Annual Work Plan

National Environmental Research Program (NERP)

Marine Biodiversity Hub

July 2011 – December 2012

Version 0.2

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

www.nerpmarine.edu.au

Annual Work Plan July 2011 – December 2012 **National Environmental Research Program (NERP)** **Marine Biodiversity Hub** VERSION CONTROL REVISION HISTORY			
Version	Date revised	Section Revised	Revision Comments and Who
Plan V0.1	June 6, 2011		Submitted Draft - Bax
Plan V0.2	July 7, 2011	All	Modified following comments from DSEWPaC and approved by Steering Committee

Annual Work Plan 2011-2012 **Marine Biodiversity Hub** ACCEPTANCE AND RELEASE NOTICE			
This Annual Work Plan 2011-2012 Version 0.2 of the Marine Biodiversity Hub is authorised for release once all signature have been obtained.			
Role	Name and Position title	Signature	Date
Hub Leader	Nic Bax, IMAS, UTAS		July 7, 2011
Business Owner	Mr Geoff Richardson, ERIB, DSEWPaC		

1.0 Introduction

The National Environmental Research Program (NERP) provides around $20 million each year for environmental research to improve our capacity to understand, manage and conserve Australia's unique biodiversity and ecosystems through the generation of world-class research, and its delivery to Australian environmental decision-makers and other stakeholders. The NERP supports applied research that is end-user focused and addresses the needs of the Australian Government and other stakeholders in developing evidence-based policy and improving management of the Australian environment.

Research hubs have been established to examine emerging biodiversity issues, including in terrestrial and marine ecosystems, across Northern Australia, and the Great Barrier Reef and Torres Strait. For further details see www.environment.gov.au/about/programs/nerp/index.html

The overall objective of the NERP Marine Biodiversity Hub is to provide scientific information and advice that will support the Department in decision making in the marine environment, specifically in implementing and monitoring its marine bioregional plans, managing the NRSMPA, supporting the information needs of ERIN and AWD, and providing key baseline information for the Heritage Division. This will be accomplished through four tightly integrated national themes, which will include the engagement of Departmental staff in program development prior to any research commencing. Our scope is national. It matches DSEWPaC's responsibilities and will allow us to provide consistent scientific data, information and advice to the Commonwealth, States and NT. The four research themes are:

1. National Monitoring, Evaluation and Reporting, which will contribute towards two blue-prints: first, for a sustained national environmental monitoring strategy designed to evaluate marine ecosystem health, and: second, for a sustained monitoring strategy to help manage the Commonwealth Marine Reserve Network (focussing on the Southeast Marine Region).
2. Supporting Management of Marine Biodiversity, which will provide methods and tools to value marine biodiversity, identify threats and cumulative impacts, and evaluate and provide guidance on the effectiveness of management tools to meet conservation objectives in a multi-jurisdictional and multi-sectoral environment.
3. National Ecosystems Knowledge, which will provide a better understanding of linkages between seabed physical features and ecological processes that sustain important areas for marine biodiversity including Key Ecological Features (KEFs), estimate and test connectivity between these important areas and those areas being actively managed for biodiversity conservation (eg. CMRs), and provide the long-term perspective on biodiversity dynamics to inform future management under climate change.
4. Regional Biodiversity Discovery to Support Marine Bioregional Plans, which will address regional knowledge gaps in Northern Australia, identified as a Departmental priority in recognition of the global marine biodiversity significance of this regions, and the rapidly increasing pressures it faces.

Full details are in the Hub's Multi-Year Research Plan (MYRP) which broadly describes the scope of the research work program over four years (July 2011- December 2014).and is updated as circumstances and departmental needs develop. For the most recent version of the MYRP see the Hub website www.marinehub.org or www.nerp.marinebiodiversity.edu.au

This Annual Work (AWP) has been developed for the NERP Marine Biodiversity Hub. It extends from July 2011 until December 2012. Subsequent AWPs will cover calendar years. The AWP sits under the MYRP and defines, justifies and provides budgets and schedules for activities on an annual basis. It is an annual planning tool for research administrators, researchers, communications staff and Australian Government staff. Other interested stakeholders may be non-hub researchers (seeking collaborations), government and non-government organisations and the general public (seeking information on the Hubs).

The Annual Work Plan:

- provides a management tool for the Leader and teams including outlining the projects and activities planned and their timing
- links outputs and outcomes with monitoring and evaluation
- links to Australian Government Environment Portfolio policies and programs and end users
- provides the basis for reporting progress of Hub activities, for example when the current status of a project is compared to what had been foreseen in the work plan and
- provides for opportunities to present a visual outline or illustration of the sequence of projects. This can facilitate presentations and negotiations concerning the projects.

