

Annual Work Plan 1
National Environmental Research Program
(NERP)

Tropical Ecosystems Hub

July 2011-June 2012



Australian Government

**Department of Sustainability, Environment,
Water, Population and Communities**

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1.0 Introduction

The key intent of the NERP investments is to deliver research which supports evidenced based policy, management and decision making, particularly by the Australian Government and other key end users. The Hub is a partnership between research providers with on-ground presence in Queensland, particularly AIMS, CSIRO, JCU and UQ, along with other research providers and end-users including government agencies (Commonwealth and State), statutory authorities (GBRMPA, TSRA and WTMA), NRM bodies, conservation NGOs, regional industries, indigenous communities and the general public.

The NERP Tropical Ecosystems Hub will address issues of concern for the management, conservation and sustainable use of the World Heritage listed Great Barrier Reef (GBR) and its catchments, tropical rainforests including the Wet Tropics World Heritage Area (WTWHA), and the terrestrial and marine assets underpinning resilient communities in the Torres Strait, through the generation and transfer of world-class research and shared knowledge.

The strategic goals of the NERP Tropical Ecosystems Hub are to improve understanding and delivery of knowledge relating to:

Theme 1 - Understanding ecosystem condition and trend: Understanding the condition, trend and interdependencies of unique environmental assets of the North Queensland region; building the capacity to predict how ecosystems and biodiversity will respond to change.

Theme 2 - Understanding ecosystem function and cumulative pressures: Understanding how ecosystems and biodiversity respond to cumulative pressures, and the social and economic implications for the North Queensland region.

Theme 3 - Managing for resilient tropical systems: Partnering with key environmental decision-makers in government, industry and community to develop information, systems and tools to assist ecologically-sustainable management and strengthen environmental and social resilience.

As the NERP Tropical Ecosystems Hub research activities span several years, the Annual Work Plan (AWP) is the key document for defining, justifying, budgeting for and scheduling activities on an annual basis. It relates directly to the Hub Multi-Year Research Plan (MYRP) which broadly describes the scope of the research work program over four years (July 2011- December 2014).

The Annual Work Plan (AWP) is intended to be used as an annual planning tool for research administrators, researchers, communications staff and Australian Government staff. It will also inform the Minister for Sustainability, Environment, Water, Population and Communities of the Hub's planned research for the year. Other interested stakeholders may be non-hub researchers (seeking collaborations), government and non-government organisations and the general public (seeking information on the Hubs).

For the NERP TE Hub, 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

Supporting the AWP is a Hub Science Communication Plan that will deliver/transfer new knowledge and tools (e.g. decision support systems) to managers and other users requiring environmental, social and/or economic information to support their respective future decisions whether it is about regulatory responses or investments.

Table 1: Summary of program budget for the Tropical Ecosystems Hub*

Hub Activity (ex. GST)	2010/2011	2011/12	2012/13	2013/14	2014/15	Total program budget
Research costs:						
Theme 1:		1,676,342	2,083,858	1,785,000	947,799	6,492,999
Theme 2:		1,585,494	1,639,352	1,498,040	610,740	5,333,626
Theme 3:		1,970,326	1,992,966	2,308,417	824,504	7,096,213
TOTAL RESEARCH COSTS		5,232,162	5,716,176	5,591,457	2,383,043	18,922,838
Science Establishment	3,800,000					3,800,000
Governance (Science Leader support)		67,697	69,129	70,603	72,120	279,549
TOTAL Science Communications and Knowledge Brokering COSTS	68,190	685,651	734,551	768,107	541,114	2,797,613
Administration (Contracted fee)	661,819	649,091	636,364	661,182	70,000	2,678,456
Emerging Priorities						To be negotiated
TOTAL FUNDING (ex. GST)	4,530,009	6,634,601	7,156,220	7,091,349	3,066,277	28,478,456

**These figures include only NERP cash plus the additional costs of Administration.*

2.0 Planning and Implementation of the Annual Work Plan

The Annual Work Plan is derived from the NERP TE Hub Multi-Year Research Plan (MYRP) which was prepared by the Hub Administrator (the Reef and Rainforest Research Centre) in consultation with Hub Science Leader and the NERP Tropical Ecosystems Hub Steering Committee. In addition to the formal selection process to establish the Hub research program, a substantial consultation process was undertaken with the research community and multiple end-users.

The NERP TE Hub AWP is intended to be a stand alone document that directs the annual activity of the Hub to ensure the objectives of the MYRP are met. The AWP defines the proposed outputs from the projects, the timing, the annual budget and the proposed knowledge brokering and communication activity associated with the research activities.

The AWP for the NERP TE Hub aligns to the financial year.

2.1 Preparation of the Annual Work Plan

Following the Ministerial announcement of the successful research projects for the NERP TE Hub a substantial consultation process was undertaken with the research community and multiple end-users to refine the MYRP and to structure the first AWP. The intention of the consultation process was to establish a framework, through consensus, which most effectively addresses the needs of the major stakeholders (government, industry, community and the research community) and enhances end-user engagement and prospective communication and outreach of the science.

The consultation process occurred primarily through the NERP TE Hub Working Groups for each geographical node. The Working Groups were established by the NERP TE Hub Steering Committee, chaired by the relevant management agency (GBRMPA, WTMA and TSRA) and consisted of end-users and research providers.

The following consultation process occurred:

- The NERP Working Group members were provided with an assessment template for the proposals received and discussed at the first Working Group Meetings.
- Members were requested to rank each project (High, Medium, or Low) on four criteria: Relevance, Research Quality / Methods, Team Strength / Collaboration and Value for Money, and provide additional comments.
- The responses were combined and grouped into research and end user responses. The responses were also examined from the point of view of end-user relevance, with consideration of researcher comments on research method and team strength. Researcher comments on their own proposals or proposals that they were associated with were not considered.
- For the GBR Node: a subgroup team including Science Leader, Working Group Chair, the Administrator, the Hub Steering Committee Chair and DSEWPaC considered the assessments and grouped the proposals into 'supported', 'not supported', 'intermediate' and 'mixed responses'. Consultation with major end-users (GBRMPA, WWF, DEEDI, Reef Plan managers, Reef Rescue Managers and e-Reefs) occurred, focussing particularly on those projects that received intermediate or mixed support.
- A Rainforest Subgroup was formed including Science Leader, Working Group Chair, the Administrator, the Node Research Leader and DSEWPaC to further prioritise research projects and suggest indicative budget allocations.
- The Torres Strait Working Group formed a subgroup in closed session with the end-users, Administrator, DSEWPaC and Science Leader to further prioritise research projects and suggest indicative budget allocations.
- Research leaders and Institutional representatives received the outcomes of the evaluation after the subgroups had met to further prioritise research projects and suggest indicative budget allocations. Revised research proposals were submitted by Project Leaders one week before their respective working group meetings in May. These projects were provided a *checklist for researchers* that detailed the expected engagement with end users. This included an expectation of project discussions with end users before finalisation of the schedules.

- Working Group members were invited to revise their evaluations based on the revised proposals for the Working Group meetings during May.
- Members were again requested to rank each project on four criteria: Relevance, Research Quality / Methods, Team Strength / Collaboration and Value for Money, and provide additional comments. These assessments were then collated to indicate the number of times each score was allocated to each project for Managers, Stakeholders and Researchers.
- The Rainforest and Torres Strait subgroups were then requested to reconsider prioritisation and indicative funding allocation and to consider the Communications and Knowledge Brokering needs. The final list of projects was given a priority rating.
- The GBR Subgroup considered the GBR assessments and identified the final priority list of projects and indicative allocations.

The outcomes from the consultation process were collated into the MYRP and presented to the NERP TE Hub Steering Committee as a draft on 30th April 2011. The Steering Committee recommended amendments and some further brokering activities to ensure a comprehensive and well structured program.

2.2 Review of Progress against 2011-2012 Annual Work Plan

The AWP will be primarily reviewed using the Hub Progress Reports which will be prepared by the Administrator on a biannual basis. Matters relating to the output of science and science quality will be prepared by the Hub Science Leader. The Hub Progress Reports will be reviewed by the NERP TE Hub Steering Committee and DSEWPaC and will be amended and published as required. The Hub may wish to do more frequent reviews, however amendment to the proposed timing will require Departmental agreement.

This review of progress is a major activity for each AWP. The Hub Progress Reports will:

- enable tracking of individual projects ensuring that the research conducted remains focused on the outcomes intended at the outset;
- provide an opportunity to revise the direction of projects to capture changing management priorities or emerging issues;
- identify projects that require assistance and provides an opportunity to develop options to mitigate impediments to successful delivery; and
- highlight and communicate the progress of the Hub.

The review of progress is also central to activity monitoring. It will consolidate the results of all progress monitoring and reporting activities as a basis for setting future directions, and is considered and discussed by all the activity participants.

For changes to the AWP outside the review process and any follow-on changes to the Multi Year Research Plan, Funding Agreement or other work plans, a written change request will be submitted to DSEWPaC for approval. Any changes will also require a contract variation which will be undertaken by the Administrator following direction from DSEWPaC.

