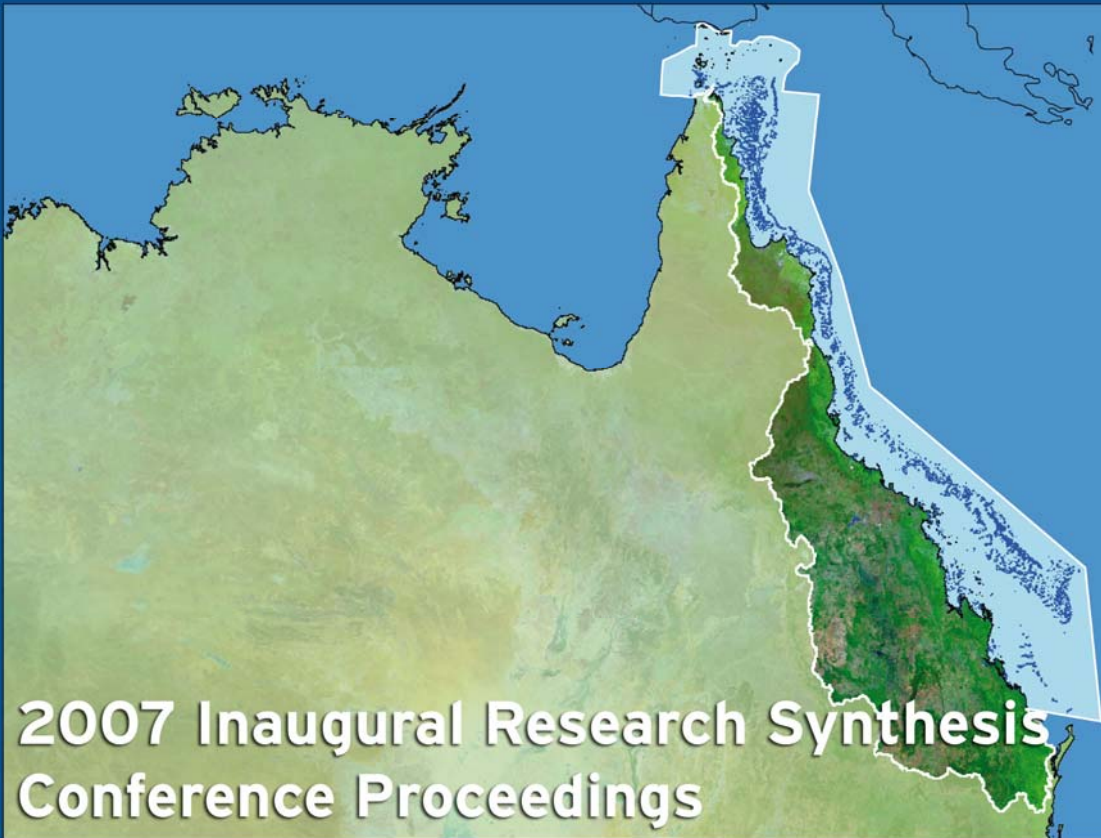




Australian Government

Department of the Environment and Water Resources

**Commonwealth Environment Research Facilities
Marine and Tropical Sciences Research Facility**



May 2007

Introduction

The Marine and Tropical Sciences Research Facility (MTRSF) is part of the Commonwealth Environmental Research Facilities Program (CERF), an initiative of the Australian Government that will invest \$100 million (AUD) in world-class public good research over four years from July 2006. Of this \$100 million, \$40 million will be allocated under the MTRSF to develop collaborative, public benefit research between Australia's tropical environmental researchers to support the conservation and sustainable use of North Queensland's environmental assets – the Wet Tropics rainforests, the Great Barrier Reef and the connecting coastal regions. On 10 August 2006, the then Commonwealth Department of the Environment and Heritage approved a contract with the Reef and Rainforest Research Centre Limited (RRRC) to administer the MTRSF Research Programme in North Queensland.

Throughout the lifespan of the Cooperative Research Centres (CRCs) for the Great Barrier Reef ('Reef CRC') and for tropical rainforest ecology and management ('Rainforest CRC'), the need to protect our public environmental assets has been well understood and research efforts have typically focused on providing appropriate information to facilitate conservation of the Great Barrier Reef and the Wet Tropics World Heritage Areas. With the wind-up of the two CRCs in 2006, the Australian Government supported a new initiative, the MTRSF, which was established to build upon the work of the two CRCs during their fifteen year tenure.

The MTRSF is located in Cairns and Townsville with offices located at campuses of James Cook University in both cities. It represents an exciting, world-first opportunity to comprehensively address issues of concern for the sustainable use, management and protection of the Great Barrier Reef and its catchments, tropical rainforests including the Wet Tropics World Heritage Area, and the Torres Strait through the generation and transfer of world-class research and sharing knowledge. Through the MTRSF a range of research will be undertaken that is targeted for public benefit and towards delivering useful products that support the health of these environmental assets. The research to be conducted through the Facility will support responsible parties in their endeavours to protect, conserve, sustainably use and manage North Queensland's public environmental assets. To achieve this, the MTRSF will build upon the knowledge base developed through the CRCs to ensure targeted, focused research is delivered to appropriate end users and management agencies. The MTRSF will also enable the continuation of research initiated by the CRCs to investigate and develop an understanding of the influences of impacts such as climate change on our delicate tropical ecosystems in an effort to improve our management of our impacts and mitigate any negative influences.

This document provides a written record of the Inaugural Research Synthesis Conference of the MTRSF, convened in Townsville over five days in April 2007. The Conference provided MTRSF Program Leaders the opportunity to present the work being conducted in Year 1 of the MTRSF Research Programme and gave key stakeholders the chance to learn more about their area of interest and to workshop issues of concern with MTRSF researchers. The Conference consisted of three geographically based Workshops, held back to back:

Rainforests and Catchments Workshopheld Monday, 16 and Tuesday, 17 April
Water Quality Workshop..... held Wednesday, 18 April
Great Barrier Reef and Torres Strait Workshops..... held Thursday, 19 and Friday, 20 April

Approximately 160 researchers, stakeholder representatives and interested community members attended one or more of the three Workshops over the five days.

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Disclaimer

The views and opinions expressed in this publication are those of conference or workshop attendees and do not necessarily reflect those of the Australian Government or the Minister for the Environment and Water Resources.

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Rainforests and Catchments Workshop

Convened Monday, 16 April and Tuesday, 17 April 2007

Pandora Room, The Holiday Inn, Townsville

List of Registered Attendees

Attendee	Affiliation
Ms Helen Adams	The Missing Link – Resource Coordinators Pty Ltd
Ms Denise Bailey	CSIRO
Dr Alastair Birtles	James Cook University (JCU)
Dr Erin Bohensky	CSIRO
Mr Ian Breckheimer	School for Field Studies
Mr David Briggs	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Annette Bryan	Reef and Rainforest Research Centre (RRRC)
Mr Russell Butler Jnr.	Aboriginal Rainforest Council (ARC)
Dr James Butler	CSIRO
Ms Moni Carlisle	FNQ NRM Ltd
Mr Max Chappell	Wet Tropics Management Authority (WTMA)
Ms Catherine Collier	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Niall Connolly	Queensland Environmental Protection Agency (QEPA)
Ms Melinda Connolly	Tourism Tropical North Queensland (TTNQ)
Dr Allan Dale	FNQ NRM Ltd
Mr Peter Elliot	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Dr Nick Emtage	The University of Queensland (UQ)
Ms Emily Fenwick	School for Field Studies
Ms Kim Forde	The Missing Link – Resource Coordinators Pty Ltd
Mr Alastair Freeman	Queensland Parks and Wildlife Service (QPWS)
Dr Amanda Freeman	School for Field Studies
Ms Gillian Goby	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Margaret Gooch	James Cook University (JCU)
Ms Rowena Grace	FNQ NRM Ltd
Ms Allison Halliday	Aboriginal Rainforest Council (ARC)
Mr Nigel Hedgcock	Wet Tropics Management Authority (WTMA)
Mr John Higgins	Australian Greenhouse Office (AGO)
Dr David Hilbert	CSIRO
Ms Shannon Hogan	Reef and Rainforest Research Centre (RRRC)
Mr William Hyams	James Cook University (JCU)
Mr James Innes	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Johanna Johnson	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Kamaljit Kaur	James Cook University (JCU)