Table 1: Summary of program budget for the Marine Biodiversity Hub

Hub Activity (exc GST)	2011-12	2012-13	2013-14	2014-15	Total program budget (cash and in-kind)
Research costs:					
Theme 1 - National Monitoring, Evaluation and Reporting	2,317,859	2,368,491	2,001,638	179,307	**6,867,295**
Theme 2 - Supporting Management of Marine Biodiversity	1,952,709	1,978,642	1,780,069	156,304	**5,867,724**
Theme 3 - National Ecosystems Knowledge	2,236,015	2,603,626	2,491,935	204,690	**7,536,266**
Theme 4 - Regional Biodiversity Discovery to Support Marine Bioregional Plans	1,792,989	1,144,780	469,596	129,498	**3,536,863**
TOTAL RESEARCH COSTS	**8,299,572**	**8,095,539**	**6,743,238**	**669,800**	**23,808,148**
TOTAL ADMINISTRATION COSTS (including UTas PhD scholarships)	**497,446**	**723,033**	**747,176**	**773,463**	**2,741,118**
TOTAL KNOWLEDGE BROKERING & COMMUNICATION COSTS	**458,772**	**808,118**	**854,631**	**896,213**	**3,017,735**
TOTAL FUNDING (exc GST)	**9,255,790**	**9,626,690**	**8,345,045**	**2,339,476**	**29,567,001**

2.0 Planning

2.1 Preparation of the Annual Work Plan

The AWP has been developed by the Hub Theme and Project Leaders in consultation with DSEWPaC staff and with the approval of the Hub's Steering Committee. It provides the basis for the more detailed project by project planning that will take place with DSEWPaC staff and other stakeholders (including IMOS, AFMA, and APPEA) once the projects commence.

2.2 Review of Progress against 2011-12 Annual Work Plan

As this is the first Annual Work Plan for the Hub, this section is not applicable.

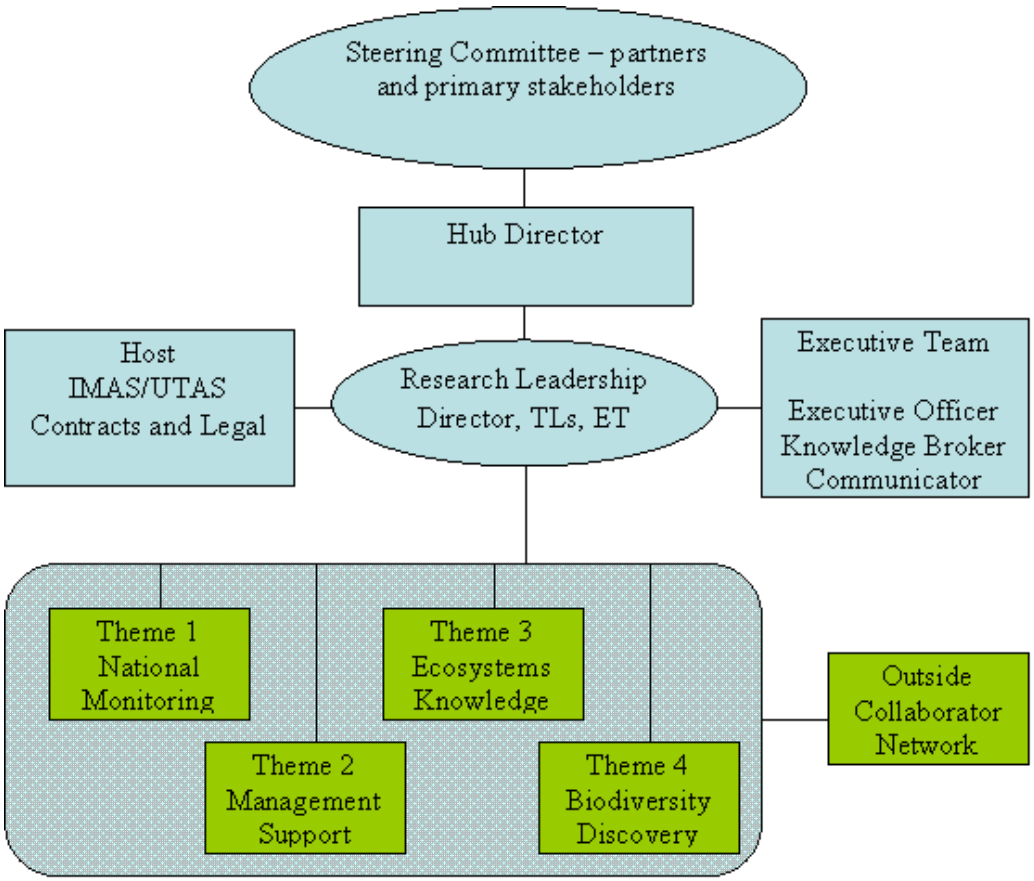
2.3 Approval and Management of the Annual Work Plan

The AWP will be endorsed by the Hub's Steering Committee and approved by the Minister. Details of those approvals and endorsements are provided in the Version Control History.

3.0 Marine Biodiversity Hub

3.1 Hub Research Structure

There are four themes in this Hub as summarised in the following figure: The breakdown of funding sources by major activity is provided in Attachment A.



3.2 Geographic Focus

The NERP Marine Biodiversity Hub has a national remit, although individual projects may have a more restricted geographic focus as identified below. Collaboration with AAD will extend the geographic area of interest.