2.3 Approval and Management of the Annual Work Plan

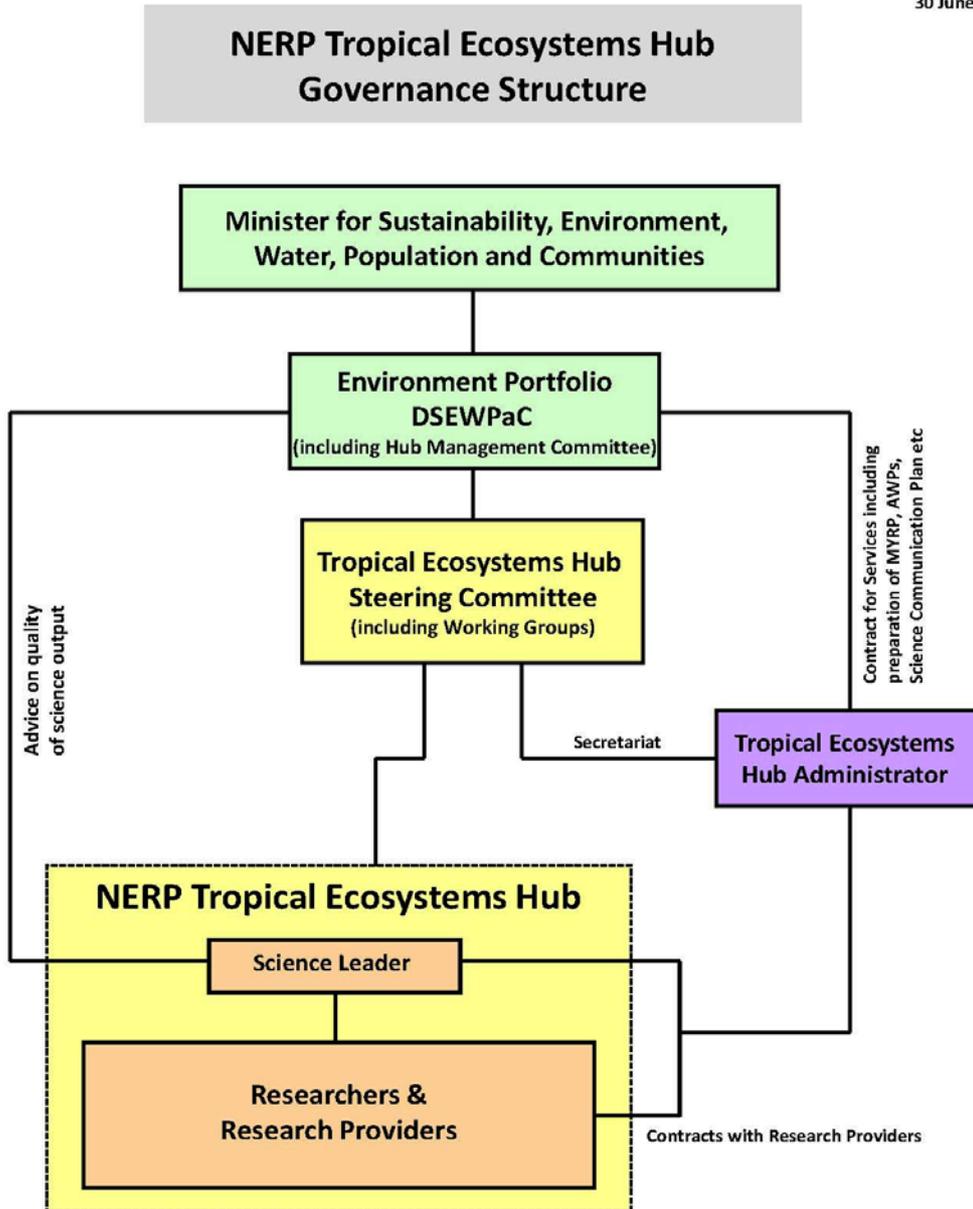
The Annual Work Plan has been collated by the Hub Administrator in accordance with contractual obligations of DSEWPaC/Administrator Agreement. The Annual Work Plan reflects the overarching Multi-Year Research Plan. The fundamental components of the Annual Work Plan were developed under the guidance of the Science Leader and with significant input of all major stakeholders within the NERP TE Hub through formal Working Group processes. The Annual Work Plan has been submitted to the Hub Steering Committee for consideration prior to submission to the DSEWPaC for approval.

Administration and project management activities for the AWP are responsibilities of the Administrator, to be overseen by the Science Leader and Hub Management Committee.

The Hub Steering Committee oversees the development and implementation of the AWP. The Science Leader is responsible for science quality, science delivery, knowledge brokering and communication and monitoring and evaluation associated with research activities under the AWP. The Administrator is responsible for the financial administration of the AWP activities and the preparation of Hub Progress Reports. The Administrator submits the progress reports to the Hub Management Committee for approval of expenditure.

Figure 1: Governance Structure of the NERP Tropical Ecosystems Hub

30 June 2011

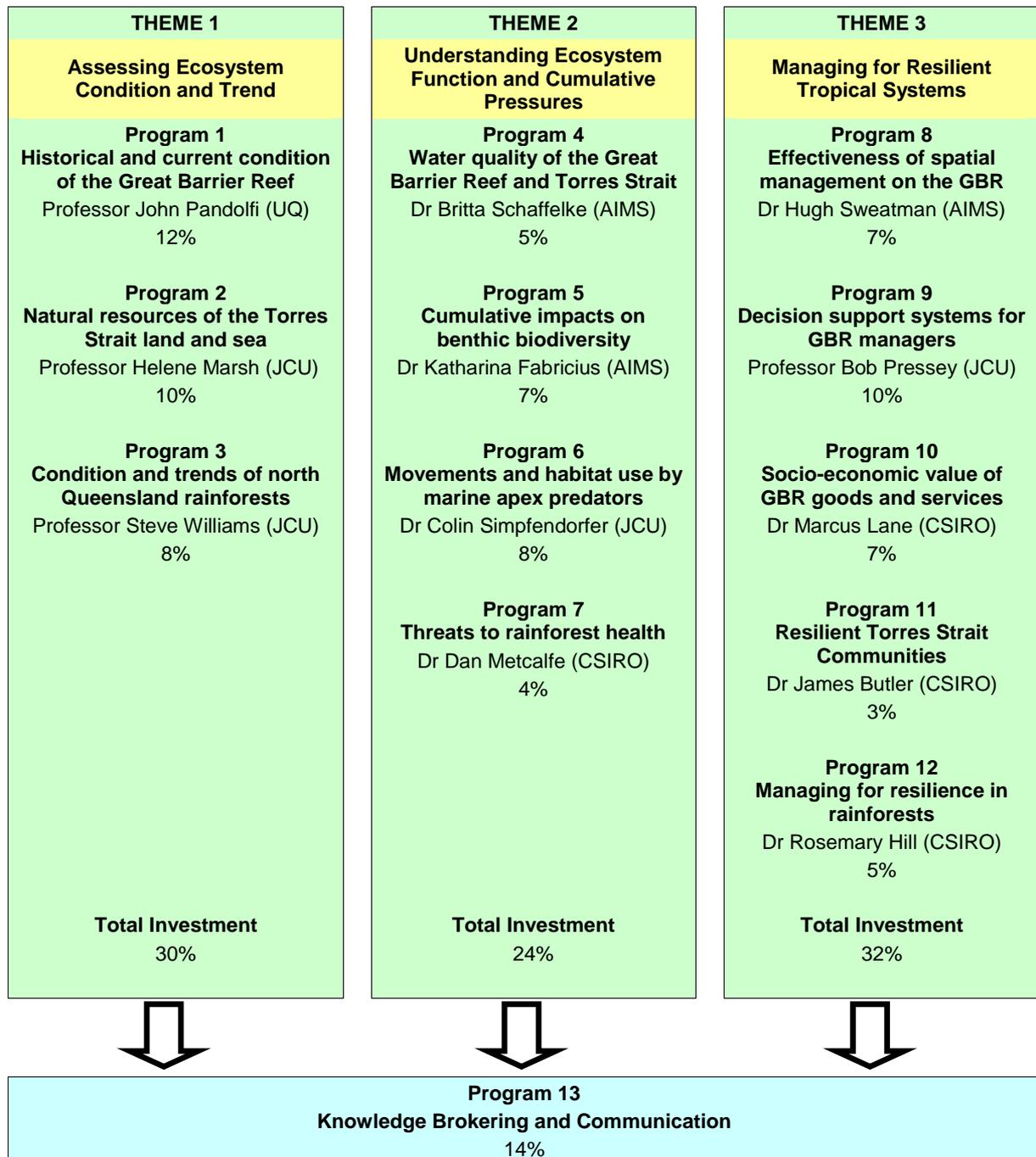


3.0 Tropical Ecosystems Hub

3.1 Hub Research Structure

The Hub has a matrix structure of three themes and thirteen programs designed to deliver the Hub goals on a thematic and geographical basis. While the Themes directly address the Hub goals, the program structure enables effective aggregation at the specific ecosystem scale. Figure 2 outlines the Themes and Programs of the Hub. Refer to [Attachment A](#) for breakdown of funding sources by major activity.

Figure 2: Themes and programs of the NERP Tropical Ecosystem Hub*



* These figures will be adjusted to reflect further brokage and adjustments to financial year structure at the contracting phase.

The detailed research programs were developed by parallel but independent processes for each Node in recognition of the separate stakeholder interests in each geographic region. The generic process involved the formation of a working group representing researchers, managers, and other stakeholders approved by DSEWPaC. In the case of the GBR Node, more than 20 members were empanelled and up to 30 (including observers) attended meetings. Each working group met twice between April and June. At the first working group meeting, proposals from research providers were ranked on four criteria (quality, relevance, capability, value) and culled to a long short-list consistent with likely maximum funding. In each Node, this represented a reduction of about 50%. Following this review, a number of strategic projects were restructured and/or re-costed through direct consultation between providers and end-users. At the second meeting, the revised proposals were re-scored on the same criteria to produce a prioritised list of projects. In the case of the much larger GBR Node, time did not permit a full reconsideration of 24 projects. Consequently this group ran a process with three stakeholder groups (researchers, managers, other end-users) to identify five projects with least support from each group.

Final project selection to produce the Hub program was done by the TE Hub Steering Committee, which consists of Ministerial appointments including the Chairs of the three Node working Groups. The function of the Steering Committee is to: provide advice to the Environmental Research Advisory Panel (ERAP) and DSEWPaC on the merits of relevant funding applications in accordance with the NERP Guidelines; provide advice to DSEWPaC on advancing the successful expressions of interest to a detailed MYRP and oversee the implementation, evaluation and progress of the MYRP and AWP. Membership to the Committee includes an independent Chair, non-government regional expertise, stakeholders, and government representation. To date the Steering Committee has met on six occasions since the 16th June 2010 to progress development of the Hub and provide advice to DSEWPaC and the Science Leader. Building on a \$25.8m investment by the Australian Government, co-investment by others will deliver a \$61.9m research program into the region.