Attendee	Affiliation
Dr Peter Latch	Queensland Parks and Wildlife Service (QPWS)
Ms Karen Lawrence	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Tim Lynam	CSIRO
Mr Troy Mallie	Aboriginal Rainforest Council
Mr Michael Marnane	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Louise Matthiesson	CSIRO
Dr Daniel Metcalfe	CSIRO
Ms Sheriden Morris	Reef and Rainforest Research Centre (RRRC)
Mr Anthony Morrison	Queensland Environmental Protection Agency (QEPA)
Dr Kerry Neil	Reef and Rainforest Research Centre (RRRC)
Dr John Neldner	Queensland Environmental Protection Agency (QEPA)
Mr Bob Noble	Queensland Department of Natural Resources and Water (QDNR&W)
Mr Sinan Ogun	Network for Sustainable and Diversified Agriculture
Professor Richard Pearson	James Cook University (JCU)
Dr Benjamin Preston	CSIRO
Professor Bruce Prideaux	James Cook University (JCU)
Dr Russell Reichelt	Reef and Rainforest Research Centre (RRRC)
Ms Ellen Reid	School for Field Studies
Dr Catherine Robinson	CSIRO
Ms Chantal Roder	Aboriginal Rainforest Council (ARC)
Professor Helen Ross	The University of Queensland (UQ)
Dr Luke Shoo	James Cook University (JCU)
Dr Colin Simpfendorfer	James Cook University (JCU)
Dr Ramasamy Suppiah	CSIRO
Mr John Tanzer	Great Barrier Reef Marine Park Authority (GBRMPA)
Professor Steve Turton	James Cook University (JCU)
Ms Vanessa Valdez-Ramirez	James Cook University (JCU)
Dr Jeremy VanDerWal	James Cook University (JCU)
Mr Peter Verwey	Queensland Department of Natural Resources and Water (QDNR&W)
Ms Jessica Wallace	School for Field Studies
Mr Adam West	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Dr David Westcott	CSIRO
Mr Michael Whiting	Powerlink Queensland
Dr Steve Williams	James Cook University (JCU)
Dr Kristen Williams	CSIRO
Dr Yvette Williams	James Cook University (JCU)
Dr Michael Wood	James Cook University (JCU)
Ms Itzel Zamora Vilchis	James Cook University (JCU)

Day One – Monday, 16 April 2007

Time	Program	Presenter
8.30-9.00	Conference opening and welcome	Russell Reichelt, RRRRC
	Introduction to Day 1	Sheriden Morris, RRRRC
9.00-10.00	Program 2: Status and Trends and Ecosystems of Tropical Rainforests	James Butler, CSIRO
10.00-10.30	MORNING TEA	
10.30-11.30	Program 6: Understanding Threats and Impacts of Invasive Pests to Tropical Rainforests	David Westcott, CSIRO
11.30-12.15	Program 4: Rainforest Threatened Species and Communities of and Ecosystem Processes	Dan Metcalfe, CSIRO
12.15-13.15	LUNCH	
13.15-14.15	Program 5ii: Climate Change: Understanding the Threat, Ecosystem Impacts and Mitigation to Rainforests and Catchments	Steve Williams, JCU
14.15-17.15	WORKSHOP SESSION	
17.15-17.30	RECAP AND CLOSE DAY ONE	Sheriden Morris, RRRRC

Morning Session – Presentations by Program Leaders

1. Program 2 – Status and Trends and Species and

Ecosystems in the Wet Tropics Dr James Butler, CSIRO

Key points raised included:

- Overview of Project 1.2.1, which involves four collaborative sub-projects with several other MTSRF projects.
- Key objective of Project 1.2.1 is to support accurate and up-to-date *state of the region* reporting on key biodiversity assets of North Queensland to support NRM planning and management of the Wet Tropics.
- Project 1.2.1 will have considerable input to *State of the Wet Tropics* reporting (annual report to Commonwealth; every six years to UNESCO); *State of the Region* Reporting (NRM Plan) (Queensland; four-yearly) and the NHT Investment Strategy; *State of the Environment* Reporting (Queensland statutory; four-yearly); and MTSRF Integrated Report Card for Rainforests and Catchments.
- Links with Aboriginal Rainforest Council, Queensland Environmental Protection Agency, Birds Australia; Earthwatch.
- Links with MTSRF components for Water Quality, Indigenous landscapes, climate change; NRM planning, social resilience, sustainable use and tourism.
- James gave an outline of projected milestones to 2010, noting the Project team is also working with Indigenous and non-Indigenous indicators that are linked to biodiversity condition (non-MTSRF funded; involves CSIRO post-doctoral fellow); engagement with Earthwatch and Birds Australia on community based monitoring for key indicators of condition; link to social-ecological ‘health check’ for the region and application to scenario planning. All of which contribute to MTSRF project.
- Key milestones in Project 1.2.1 calendar include:
 - End 2008 – revised FNQ NRM plan (four-year);
 - End 2009 – WTMA *State of the Wet Tropics* (six-year).

- End 2009 – issue new edition of Rainforest Key by CSIRO (further details online at <http://www.anbg.gov.au/cpbr/cd-keys/rfk/about.html>).
- End 2009 – cultural indicators project finished.
- 2010 – community monitoring.

2. Program 6 – Understanding Threats and Impacts of Invasive

Pests to the Tropical RainforestsDr David Westcott, CSIRO

- Collaboration between management agencies; land managers and researchers;
- Outlined what constitutes an invasive species – not endemic to Australia, or native species that have been translocated to outside their natural range, e.g. through human intervention.
- Objectives:
 - Assessment of research needs to understand threats and impacts;
 - Develop predictive frameworks of invasive species spread;
 - Descriptions of distribution and impacts of key invasive species;
 - Research into identification of priority invasive species (for priority management action).
- Have convened several major workshops involving key stakeholders to identify critical research needs at two levels – species level (ecology and how best to employ resources) and broader scale (how much control is appropriate for objectives to be achieved).
- Ten percent of Australia's flora is classed as invasive species; 6% of that 10% is considered 'serious risk'.
- Have developed website of invasive fish species for general community consumption: <http://www.actfr.jcu.edu.au/Projects/Pestfish/Profile.htm>

3. Program 4 – Rainforest Threatened Species and Communities

and Ecosystem Processes Dr Daniel Metcalfe, CSIRO

- Key research users are EPA, QPWS, WTMA and have convened major workshop involving all major stakeholders.
- Focus on key species as indicators of ecosystem health, e.g. cassowaries, mahogany glider, possums, microhylid frogs.
- Research area extends to south of Townsville.
- Research users asked to focus on coastal lowlands outside WTWHA and look at anthropogenic and natural fragmentations and impacted refuges.
- Aim to provide baseline data on condition and to develop appropriate management protocols.
- Identify threatening processes; have added another 174 voucher specimens to Queensland Herbarium.
- Outcomes for management – identifying threats; collect baseline data; identify management regimes and communication with managers (press releases; workshops; advisory groups; lectures and conferences).

4. Program 5ii – Climate Change: Understanding the Threat, Ecosystem

Impacts and Mitigation to Rainforests and Catchments.....Dr Steve Williams, JCU

- Program extends on twenty years' research; good current state of knowledge.
- Extensive data sets but not of long term nature in order to predict or demonstrate changes due to climate variability.
- Outlined what to expect from climate change, e.g. increased temperatures, increased occurrence of major storms (cyclones); increase in sea surface temperatures.

- Suppiah Ramasamy, CSIRO presented Project 2.5ii.1 work using *OzClim* to build models for temperature variation and duration of wet season. Gave temperature predictions, such as increase of 1.6 degrees Celcius by 2030 and possibly 4.8 degrees Celcius by 2070.
- David Hilbert, CSIRO presented Project 2.5ii.3 work on climate change threats to ecosystem services and processes; interacts with other current threats; wants to develop regional maps for changes to be expected. Used models on lowest scale – increase of just one degree Celsius results in 10% reduction in rainfall and result in decrease in biomass. Predicts areas of highland rainforest that will convert over time to woodland areas. Risks include inundation with mosquitoes and borne diseases; avian pox; malaria. As globe continues to increase in temperature, mosquitoes increase in distribution. Discussed potential for incursions of West Nile virus in Australia.
- Steve Williams on behalf of Michael Liddell, JCU presented Project 2.5ii.2 studies into climate change impacts through the use of the Australian Canopy Crane at Cape Tribulation. Key activities include measurements of atmospheric flux, experimental leaf level physiological studies, soil sampling, insect population studies.
- To predict, we must understand adaptive response, climatology and population genetics.
- First year summary results in maps of vegetation; vertebrate distribution models; adaptive resilience. Extinction proneness and adaptation resilience. (see slide)

Afternoon Session – Workshop Discussion

The following issues were added to the whiteboard during the afternoon session to faciliate discussion:

Current Knowledge; Status; Trends

- Ecosystems / Processes (Indicators and Thresholds of Concern)
- Invasive Pests
- Species of Conservation Concern
- Climate Change
- Management Response

What Have We Learned?

- Processes for adaptive learning; sharing 'lessons learned' with management agencies.
- Usefulness of documenting / recording shared knowledge?
- How can Industry access research projects / results?
- Evidence trail – impact of research on Industry / agencies.
- Are we using the best possible mechanisms for transfer of knowledge to research users?
- Formal adaptive management framework for MTSRF Research – would involve all major stakeholder groups; looks at same data; makes decisions based on same data.
- Incorporate Traditional Knowledge.
- Responses to catastrophic events – what are the risks we face? Potential for monitoring affected areas? Tactical immediate responses vs. strategic long-term planning.
- Ensure data / knowledge is compatible across MTSRF and other research programs / projects.
- Requirement for project mapping to demonstrate collaboration between MTSRF projects, can also capture work undertaken by Aboriginal Rainforest Council.
- What are the values of the World Heritage Area? Past, present, future.

General Discussion

Note: The general discussion for Day One is recorded here in note form only.