1. Theme 1: National Monitoring, Evaluation and Reporting
    i. Project 1: Collation and Analysis of Existing Datasets has a national focus
    ii. Project 2: Analysis of approaches for monitoring biodiversity in Commonwealth waters is focussed on three locations: Flinders Marine Reserve (Tasmania); Houtman-Abroholos Islands KEF (WA) with links with WA Fisheries; East coast shelf KEF (adjacent to NSW Solitary Island marine reserve in collaboration with NSW DECC. Existing surveys will be used to increase a Southeast focus.
2. Theme 2: Supporting Management of Marine Biodiversity
    i. Project 1: Integrating social, economic and environmental values has a national remit although the initial focus is on the Southeast
    ii. Project 2: Integrating threats, values and assets for management has a national focus initially, but will focus on a specific bioregion in years 2 and 3 following consultation with the Department.

   iii. Project 3: Landscape approaches to managing high priority conservation values has a national focus but may specialise regionally following consultation with the Department. Collaboration with AFMA is planned.
   iv. Project 4: Supporting management of listed and rare species is focussed on Northern Australia (initially the NT) and will co-ordinate and share staff with the Northern Australia Biodiversity Hub, but has national implications
3. Theme 3: National Ecosystems Knowledge
   i. Project 1: Shelf and canyon ecosystems has a national focus
   ii. Project 2: National maps of connectivity and biodiversity has a national focus
4. Theme 4: Regional Biodiversity Discovery to Support Marine Bioregional Plans
   i. Project 1: 21-day RV Solander survey, will be focussed on North or NE Australia with exact area to be determined in consultation with the Department.

3.3 Hub Administration

3.3.1 Hub Administration Description

Hub Leader: *Professor Nic Bax*
Organisation: *Institute for Marine and Antarctic Science, University of Tasmania.*

Administration activities and team members are described in Attachment B. Budget information is in Table 1 and Attachment A.

The Steering Committee will consist of major stakeholders (DSEWPaC, AFMA, APPEA, IMOS, WWF-Australia have been invited to join), a member of the NERP Secretariat, an independent chairman elected by the committee, and senior representatives of major partners. The Hub Director will report to this committee, which will meet twice a year to oversee Hub progress and reporting, and hold an annual strategic review of the Hub. The Steering Committee approves reports to be provided to the NERP Secretariat.

The Research Leadership Team will consist of Theme Leaders, additional partners (optional), the Director, Executive Officer, Knowledge Broker and Communicator. The Leadership Team will meet:

Monthly teleconferences for administrative matters and progress updates
Twice a year for review, reporting and planning

The Research Leadership Team prepares reports for Steering Committee approval.

3.3.2 Hub Administration Activities

3.3.3 Hub Administration Risks

3.3.4 Hub Administration Monitoring and & Evaluation

To be developed as Milestone 4 (November 1, 2011)

3.4 Hub Knowledge Brokering and Communications

3.4.1 Knowledge Brokering and Communications Description

KMC Leader: To be determined in consultation with the Department
Organisation: DSEWPaC (subject to confirmation)

Knowledge Brokering team members are given in Attachment B. Budget information is in Table 1 and Attachment A.

3.4.2 Knowledge Brokering and Communications Activities

3.4.3 Knowledge Brokering and Communication Risks

See section above

3.4.4 Knowledge Brokering and Communication Monitoring & Evaluation

See section above

3.5 Theme 1: National Monitoring, Evaluation and Reporting

3.5.1 Theme 1 Description

Theme Leader: *Dr Keith Hayes, CSIRO Mathematics and Information Science*

This theme will contribute towards two blue-prints: first, for a sustained national environmental monitoring strategy designed to evaluate marine ecosystem health, and: second, for a sustained monitoring strategy to help manage the Commonwealth Marine Reserve Network (focussing on the Southeast Marine Region). This research aligns broad strategies in the Draft Marine Bioregional Plan for the South West Marine Region and with a number of research priorities identified by the Marine Division of DSEWPaC. It will facilitate closer liaison between federal agencies such as DSEWPAC, BOM, and DIISR, and state agencies responsible for the management of Marine Protected Areas (MPAs), to identify the data infrastructure requirements and logistical/statistical constraints of a sustained national marine monitoring strategy.

Outputs from this theme depend critically on and are contingent upon, results from existing research in the Southeast Marine region, and results from new research in Theme 2 (project 1) to assist definition of operational objectives for the Commonwealth Southeast Marine Reserve Network.

There are two projects in this Theme:

1. Collation and analysis of existing data sets
2. Analysis of approaches for monitoring biodiversity in Commonwealth waters

Theme 1 will be managed through a Theme Leadership Team consisting of all task leaders. They will meet monthly with the Theme Leader to exchange information and quarterly to review progress and report to the Research Leadership Team.

Refer to Table 1 and Attachment A for budget information.

3.5.2 Theme 1 projects

Theme 1 Project 1: Collation and analysis of existing data sets

Participating agencies: *CSIRO, UTAS, UWA, AIMS, GA*
NERP$ $1,194,184; Total in-kind $1,582,952; 1.5 Postdocs

Project Description

The project will source and analyse available relevant data sources to validate predictions associated with KEF indicators for national-scale marine ecosystem health. The project will also develop new techniques analyse time series data for seasonality, change point and trend detection. This project will also source available data relevant to the operational objectives for the Southeast Marine Reserve Network (ie. in collaboration with Theme 2 Project 1), a process that will be relevant to Marine Reserve Networks in all bioregions.