3.2 Geographic Focus

The Tropical Ecosystems Hub is administered in North Queensland by the Reef and Rainforest Research Centre located in Cairns and Townsville. The program focuses on addressing issues of concern for the management, conservation and sustainable use of the environmental assets of North Queensland namely the World Heritage listed Great Barrier Reef (GBR) and its catchments, tropical rainforests including the Wet Tropics World Heritage Area (WTWHA), and the terrestrial and marine assets underpinning resilient communities in the Torres Strait, through the generation and transfer of world-class research and shared knowledge.

These successive research programs have sought to improve regional environmental decision making and inform regional stakeholders through better understanding of:

- the status and future trends of key species and ecosystems in northern Queensland;
- the social and economic interactions between North Queensland communities and their regional environmental assets; and
- adaptation options and management approaches for enhancing ecological and social resilience in a changing environment.

Links to other regional and NERP research

The research programs of the TE Hub (in the GBR, Torres Strait, and Wet Tropics rainforest) were developed through separate working group processes, each chaired by a senior representative of a management agency responsible for delivering community and environmental outcomes in Queensland (GBRMPA, TSRA, and WTMA respectively). In addition, the working groups included representatives from the Queensland Government, NRM groups, conservation groups, and regional industries such as agriculture, grazing, fishing, and tourism. This presence of diverse stakeholders on the various working groups has provided knowledge about need, created awareness of other investments in the region, and identified the best 'value adding activities'.

The Hub has been careful not to duplicate any part of the large investment (\$375 million) by the Australian and Queensland Governments "to halt and reverse the decline of water quality entering the Great Barrier Reef" through the decadal program known as Reef Plan. This has involved multiple

consultations with the DSEWPaC team responsible for Reef Rescue and the Reef Plan Secretariat in the Queensland Department of the Premier and Cabinet. This knowledge exchange has been facilitated by the separate appointments of Dr Peter Doherty to the Independent Science Panel advising Reef Plan and more recently to the position of TE Hub Science Leader. Coordination between the NERP TE Hub and the Australian Government's Reef Rescue R&D investment (\$9m) will also be facilitated by sharing the same Administrator (RRRC). For example the TE Hub will collect data from the coastal receiving environment of the GBR (chemical half-lives, impacts of chronic low-level exposure to pesticide breakdown products) that will complement the Australian Government's investment of \$1.6m through Reef Rescue into pesticide management in the catchments.

The Hub will add value to the investment by the Australian and Queensland Governments of more than \$13 million in infrastructure for ocean observations to link changes in the Coral Sea with the health of coastal marine ecosystems (part of the \$102 million invested by the Australian Government in a national Integrated Marine Observing System (IMOS)). The latter will provide the context to Hub projects like understanding the impact of weather, including extreme events, upon the movement and foraging success of apex predators.

The Hub will complement recent investments in research infrastructure in Queensland made by the Australian Research Council (ARC). For example, a \$2m upgrade of a Quaternary Dating Laboratory at the University of Queensland that has increased the throughput of stable isotope analyses ten-fold. This technology improvement will allow a Hub project seeking to understand when inshore coral reefs in sections of the GBR were affected by deteriorating water quality based on accurate dating of old coral debris.

The Hub will support research predicting future states of northern Queensland ecosystems and exploited living resources that is of interest to the National Climate Change Adaptation Research Facility (NCCARF) based at Griffith University but will not duplicate any of its projects.

The TE Hub will build functional links with other NERP Hubs (Environmental Decisions; Landscapes and Policy; Marine Biodiversity; and Northern Australia). All five Hubs have agreed that this is a mutual obligation, although the geographic separation of the different Hubs' activities across the vast Australian terrestrial and marine jurisdictions means that the strongest shared interest is how to connect NERP research outputs with public policy and environmental decision-making by operational agencies. Not surprisingly, the greatest overlap is with the NERP Hub for Northern Australia, through the following projects:

- Catchment to coast planning
- Carbon markets
- Indigenous NRM & livelihoods
- Freshwater habitats
- Partnerships to support biodiversity monitoring by Indigenous rangers

At least one of these (Carbon Markets) is shared with a third Hub (Environmental Decisions) and clearly justifies careful cross-reference (possibly a small working group). In all other cases, however, the context is sufficiently different that the main need is to exchange learning among Hubs.

The main opportunity for NERP Hubs to learn from each other is about successful ways to communicate the results of their research to a diverse stakeholder base unified by desire for ecologically sustainable development and the maintenance of resilient ecosystems.

3.3 Hub Administration

3.3.1 Leadership and Governance

Governance Framework

The Governance framework for the NERP TE Hub (Figure 1) is structured to accommodate the roles and responsibilities of the following parties:

The Minister

The role of the Minister is to approve the Multi-Year Research Plan (MYRP) and the Annual Work Plan (AWP) for the Hub.

DSEWPaC (the Department)

The role of the Department is to contract the Administrator, monitor progress of the research activities and approve payments to the Administrator and the research institutions. The Department will provide advice to the Minister on the MYRP and AWP. The Department also approves the Hub Science Communication Plan and the Monitoring and Evaluation Strategy and Plan.

NERP TE Hub Steering Committee

The Hub Steering Committee provides advice on the development of the MYRP and the AWP to DSEWPaC, through consideration of advice from the Great Barrier Reef, Torres Strait and Rainforest Working Groups. The Hub Steering Committee also oversees the implementation of the Multi-Year Research Plan, including annual consideration of the AWP. Evaluating progress, and when required, reporting to the DSEWPaC and associated environment portfolio agencies for the Minister's consideration. In addition the Hub Steering Committee provides advice to DSEWPaC on the coordination of research, knowledge brokering and uptake of science relevant to the scope of the NERP TE Hub.

Research Providers

The Research Providers provide financial advice and contractual information to the Administrator in accordance with the contracts. Research Providers also provide advice on the structure and form of the MYRP and the AWP and undertake the research need to meet the goals of the Hub. The Research Providers will play a significant role in communications and knowledge brokering in accordance with the Hub Science Communication Plan. The Research Providers will provide resources to support for the knowledge brokering and communications activities.

Hub Science Leader

The role of the Hub Science Leader is to lead the development of the MYRP and AWP; oversee the scientific outputs for the Hub; lead and coordinate science communication, media, knowledge brokering and end-user engagement for the Hub, address disputes and issues arising from the research and collaboration arrangements and advise the Hub Administrator and the Steering Committee on research performance and the quality of the scientific outputs. In addition, the Science Leader co-ordinates with other Hubs, communicates directly with DSEWPaC, and supervises the project management activities of the Hub Administrator. The Science Leader will be supported in these roles by the Administrator, Research Providers, the Department and key government agencies involved in the NERP TE Hub. Leaders of the four primary research providers (JCU, CSIRO, AIMS and UQ) were invited to nominate a candidate for this role and Dr Peter Doherty (AIMS) was selected and fully supported by all four institutions.

Hub Administrator

The NERP TE Hub will be administered by the Reef and Rainforest Research Centre located in Cairns and Townsville, which will apply effective governance systems to ensure the strongest possible results are produced through coordinated project management, integration of effort and timely reporting.

The RRRC is responsible for:

- Consolidation of research projects into the Multi-Year Research Plan
- Consolidation of Annual Work Plans
- Development of the Hub Science Communication Plan
- Development of the Hub Monitoring and Evaluation Plan
- Contracting projects with the Research Providers
- Receiving and reviewing milestone and financial reports from the Research Providers
- Administering payments to contracted institutions (including GST obligations)
- Monitoring and evaluating performance against Project milestones on an ongoing basis including a mid-year review at the conclusion of each AWP
- Organising the logistics of conferences and meetings as required
- Providing secretariat support to the Hub committees
- Reporting to DSEWPaC

3.3.2 Hub Administration Activities

In the AWP1 period, the TE Hub Administrator is contractually required to complete the activities outlined in Table 2.

Table 2. Contractual Hub Administration Activities

Reporting Activity	Date
1. Signing of the Administrator Agreement	15 March 2011
2. Execution of 100% of Research Agreements	30 April 2011
3. Draft Multi –year research Plan submitted to the Department for consideration by the Steering Committee. Draft Annual Research Plan submitted to the Department for consideration by the Steering Committee.	6 June 2011
4. Final Multi –year research Plan approved by the Minister. Final Annual Research Plan 2011/2012 approved by the Minister.	31 July 2011
5. Hub Progress Report 1 and associated Financial Information accepted by the Department Audited Financial Report for 2010/2011 Financial year accepted by the Department Monitoring and Evaluation Plan accepted by the Department Hub Science Communication Plan accepted by the Department	1 October 2011
6. Hub Progress Report 2 and associated Financial Information accepted by the Department	1 March 2012

Risk Assessment for the delivery of the NERP TE Hub first AWP:

Key Risk Factors	Risk	Mitigating Action	Residual Risk
1. Delays in Hub program start up and delays in funding distribution	Low/Medium Protracted contracting	The four major providers have been part of the process and are well informed about project selection and financials	Low
2. Inability of the Hub to meet objectives due to researchers being unable to complete some projects	Low/Medium Unpredictable events including weather or the failure of critical infrastructure	Force majeure clause in DSEWPaC/Administrator agreement passed through to Administrator/Research provider agreements.	Low
3. Inability of the Hub to meet objectives due to loss of research, administrative and/or K/B and Comms skills in the region that are necessary to perform the functions identified in the MYRP	Medium/High Ongoing uncertainty of future employment may lead to loss of capacity before or early into the program, which is difficult to replace or results in costly delays	Timely implementation of the research phase; rapid agreement on projects and budgets.	Medium
4. Hub program not delivered on time and not of the expected quality	Medium/High Force majeure events may delay program delivery. Uncoupling project milestone delivery from the financial management may reduce the inducements to ensure timely and effective delivery.	Select researchers with demonstrated history of timely delivery in tropical conditions. Link project milestone delivery to institutional payments. Do not support 'reach-through' (subcontracting) research arrangements.	Medium / Low
5. Hub program not delivered due to trust eroded between researchers and end-users	Medium Inability of regional stakeholders to recognise their priorities in the Program; culturally inappropriate engagement with indigenous communities	Active consultation and engagement of regional stakeholders in formation of the Hub program; retain the knowledge and mechanisms utilised	Medium / Low

