch species composition and abundance [Provisional] 4.4.2 Implications of mobility and stock structure of species for management approaches [Provisional] 4.4.3 Development of cost-effective methods for monitoring the catch of the non-commercial sector [Provisional]
<b>4.5</b>	<b>Socio-economic implications</b>	<b>UWA</b>	Project Plan under development
<b>5</b>	<b>Marine Biotechnology. Biodiversity &amp; Aquaculture</b>	<b>Chris Battershill AIMS</b>	Project Plans under development
<b>6.1</b>	<b>Offshore and coastal engineering and the effects of climate change</b>	<b>Ian Eliot UWA</b>	Project Plan under development
<b>6.2</b>	<b>Impact of internal waves on offshore engineering</b>	<b>Greg Ivey UWA</b>	Project Plan under development
<b>6.3</b>	<b>Ocean conditions and forecasting for WA regional water</b>	<b>Gary Brassington BUREAU OF METEOROLOGY</b>	Project Plan under development
<b>6.4</b>	<b>Western Australian Integrated Marine Observation System</b>	<b>Charitha Pattiaratchi UWA</b>	Project Plan under development