The project will include an analysis of available data to identify gaps and propose a way forward for meeting the data requirements for reporting on national-scale ecosystem health and managing the Southeast Commonwealth Marine Reserve Network.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

Theme 1 Project 2: Analysis of approaches for monitoring biodiversity in Commonwealth waters

Participating agencies: *CSIRO, UTAS, UWA, GA*
NERP$ $1,744,224; Total in-kind $2,345,935; 1.5 Postdocs

Project Description

The project will design, implement and test ways to integrate new and existing survey and monitoring methods at three locations: the shelf of the Flinders CMR in the Southeast IMCRA transition bioregion, the coral/kelp KEF to the east of the Houtman-Abrolhos islands and the east-coast shelf KEF adjacent to the Solitary Islands marine reserve. The project will access existing CMR (and other MPA) monitoring datasets from the partners for the Southeast Marine Bioregion (i.e. Freycinet, Huon, Tasman Fracture and Zeehan CMRs and Maria Island MPA) and thereby attempt to extend the spatial coverage of survey and monitoring methods to include all depths and habitat-types contained in the Commonwealth Southeast Marine Reserve Network (excepting the abyssal plain)

The project will use these new and existing datasets to examine: a) economic and logistical issues, such as the costs and benefits (developed by Theme 2 project 1) of the survey methods, and the use of regular versus event-initiated surveys; and, b) scientific and statistical survey design issues, such as the choice of biodiversity metric and seasonal variation in species group indicators of ecological health, and their impact on the variance and bias of survey data and hence our ability to reliably detect change with these data.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

3.6 Theme 2: Supporting Management of Marine Biodiversity

3.6.1 Theme 2 Description

Theme Leader: *Dr Tony Smith AM, CSIRO Marine and Atmospheric Research*

This theme will provide methods and tools to value marine biodiversity, identify threats and cumulative impacts, and evaluate and provide guidance on the effectiveness of management tools to meet conservation objectives in a multi-jurisdictional and multi-sectoral environment. Tools and options will be designed to add value to existing management processes; including implementing marine bioregional plans, monitoring the Southeast Marine Reserve Network, and assessing and managing listed species under the EPBC Act. Our goal will be to provide scientific advice that can be used by conservation and resource management agencies, thus supporting a shared understanding of the environmental and economic values, and options for monitoring and management. An increased emphasis on performance based management will assist development of a shared understanding.

Outputs from this theme depend critically on and are contingent upon, results from existing research in the South East Marine region, and results from new research on improved understanding of biodiversity assets from Theme 3 and analysis of approaches to monitoring biodiversity in Theme 1, Project 2. Outputs also feed directly into developing a blue-print for a sustained monitoring strategy to help manage the Commonwealth Marine Reserve Network being developed under Theme 1.

There are four Projects in this Theme:

1. Integrating social, economic and environmental values
2. Integrating threats, values and assets for management
3. Landscape approaches to managing high priority conservation values, and
4. Supporting management of listed and rare species

Theme 2 will be managed through a Theme Leadership Team consisting of all project leaders. They will meet monthly with the Theme Leader to exchange information and quarterly to review progress and report to the Research Leadership Team.

Refer to Table 1 and Attachment A for budget information.

3.6.2 Theme 2 projects

Theme 2 Project 1: Integrating social, economic and environmental values

Participating agencies: CSIRO, UTAS, UWA
NERP$ $814,506; Total in-kind $1,177,693; 1.5 Postdocs

Project Description

This project will develop socio-economic approaches to valuing biodiversity to support implementation of management objectives in the CMR network management plan, and approval and permitting of new infrastructure developments. The project will have three main components: 1) to assist development of performance indicators in the Commonwealth Southeast Marine Reserve Network; 2) to develop options for using incentives to increase stewardship of CMRs, especially in support of monitoring and compliance in multiple-use zones; and 3) provide biodiversity valuations to support decisions on new approvals (in areas to be determined in consultation with the Department).

An early emphasis will be on working with the Marine Division to understand management objectives for the Southeast CMR network management plan, with the aim of providing quantifiable measures that can be used to compare the efficacy and cost of different options to monitor and manage marine biodiversity, including assessing the data needs. The initial task will use a variety of approaches in working with the Marine Division to develop quantitative performance indicators for managing the Southeast CMR network. This is an essential component of developing a sustained monitoring blue-

print for this network, and this project will developed jointly with the Marine Division and Theme 1 Project 1.

The second component will be to work with the Marine Division to identify management options and incentives that would support a sharing of responsibility and stewardship of the CMR network, with an initial focus on the Southeast. The goal of this work will be to assess how best to involve marine users in the monitoring and performance assessment of CMRs, especially multiple-use zones, and how alternative approaches to involving marine users affects their support, stewardship and compliance. This research has the potential to be extended to also inform how existing users of the marine environment would respond to management options likely to be considered in implementing marine bioregional plans more generally. A focus for this extension will be determined in consultation with the Department.

The third component will be to derive and compare economic values for marine biodiversity and habitats, at different scales (eg. local and regional) and to different stakeholders. This will support development of monitoring plans, the comparison of alternative management options, and decisions associated with the approval and permitting of new marine developments, particularly in the oil and gas industry. Early discussions will be held with the Department to provide a geographic focus for this research.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

Theme 2 Project 2: Integrating threats, values and assets for management

Participating agencies: CSIRO
NERP$ $411,957; Total in-kind $411,957

Project Description

The first component of this project is to identify the relevant risks and impacts from human activities and map their spatial distribution at the national scale. A significant amount of work has already been done to identify individual threats. The project will bring together existing data and information on key threats to marine biodiversity –CERF Marine Biodiversity Hub, DSEWPaC Marine Bioregional Planning, DSEWPaC/CSIRO Marine Indicators Threat Mapping Project, fisheries risk assessment, NPEI, IMOS and NOIS – to provide a threat assessment that can be prioritised to meet the Department's needs in implementing marine bioregional plans. Additional important threats including SST anomalies, marine debris and invasive species need quantification. There is no agreed method to quantify cumulative threats and impacts and this project will explore several methods, testing them against independent data to support the Department's management of cumulative threats to marine biodiversity. Finally, improved methods for mapping cumulative threats will be used to provide threat and impact layers nationally.