Key Risk Factors	Risk	Mitigating Action	Residual Risk
6. Poor transfer of Hub outputs/outcomes to end-users of knowledge and/or tools	<p>Medium/low</p> <p>Low quality of outputs and/or reliance on narrow range of products (e.g. over reliance on written reports).</p> <p>Hub relies on passive knowledge transfer mechanisms to distribute new understanding or capabilities</p>	<p>Employ a professional communications officer for delivery of multimedia (e.g. Web)</p> <p>Build multiple pathways for knowledge transfer; employ a skilled and dedicated knowledge broker to support the Science Leader and Key Researchers; develop user pull through willing “project associates” embedded in operational agencies</p>	Low

3.3.4 Hub Administration Monitoring and Evaluation

The NERP TE Hub Monitoring and Evaluation Plan will be developed and delivered on the 1st October 2011. The NERP TE Monitoring and Evaluation Plan will reflect operating principles and will be focused on ensuring the successful delivery of key components of the NERP TE Multi-Year Research Plan, Annual Research Plan and the Hub Science Communication Plan.

3.4 Hub Knowledge Brokering and Communications

3.4.1 Knowledge Brokering and Communications Description

Science Leader: Dr Peter Doherty

Organisation: NERP TE Hub

Specific knowledge brokering and communication activities for the NERP TE Hub will be detailed in the Hub’s Science and Communication Plan developed by the Hub Administrator under the direction of the Science Leader, Research Institutions and key government agencies. The Hub’s Science Communication Plan will be delivered on 1st October 2011.

- Refer to Table 1 and [Attachment A](#) for budget information.
- Refer to [Attachment B](#) for description of the Knowledge Brokering and Communications team members

3.4.2 Knowledge Brokering and Communications Activities

The Knowledge Brokering and Communication activities will be defined through the Hub Science Communication Plan which is to be developed in consultation with the Science Leader, research providers and end-users. The Plan will be submitted to the Department on 1st October 2011.

3.4.3 Knowledge Brokering and Communication Risks

The risks associated with potential knowledge brokering and communications activities will be outlined in the Hub Science Communication Plan.

3.4.4 Knowledge Brokering and Communication Monitoring & Evaluation

Monitoring and evaluation of knowledge brokering and communications activities will occur in accordance with the NERP TE Hub Monitoring & Evaluation Plan. The Plan is due to the Department

on 1st October 2011. The Department intends to give direction on the required components of the Monitoring & Evaluation Plan.

3.5 Theme 1: Assessing Ecological Condition and Trend

3.5.1 Theme 1 Description

A clear understanding of the ecological condition and trends of environmental assets of the Great Barrier Reef, the Torres Strait, and the Wet Tropics rainforest is fundamental to ecologically sustainable use of those assets by industry and communities, supported by appropriate management and policy settings. Theme 1 is comprised of three inter-related Programs, each of which concentrates on a specific component of north Queensland's natural and cultural heritage, and delivers reports on the condition and trend of key ecosystems and natural living resources.

Within Theme 1, there are three programs:

- Program 1: Historical and current condition of the Great Barrier Reef
- Program 2: Natural resources of the Torres Strait land and sea
- Program 3: Condition and trends of North Queensland rainforests

3.5.2 Program 1: Historical and current condition of the Great Barrier Reef

Program 1 Leader: Professor John Pandolfi

Organisation: University of Queensland

Program 1 will have three projects assessing the condition and trend of Great Barrier Reef assets. Two of these concern temporal changes in coral communities: one over timescales of the last 100-200 years and one based on current monitoring of approximately 100 coral reefs representative of the whole system. The latter provides a synoptic view of coral cover and continues a time series that started in 1986. Over 20 years, these surveys have shown that the two main sources of coral mortality are predation by crown of thorns starfish and physical damage by severe tropical cyclones. The surveys have also captured the dynamics of recovery and shown the importance of connectivity to upstream spawning sources. The historical project will use modern radioactive dating methods to search for temporal shifts in abundance and/or community composition among coral death assemblages. Broad-scale directional change will be taken as evidence for changing environmental conditions and may be able to date the recent decline in water quality in some inshore sections of the GBR. The third project will continue to monitor the distribution, abundance, and ecology of iconic marine species of high conservation concern, notably dugong, marine turtles, and coastal dolphins. This information directly supports the management of these vulnerable species and is critical to the issue of indigenous use.

- Project 1.1 - Monitoring status and trends of coral reefs of the Great Barrier Reef
- Project 1.2 - Marine wildlife management in the Great Barrier Reef World Heritage Area
- Project 1.3 - Characterising the cumulative impacts of global, regional and local stressors on the present and past biodiversity of the Great Barrier Reef

3.5.3 Program 2: Natural resources of the Torres Strait land and sea

Program 2: Professor Helene Marsh

Organisation: James Cook University

Program 2: Natural resources of the Torres Strait land and sea; will have three projects assessing the condition and trend of Torres Strait assets. One will provide information on marine turtles and dugongs that complements the study of these species on the GBR including data on movements and connectivity of populations. Aerial surveys will be conducted to estimate abundance as the importance of healthy stocks to Torres Strait communities cannot be overestimated. A second project will make baseline surveys of mangrove communities and freshwater habitats on Torres Strait islands. The

former is important in shoreline stabilisation and as a littoral habitat. The latter provide potential stepping stones for invasive freshwater species from Australia's northern neighbours and represents a long term threat to the freshwater faunas of Cape York and elsewhere in northern Australia. The third project will design and implement a reef health monitoring program that will be delivered by indigenous sea rangers and initiate monitoring of sea temperatures through a combination of remote sensing and real-time monitoring. The latter has been requested by the TSRA following the first account of widespread coral bleaching in the Torres Strait in 2010.

- Project 2.1 - Marine turtle and dugongs of Torres Strait
- Project 2.2 - Mangrove and freshwater habitat status of Torres Strait islands
- Project 2.3 - Monitoring the health of Torres Strait coral reefs

3.5.4 Program 3: Condition and trends of North Queensland rainforests

Program 3 Leader: Steve Williams

Organisation: James Cook University

Program 3: Condition and trends of North Queensland rainforests; will have four projects focussed on biodiversity drivers of Queensland's Wet Tropics rainforests, particularly rainforest refugia and hot spots of genetic diversity in the World Heritage Area and adjacent Cape York regions. The Program will deliver species distribution models and composite biodiversity maps using long term data sets to describe patterns of environmental change. The Program will also search for remnant populations of critically endangered frogs and monitor the abundance of key vertebrate species such as the Cassowary and the Spectacled Flying Fox. Results from Program 2 will contribute to State of Environment and World Heritage reporting for the Wet Tropics World Heritage Area, and provide information to assist the development assessments under the *EPBC Act 1994*.

- Project 3.1 - Rainforest Biodiversity
- Project 3.2 - Rainforest refugia and hotspots of plant genetic diversity in the Wet Tropics and Cape York Peninsula
- Project 3.3 - Targeted surveys for missing and critically endangered rainforest frogs in ecotonal areas, and assessment of whether populations are recovering from disease
- Project 3.4 - Monitoring of key vertebrate species

3.6 Theme 2: Understanding Ecosystem Function and Cumulative Pressures

3.6.1 Theme Description

Theme 2 builds on research undertaken through the MTSRF and other programs that have identified many of the primary risks and threats to the environmental assets of Northern Queensland. These pressures do not occur in isolation to each other and it is clear that a greater understanding of the cumulative and synergistic impact of these pressures is required for improved management. These pressures are not static therefore predicting and preparing for change is a significant challenge for environmental decisions makers charged with stewardship of Queensland's natural environment. Changing climates, extreme natural events, changes in natural resource use and population growth are some of the pressures facing these ecosystems. Theme 2 is comprised of four Programs that are increasing the understanding of ecosystem function and the impact of synergistic and cumulative pressures on the system. This understanding is essential in developing effective management responses that promote ecosystem resilience.

Within Theme 2 there are three programs:

- Program 4: Water quality of the Great Barrier Reef and Torres Strait
- Program 5: Cumulative impacts on benthic biodiversity
- Program 6: Movements and habitat use by marine apex predators
- Program 7: Threats to rainforest health

3.6.2 Program 4: Water quality of the Great Barrier Reef and Torres Strait

Program 4 Leader: Dr Britta Schaffelke

Organisation: AIMS

Program 4: Water quality of the Great Barrier Reef and Torres Strait; will have three projects assessing risks to biodiversity from current water quality in the inshore Great Barrier Reef and a desktop hazard study for water quality outlook in the Torres Strait. The latter will concern flood plumes from the Fly River, one of Papua New Guinea's largest rivers, which regularly reach the eastern margins of the Torres Strait. Significant expansion of mining activity is forecast in PNG's western province which may result in new threats to the water quality of the region but the hazard assessment will also concern local declines in water quality near home islands affected by erosion and run-off. The GBR projects will focus on two components of terrestrial run-off discharged into coastal receiving waters. One project will measure the transport and settlement of fine sediments carried by river plumes and subsequently resuspended by winds. The new knowledge sought is the impact of these processes on light availability to benthic communities. A second project will establish the half-lives of common agricultural chemicals in the marine environment and study the impacts on biodiversity of chronic low-level exposure to these pollutants. This information will contribute to the Reef Water Quality Protection Plan (Reef Plan) and was designed in consultation with the Reef Rescue Program. The final project will be a methodological pilot study recommending how to conduct a formal risk analysis of the threats from multiple stressors in water quality that would be used to prioritise future investment decisions in the catchments (i.e. what is the relative risk from sediments, excess nutrients, and contaminants?).