- Workshop discussion included debate on terrestrial 'Regional Ecosystems' vs. 'Bioregions' and which data sets were more adaptable to other studies.
- Max Chappell questioned if the Project 1.2.1 study area as shown during James Butler's presentation would lead to a comparable data set or would using the Wet Tropics bioregion be more suitable for comparing NRM and WTMA planning areas? James conceded that it would not be perfect; that the framework will highlight gaps and areas of incompatibility; then a way will be found to fill the gaps.
- Steve Williams added that a buffer needs to be included to ensure that data for key areas is whole and correctly reflective.
- Sheriden Morris noted that the western areas identified on the map could contribute to Savanna CRC projects for cross-institution collaboration.
- Richard Pearson asked how to marry-up approaches through regions where boundaries overlap.
- James ensured that very fine resolution data will be used so that it can be adapted across regions.
- Russell Reichelt explained that cross-boundary comparisons can be too complex and that simplicity was needed for IRC reporting, and asked how best to deal with the complexity.
- Helen Adams asked, if *State of the Environment* reporting doesn't work has any of the information been scrapped and has the process been reviewed for effectiveness to note any doubling up?
- Terrestrial 'Regional Ecosystems' is based on communities of species while 'Bioregions' are primarily one system, i.e. rainforest. Stanton units based on geology first where as 'Regional Ecosystems' is based on land zone but also units of Stanton mapping.

Day Two – Tuesday, 17 April 2007

Time	Program	Presenter
8.45-9.00	Introduction to Day 2	Sheriden Morris, RRRRC
9.00-10.00	Program 9: Sustainable Use, Planning and Management of Tropical Landscapes Part A <i>Indigenous Landscapes</i> <i>Impacts of Urbanisation</i> <i>Restoring Landscapes</i>	Steve Turton, JCU
10.00-10.30	MORNING TEA	
10.30-11.30	Program 9: Sustainable Use, Planning and Management of Tropical Landscapes Part B <i>Sustainable Tourism</i> <i>Integrating Ecology, Economics and People</i> <i>Understanding and Enhancing Social Resilience</i>	Helen Ross, UQ
11.30-12.30	Program 9: Sustainable Use, Planning and Management of Tropical Landscapes Part C <i>Strategic Natural Resource Management</i>	Catherine Robinson, CSIRO
12.30-13.30	LUNCH	
13.30-16.00	WORKSHOP SESSION	
16.00-16.15	RECAP AND CLOSE DAY TWO	Sheriden Morris, RRRRC

Morning Session – Presentations by Program Leaders

1. Program 9 – Sustainable Use, Planning and Management of

Tropical Landscapes (Part A).....Professor Steve Turton, JCU

Indigenous Landscapes; Impacts of Urbanisation; Restoring Landscapes

Key points raised included:

- The Wet Tropics contain 10% of the State's agriculture and 23% of the State's tourism, in only 1% of the State land area. The Wet Tropics is expecting a 2.3% p.a. population growth. The Wet Tropics is a contested landscape with conservation requirements, tourism and Indigenous requirements, urban expansions and ecosystem services requiring attention. Program 9 is taking a 'whole of landscape' approach by providing a knowledge base for sustainable use.
- Mike Wood introduced Project 4.9.1. Purpose is to understand Indigenous natural resource use. To engage with managers, develop links with management and to enhance Traditional Owners' capacities. There is a need to include Traditional Owners in planning and collaboration through the ARC, which will lead to the best outcomes. Future directions are to enhance the ARC cultural mapping project, to develop case studies and to work on NHT and Cultural World Heritage listing.
- Allison Halliday, Chantal Roder and Russell Butler Jnr. gave an overview of ARC activities. Russell explained the process behind the *Wet Tropics Regional Agreement*. Allison explained that engagement with Traditional Owners would develop a bridge for collaboration which will 'value add' to current and future research and empower Traditional Owners to look after their own cultural heritage. Chantal described the cultural heritage mapping project underway at ARC and the work undertaken on the cultural heritage listing of the WTWHA. Allison noted she'd like to see a five year project looking at Traditional Owners' methods for recovery, or "healing country", following Tropical Cyclone *Larry*. Russell

explained that scientists have previously been seen as “knowledge takers”, and the aim of the ARC is turn that around to build trust between researchers and Traditional Owners for the benefit of all.

- Steve Turton outlined work under Project 4.9.3 with Dr Miriam Goosem of JCU, outlining two main components of the project: 1) Linear community infrastructure throughout the Wet Tropics World Heritage Area; and 2) Riparian and remnant vegetation. Both tasks are a collaboration involving JCU, CSIRO, FNQ NRM and Powerlink. Wet Tropics biodiversity ‘hotspots’ were identified as the Daintree, Port Douglas, Cairns, Myola and the Atherton Tablelands. The aims of the project are to maintain connectivity, the present vegetation and ecosystem services while reducing edge effects. Known gaps identified include the use of canopy bridges by rainforest species. The success of road underpasses and the effects of the road infrastructure on pollination and seed dispersal. In Year 1, this project has examined edge effects, road noise penetration and cyclone impacts. The project will now also look at visioning future landscapes, with and without sugar based agriculture in the area.
- Steve Turton gave an overview of Project 4.9.5, led by Carla Catterall of Griffith University. Studying the consequences of deforestation and reforestation. The objective is to develop a biodiversity monitoring toolkit and indicators and to further research rainforest processes. Results of Year 1 include the finding that rainforest fragments are more vulnerable and sustained more damage in Cyclone *Larry* than continuous rainforest. Peter Gimbacher’s beetle project has identified that the closer a fragment is to continuous rainforest the better they are recolonised after disturbance. Future plans include stakeholder workshops, further development of the monitoring toolkit, engagement in community education, new data collection and the publication of a entire edition of *Austral Ecology* on the results of post-*Larry* research.

2. Program 9 – Sustainable Use, Planning And Management of

Tropical Landscapes (Part B)..... **Professor Helen Ross, UQ**
Sustainable Tourism; Integrating Ecology, Economics and People; Understanding and Enhancing Social Resilience

- Bruce Prideaux, JCU gave an overview of Project 4.9.2, which consists of two sub-projects: (a) to increase knowledge on seasonality of tourism and who is visiting far northern Queensland; and (b) to identify what is happening at specific sites and the change trend over the last five years. Stakeholders include WTMA, QPWS, TTNQ, ARC, EPA and regional tour operators. The objectives of (a) are a new Visitor Monitoring Program, to identify the key drivers as to why people choose far northern Queensland and who are the main competitors. Research will also be undertaken to identify the economic contribution of tourism in the region. The objectives of (b) are to identify community attitudes, the marketing power of the World Heritage Areas and to undertake both a wet- and dry-season visitor survey. Research outputs for objective (a) will provide a Wet Tropics wide data set and the identification of long term tourism patterns, real world economic data and the sustainability of tourism. Objective (b) will provide a comparative analysis and revision and updated studies to develop best practice.
- Nick Emtage, UQ gave an overview of Project 4.9.4. Noted the Project Team will undertake a survey of rural landholders, develop a software package and integrate landscape planning. The main project will be the survey of landholder attitudes and practices, building on the work of FNQ NRM Ltd, to establish partnerships with stakeholders, to review the stakeholder profiles. Key outcomes are expected to be an understanding of landholder “duty of care” and to establish their threshold of concern.
- Helen Ross continued with the Program 9 overview, noting a key output of Project 4.9.7 is to understand and enhance social resilience to water quality change in the Great Barrier Reef. Objective is to develop indicators of social resilience. This will mostly be undertaken through case studies. The project will work

at three scales – whole of GBR; large catchment area; and at the community level. The future research will include generating indicators and conducting case studies to identify indicators of social resilience.

3. Program 9 – Sustainable Use, Planning and Management of

Tropical Landscapes (Part C)..... Dr Catherine Robinson, CSIRO

Strategic Natural Resource Management

- Cathy Robinson gave an overview of Project 4.9.6, noting three sub-projects: (a) water quality; (b) local area planning; and (c) environmental conservation. Objective (a) S.M.A.R.T water quality partnerships with six sector workshops from April to May 2007. Objective (b) Effective local planning framework with Rosemary Hill, CSIRO. Objective (c) environmental economics – the impacts of ecosystem services on urbanisation. Working towards effective Natural Resource Management and the development of an effective skill set.

Afternoon Session – Workshop Discussion

Note: The general discussion for Day Two is recorded here in note form only.

The afternoon session saw a brief presentation from Troy Mallie of the Aboriginal Rainforest Council, who demonstrated the new Cultural Sites Management System, a web-based delivery of an Access database that holds crucial information about culturally significant sites. The system allows for archiving of various media, such as video footage and photographs, along with maps and graphics/images, and can provide various levels of passworded access through management of individual profiles.

Kim Forde (Consultant) kicked off the workshop discussion session with a key question: “Are we heading in the right direction?”

Ellen Weber (WTMA) identified a gap in engagement with local councils who give the approval for over-urbanisation, noting there was no local government representation at the discussion. Ellen then asked if MTSRF has the capacity to answer such ‘big questions’ (referring to Kim’s question to boost discussion). Russell Reichelt queried whether WTMA has a process for putting such questions on the table. Max Chappell (WTMA) informed the group that there have been many workshops on how they can provide direction for researchers but that there are emerging priorities to address.

Michael Whiting (Powerlink) said that Industry has the funding available to retrieve the scientific answers it needs, but that they find it very frustrating trying to figure out what research is going on and where, and often research projects they do identify are not heading in a direction that they need them to. Michael added that there is money in Industry but researchers need to see Industry in a partner / collaborator role rather than as a money cow or user or even something to be ignored. Industry is often blocked out of designing research projects therefore the researchers design projects without a clear idea of Industry requirements. Russell Reichelt (RRRC) stated that MTSRF is “all about partnership and co-learning”, and took the comment on board.