The information from threats and impacts will be integrated with improved knowledge on socio-economic values from Project 1 and improved understanding of biodiversity assets from Theme 3 to support implementation of marine bioregional plans. The project will identify interactions between threats, biodiversity values and biodiversity assets and develop a geographic focus based on the Marine Bioregional Plans and in discussion with the Department. It will result in an improved understanding how information and analyses from a variety of sources (including other projects and themes in this Hub) can be integrated to support their decision making. A key priority for the task is to

assemble the expertise in EBM, EBFM and spatial planning within the Hub and CSIRO to formulate options and opportunities that build on existing work.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

Theme 2 Project 3: Landscape approaches to managing high priority conservation values

Participating agencies: CSIRO/UWA
NERP$ $318,350; Total in-kind $446,984

Project Description

This project focuses on integrated management solutions to key threatened groups and habitats, including on and off reserve management. It comprises 2 tasks focused at a range of landscape scales to deliver improved management arrangements to address high priority conservation values identified under the EPBC Act.

Task 1: Supporting management of high conservation priority species: This task will develop new approaches to manage high conservation priority species at a landscape scale in a multi-jurisdictional and multi-sectoral environment. A significant fraction of Australia's chondrichthyan fauna is at risk from a variety of human uses, particularly fishing. The group contains many slow-growing vulnerable species, including some of high concern to the Marine Division, so this group provides a good test case for developing these methods. Landscape approaches to management have been identified as a primary tool for protection, but chondrichthyans are widely distributed and cannot be fully protected in all parts of their range. The task will identify and test strategies for supporting management of chondrichthyans both on and off reserve. What combination of spatial and other management strategies can best protect this group, including more mobile species, while maintaining access for ocean users? This issue will be addressed at national and regional scales. Delivery outputs will include recommendations for improved guidelines for managing high conservation priority species on and off reserve and will seek to identify complementary arrangements between conservation and resource management agencies, particularly fisheries.

Task 2: Supporting management of marine benthic biodiversity: Considerable information has now accumulated on benthic biodiversity and human uses that interact with the seabed, including detailed maps in some regions. It is known that some uses are a potential threat to benthic biodiversity, but it is not known how these threats may interact. What combination of spatial and other management strategies can protect benthic biodiversity while maintaining access for ocean users now and in the future? This task has strong links to biodiversity valuation in Project 1 of this theme, and monitoring in Theme 1. The landscape approach being taken will also lead to complementary and competing management options with Task 1 that will need to be resolved as part of these tasks.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

Theme 2 Project 4: Supporting management of listed and rare species

Participating agencies: CDU. NT Fish, CSIRO
NERP$ $954,399; Total in-kind $1,331,878

Project Description

This project focuses on landscape-level integrated management solutions for supporting management of rare and listed species, using euryhaline elasmobranchs a key threatened group in Northern Australia as a test case. The new genetic techniques that will be modified and applied in this task have the potential to make it possible to assess rare and listed species more effectively and at a radically reduced cost. The management options developed in this project will have wide applicability to other listed and data poor species providing for a more effective and efficient management of this very diverse group. A key output of this project will be an assessment of the effectiveness of this approach for other listed and rare species.

Australian populations of sawfish have undergone substantial albeit unquantified declines in abundance, accompanied by fragmentation and range contraction. The species continue to be at risk from overfishing (commercial, recreational, and domestic/international IUU) and habitat modification. There has been no systematic monitoring of abundance, and therefore no way of demonstrating the extent of decline, or the current population trajectories. The high spatial structuring of this species requires a landscape approach to their management. We will develop a novel and modern assessment and monitoring strategy for freshwater sawfish in the Northern Australia to assess population status, distribution and assess current management effectiveness. Biological information will be collected on additional listed species as they are captured. The problems above are shared by many other high-profile listed species such as Australian sea lions, dugongs, marine turtles, and numerous other elasmobranchs. The techniques developed in this project will find application to these other species in the future, although the specifics will differ from species to species. In particular, the methods to address conservation issues for rare and data poor species should see wide application.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

3.7 Theme 3: National Ecosystems Knowledge

3.7.1 Theme 3 Description

Theme Leader: *Dr Brendan Brooke, Geoscience Australia*

This theme will provide a better understanding of linkages between seabed physical features and ecological processes that sustain important areas for marine biodiversity including Key Ecological Features (KEFs), estimate and test connectivity between these important areas and those areas being actively managed for biodiversity conservation (eg. CMRs), and provide the long-term perspective on biodiversity dynamics to inform future management under climate change.

Outputs from this theme will be used in Theme 2 Project 1 to value marine biodiversity and may influence monitoring decisions in Theme 1.

There are two projects in Theme 3.

1. Shelf and Canyon Ecosystems - functions and processes, and
2. National Maps of Connectivity and Biodiversity

Theme 3 will be managed through a Theme Leadership Team consisting of all project leaders. They will meet monthly with the Theme Leader to exchange information and quarterly to review progress and report to the Research Leadership Team.