- Project 4.1 - Tracking coastal turbidity over time and demonstrating the effects of river discharge events on regional turbidity in the GBR
- Project 4.2 - The chronic effects of pesticides and their persistence in tropical waters
- Project 4.3 – Ecological Risk Assessment for the GBR
- Project 4.4 - Hazard assessment for water quality threats to Torres Strait marine waters, ecosystems and public health

3.6.3 Program 5: Cumulative impacts on benthic biodiversity

Program 5 Leader: Dr Katharina Fabricius

Organisation: AIMS

Program 5: Cumulative impacts on benthic biodiversity; will have three projects designed to assess the impacts of cumulative pressures on coastal biodiversity in the GBR. One will be a synthesis and analysis of spatial and temporal patterns of inshore biodiversity seeking to partition the influence of different environmental drivers (water quality, crown of thorns starfish, cyclones, and connectivity) and identify synergistic interactions between stressors. The other two will be multi-factorial experiments exposing corals and seagrasses to different combinations of stressors in order to incorporate cumulative hazards into quantitative risk models.

- Project 5.1 - Understanding diversity of the Great Barrier Reef: spatial and temporal dynamics and environmental drivers
- Project 5.2 - Combined water quality and climate effects on corals and other reef organisms
- Project 5.3 – Vulnerability of seagrass habitats in the Great Barrier Reef to changing coastal environments

3.6.4 Program 6: Movements and habitat use by marine apex predators

Program 6 Leader: Dr Colin Simpfendorfer

Organisation: James Cook University

Program 6: Movements and habitat use by marine apex predators; will have three projects designed to monitor the movements of apex predators in the GBRMP using widespread arrays of acoustic receivers installed and maintained by other funding programs (e.g. IMOS, ARC). One project will focus on the movement and habitat use of large predatory fishes (e.g. sharks and coral trout) in reef environments. New knowledge about the scale of daily and seasonal movements will establish a

minimum viable size for no-take areas to offer effective protection to these mobile animals. A second project will focus on the movement and habitat use of coastal fish populations, with an emphasis on inshore shark populations. The latter are under considerable pressure from commercial netting and the study will seek to identify critical habitats (e.g. juvenile shark nurseries) that may require higher levels of protection to ensure sustainable populations. The third project will map the movements and habitat use of pelagic environments by foraging seabirds seeking an oceanographic explanation for the decline in seabird numbers observed in many breeding colonies.

- Project 6.1 - Maximising benefits of mobile predators to Great Barrier Reef ecosystems: the importance of movement, habitat and environment
- Project 6.2 - Drivers of juvenile shark biodiversity and abundance in inshore ecosystems of the Great Barrier Reef
- Project 6.3 - Critical seabird foraging locations and trophic relationships for the Great Barrier Reef

3.6.5 Program 7: Threats to rainforest health

Program 6 Leader: Dr Dan Metcalf
Organisation: CSIRO

Program 7 (Threats to rainforest health) will have three projects addressing different threats to rainforest health. A generalised analytical toolkit for assessing vulnerability to extreme climatic events, particularly the sensitivity of Wet Tropics fauna to temperature extremes, will be developed. The role of fire as a driver of rainforest distribution (particularly on the threatened ecosystem of the Mabi forest) will be determined. The Program will also deliver maps of weed populations identifying sources of invasive propagules and rainforest areas that are particularly susceptible to invasion or re-invasion because of their connectivity to these source populations. This information is critical for invasive weed control programs, identifying high priority areas for control, and guiding surveillance. The Program will also provide a qualitative and operational assessment of alternative management strategies for feral pig management.

- Project 7.1 - Fire and rainforests
- Project 7.2 - Invasive species risks and responses in the Wet Tropics
- Project 7.3 - Climate change and the impacts of extreme events on Australia's Wet Tropics biodiversity

3.7 Theme 3: Building Resilient Tropical Systems

3.7.1 Theme Description

Research undertaken within Theme 3 will provide knowledge and options to assist key decision makers in government, industry and the community in managing the complex ecosystems of the Great Barrier Reef, the Wet Tropics rainforest (including the World Heritage Area) and the Torres Strait. Theme 3 draws on the assessment of ecological condition and trends undertaken in Theme 1 and the improved understanding of ecosystem function and cumulative pressures from Theme 2. Theme 3 will provide tools and information for evidence-based decision making that address the pressures and sustains resilient ecological, social and economic systems.

Within Theme 3 there are three programs:

- Program 8: Effectiveness of spatial management on the GBR
- Program 9: Decision support systems for GBR managers
- Program 10: Socio-economic value of GBR goods and services
- Program 11: Resilient Torres Strait Communities
- Program 12: Managing for resilience in rainforests

3.7.2 Program 8: Effectiveness of spatial management on the GBR

Program 8 Leader: Dr Hugh Sweatman

Organisation: AIMS

Program 8: Effectiveness of spatial management on the GBR will have three inter-linked projects that will test the effectiveness of spatial management arrangements (differential use zones) for conserving exploited fish populations in the GBRMP. One project will compare the abundance of fish, corals, and the incidence of coral disease between fringing reefs in the coastal zone that have been closed to fishing at different times in the past with adjacent areas that remain in use by the recreational fishing sector. A second project in the southern GBR will apply genetic parentage analysis to estimate the recruitment subsidies to fished areas that are contributed by protected fish stocks spawning in no-take areas. The third project was started with the major rezoning of the GBR in 2004 and will track a suite of biodiversity indicators across 26 closely matched pairs of reefs offering fished/unfished contrasts. Since these 52 reefs are spread through the mid-shelf from Cairns to Gladstone, this new design covers the area with the highest incidence of crown-of-thorns starfish outbreaks. The strong experimental design will be the best chance yet to determine whether fishing has any impact on the frequency and/or severity of starfish outbreaks. If there is a positive association this will be further evidence that the starfish and its huge effect on coral cover may be unnatural and require further management intervention to restore the resilience of coral populations.

- Project 8.1 – Monitoring of ecological effects of the Great Barrier Reef zoning plan on mid and outer shelf reefs
- Project 8.2 – Assessing the long term effects of management zoning on inshore reefs of the Great Barrier Reef
- Project 8.3 - Significance of no-take marine protected areas to regional recruitment and population persistence on the Great Barrier Reef

3.7.3 Program 9 Decision support systems for GBR managers

Program 9 Leader: Professor Bob Pressey

Organisation: JCU

Program 9: Decision support systems for Great Barrier Reef managers; will have four projects designed to develop new tools for reef managers. One project will develop methodology to allow managers to evaluate alternative management scenarios and choose between options. It will focus on tools to assist in the management of the inshore region for biodiversity outcomes, particularly inshore multi-species fisheries management, using a stakeholder driven approach. A second project will create vulnerability maps for coral reef communities and allow managers to prioritise the conservation of subregions with high natural resilience to coral bleaching from extreme sea temperatures. A third project will create a modelling framework suitable for exploring alternative futures for the coastal zone considering climate change, changes in land use and infrastructure, and the effects of land uses on water quality in the Great Barrier Reef lagoon. The fourth project will develop a framework and tools to allow managers to prioritise investment decisions for the day to day management of Great Barrier Reef islands. In addition, drivers of visitor (tourism) usage, particularly relating to reef health and economic and social impacts of reef-related tourism to northern Queensland will be assessed.

- Project 9.1 - Decision support tools for the Great Barrier Reef to identify and map bleaching resistant areas within the Great Barrier Reef World Heritage Area
- Project 9.2 – Design and implementation of management strategy evaluation for the Great Barrier Reef
- Project 9.3 - Prioritising management actions for Great Barrier Reef islands
- Project 9.4 – Conservation planning for a changing coastal zone

3.7.4 Program 10: Socio-economic value of GBR goods and services

Program 10 Leader: Dr Marcus Lane

Organisation: CSIRO

Program 10: Socio-economic value of Great Barrier Reef goods and services; will have two projects designed to capture social and economic information from Great Barrier Reef industries and coastal communities. One will be the start of a long-term compilation and tracking of essential socio-economic indicators to detect spatial and temporal trends in human uses of the region and to monitor variations in economic activity. Both will be useful in forecasting trends and providing the human dimension to scenario planning by coastal managers. The design of the database will be determined by close consultation with managers and other end-users including all levels of government. The second project will explore the social and economic valuation of environment assets in the GBRMPA from the point of view of the ecosystems ability to supply sustainable ecological goods and services.

- Project 10.1 - Social and economic long-term monitoring program
- Project 10.2 - Socio-economic systems and reef resilience

3.7.5 Program 11: Resilient Torres Strait Communities

Program 11 Leader: Dr James Butler

Organisation: CSIRO

Program 11: Resilient Torres Strait Communities; will have two projects designed to assist key decision makers in the Torres Strait community to build a resilient future based on sustainable environmental use. The program will deliver information on the value of ecosystem services underpinning Torres Strait livelihoods within the cultural frame of the region. The program will deliver information on resource sharing with Treaty Villages in the Western Province of Papua New Guinea and improved methodologies to support emerging sustainable industries in the region. A mechanism to repatriate knowledge in culturally appropriate ways will continue to be developed and used to raise awareness of environmental issues and build community resilience in Torres Strait. The program will also work with existing biosecurity arrangements to enhance the methodologies for detection and prevention of wildlife disease incursions.