Steve Turton (JCU) pointed out that the Rainforest CRC had cooperative, formal partnerships with Queensland Department of Main Roads and researchers worked with engineers, environmental officers, etc. directly regarding infrastructure research.

Russell Reichelt said that MTSRF is trying new ways to find positions in Industry and agencies to facilitate collaboration from within the organisations that are seeking the answers from researchers.

Helen Ross (UQ) asked “Is it a massive experiment in knowledge use and management?” and added that the level of collaboration that MTSRF had achieved is fantastic – do others find the direction MTSRF is taking to be a good one?

Alistair Birtles (JCU) raised concerns about pressures on the environment stemming from human use, and asked if current practices actually protect the Wet Tropics. The fundamental question is “Are we addressing the right questions for the long term survival of the region?”

Russell Reichelt argued that we need to develop a short list of hard questions that are relevant at each tier of government and community.

Another point raised, “What is our accountability to the assets? And how is it funneled through to local management?”

Alistair Birtles asked the group not to ignore input from Indigenous groups.

Sheriden Morris (RRRC) said that institutional impediment to change is a problem and is hard to translate into fundamental change. We need to show that the MTSRF is making good progress before we can potentially make a push to move into the areas we are discussing at the workshop.

Max Chappell (WTMA) said we need to demonstrate the impacts of certain activities prior to ‘travelling down that road’, which would enable confidence in the direction MTSRF is taking.

Louise Matthiesson (CSIRO) queried the consultation process of the MTSRF, including its multi-tiered committees. Russell Reichelt responded, noting there have been more complex committee arrangements in other organisations, but the current set up was necessary politically to enable engagement nationally. The process is maturing, so some leeway is needed.

Helen Ross was positive on what the Operations Committees are achieving as an interaction forum that also facilitates decision making.

Sheriden Morris drew an outline of the MTSRF committee structure to demonstrate the level of interaction being achieved, noting a very tight budget for convening committee meetings which provides the research programs with as much funding as possible.

Water Quality Workshop

Convened Wednesday, 18 April 2007

Ballroom 1, Jupiters Hotel and Casino, Townsville

List of Registered Attendees

Attendee	Affiliation
Ms Helen Adams	The Missing Link – Resource Coordinators Pty Ltd
Professor Angela Arthington	Griffith University (GU)
Ms Donna-marie Audas	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Zoe Bainbridge	James Cook University (JCU)
Mr John Baldwin	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Bryony Barnett	TYTO Consulting
Mr John Bennett	Queensland Environmental Protection Agency (QEPA)
Dr Alastair Birtles	James Cook University (JCU)
Dr Erin Bohensky	CSIRO
Mr David Briggs	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Jon Brodie	James Cook University (JCU)
Dr Matthew Browne	CSIRO
Ms Annette Bryan	Reef and Rainforest Research Centre (RRRC)
Ms Moni Carlisle	FNQ NRM Ltd
Hon AO Virginia Chadwick	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Andrew Chin	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Anne Clarke	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Dr Rob Coles	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Mr Niall Connolly	Queensland Environmental Protection Agency (QEPA)
Associate Professor Rod Connolly	Griffith University (GU)
Dr Perran Cook	CSIRO
Mr Tim Cooper	Australian Institute of Marine Science (AIMS)
Mr Jon Day	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Glenn De'ath	Australian Institute of Marine Science (AIMS)
Dr Lyndon DeVantier	Consultant
Dr Katharina Fabricius	Australian Institute of Marine Science (AIMS)
Mr David Feary	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Kim Forde	The Missing Link - Resource Coordinators Pty Ltd
Dr Kevin Gale	Department of the Environment and Water Resources (DEW)
Ms Gillian Goby	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Margaret Gooch	James Cook University (JCU)
Professor Iain Gordon	CSIRO
Ms Katrina Goudkamp	Great Barrier Reef Marine Park Authority (GBRMPA)

Attendee	Affiliation
Mr Leigh Gray	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Mark Hamann	James Cook University (JCU)
Dr David Haynes	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr John Higgins	Australian Greenhouse Office (AGO)
Mr David Hine	Land and Water Management Pty Ltd
Ms Jessica Hoey	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Shannon Hogan	Reef and Rainforest Research Centre (RRRC)
Mr James Innes	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Nathan Johnston	Fitzroy Basin Association (FBA)
Dr Petra Kuhnert	CSIRO
Ms Karen Lawrence	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Stephen Lewis	James Cook University (JCU)
Mr Chris Manning	Townsville/Thuringowa Water Quality Improvement Plan
Dr Laurence McCook	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Carl Mitchell	Mackay Whitsunday Natural Resource Management Group
Dr Fergus Molloy	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Sheriden Morris	Reef and Rainforest Research Centre (RRRC)
Dr Kerry Neil	Reef and Rainforest Research Centre (RRRC)
Dr John Neldner	Queensland Environmental Protection Agency (QEPA)
Mr Bob Noble	Queensland Department of Natural Resources and Water (QDNR&W)
Ms Diana O'Donnell	Burdekin Dry Tropics NRM
Mr Sinan Ogun	Network for Sustainable and Diversified Agriculture
Professor Richard Pearson	James Cook University (JCU)
Dr Joelle Prange	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Russell Reichelt	Reef and Rainforest Research Centre (RRRC)
Dr David Roberts	Queensland Department of Natural Resources and Water (QDNR&W)
Dr Catherine Robinson	CSIRO
Professor Helen Ross	The University of Queensland (UQ)
Dr Marcus Sheaves	James Cook University (JCU)
Dr Colin Simpfendorfer	James Cook University (JCU)
Ms Anna Skillington	Townsville Port Authority
Ms Bettina Soderbaum	Department of the Environment and Water Resources (DEW)
Dr David Souter	Souter Marine and Coastal Consultants
Professor Steve Turton	James Cook University (JCU)
Ms Maria Vandergragt	Queensland Environmental Protection Agency (QEPA)
Mr Vern Veitch	James Cook University (JCU)
Mr Peter Verwey	Queensland Department of Natural Resources and Water (QDNR&W)
Dr David Wachenfeld	Great Barrier Reef Marine Park Authority (GBRMPA)
Professor Jim Wallace	CSIRO

Attendee	Affiliation
Ms Jane Waterhouse	Reef Water Quality Partnership / CSIRO
Dr Eric Wolanski	Australian Institute of Marine Science (AIMS)
Mr Hugh Yorkston	Great Barrier Reef Marine Park Authority (GBRMPA)

Day Three – Wednesday, 18 April 2007

Time	Program	Presenter
8.45-9.00	Introduction to Day 3	Sheriden Morris, RRRRC
9.00-10.00	Program 7: Halting and Reversing the Decline of Water Quality Part A <i>Freshwater Indicators and Thresholds of Concern</i> <i>Wetlands and Floodplains</i>	Richard Pearson, JCU
10.00-10.30	MORNING TEA	
10.30-11.30	Program 7: Halting and Reversing the Decline of Water Quality Part B <i>Connectivity and Risk: Tracing Sediments</i> <i>Marine and Estuarine Indicators and Thresholds of Concern</i>	Katharina Fabricius, AIMS
11.30-12.30	Program 7: Halting and Reversing the Decline of Water Quality Part C <i>Socio-economic constraints and Incentives for the Adoption of Land Use and Management Options</i> <i>Delivery of Social and Economic Indicators of Water Quality</i> <i>Conceptual and Statistical Framework for the Water Quality Component – Integrated Report Card</i>	Iain Gordon, CSIRO (Coordinator of Part C presentations)
12.30-13.30	LUNCH	
13:30-14:00	Project 1.1.5: Risk Mapping for Water Quality <i>First Year Integration Project Focused on Water Quality</i>	Glenn De'ath, AIMS
14:00-16.00	WORKSHOP SESSION – Water Quality Projects	
16.00-17.00	WORKSHOP SESSION – Water Quality Integrated Report Card	
17.00-17.15	RECAP AND CLOSE DAY THREE	Sheriden Morris, RRRRC

Morning Session – Presentations by Program Leaders

1. **Opening and Introduction to Day Three** Ms Sheriden Morris, RRRRC

2. **Program 7 – Halting and Reversing the Decline of**

Water Quality (Part A) Professor Richard Pearson, JCU

Freshwater Indicators and Thresholds of Concern; Wetlands and Floodplains

- Richard Pearson gave an overview of Project 3.7.3. Key points raised include: The project builds on Catchment to Reef program developed by the Reef and Rainforest CRCs. Team now has a framework for understanding ecosystem health to provide the community with an understandable water quality report card. Identifying indicators of water health is not a straight forward process, however barramundi are a good indicator of dissolved oxygen as at a certain point they disappear from the ecosystem. Thresholds of concern are not just about the INS or OUTF, as there are many more gray areas. Catchment processes. Human influences affect natural processes. Justification for research, projects are needed in North Queensland because hydrology is much different in northern Australia than in the south. The tropics are different biologically because the higher temperatures incur faster biological

processes. There is greater fluctuation in levels of dissolved oxygen. The monitoring of oxygen levels needs to be undertaken on a much finer scale than even a daily basis.