Refer to Table 1 and Attachment A for budget information.

3.7.2 Theme 3 projects

Theme 3 Project 1: Shelf and Canyon Ecosystems - functions and processes

Participating agencies: *GA, UWA, AIMS, CSIRO*
NERP$ $1,508,743; Total in-kind $2,734,824; 3.5 Postdocs

Project Description

Project 1 focuses on shelf and canyon features as these were identified as important areas for biodiversity in marine bioregional plans. Improved information on the importance of individual features to biodiversity values and the relative biodiversity value of nearby features will assist assessments of the impacts of marine use and inform subsequent management decisions. Ecologically important physical processes that operate within and between shelf and canyon ecosystems determine their value as biodiversity hotspots, eg. for locally rich benthic biodiversity, high productivity, or local abundances of listed species. This project will improve knowledge of the importance of large-scale shelf features that support biodiversity values for areas of management interest in Northern Australia, selected in consultation with DSEWPaC. The project will harvest the best available existing data (bathymetry, oceanography, sediments, habitats, species), incorporate new data from strategically selected sites (in collaboration with Themes 1 and 4) and employ advanced spatial analysis methods (in collaboration with Project 2 and Theme 1). Importantly, this project will develop an analytical template for characterising and assessing the significance for biodiversity of key physical and ecological features throughout the Australian Marine Estate. This will assist managers evaluating options for biodiversity management of the many canyons and outer shelf features (especially outside the Commonwealth Marine Reserve Network) where no biological surveys have occurred. The project comprises two tasks:

Task 1: Data Discovery for Areas of Management Interest. Data that describe physical features, processes and patterns of biodiversity on the continental shelf in areas of management interest of Northern Australia will be identified, harvested and formatted for analysis. The key outputs will be GIS products and supporting documentation that describe and integrate these datasets for these areas, as well as the provision of sustainable management and online discoverability of the data.

Task 2: Data Analysis & Synthesis for Areas of Management Interest. The role of large-scale physical features on the shelf (banks, canyons, reefs) in influencing patterns of marine biodiversity will be analysed for these identified areas. Key objectives of the analysis are: (i) Providing quantitative descriptions of the morphology of large-scale physical features that can be used to predict their likely influence on key ecological processes (exposed substrate and increased productivity); (ii) Characterising physical and biological oceanography both on and off these large-scale physical features (e.g. upwelling zones); (iii) Mapping the distribution, abundance and behaviour of selected taxa (e.g. large sharks and fishes); (iv) Assessing the role of physical processes and ecology in the distribution of biodiversity. The key outputs will be new models (conceptual, qualitative & quantitative) that describe how the morphology and local oceanography of large-scale physical features influences their value to biodiversity. These models can then be used to predict the biodiversity value of other large-scale physical features that have not been sampled for their biodiversity. This information will assist assessing and managing impacts of marine industries including fisheries and oil and gas development.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

Theme 3 Project 2: National Maps of Connectivity and Biodiversity

Participating agencies: *Museum Victoria, AIMS, CSIRO*
NERP$1,203,893; Total in-kind $2,088,808; 2 Postdocs

Project Description

This project will take advantage of recently developed and upgraded biodiversity databases, supplemented with new genetic information, to compare and contrast alternative attributes of Australian marine biodiversity. It will compare the distribution of species richness of local endemics with those for all species, or with areas identified to be important in speciation or climate refuge. It will use a process-based approach to identify common biodiversity patterns that will inform conservation management.

Task 1: National maps of biodiversity and connectivity. There are few national maps of biodiversity and connectivity for the Australian marine environment. The aim of this task is to accumulate comprehensive datasets for the entire Australian EEZ, including Antarctica (from 0-2000 m), map hotspots of biological and genetic diversity, and explore potential changes to faunal composition under various climate-change scenarios. This task will employ an innovative mix of genetics, phylogenetics and modelling to map patterns of connectivity of data-rich biota at national and regional scales. Outputs will be national maps of species and genetic biodiversity supported by datasets at sub-regional scale to assist decision makers. At present we have little data for many places identified as of interest to Marine Heritage (eg Coral Sea, Cape York, Kimberley). An atlas will summarise and interpolate existing knowledge for two large faunal groups. National maps of biodiversity will assist understanding of the role of networks of CMRs and other management measures in achieving the objectives of marine bioregional plans. Output from this task will be used in Theme 2 Project 1 to value marine biodiversity and may influence monitoring decisions in Theme 1.

Task 2: National biodiversity datasets for sharks, rays and selected teleosts. This task will utilise the key conservation values, vulnerability and extensive data holdings for Australian sharks, rays and selected teleosts to identify areas of key importance to threatened species, endemics, and both ancient and recently evolved elements of the fauna within marine provinces and their bathomes. Outputs will include datasets and maps summarising distributions and conservation values of sharks, rays and selected teleosts, incorporating hotspots of distribution and endemicity. This project will provide data

products and maps that will improve DSEWPaC capacity to recognise, interpret and identify options to manage potential intersections between users of the marine environment and biodiversity values in identified hotspots, and provide improved information on which to base recovery plans if required.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

3.8 Theme 4: Regional Biodiversity Discovery to Support Marine Bioregional Plans

3.8.1 Theme 4 Description

Theme Leader: *Dr Julian Caley, Australian Institute of Marine Science*

Regional knowledge gaps in Northern Australia have been identified as a Departmental priority in recognition of the global marine biodiversity significance of these regions, and the rapidly increasing pressures facing them. A broad suite of physical and biological data will be collected by an interdisciplinary team from AIMS, Geoscience Australia, Museum Victoria, and the University of Western Australia using a diverse set of data collecting methods. The two surveys proposed for this theme have now been reduced to one, but opportunities will be sought to mount a second survey through co-investment from other sources including the Marine National Facility.