- Project 11.1 - Building resilience communities for Torres Strait futures
- Project 11.2 – Improved approaches for the detection and prevention of wildlife diseases in the Torres Strait

3.7.6 Program 12: Managing for resilience in rainforests

Program 12 Leader: Dr Rosemary Hill

Organisation: CSIRO

Program 12: Managing for resilience in rainforests, will have four projects designed knowledge to assist environmental managers, industry, indigenous, and community groups to manage the Wet Tropics bioregion. This is a complex and often highly contested landscape with many competing interests. The four projects will determine the most effective approaches to collaborative governance, planning and co-management of biodiversity within Indigenous Protected Areas; the most appropriate ways to develop a carbon market within the Wet Tropics region; the best approaches to managing and accelerating revegetation including potential management interventions particularly in the rainforest uplands; and the social and economic value of environmental icons of the Wet Tropics rainforest and their contribution to northern Queensland.

- Project 12.1 - Indigenous peoples and protected areas
- Project 12.2 - Harnessing natural regeneration for cost-effective rainforest restoration
- Project 12.3 - Relative social and economic values of residents and tourist in the Wet Tropics World Heritage Area
- Project 12.4 - Governance, planning and the effective application of emerging ecosystem service markets to secure climate change adaptation and landscape resilience

3.8 Knowledge Brokering and Communication

3.8.1 Theme Description

The success of the NERP TE Hub will, in part, be due to how information developed during the life of the Hub helps facilitate real improvements in sustaining the ecosystems of the Great Barrier Reef, the wet tropics rainforest and the Torres Strait regions. Accordingly, the Hub research activities will be supported by a substantial knowledge brokering, communication and engagement framework. There are two primary outputs for knowledge brokering and communication. The first is the establishment and maintenance of an end-user engagement framework and the second, is a suite of communication products and reporting tools including web based communication, technical reports, newsletters, email updates and peer reviewed publications.

3.8.2 Program 13: Potential Knowledge Brokering and Communications Projects

Program 13 Leader: Dr Eric Lawrey

Organisation: AIMS

- Potential Project 13.1 – The e-Atlas (GBR and Rainforest)
- Potential Project 13.2 - Torres Strait e-Atlas – a data platform for resource managers, researchers and the Torres Strait community

3.9 Emerging Priorities

Considering that this is the first Annual Work Plan of the newly established NERP TE Hub, all projects described and funded under this plan have been through a thorough prioritisation process during the development of this plan and the overarching Multi-year Research Plan. The suite of research projects described in this Annual Work Plan addresses the current research priorities of the DSEWPaC, the portfolio and major stakeholders, including industry, NGOs and research providers.

It is highly likely that research priorities may change or new research priorities emerge during the lifetime of the NERP TE Hub. The identification of priority research needs will be facilitated by the engagement frameworks established within the Hub that ensures strong and frequent engagement with the major stakeholders within the NERP TE Hub. Projects addressing identified emerging priorities will be negotiated under the direction of the Science Leader and the Hub Steering Committee and included in subsequent annual work plans as appropriate.

Attachment A – Breakdown of Tropical Ecosystems Hub Funding Sources by Major Activity (2011 – 2012)

		Admin	Knowledge Brokering	Theme 1	Theme 2	Theme 3	TOTAL (ex. GST)
NERP program funding	Cash	67,697*	702,698**	1,676,342	1,585,494	1,970,326	6,002,557
Cash		0	0	55,000	123,073	129,500	307,573
In-kind		62,006	389,769	2,622,233	2,717,440	4,549,921	10,341,369
AIMS	NERP	47,697	353,298	259,594	653,673	402,834	1,717,096
	Cash	0	0	0	0	0	0
	In-kind	62,006	365,369	250,589	816,636	966,609	2,461,209
	Total	109,703	718,667	510,183	1,470,309	1,369,443	4,178,305
CSIRO	NERP		24,400	89,945	262,425	624,682	1,001,452
	Cash		0	0	19,073	0	19,073
	In-kind		24,400	93,745	243,352	918,704	1,280,201
	Total		48,800	183,690	524,850	1,543,386	2,300,726
JCU	NERP			1,020,613	612,196	831,360	2,464,169
	Cash			55,000	104,000	87,500	246,500
	In-kind			1,577,891	1,394,892	1,493,266	4,466,049
	Total			2,653,504	2,111,088	2,412,126	7,176,718
UQ	NERP			263,333	50,000	54,270	367,603
	Cash			0	0	0	0
	In-kind			534,715	58,000	122,236	714,951
	Total			798,048	108,000	176,506	1,082,554
Other	NERP			42,857	7,200	57,180	107,237
	Cash			0	0	42,000	42,000
	In-kind			165,293	204,560	1,049,106	1,418,959
	Total			208,150	211,760	1,106,286	1,526,196
	Total (ex. GST)	109,703[†]	767,467^{††}	4,353,575	4,426,007	6,649,747	16,306,499

*Is the total NERP cash allocation for governance and the administrative role of the Science Leader

**Is the total NERP cash allocation for Knowledge Brokering

[†]An additional \$20,000 has been set aside for steering committee activities but not allocated to a specific institution. The bottom line total for administration does not include this allocation.

^{††}An additional \$325,000 has been set aside for knowledge brokering and communication activities but not allocated to a specific institution. The bottom line total for knowledge brokering does not include this allocation.

Attachment B – Tropical Ecosystems Hub staff (2011 – 2012)

The table lists key staff and researchers only.

	Name	Role	Organisation	FTE*
Administration	RRRC staff	Financial Administration and secretariat services	Reef and Rainforest Research Centre Pty Ltd	3.1
Knowledge Brokering and Communication Team	Peter Doherty	Science Leader	NERP TE Hub	0.5
Research Teams:				
	Dr Hugh Sweatman	Project Leader	AIMS	0.4
	LTM Field team (6)	Data collection and analysis	AIMS	2.4
	Prof Helene Marsh	Project co-leader	JCU	0.1
	Dr Mark Hamann	Project co- leader	JCU	0.2
	Dr. Alana Grech	Spatial data analyst	JCU	0.1
	Dr. Guido Parra	Co-leader of objective 1	Flinders Uni	0.1
	Prof. David Blair	Assistance with dugong genetics	JCU	0.05
	Dr. Lyn Van Herwerden	Assistance with dugong genetics	JCU	0.05
	Dr. Nancy FitzSimmons	Assistance with turtle genetics	Uni Canberra	0.05
	Dr. Karen Arthur	Advise the project on stable isotopes and ecosystem role	Uni of Hawaii	0.05
	Dr. Ellen Ariel	Assistance with turtle project sample collection	JCU	0.05
	GBR TUMRA communities	Assistance with field and logistic operations	Various communities	Various
	Dr. Col Limpus	Marine turtle advice	QDERM	0.05
	Post Doc	Objective 1 (2012 to 2014)	JCU	1
	Research Officer	Objective 2 & 3 (2011 to 2013)	JCU	1
	Dr Hugh Sweatman	Project Management	AIMS	0.4
	LTM Field team (6)	Data collection and analysis	AIMS	2.4
	Professor Garry Russ	Project Leader	JCU	0.20
	Dr. David Williamson	Project Leader	JCU	0.20
	Dr. Daniela Ceccarelli	Project Researcher	JCU	-
	Dr. Richard Evans	Collaborator	WADEC	0.05
	Prof. Bette Willis	Project Coordinator	JCU	0.05

	Prof GP Jones	Project Leader, Reef fish ecologist	JCU	0.15
	Dr JM Leis	Chief Investigator, Larval fish biologist	Australian Museum	0.15
	Dr DM Williamson	Research Associate, Reef fish ecologist	JCU	0.3
	Dr GR Almany	Future Fellow, Reef fish ecologist; GIS analysis	JCU	0.15
	Dr M Berumen	Microsatellite development, Gene sequencing	King Abdullah University of Science and Technology	0.15
	Dr L van Herwerden	Geneticist	JCU	0.15
	Dr S Choukroun	Research Associate, Hydrodynamic modeller, Instrumentation	JCU	0.3
	Dr L Mason	Biophysical modeller	JCU	0.1
	Dr. Erin Bohensky, social scientist	Work area leader: coastal communities and indigenous communities	CSIRO	0.4
	Dr. Colette Thomas, research scientist	Work area leader: marine tourism and shipping	CSIRO	0.30
	Dr. Renae Tobin, social scientist	Work area leader: recreational fishing and commercial fishing	JCU	0.8
	TBA	Work area leader; catchment communities, technical scientist	CSIRO	1.0
	Team of Casual staff	In data collection activities	CSIRO	3.0
	Prof Darren Crayn	Project Leader, contribute to all aspects, student supervision.	ATH/JCU	0.05
	Mr Craig Costion	Postdoc. Project design, management, data collection/analysis/interpretation, communications (publications, reporting, stakeholder engagement)	ATH/JCU	1.0
	Ms Kaylene Bransgrove	PhD student, mountain-top biodiversity component: Project design, management, data collection/analysis/interpretation, communications (publications, reporting, stakeholder engagement)	ATH/JCU	1.0
	Dr Katharina Schulte	Project design, data analysis and interpretation (phylogeography)	ATH/JCU	0.1
	Dr Sandra Abell-Davis	Project design, data analysis and interpretation (fungi), student supervision	ATH/JCU	0.1
	Dr Dan Metcalfe	Project design, data collection/analysis/interpretation	CSIRO	0.03
	Dr Maurizio Rossetto	Project design, data analysis and interpretation, articulation with separately funded SE QLD / NE NSW rainforest plant multi-	Royal Botanic Gardens Sydney	0.05