- Jim Wallace (CSIRO) gave an overview of Project 3.7.4. Key points raised include: The project is studying the hydro-ecological functions across floodplains. How can hydrological models be connected with ecological function? In the Tully/Murray catchment floodwater monitoring system there has been installation of monitoring stations in the field for the analysis of sediment, etc. These stations monitored the floods of February 2007. Jim displayed a simulated model of a mapped flood event in the Tully-Murray catchment. Another model displayed connectivity between wetlands, including freshwater and saline wetlands, during flood events; these have important implications for aquatic biota. The Tully/Murray catchment floods up to three times a year, transporting material to the Great Barrier Reef.
- Richard continued to explain outputs from the Water Quality program, noting the team have tested some water quality indicators, with nitrate being a simple measure of the proportion of agriculture in a catchment. There is a big difference in biodiversity between, for example, Bahana Creek is doing better than Babinda Creek. There is a strong relationship between riparian health and river health. This information will feed into the Water Quality Integrated Report Card process.
- Angela Arthington (GU) provided further insight to the tasks being conducted within the Water Quality program, noting that a key focus is development of early warning indicators to direct management response. Hydrological change gradient was not achieved in the Catchment to Reef program, so it has become the key focus of MTSRF research. The models are based on the literature and are only concepts at this stage.

3. Program 7 – Halting and Reversing the Deline of

Water Quality (Part B) Dr Katharina Fabricius, AIMS

- Katharina Fabricius introduced Project 3.7.1. Key points raised included: The Project looks at materials and dissolved organic materials from the catchments to the reef lagoon – tracing materials and identifying their effects on the reef and seagrasses. The objective is to identify the origins of the sediment exported to the Great Barrier Reef. In the Burdekin River catchment, dams trap 80% of sediment during low flow periods but only 15% during high flow periods. What do river bottlenecks do for sediment trapping and river flow? Studies currently in process. Suspended solids in river flow usually drop before reaching the reef but are stirred up again by even moderate winds.
- Katharina gave an overview on a sub-component of Project 3.7.1 looking at indicators and thresholds of concern. Key points raised included: Muddiness of sediment has gradually increased over time with a reduction in seagrass abundance. Epiphytes on seagrass are used as an indicator of ecosystem health. Biofilms and diatoms are the most important benthic species. In this project they have demonstrated how biofilm communities change along the water quality gradient. They have compiled a report on bioindicator measures to monitor exposure to varying water quality on the Great Barrier Reef. Coral colour is still a useful tool for establishing water quality on the reef.

4. Program 7 – Halting and Reversing the Deline of

Water Quality (Part C) Professor Iain Gordon, CSIRO

- Iain Gordon introduced the workshop to the socio-economic component of the Water Quality program. Key points raised included: Drivers that can reduce impacts of terrestrial land management on the reef. Socio-economic research not undertaken separately to biophysical work but is conducted in conjunction with it.
- Martjin Van Grieken (CSIRO) introduced Project 3.7.5 on behalf of Dr Peter Roebeling. Key points raised included: The project looks at halting and reversing decline of water quality while maintaining and

enhancing socio-economics in Great Barrier Reef region. Currently studying cost-effectiveness of current management regimes (student project).

- Tim Lynam (CSIRO) introduced Project 3.7.6, a socio-economics project that complements the biophysical work being undertaken in other water quality projects. Key points raised included: The CSIRO component of the project is now up and running while the JCU/UQ component is just starting up. In this project they are developing indicators of social resilience to water quality change to enable management to understand the implications to the human dimension as a response to these changes. Every change in water quality will have a social consequence.
- Petra Kuhnert (CSIRO) introduced Project 3.7.7, outlining the proposed framework for developing the MTSRF Integrated Report Card on Water Quality.
- Glenn De'ath (AIMS) gave an overview of Project 1.1.5 and its implications for the Water Quality program, providing an outline of the spatial, temporal and structural composition of water quality in the Great Barrier Reef region and how his modelling work can feed into water quality projects.
- In summing up the Part C presentations, Iain Gordon posed the question, "Where might MTSRF most effectively use socio-economic research?", noting that MTSRF needs to aim for a win/win situation, i.e. economic return AND gains in environmental quality. Using a modeling program that aims to find out costs and benefits. Iain put forward questions for consideration during the afternoon workshop session:
 - 1) What are we doing to meet water quality targets?
 - 2) How will we target limited resources?
 - 3) How do we enable land managers' input?
 - 4) How can we tell where we are going?
 - 5) What will be the effects of climate change?

Afternoon Session – Workshop Discussion

Note: The general discussion for Day Three is recorded here in note form only.

Sheriden Morris (RRRC) outlined the role of the Water Quality Operations Sub-Committee meeting to be held Wednesday night and the way forward for the reviews of ARP1 projects and how they feed into the ARP2, which was due for submission on 14 May. Sheriden outlined the synthesis report for Water Quality, to be prepared by Jon Brodie, JCU, and asked the questions, "Where is MTSRF heading?", "Should we be refocusing on certain issues and rearranging projects?", "Is the science adequate?", "Are we asking the right questions?". Sheriden explained that the MTSRF is a 'lapsing' program that could potentially seek a further four-years' funding after 2010, and noted that if MTSRF had not been developed, the collapse of the Reef and Rainforest CRCs would have caused a significant gap in North Queensland's capacity for environmental research. MTSRF science must be of value to community, politics, end-users and to the science community itself. The RRRC has approximately eighteen months before it requests funding for four years following 2010. We need to identify our deliverables now.

Richard Pearson (JCU) asked "Who are the end-users here today?" and suggested that there is a hiatus between researchers, DEW and end-users. Sheriden Morris replied that there are so many end-users involved in the water quality program that the reports and outputs must be able to feed into Outlook programs, *State of the Environment / Region* programs both national and Queensland.

Richard Pearson raised the point that all end users have different priorities to those on the ground and to DEW.

Russell Reichelt (RRRC) noted that 'adaptive management' makes sense. FNQ NRM Ltd's 'co-learning' is a good idea – how to make this happen for MTSRF? It is heavily driven by those who set the policies. Laurence

McCook (GBRMPA) argued that if you tell the community that you want to learn as much as we can, it's manageable. To tell people you are experimenting with their lives, however, is a big mistake. Alistair Birtles (JCU) said the largest adaptive management experiment is fishing – however key end-users can't be the only group involved. All stakeholders need to be involved: community, Traditional Owners, conservation groups, etc. Jon Brodie (JCU) advised that Water Quality Improvement Plans are in development now along the coast. There are large scale adaptive management experiments that involve some MTSRF people. Good place to get community and scientists together at the same time as monitoring of water quality is occurring.

Rebecca Bartley (CSIRO) said the proposed Water Quality Intergrated Report Card looks like a diamond into which everything feeds – how does MTSRF and the Report Card link into existing monitoring programs, for example the Water Quality Protection Plan? How do we deliver into the plans currently being developed and those in place? Rachel Eberhard (Reef Water Quality Partnership) introduced herself and spoke of the collection of management objectives within the Partnership. She noted that a strong group of end-users and management agencies were working to provide guidance to the Report Card framework.

Sheriden Morris added that the Report Cards are part of the major deliverable for MTSRF for each geographic region – the GBR, Rainforests and Catchments, Water Quality and Torres Strait. They are a strong tool to underpin science and are intended for bodies that manage those geographic regions. The challenge is achieving a suitable framework to feed information into – we're not quite there yet. Richard Pearson asked where the Water Quality Integrated Report Card will sit, noting it would be helpful for all involved to know who will hold it. Sheriden Morris responded, advising it would be the Reef Water Quality Partnership. Rachel Eberhard said that the Partnership was developing agreed strategies now and would advise what they want to see in the final product. The main decisions are yet to be made, multi institutions will have it. Sheriden Morris added, hence the big investment into science rather than monitoring programs. The responsibility sits with the various agencies involved. Conceptual models in involved. Jane Waterhouse (CSIRO) said the Integrated Report Card was a 'home' for indicators for the monitoring program.

Iain Gordon explained that the Report Card's primary activity for MTSRF is the integration of monitoring for a robust system for reporting. Anne Clarke (QDPI&F) added that it's about efficiencies, it's about trying to synthesise what we know, then everyone will be able to use it.

Katharina Fabricius (AIMS) said perhaps it is a good idea to have a synthesis program in MTSRF to achieve this. Sheriden Morris responded, and explained that the DEW withdrew \$1 million from Year 1 funding, which stopped the synthesis work from going ahead. It was asked whether opportunities existed in Year 2 to repropose this work, to which Sheriden replied that there were opportunities, but no guarantees unfortunately. Jon Brodie (JCU) added that the Reef Water Quality Protection Plan had no synthesis component either – need to think about putting an integration program into MTSRF at least for the Water Quality program as a massive gap currently exists. Sheriden Morris advised it was possible to go back through the committees of the Reef Water Quality Partnership to put forward a proposal.

Russell Reichelt asked if the Partnership is the place where frameworks and targets can be pulled from? Does GBRMPA feel this way? Hugh Yorkston (GBRMPA) responded, noting there is a panel established to look at these issues. A whole range of actions in reef plans targeted at institutions. Secretariat is to be active in working with science providers. Russell Reichelt noted that it was currently missing from the Reef Plan. Sheriden Morris queried whether we need overarching management to have a collective plan of investment.