Outputs from this Theme will be key inputs of data and samples to Theme 3 and will also provide opportunities for testing and extending the work in Themes 1 and 2 particularly the proposed regionally focussed work to support marine management.

The one Project in this Theme is supported by a 21-day survey on RV Solander

Theme 4 will be managed through a Theme Leadership Team consisting of all task leaders. They will meet monthly with the Theme Leader to exchange information and quarterly to review progress and report to the Research Leadership Team.

Refer to Table 1 and Attachment A for budget information.

3.8.2 Theme 4 projects

Theme 4 Project 1: 21-day RV Solander Survey

Participating agencies: *AIMS*, GA, *Museum Victoria, UWA*
NERP$ $1,437,606; Total in-kind $2,099,258; 0.5 NERP-funded Postdoc

Project Description

We will use ship-based sampling to "develop a better understanding of the marine biodiversity and major drivers for maintaining biodiversity" (Marine Division) by filling major knowledge gaps for specific data poor KEFs and CMRs in Northern Australia and/or the Coral Sea. This will also address the interests of Natural and Indigenous Heritage in biodiversity mapping in the Coral Sea and Cape York. The survey will have the potential to extend from shallow to deep habitats (~2000m); however the precise location and focus will be determined in consultation with DSEWPaC and with the aim of directly enhancing outputs from other projects in the Hub. We plan to determine the area and conduct the survey in the first year of the NERP Hub, so that samples can be worked up and available to other Hub projects in a timely fashion.

These data will be used to fill nationally recognised gaps in biodiversity knowledge and to understand patterns of community assembly, associated physical drivers of marine biodiversity in these poorly studied marine realms, and provide a regional context to these patterns and processes. This sampling will also support further development of a national mapping and survey capacity capitalising on recent marine infrastructure investments. This theme will provide key inputs of data and samples to Theme 3. These data will also provide opportunities for testing and extending the work in Themes 1 and 2 particularly the proposed regionally focussed work supporting marine management.

Project Methods / Approaches / Design

Project Reporting

The project reporting will be coordinated through the Theme or Hub Leader. This includes project progress, finance and final reports.

Project Monitoring and Evaluation

see above

3.9 Emerging Priorities

Emerging priorities projects are yet to be agreed. Some initial ideas from discussions with stakeholders are captured below:

Oil and Gas Development – Discussions with AW&D Ports and Marine indicated that there were several areas where Departmental decision making could be profit from new research and access to existing industry data. These included, identifying critical habitat in ports (including for offsetting), importance of background noise on existing critical habitats (eg. nursery areas for whales), and seismic testing per se on turtles, and development of methods (toolkits) to measure impacts of dredging eg. on corals and seagrasses. Discussions have been initiated with the oil and gas industry through the APPEA Environmental Managers Committee.

Marine Division – Discussion with Marine Policy Development have highlighted likely need to support Australia's involvement in Regional High Seas planning initiatives in the Southern Pacific and Indian Oceans. These include supporting the Regular Process, and identifying Ecologically and Biologically Significant Areas (EBSAs) under the CBD, and Vulnerable Marine Ecosystems (VMEs) under FAO.

Emerging priorities projects identified – None to date

Emerging priorities projects funded – None to date.

Attachment A – Breakdown of Marine Biodiversity Hub Funding Sources by Major Activity

(2011 – 2012)

*Admin, Commns & Knowledge Brokering and PhD schols budget July - Dec 2011

	$, exc GST	*Admin	*Commns & Knowledge Brokering	PhD schols 2011	Theme 1	Theme 2	Theme 3	Theme 4	TOTAL
NERP program funding	**Cash**	**25,843**	**343,872**		**1,006,307**	**860,874**	**802,616**	**725,410**	**3,764,922**
UTAS	Cash	46,777		135,563					182,339
	In-kind	315,107	166,139		468,576	*88,068*			1,037,890
	Total	**361,884**	**166,139**	**135,563**	**468,576**	**88,068**	**-**	**-**	**1,220,229**
CDU	Cash								-
	In-kind					*312,467*			312,467
	Total	**-**	**-**	**-**	**-**	**312,467**	**-**	**-**	**312,467**
UWA	Cash								-
	In-kind				50,736	*216,912*	199,194	44,449	511,291
	Total	**-**	**-**	**-**	**50,736**	**216,912**	**199,194**	**44,449**	**511,291**
AIMS	Cash								-
	In-kind				**110,561**		**295,995**	**527,738**	934,294
	Total	**-**	**-**	**-**	**110,561**	**-**	**295,995**	**527,738**	**934,294**
CSIRO	Cash								-
	In-kind	**25,843**			**399,812**	**474,386**	**80,595**		980,636
	Total	**25,843**	**-**	**-**	**399,812**	**474,386**	**80,595**	**-**	**980,636**
GA	Cash								-
	In-kind				**281,867**		**433,205**	**495,393**	1,210,465
	Total	**-**	**-**	**-**	**281,867**	**-**	**433,205**	**495,393**	**1,210,465**
MV	Cash								-
	In-kind						**424,410**		424,410
	Total	**-**	**-**	**-**	**-**	**-**	**424,410**	**-**	**424,410**
	Total	**413,569**	**510,011**	**135,563**	**2,317,859**	**1,952,708**	**2,236,015**	**1,792,989**	**9,358,714**