		species phylogeography project.		
	Prof Andy Lowe	Project design, data analysis and interpretation, articulation with TERN-LTERN.	U. Adelaide and State Herbarium of South Australia	0.05
	Prof Stephen Williams	Data analysis and interpretation, integration with faunal and environmental datasets.	JCU	0.01
	Dr. Robert Puschendorf	Principal Investigator	JCU	0.5
	Dr. Conrad J. Hoskin	Principal Investigator	JCU	0.2
	David Westcott	Project Leader	CSIRO	0.35
	Suzanne Metcalfe	Genetics	CSIRO	0.91
	Adam McKeown	Field technician	CSIRO	0.78
	Dr Mark Hamann	Project leader and co-supervise PhD student/post doc	JCU	0.2
	Prof. Helene Marsh	Oversee dugong tracking and co-supervise PhD student/post doc	JCU	0.1
	Dr Lynne Van Herwerden	Supervise dugong genetics	JCU	0.05
	Prof. David Blair	Supervise dugong genetics	JCU	0.05
	Dr Alana Grech	Oversee analysis of spatial data	JCU	0.1
	Dr Mariana Fuentes	Supervise dugong tracking	JCU	0.05
	Research Officer	Field and logistic operations	JCU	1
	Dr Nancy FitzSimmons	Supervise green turtle genetics	Uni of Can	0.05
	Dr Col Limpus	Marine turtle advise, provision of hawksbill turtle data from GBR	QDERM	0.05
	TS Community rangers/TSRA staff	Field and logistic operations	TSRA/Various communities	1
	Frank Loban	Oversee TSRA LSMU staff and ranger involvement as well as field and logistic operations	TSRA	0.1
	Dr. Norm Duke	Joint Project leader (mangroves)	JCU	0.3
	Dr. Damien Burrows	Joint Project leader (freshwater)	JCU	0.3
	Research assistants	Field and office research assistance	JCU	1.0
	Ray Berkelmans	Project leader, coral bleaching	AIMS	0.225
	Scarla Weeks	Current conditions reports	UQ	0.09
	Scott Bainbridge	Real-time observing stations	AIMS	0.15
	Vimal Sunderaraj	Temperature loggers	AIMS	0.3
	Technicians	Real-time observing stations	AIMS	0.425
	Hugh	Project leader, coral reef	AIMS	0.075

	Sweatman	ecology		
	AIMS GBR Long-term Monitoring Team	Monitoring and assessment	AIMS	0.6
	LSMU staff	Participation in monitoring	TSRA	0.6
	Jon Brodie	Project leadership, pollutant source survey, RS image retrieval and analysis, data analysis, basic monitoring program design, reporting	Catchment to Reef Research Group, ACTFR, JCU	0.2
	Jane Waterhouse	Pollutant source survey, PNG/West Papua/TS development survey, RS image retrieval and analysis, reporting	Catchment to Reef Research Group, ACTFR, JCU	0.15
	Eric Wolanski	SLIM modelling, RS image retrieval and analysis, reporting	Catchment to Reef Research Group, ACTFR, JCU	0.12
	Katharina Fabricius	Experimental design, write up	AIMS	0.14
	Murray Logan	Biostatistician, experimental design, data analysis	AIMS	0.23
	Sam Noonan	Data organisation	AIMS	0.23
	Jon Brodie	Experimental design, write up	JCU	0.12
	Eric Wolanski	Experimental design, hydrodynamics analysis, write up	JCU	0.23
	Scarla Weeks	RS data analysis, write up	UQ	0.23
	Marites Canto	RS data analysis, write up	UQ	0.30
	Andrew Negri	Project leader, researcher, ecotoxicology	AIMS	0.3
	Catherine Collier	Researcher seagrass	JCU	0.2
	Jochen Mueller	Analytical, bioanalytical techniques (0.1)	UQ	In kind
	Peter Ralph	Photophysiology (0.1)	UTS	In kind
	Florita Flores	Technical assistant	AIMS	0.3
	Victor Beltran	Zooxanthellae culturing	AIMS	0.2
	PhD student	Seagrass component	AIMS@JCU	1.0
	PhD student	Pesticide persistence component	AIMS@JCU	1.0
	Dr Glenn De'ath	Biostatistician, Ecological Modeller	AIMS	0.6
	Dr Katharina Fabricius	Coral Reef Ecologist	AIMS	0.25
	Alistair Cheal	Fish Ecologist, LTMP	AIMS	0.1
	Dr Mike Cappo	Fish Ecologist	AIMS	0.3
	Greg Coleman	Data Management	AIMS	0.05
	Prof Jian-xin Zhao	Project leader, geochemistry, geochronology and palaeoclimatology	UQ	0.3
	Prof John Pandolfi	Project co-leader, palaeoecology	UQ	0.2
	Prof Malcolm McCulloch	Boron isotopes and ocean acidification, geochemistry and palaeoclimatology	UWA	0.1

	A/Prof Scott Smithers	Past sea-level and geomorphology	JCU	0.1
	Dr Steve Lewis	Water quality and geochemistry	JCU	0.1
	Dr Terry Done	Reef ecology	UQ	0.1
	Dr Kefu Yu	Palaeoclimate proxy reconstruction	UQ	0.1
	Dr George Roff	Reef ecology and geochronology	UQ	0.2
	Dr Yuexing Feng	Geochronological and geochemical methods	UQ	0.1
	Dr Laurence McCook	Reef ecology and conservation	GBRMPA	TBA
	Mr Alberto Rodriguez-Ramirez	PhD Student Reef ecology and geochronology	UQ	1.0
	Research Associate (TBA)	Dating, geochemical and ecological analysis, assistance to project leaders on coordination and reporting	UQ	1.0
	New Ph.D#1	Boron isotope analysis & ocean acidification	UWA	1.0
	New Ph.D#2	Study of sea-level and water quality	JCU	1.0
	New Ph.D#3	Reef palaeoecology and geochronology in Cairns region of the Wet Tropics World Heritage Area	UQ	1.0
	New Ph.D#4	Reef palaeoecology and geochronology in Princess Charlotte Bay Area	UQ	1.0
	New Ph.D#5	Reconstruction of past climate variability	UQ	1.0
	Sven Uthicke	Project leader, researcher ecology and physiology	AIMS	0.25
	Sam Noonan	Experimental scientist	AIMS	0.3
	Florita Flores	Experimental scientist	AIMS	0.3
	Katharina Fabricius	Researcher ecology	AIMS	0.1
	Andrew Negri	Researcher ecotoxicology	AIMS	0.1
	Frances Patel	Experimental scientist	AIMS	0.3
	TBA	PhD student	JCU/AIMS	1
	M. Heupel	Project leader. Responsible for project coordination and managing all aspects of the project.	AIMS	0.2
	C. Simpfendorfer	Responsible for coordination of the JCU aspects of the research	JCU	0.2
	M. Cappo	Collaborator in inshore to reef connectivity research	AIMS	0.1
	A. Tobin	Collaborator in central GBR research	JCU	0.2
	M. Stowar	Assists on the inshore to reef connectivity research	AIMS	0.1
	Field technician, TBA	Assists in maintaining all telemetry networks and databases	JCU	1.0
	L. Currey	PhD student on southern GBR	JCU/AIMS	1.0

		research		
	Dr Colin Simpfordorfer	Project leader. Leader environmental effects. Responsible for all aspects of the project	JCU	0.5
	Dr Andrew Tobin	Co-project leader. Leader of nursery surveys	JCU	0.6
	Dr Michelle Heupel	Provide expertise on shark nursery areas and acoustic telemetry	AIMS	0.1
	TBA	Research worker – lead field trips for nursery surveys, assists with acoustic monitoring	JCU	1.0
	TBA	Analysis of DEEDI data, assist with field work, data analysis and reporting	DEEDI	0.2
	Mr Peter Yates	PhD student	JCU	1.0
	Ms Samantha Munroe	PhD student	JCU	0.5
	Ms Audrey Schlaff	PhD student	JCU	0.5
	Dr Brad Congdon	Chief investigator	JCU	0.25
	Fiona McDuie	PhD candidate	JCU	1
	Carol Devney	Research Associate/PhD candidate	AIMS@JCU	0.25
	William Goulding	Seabird field research officer	JCU	0.05
	Dr Scarla Weeks	Satellite image oceanographer	UQ	0.05
	Craig Steinberg	Physiochemical oceanographer	AIMS	0.05
	Prof S.E. Williams	Principal Investigator	JCU	0.5
	Dr J. VanDerWal	Spatial Ecologist	JCU	0.7
	Post-doctoral Fellow	Post-doctoral Fellow	JCU	1.0
	GIS Technician	GIS Technician	JCU	0.5
	Research Assistant	Research Assistant	JCU	1.0
	D Metcalfe	Project leader; rainforest fire ecology	CSIRO	0.15
	D Hilbert	Fire & veg modelling	CSIRO	0.10
	M Bradford	Tech support, fire ecology	CSIRO	0.15
	A Ford	Tech support, plant ecology	CSIRO	0.15
	T Lawson	Tech support, GIS & remote sensing	CSIRO	0.10
	Dr Helen Murphy	Project Leader, Research Scientist	CSIRO	1.12
	Dr Dan Metcalfe	Research Scientist	CSIRO	0.18
	Matt Bradford	Research Technician, rainforest ecology	CSIRO	0.30
	Dr David Westcott	Research Scientist	CSIRO	0.18