Jon Brodie (JCU) said the Protection Plan is a policy document, not a technical document, which really needs an implementation plan on how to roll it out on-ground in a scientific way. No framework exists to integrate the knowledge. We need this framework to link projects to delivery.

Iain Gordon (CSIRO) said that most of Richard Pearson's work occurs in the Wet Tropics – freshwater biota responses to water quality. What about the Dry Tropics? Who is working on this and/or what has been done? Richard Pearson (JCU) answered that it is an area they want to move into, subject to resources. There is a good basis to start but there is along way to go. Angela Arthington (GU) added that Brad Pusey's (GU) work on fish species in various areas had produced good information across the tropics and was now assembling all this information in order to use it.

Bryony Barnett (TYTO Consulting) asked about communication – how to delivery information from the Water Quality Integrated Report Card into the southeast report card. Sheriden Morris replied that the Partnership will want a similar arrangement. John Neldner (EPA) said that this is the first stage of "who is out there".

The main issue raised during the afternoon session was the the Water Quality Integrated Report Card would take time to develop and that the Reef Water Quality Partnership is only a newly established entity. However, MTSRF would provide a current state of knowledge to feed into the Report Card.

Great Barrier Reef and Torres Strait Workshop

Convened Thursday, 19 and Friday, 20 April 2007

Ballroom 1, Jupiters Hotel and Casino, Townsville

List of Registered Attendees

Attendee	Affiliation
Ms Helen Adams	The Missing Link - Resource Coordinators Pty Ltd
Mr Ian Bell	Queensland Parks and Wildlife Service (QPWS)
Ms Lauren Bird	RRRC Media Liaison Officer
Dr Alastair Birtles	James Cook University (JCU)
Dr David Blair	James Cook University (JCU)
Dr Erin Bohensky	CSIRO
Mr David Briggs	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Chris Briggs	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Annette Bryan	Reef and Rainforest Research Centre (RRRC)
Dr Alan Butler	CSIRO
Mr Russell Butler Jnr.	Aboriginal Rainforest Council (ARC)
Dr Julian Caley	Australian Institute of Marine Science (AIMS)
Hon AO Virginia Chadwick	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Andrew Chin	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Anne Clarke	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Dr Alexandra Coghlan	James Cook University (JCU)
Dr Rob Coles	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Ms Catherine Collier	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Niall Connolly	Queensland Environmental Protection Agency (QEPA)
Mr Matt Curnock	James Cook University (JCU)
Professor Pat Dale	Griffith University (GU)
Mr Jon Day	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Lyndon DeVantier	Consultant
Dr Kirstin Dobbs	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Peter Doherty	Australian Institute of Marine Science (AIMS)
Dr Geoff Dyne	Department of the Environment and Water Resources (DEW)
Mr David Feary	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Leanne Fernandes	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Kevin Gale	Department of the Environment and Water Resources (DEW)
Ms Gillian Goby	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Katrina Goudkamp	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Mark Hamann	James Cook University (JCU)
Dr David Haynes	Great Barrier Reef Marine Park Authority (GBRMPA)

Attendee	Affiliation
Dr Kirsten Heimann	James Cook University (JCU)
Mr John Higgins	Australian Greenhouse Office (AGO)
Ms Jos Hill	Reef Check Australia
Mr David Hine	Land and Water Management Pty Ltd
Ms Jessica Hoey	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Shannon Hogan	Reef and Rainforest Research Centre (RRRC)
Mr James Innes	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Richard Ireland	Reef and Rainforest Research Centre (RRRC)
Ms Johanna Johnson	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Margaret Johnson	Department of the Environment and Water Resources (DEW)
Mr Peter Latch	Queensland Parks and Wildlife Service (QPWS)
Ms Karen Lawrence	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Troy Mallie	Aboriginal Rainforest Council (ARC)
Mr Arnold Mangott	James Cook University (JCU)
Mr Michael Marnane	Great Barrier Reef Marine Park Authority (GBRMPA)
Professor Helene Marsh	James Cook University (JCU)
Dr Laurence McCook	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr Vic McGrath	Torres Strait Regional Authority (TSRA)
Dr Fergus Molloy	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Sheriden Morris	Reef and Rainforest Research Centre (RRRC)
Dr Kerry Neil	Reef and Rainforest Research Centre (RRRC)
Mr Bob Noble	Queensland Department of Natural Resources and Water (QDNR&W)
Mr Sinan Ogun	Network for Sustainable and Diversified Agriculture
Dr Rachel Pears	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Ann Penny	James Cook University (JCU)
Dr Joelle Prange	Great Barrier Reef Marine Park Authority (GBRMPA)
Professor Bruce Prideaux	James Cook University (JCU)
Dr Michael Rasheed	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Dr Russell Reichelt	Reef and Rainforest Research Centre (RRRC)
Mr Martin Russell	Great Barrier Reef Marine Park Authority (GBRMPA)
Dr Colin Simpfendorfer	James Cook University (JCU)
Ms Hilary Skeat	Great Barrier Reef Marine Park Authority (GBRMPA)
Ms Susan Sobtzick	James Cook University (JCU)
Ms Bettina Soderbaum	Department of the Environment and Water Resources (DEW)
Dr David Souter	Souter Marine and Coastal Consultants
Mr Sean Sullivan	Department of the Environment and Water Resources (DEW)
Dr Stephen Sutton	James Cook University (JCU)
Mr Hugh Sweatman	Australian Institute of Marine Science (AIMS)
Mr John Tanzer	Great Barrier Reef Marine Park Authority (GBRMPA)

Attendee	Affiliation
Ms Yara Tibirica	James Cook University (JCU)
Ms Maria Vandergragt	Queensland Environmental Protection Agency (QEPA)
Dr David Wachenfeld	Great Barrier Reef Marine Park Authority (GBRMPA)
Mr David Welch	Queensland Department of Primary Industries and Fisheries (QDPI&F)
Dr Steve Williams	James Cook University (JCU)
Dr Ashley Williams	James Cook University (JCU)
Dr Bette Willis	James Cook University (JCU)
Ms Itzel Zamora Vilchis	James Cook University (JCU)

Day Four – Thursday, 19 April 2007

Time	Program	Presenter
8.45-9.00	Introduction to Day 4	Sheriden Morris, RTRC
9.00-10.00	Program 1: Status and Trends of Species and Ecosystems of the Great Barrier Reef Program 6: Understanding Threats and Impacts of Invasive Pests on the Great Barrier Reef	Peter Doherty, AIMS
10.00-10.30	MORNING TEA	
10.30-12.00	Program 8: Sustainable Use and Management of marine Resources of the Great Barrier Reef Part A <i>Resilience and Connectivity</i> <i>Influence of Zoning on Habitats and Biodiversity</i> <i>Resilience of Key Fish Species</i> <i>Evaluation Impacts from Industry and Community Uses on Inshore Biodiversity</i> <i>Forecasting Risk of Exposure to Irukandji</i> <i>Community Engagement and Enhanced Delivery</i>	Colin Simpfendorfer, JCU
12.00-12.45	Program 8: Sustainable Use and Management of marine Resources of the Great Barrier Reef Part B <i>Incorporating Stakeholder Values in the Care of the GBR Marine Park</i> <i>Analysis of Recreational and Tourism Use and Impact on the GBR</i>	Bruce Prideaux, JCU
12.45-13.45	LUNCH	
13.45-17.00	WORKSHOP SESSION	
17.00-17.15	RECAP AND CLOSE DAY FOUR	Sheriden Morris, RTRC

Morning Session – Presentations by Program Leaders

1. **Opening and Introduction to Day Four..... Ms Sheriden Morris, RRRC**
Sheriden Morris opened the proceedings and outlined MTSRF, explaining that in eighteen months' time the RRRC would approach DEW to establish the potential for funding for the MTSRF beyond 2010. She then introduced Dr Peter Doherty (AIMS).
 2. **Program 1 – Status and Trends of Species and Ecosystems of the Great Barrier Reef / Program 6 – Understanding Threats and Impacts of Invasive Pests on the Great Barrier Reef Dr Peter Doherty, AIMS**
 - Peter Doherty presented an outline of the structure of Programs 1 and 6. Key points raised included:
 - Project 1.1.1 involves sampling of about 2,000 locations across the GBR. Delivery of biomass maps for many species to be complete by June 2007 for final report. This project will not continue into ARP2.
 - Hugh Sweatman (AIMS) gave an overview of Project 1.1.2, noting: AIMS long term monitoring project in collaboration with Reef Check Australia. Coral Trout have shown a forty percent increase in numbers since the introduction of the new Green Zones in 2003, as opposed to when they were marked as Blue Zones prior to the implementation of the GBR Zoning Plan 2003.
 - Jos Hill (Reef Check) gave an overview of their component of Project 1.1.2, noting: Aim to involve community in coral reef monitoring and build public support for monitoring. Also aims to build partnerships, etc. with dive operators. Currently there are around fifty community volunteers working on coral reef monitoring. Only two crown-of-thorns starfish have been discovered of recent, found in the Whitsundays area.
 - Rob Coles (QDPI&F) gave an overview of Project 1.1.3;
 - Peter Doherty (AIMS) gave an overview of Project 1.1.4;
 - Glenn De'ath (AIMS) gave an overview of Project 1.1.5, noting: Synthesis of data to feed into the Water Quality program, and in particular the Water Quality Integrated Report Card.
 3. **Collaboratio with Traditional Owners / Aboriginal Rainforest Council..... Mr Russell Butler Jnr., ARC**
 - Sheriden Morris introduced to the workshop Russell Butler Jnr. and Troy Mallie, both of the Aboriginal Rainforest Council. Russell Butler outlined the value to be added to current and future research by including the input and knowledge of Traditional Owners of the study areas. Troy Mallie demonstrated the Cultural Site Management System, a web-based delivery of an Access database that holds crucial information about culturally significant sites. The system allows for archiving of various media, such as video footage and photographs, along with maps and graphics/images, and can provide various levels of access through profile management. Troy went on to explain how the new system could be adapted to suit GBR related research.
 4. **Program 8 – Sustainable Use and Management of Marine Resources of the Great Barrier Reef (Part A)..... Dr Colin Simpfendorfer, JCU**
 - Colin Simpfendorfer introduced Program 8, noting there are a large number of bioregions within the Great Barrier Reef World Heritage Area. Colin gave an outline of the objectives of Project 4.8.1, noting the development of larval fish dispersal models by the Australian Museum and the Australian Maritime College and would test realistic larval fish dispersal models.
 - Peter Doherty (AIMS) gave an outline of Project 4.8.2, noting: the project aims to understand the impacts of zoning in inshore areas and to measure responses of biodiversity to change in human use following implementation of the Great Barrier Reef Zoning Plan 2003. Consequently the increase in
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Coral Trout numbers in new Green Zones has, as expected, reduced the number of damsel fish in a trophic cascade. The team is using radar mapping of ocean floor to map habitat types.