Attachment A Contd – Breakdown of Marine Biodiversity Hub Funding Sources by Major Activity

(2012 – 2013)

*Admin, Commns & Knowledge Brokering and PhD schols calendar budget 2012

	$, exc GST	*Admin	*Commns & Knowledge Brokering	PhD schols 2011	Theme 1	Theme 2	Theme 3	Theme 4	TOTAL
NERP program funding	**Cash**	**54,270**	**480,183**		**1,043,189**	**859,870**	**955,575**	**504,190**	**3,897,277**
UTAS	Cash	78,190		284,681					362,871
	In-kind	360,162	352,911		505,626	95,609			1,314,308
	Total	**438,352**	**352,911**	**284,681**	**505,626**	**95,609**	**-**	**-**	**1,677,179**
CDU	Cash								-
	In-kind					328,091			328,091
	Total	**-**	**-**	**-**	**-**	**328,091**	**-**	**-**	**328,091**
UWA	Cash								-
	In-kind				106,546	225,868	207,264	46,321	585,999
	Total	**-**	**-**	**-**	**106,546**	**225,868**	**207,264**	**46,321**	**585,999**
AIMS	Cash								-
	In-kind				**114,151**		**305,423**	**266,020**	685,594
	Total	**-**	**-**	**-**	**114,151**	**-**	**305,423**	**266,020**	**685,594**
CSIRO	Cash								-
	In-kind	**54,270**			**418,754**	**469,205**	**170,916**		1,113,144
	Total	**54,270**	**-**	**-**	**418,754**	**469,205**	**170,916**	**-**	**1,113,144**
GA	Cash								-
	In-kind				**180,224**		**492,180**	**328,249**	1,000,653
	Total	**-**	**-**	**-**	**180,224**	**-**	**492,180**	**328,249**	**1,000,653**
MV	Cash								-
	In-kind						**472,268**		472,268
	Total	**-**	**-**	**-**	**-**	**-**	**472,268**	**-**	**472,268**
	Total	**546,892**	**833,093**	**284,681**	**2,368,491**	**1,978,642**	**2,603,625**	**1,144,780**	**9,760,205**

Attachment B – Marine Biodiversity Hub staff (2011 – 2013)

The table lists key staff and researchers only.

* FTE for July - Dec 11 only and calendar 2012, all others for FY 2011/2012 and 2012/2013				2011-2012	2012-2013
	Name	**Role**	**Organisation**	**FTE**	**FTE**
Administration	Bax, Nic	Director	UTas	0.05	0.10
	Randell, Vicki	Exec Officer	UTas	0.20	0.40
Knowledge Brokering and Communications Team*	Bax, Nic	Director	UTas	0.25	0.50
	Ozimec, Annabel	Science Support	CSIRO	0.30	0.60
	tba	Communications Mgr	UTas	0.20	0.40
	tba	Database Mgr	UTas	0.20	0.40
	tba	Knowledge Broker	UTas	0.20	0.40
Research Teams:					
Theme 1	**Hayes, Keith**	Leader	CSIRO	0.50	0.50
Project 1.1	Edgar, Graham	Researcher	UTAS	0.10	0.10
Project 1.1	Sweatman, Hugh	Researcher	AIMS	0.10	0.10
Project 1.2	Babcock, Russ	Researcher	CSIRO	0.20	0.20
Project 1.2	Barrett, Neville	Researcher	UTAS	0.30	0.30
Theme 2	**Smith, Tony**	Leader	CSIRO	0.30	0.30
Project 2.1	Pascoe, Sean	Researcher	CSIRO	0.20	0.20
Project 2.1	Jennings, Sarah	Researcher	UTAS	0.10	0.10
Project 2.3	Pitcher, Roland	Researcher	CSIRO	0.10	0.10
Project 2.4	Pillans, Richard	Researcher	CSIRO	0.30	0.30
Project 2.4	Bravington, Mark	Researcher	CSIRO	0.30	0.30
Project 2.4	Austin, Chris	Researcher	CDU	0.10	0.10
Project 2.4	Edyvane, Karen	Researcher	CDU	0.10	0.10
Theme 3	**Brooke, Brendan**	Leader	GA	0.50	0.50
Project 3.1	Nichol, Scott	Researcher	GA	0.20	0.40
Project 3.1	Meeuwig, Jessica	Researcher	UWA	0.10	0.10
Project 3.1	Waite, Anya	Researcher	UWA	0.10	0.10
Project 3.1	De'ath, Glen	Researcher	AIMS	0.20	0.20
Project 3.2	O'Hara, Tim	Researcher	MV	0.50	0.50
Project 3.2	Gledhill, Dan	Researcher	CSIRO	0.00	0.27
Theme 4	**Caley, Julian**	Leader	AIMS	0.20	0.20
Project 4.1	Brooke, Brendan	Researcher	GA	0.35	0.35
Project 4.1	Meeuwig, Jessica	Researcher	UWA	0.05	0.05