	Tina Lawson	Research Technician, spatial analyst	CSIRO	0.46
	Dr Cameron Fletcher	Research Scientist, modeller	CSIRO	0.50
	Dr Darren Kriticos	Research Scientist, climate change modeller	CSIRO	0.13
	Dr J A. Welbergen	Project leader	JCU	0.7
	A/Prof A K Krockenberger	Ecophysiologicalist	JCU	0.1
	Research Assistant	Research Assistant	JCU	0.4
	Ken Anthony	Project leader, Framework and model development, experimental design	AIMS	0.19
	Scott Wooldridge	Researcher, model development, data analysis	AIMS	0.19
	Richard Brinkman	Researcher, spatial information layers: hydrodynamics, water quality	AIMS	0.07
	Sven Uthicke	Researcher, experimental design and analysis	AIMS	0.08
	Peter Mumby	Researcher, model development, experimental design and analysis	UQ	0.07
	Hugh Possingham	Researcher, spatial decision support tool	UQ	0.03
	Iliana Chollett	Technical support, data analysis	UQ	0.10
	Paul Marshal Roger Beeden	Facilitating input by GBRMPA managers into project planning and collaborating on development of decision support system	GBRMPA	0.23
	Cathy Dichmont	Project Leader / MSE development	CSIRO	0.25
	Olivier Thébaud	MSE development	CSIRO	0.15
	Wendy Proctor	Multi-criteria decision approaches	CSIRO	0.15
	Roy Deng	GIS/ Data management	CSIRO	0.30
	Roland Pitcher	Biodiversity	CSIRO	0.10
	Leo Dutra	Qualitative modelling	CSIRO	0.15
	Jeffrey Dambacher	Qualitative modelling	CSIRO	0.15
	Neil Gribble	Inshore fisheries and biodiversity	JCU	0.20
	Staff co-ordinated by Laurence McCook	GBR Management, biodiversity, fisheries	GBMPA	0.30
	Malcolm Dunning	Facilitation of access to Fisheries Queensland information and high level interpretation, assistance with stakeholder workshop strategic planning	DEEDI	0.10
	Mark Lightowler	Fisheries manager	DEEDI	0.10

	Julia Playford	Water quality, DERM co-ordinator	DERM	0.05
	Michael Warne	Water quality, DERM science co-ordinator	DERM	0.05
	DERM staff TBA	Water quality data and high level interpretation	DERM	0.25
	Bob Pressey	Project leader	JCU	0.2
	John Hicks	Project co-leader	DERM (QPW)	0.1
	Malcolm Turner	Project co-leader	GBRMPA	0.1
	Postdoctoral researcher (to be appointed)	Analysis and liaison	JCU	1.0
	Bob Pressey	Project leader	JCU	0.2
	Hugh Yorkston	Project co-leader	GBRMPA	0.1
	Allan Dale	Project co-leader	JCU	0.1
	Jon Brodie	Project co-leader	JCU	0.1
	Postdoctoral researcher (to be appointed)	Analysis, modelling, liaison	JCU	1.0
	GIS technician (to be appointed; Yr 1 only)	Analysis, modelling, liaison	JCU	0.67
	Natalie Stoeckl	Overall project leader and coordinator	JCU	0.3
	Jon Brodie	Project co-leader (water quality activity), advisor on attributes of reef health for tourism activity, conduit to other biophysical researchers and research	JCU	0.1
	Silva Larson	Project co-leader (resident activity)	CSIRO	0.2
	Bruce Prideaux	Project co-leader (tourism activity)	JCU	0.1
	Steven Lewis	Analysis and preparation of water quality data	JCU	0.05
	Renaë Tobin	Providing specialist fisheries advice, liaison, and perspectives.	JCU	0.1
	Taha Chaiechi	Co-ordination of analysis, and development of survey instruments across activities (to ensure cohesive and comparable approaches)	JCU	0.35
	Professor Bob Costanza & Ida Kubiszewski	International liaison & perspectives	Institute for Sustainable solutions, Portland State University	0.05
	Research officers (to be recruited)	Assistance with preparation and administration of surveys, data entry, data collation, analysis of data; assistance with writing of reports and papers	JCU or CSIRO	1.15
	Associate Professor Allan Dale	Lead Researcher	JCU	0.35

	Dr. Karen Vella	Research Collaborator	GU	0.05
	Dr Ro Hill	Project Leader, collaborative and Indigenous planning	CSIRO	0.24
	Dr Petina Pert	Researcher, geography and spatial analysis	CSIRO	0.15
	Dr Iris Bohnet	Researcher, collaborative and Indigenous planning	CSIRO	0.15
	Traditional Owners	Co-Researchers, Indigenous protected area planning and management	Indigenous Protected Area projects	0.15
	Mr Steve McDermott	Research collaboration, total in-kind contribution across Terrain's biodiversity and Indigenous planning teams	Terrain NRM	0.1
	Ms Toni Baumann	Research collaboration with AIATSIS Native Title Unit joint management of conservation areas project, in-kind contribution	AIATSIS	0.1
	Ms Ellie Bock	Research collaboration, in-kind contribution in association with Girringun Aboriginal Corporation IPA and co-management initiatives	Regional Advisory and Innovation Network (RAIN) Pty Ltd	0.1
	Assoc Prof Allan Dale Assoc Prof Natalie Stoeckl	The governance and planning, Indigenous peoples and iconic biodiversity projects within the NERP Tropical Ecosystems Hub (Rainforest) will link through a "Social and Economic Scientists' Coordination Group" to ensure collaboration on data collection, analysis and theory-building. Linkages will also be made with the "Systematic conservation planning" project within the "Resilience and Adaptation" strand.	JCU	TBC
	Prof. Carla Catterall	Project leader	Griffith Uni	0.25
	Dr. Luke Shoo*	Project co-leader	Uni. of Qld	0.15
	Ms Kylie Freebody	Project researcher/practitioner liaison	Griffith Uni/Tablelands Reveg Unit	0.50
	Dr. Kerrie Wilson	Project researcher	Uni. of Qld	0.15
	Assistant TBA	Project researcher	Griffith Uni	0.40
	Ms Debra Harrison**	Project advisor/Terrain liaison	Terrain/Griffith Uni	0.10
	Dr. John Kanowski	Project advisor	Australian Wildlife Conservancy	0.05
	Ms Deborah Pople	Project advisor/WTMA liaison	WTMA	0.05
	Mr Dave Hudson	Liaison - landholder and works	CVA	0.05
	Natalie Stoeckl	Project co-leader; Economist	JCU	0.2

	Silva Larson	Project co-leader; Social Scientist	CSIRO	0.2
	Research officer / post-doc (to be recruited)	Assistance with preparation of questionnaires, administration of surveys, data entry, data collation, statistical analysis; assistance with writing of reports and papers	JCU	0.5
	Social and Economic Scientists collaboration group (Alan Dale, Ro Hill, Natalie Stoeckl)	Coordinate activities and objectives across socio-economic projects within the Rainforest Hub so as to maximise collaborative opportunities	JCU, CSIRO	TBC
	James Butler	Leader, livelihoods and resilience	CSIRO	0.25
	Erin Bohensky	Futures analysis	CSIRO	0.25
	Yiheyis Maru	Adaptive capacity assessments	CSIRO	0.25
	Luis Rodrigues	Ecosystem services valuation	CSIRO	0.20
	Suppiah Ramasamy	Climate projections	CSIRO	0.15
	Research assistant	Livelihoods surveys and participatory planning	CSIRO	1.00
	John Rainbird	Climate adaptation planning	TSRA	0.10
	Vic McGrath	Community engagement	TSRA	0.10
	Miya Isherwood	Sustainability planning	TSRA	0.10
	Michelle Torrens	Economic development	TSRA	0.10
	John McDougall	Torres Strait Treaty coordination	SEWPAC	0.10
	Simon Moore	Torres Strait Treaty coordination	DFAT	0.10
	Dr Sue Laurance	Ecologist	JCU	0.4
	Dr Eric Lawrey	Project leader, systems developer, map data preparation, training	AIMS	0.7
	Gael Lafond	Programmer for the website and mapping tools	AIMS	0.6
	Dr Glenn De'ath	Spatial models, tool and system development	AIMS	0.05
	Dr David Souter	Project leader, reporting, communication	RRRC	0.25*
	Shannon Hogan	Content editing, integration with NERP website.	RRRC	0.2*
	Eric Lawrey	Project leader, system development, data mapping, training	AIMS	0.45
	Libby Evans-Illidge	Manage consultation, contents planning, content writing and editing, outreach	AIMS	0.3
	Dave Abdo	Content planning, data output design, writing	AIMS	0.3
	Gael Lafond	System development, system programming	AIMS	0.3

	Roland Pitcher	Facilitate upload of CSIRO data holdings, content planning, data output design	CSIRO	0.075
	Tim Skewes	Facilitate upload of CSIRO data holdings, content planning, data output design	CSIRO	0.075
	Ian McCleod	Facilitate upload of CSIRO data holdings, data output design	CSIRO	0.15
	Rai Kookana	Project Leader, overall approach, data analysis, reporting	CSIRO	0.10
	Jon Brodie	Project Leader, Nutrient, sediment and pesticide fluxes, catchment data, reporting	JCU	0.10
	Danni Oliver	Data collation, carrying out pesticide risk assessment, reporting	CSIRO	0.10
	Katharina Fabricius	Marine nutrients & sediments risks, marine data	AIMS	0.10
	Andrew Negri	Marine pesticides risks–, marine data	AIMS	0.10
	Michael Warne	Input data, Risk assessment; ecotoxicology	DERM	0.10
	Keith Hayes,	Risk Framework/Risk Modelling	CSIRO	0.10
	Modeller + GIS specialist	Data management, Spatial analysis, GIS, modelling	CSIRO	0.1-0.2
	Steve Lewis	Nutrient, sediment and pesticide fluxes, catchment data	JCU	0.10
	Frederieke Kroon	Nutrient and sediment fluxes, catchment data	CSIRO (in-kind)	0.05
	Dr Catherine Collier	Project leader, researcher, seagrass eco-physiology	JCU	0.8
	Dr Sven Uthicke	Assist with experiments (including design, execution, interpretation of results)	AIMS	0.1
	Assoc Prof Michelle Waycott	Objective 1 general input, data provider, seagrass population dynamics (0.1)	JCU	0.05
	Dr Michelle Devlin	Lead researcher of water quality, Objective 1 (0.1)	JCU	0.05
	Len McKenzie	Monitoring provider, end-user, data provider, assist with interpretation and general input in relation to seagrass ecology (0.1)	DEEDI	0.05
	Research worker	Assist with general activities associated with experimental and field research	JCU	0.5
	PhD Student*	Undertake water quality experiments	JCU	1.0

* Refer to individual Project schedules in Attachment B of the Tropical Ecosystems Hub Multi-Year Research Plan for specific details of FTE funding contributions.