- Colin Simpfendorfer gave an outline of Projects 4.8.3; 4.8.4 (for Ashley Williams) and 4.8.7 (for Michael Kingsford). He went on to overview Project 4.8.8, the communication and community engagement project within Program 8, noting key objectives include engagement with stakeholders – commercial fishers, recreational fishers, local residents, management agencies and representative groups such as Sunfish and QSIA. There is a high degree of community interest in projects that enables communication without researchers having to do it. Builds on history of research conducted by CRC Reef.
- Steve Sutton (JCU) introduced Project 4.8.5, noting: the project aims to identify socio-economic indicators for the use of the GBR, fishing, commercial fishing, tourism, etc. Progress to date includes workshop held in November 2006 to inform various end-users but also to facilitate their involvement.

Afternoon Session – Workshop Discussion

Note: The general discussion for Day Four is recorded here in note form only.

Sheriden Morris (RRRC) outlined the aim of the discussion session, noting the Great Barrier Reef Operations Sub-Committee would be undertaking an extensive review of ARP1 projects on Monday 23 April, and outputs from that meeting would feed into the Steering Committee meeting on 2 May to make recommendations on future of projects up through RRRC Board to DEW for consideration. Hoping to get interactions and collaborations we're looking for today, so there is greater comfort with the outputs of MTSRF. MTSRF is applied science program with delivery of key outputs

Sheriden Morris requested any ideas, comments, concepts or basic questions of clarification from the workshop participants regarding Program 1 led by Peter Doherty.

Peter Doherty (AIMS) began, noting it is not a very complex program, with major delivery through three projects. Synthetic data analysis project is the one going forward into Year 2 and that's the one he'd like comment on.

Dave Wachenfeld (GBRMPA) noted that, at some stage, MTSRF would develop the Great Barrier Reef Integrated Report Card. We need to start thinking about all the pieces that have to fit into the that process. Peter Doherty responded, noting work on the framework commenced this year, and strategic data analyses will feed into that framework. Appropriate indicators identified was not the aim for this year, focus was on work by Glenn De'ath.

Sheriden Morris noted that in terms of biological and social indicators, some groups have progressed well, while others haven't. The aim of Year 2 is to workshop indicators to share some thinking and move all projects forward. Aim to hold workshop early in Year 2.

Helene Marsh (JCU) asked "How is the indicator process for GBR going to dovetail into conceptual framework on Outlook report which Jon Day of GBRMPA is planning for?". Jon Day responded, noting that clearly indicators are an important part of the Outlook report and they are working now to develop a framework for integrating the information. Dave Wachenfeld (GBRMPA) added that the timing of the report was scheduled for 2009. The Outlook reports would then be produced every five years. If useful work on indicators is completed by MTSRF in 2009 and 2010, it will be into the next Outlook report. The first report will evolve into the next, and so on.

Sheriden Morris stressed that indicators can't sit alone. They must sit in a framework to tell what they mean, what they imply. There is a huge amount of expertise here to start to contribute to understanding the framework.

Russell Reichelt (RRRC) commented on the alignment of MTSRF outputs with Outlook reports. There are some points of anchorage – a legislative reporting system means we have to switch on to that. Framework will be important for ongoing Outlook reports. Work out what's required to deliver necessary population of data to fill the Outlook report – how do we want it to look? We might find we lack the monetary resources. Think about the

outcome and where we want to be... part of this review leading up to ARP2 needs to include “where do we want to be... how do we service the 2009 report?”

Sheriden Morris agreed, noting that this puts pressure on what we are doing today however. Part of the MTSRF charter is looking at better, faster and more effective ways of monitoring, and includes setting up a risk management framework. Do our programs do that?

Peter Doherty responded, “not completely, of course. When we discussed these issues throughout the past twelve months, there was an investment in strategic data collection and data analysis because data sets gave sufficient richness and information content that is useable. There are many ways to extending this to biodiversity indicators. It is not, at present, easy to see the pathway for pouring that into the Integrated Report Card other than what we currently do – analyse and feed into regular status reports.” Hugh Sweatman (AIMS) added that lots of indicators are available in the data, but what we don’t have is reference points.

Dave Wachenfeld (GBRMPA) emphasised risk assessment – the key differences between Outlook reports and the way GBRMPA has undertaken *State of the Region* reporting. GBRMPA has used indicators in the *State of the Reef* report to make statements about the condition of the reef, but the Outlook report will be more explicit. We might need to change what the indicators are. Sheriden Morris asked if the Outlook report would identify potential policy or management response frameworks? Jon Day (GBRMPA) commented that it was up to the Government to respond.

Laurence McCook (GBRMPA) raised thresholds and indicators, noting a real risk in trying to be too precise and too concrete. Where it can be done well, it’s clearly effective as a management policy tool but to get it wrong has consequences. Sheriden Morris added that thresholds indicate points when we start to become concerned or to take action, however it’s clearly grayscale, not black and white. Peter Doherty queried whether some indicators are more important than others, to which Russell Reichelt responded that there seems to be a mis-match in scales. Management seems to revolve around pressures, rather than what pressures are doing to the system.

Rob Coles raised the need to show farmers that tourists are reporting that the reef is degraded, otherwise approaching managers with problems simply won’t work.

Sheriden Morris asked whether agreement would be reached by, say, five scientists as to what they consider to be a ‘reef under stress’? Hugh Sweatman (AIMS) responded, noting that a huge variability exists due to arguably natural occurrences – COTs, tropical cyclones, etc. – which would swamp the subtle human impacts. The challenge is to identify the human change in a naturally varying system.

Hilary Skeat (GBRMPA) commented that the choice of indicators is quite easy – the hard thing is to identify what difference all of these ‘pressures’ make to trends. Therefore, what is the outlook? Dave Wachenfeld (GBRMPA) said that 99% of management actions are not manipulated by the environment, but by what people do in the environment. We can’t simply measure coral cover and find something we don’t like; have no idea what pressures made that happen and no idea what to do about it. What are the pressures doing? Which pressures do we need to address? Management can’t address everything simultaneously. We need a cost-benefit analysis to see which area is best to be addressed and when. Indicators of pressures are at least as important as the indicators of the conditions for management.

Russell Reichelt commented that we need to know the causal links. We will manage for that and carry on trying to understand that link. We need a ‘no regrets’ policy. Sheriden Morris suggested there exists an outrage factor associated with some of these issues. There are also other forms of ecosystem indicators as Russell Butler Jnr. pointed out (i.e. input of Traditional Owner knowledge). There are other styles of indicators that we have to be innovative enough to test to see where they align and how we can use them. This is a big challenge for MTSRF and for the Outlook report.

Russell Butler Jnr. (ARC) gave an example in response to Sheriden's comment, noting that scrub turkeys are a good indicator. Near Malanda (Atherton Tablelands), Traditional Owners have noticed an increase in females being born – the sex of the birds is determined by outside temperature. This reflects climate change. A group up around Wujal Wujal have noticed the size of mussels are reducing and have a collection of shells to show this. Their seasonal indicators are changing and the Traditional Owners would like to see research benefit from these sorts of observations.

Alastair Birtles (JCU) queried whether the sort of indicators and thresholds to be identified by the MTSRF would be appropriate, suggesting that if time is as short as climate change indicates, researchers should perhaps focus on 'outrage factors' to influence the Australian community to take action. If the Outlook report only suggests possible options and not really strong messages, decision makers don't have the information they need. We must empower the community. Refine the outrage factors so they stand up to rigorous scrutiny. If we can't come up with 'canaries' that will sing strongly to community and the government, we have avoided a great responsibility that rests with us.

Kirstin Dobbs (GBRMPA) argued that Alastair's comment brings its own form of management implication, for example, humpback whales – if you took away the human pressures, the animals would repopulate. Alastair responded, saying that yes, that was the outrage factor and it had worked.

Dave Wachenfeld (GBRMPA) noted that Coral Trout are a great indicator – they are predatory; if you impact on their numbers, it impacts on the numbers of their prey as well. It's important to have indicators to which the public can relate. Work that AIMS is doing does not enable the community to buy into water quality programs due to the types of indicators being used. We need to choose indicators that the public will be able to use. Comment from the audience was that community education is the key. The freshwater researchers have a much better take on that than reef researchers, who tend to focus on things the community loves however our baseline education about how the reef works is lacking.

Rob Coles (QDPI&F) stated that he shared Alastair's concern, however painting a negative picture was not necessarily the best way to move forward. Fisheries have made drastic cuts and we shouldn't avoid taking this into account. We understand the pressures on the reef and are trying to respond. We need to make links from thresholds to outcomes. Anne Clarke (QDPI&F) added that Seagrass Watch is doing just that.

Laurence McCook (GBRMPA) raised the outrage factor again, noting it is important to find balance. We have a strong record of objective rational high quality science that is not over sensationalised or dramatised. One of our powerful tools is to simply provide robust peer-reviewed science that plainly states, "We have a crisis".

Comment from the audience was that scientific reporting was not enough and that it's 'all about political strategy'. The community isn't moved by science, however it is persuaded by people who say "You must do this particular action, or that particular result will happen".

Helene Marsh (JCU) commented that this workshop on indicators should not be restricted to the research community. We need experts for input and political advice on how to influence the community's values. None of our science is based on how to influence the political process. It's not irrelevant to a workshop about indicators, just as input from the science community is not irrelevant. We need the whole package to come up with robust and socially influential research.

On another matter, Sheriden Morris asked, "What about other habitats, such as seagrass? Are we hitting the mark with seagrass research? Would five seagrass experts come to agreement on what is a healthy seagrass ecosystem and what are best indicators?"

Michael Rasheed (QDPI&F) suggested yes, five experts would reach agreement on what constitutes a healthy system and what to monitor. However they would only reach a complex answer on what the thresholds of concern are. Seagrasses vary so much and behave very differently between species. Experts would not come

up with one figure *per se*. Sheriden Morris queried Jos Hill of Reef Check Australia regarding seagrass monitoring activities, asking, “Reef Check has the assistance of many monitoring volunteers. Would you be able to point to indicators and have a group tell you what they think a healthy system is?” Jos Hill (Reef Check) responded, noting “Yes, we work with hard coral cover; how much algae is present; and we try to communicate in terms of change, and encourage people to think about what they see on the reef as well. If too much algae exists and coral is declining in any given area, we have an indicator. We have to have science input as well however. We feed data back into the system. It’s important that reports be politically focused – we need a united front. We can’t allow people to lose faith in science. If we are undertaking applied science, we must keep discussions in the right place.” Sheriden Morris noted a similar situation for water quality. We need a sufficient consensus even though all people may not agree.

David Wachenfeld (GBRMPA) noted he could not see from the MTSRF study of coral bombies on reef flats and cyclone frequency what the application of that information would be? Who will use this information, and for what? Peter Doherty responded, noting the project that had been presented was a student project with only minor investment. Laurence McCook supported the project, suggesting the application is for climate change – for documenting changes. Evidence of reef recovery from minor storms does exist but not for major storms such as Tropical Cyclone *Larry*. He suggested that the project would be of interest to GBRMPA in that the project has developed a capacity to date coral rubble, which allows management to demonstrate mass mortality due to catastrophic events. If much greater mortality is occurring, it tells us that we have a major shifting baseline in the condition of inshore reefs. If not the case, we still need to know the information.

Conversation moved on to Project 2.6.1, run by David Blair of JCU. David noted that the project hasn’t commenced yet, which is why little information was given at the workshop. The team will soon be starting on literature reviews, desktop studies and risk assessments. Student project gets started soon and outcome will be risk assessment. The team hopes to identify species of interest and produce an atlas to identify species themselves. Peter Doherty noted that the volume of shipping in the Great Barrier Reef Marine Park is increasing – the number of plants and animals being transported unintentionally increases every day. Not quite enough investment in the reality of the problem – scale of threat and scale of investment is mismatched. Sheriden Morris responded, noting that one project cannot run the whole marine invasive pests program, and that the QDPI&F would also need to collaborate on this project. Russell Reichelt asked what constitutes a species of ‘interest’?

Sheriden Morris moved discussion to sustainable use of resources, noting Program 8 was a large investment for MTSRF and suggested that management can manage the use of resources, as opposed to managing the system. Comments were sought from the audience.

Colin Simpfendorfer (JCU) noted that engagement with QDPI&F was progressing, with Program 8 providing input of what we can do now. Anne Clarke (QDPI&F) advised that good relationships had been built and the Department is feeding into the research as much as they can.

Sheriden Morris outlined the milestone process for MTSRF projects. Kirstin Dobbs (GBRMPA) said there was general community interest in results and that we must get the message to the public on what the outputs from the Program are. Need to feed out results, but also the process all the way along so it’s not a big surprise at the very end. Public don’t know much about invasives and their impacts, and why government might have a focus on those species in future. Word of encouragement to continue community engagement as the project evolves – good work so far with F&F group, who ensure regular engagement, which is great. Good model that could be picked up elsewhere in other fisheries. There are a lot of ways you can get the message out there – GBRMPA also has good community engagement programs.

Peter Doherty (AIMS) noted that his team had now made four public presentations through the community partnerships program with huge audiences who are very interested – has been very effective and cost effective mechanism. MTSRF could benefit.

Sheriden Morris spoke of the new RRRC media liaison officer who will assist with dissemination of information. We are looking for a series of players to assist with that process. We are fortunate to have a website that is accessible and puts the information out there.

Comment from the audience regarding community engagement; LMACs (eleven of these), which cover the whole coast. Enables talking with opinion centres within key stakeholder groups. LMACs meet every two months. Contact GBRMPA to get involved. People who have used that forum have found it effective.

Jos Hill (Reef Check) agreed that the LMACs were successful. “We run workshops with dive operators – they all have different stories to tell us. Many didn’t know about LMACS – be good to communicate with these sorts of committees. We need to be creative and think about how the public operates and gathers its own information. We need to be creative and use various medias to ensure people gain access.”

Martin Russell (GBRMPA) noted that timelines are important. You never have enough information to base management on – we always need information to make decisions. Fisheries management plans are an example of plans coming into effect; not all the information is there; adaptive management; as more info comes in; management is adapted to suit. Timeframes are very tight.

Sheriden Morris added that under the MTSRF framework we design and write a contract that is sharp and clearly spells out what you must deliver and when. We have an issue if projects change rapidly under framework because then we lose focus of where we’re heading. Some projects have slid off the rails. It’s important now as we get to ARP2 to ensure timeframes and milestones are right as much as possible and then know that we will stick to it. Many of these projects are fully linked and timing quite linked. Projects that fail to deliver on time have consequences all the way down the line. If one project slips up and has projects dependent on it, the others suffer. We must remain strict and well known to all players. The second we get wobbly, we lose track.

Anne Clarke (QDPI&F) asked if project personnel were aware of how they are linked with the other projects? Is the grand machine being communicated to all the other projects? Sheriden Morris responded, noting the system was not as good as it could be. The linkages are extensive so we’re trying to map projects in tight bundles. Legal links are clear, but “who is doing what” in the big picture is not quite clear yet.

Sheriden Morris moved discussion to the social science areas.

Bruce Prideaux (JCU) said there is opportunity if others want to feed into the projects or pull out information. We only have a small amount of staff if collaboration is needed – may need co-investment. The data is there – use it. Down the track, we’ll have to run workshops to teach people how to use the data to pull out specific information for their own particular industry or use.

Sheriden Morris added that if we want to add to the survey process, and gather information for your own projects, work with Bruce to do this. Steve Sutton’s work is also interesting in that he looks at social and resilience indicators and how to form policy frameworks accordingly.

Steve Sutton (JCU) said it was interesting to hear about ecological indicators and see whether we’re behind other projects. Quite a bit of work still to do. At the end of the day a set of indicators we can agree to would be most useful. What we are doing is managing people, not the reef or fish, but people’s values and activities. It’s community values that drives how management reacts. We need an understanding of what those values are. More work to be done in that area.

Day Five – Friday, 20 April 2007

Time	Program	Presenter
8.45-9.00	Introduction to Day 5	Sheriden Morris, RRRRC
9.00-10.00	Program 5i: Climate Change Understanding the Threat, Ecosystem Impacts and Mitigation for the Great Barrier Reef	Julian Caley, AIMS
10.00-10.30	MORNING TEA	
10.30-11.30	Program 4: Marine Species and Communities of Conservation Concern <i>Condition, Trends and Projected Futures</i> <i>Sustainable Use</i>	Helene Marsh, JCU
11.30-13.00	Program 3: Torres Strait – Status, Use and Trends	Alan Butler, CSIRO
13.00-14.00	LUNCH	
14.00-17.00	WORKSHOP SESSION (GBR AND TORRES STRAIT)	
17.00-17.15	RECAP OF DAY FIVE	Sheriden Morris, RRRRC
17.15-17.30	RECAP AND CLOSE CONFERENCE	Russell Reichelt, RRRRC

Morning Session – Presentations by Program Leaders

1. Opening and Introduction to Day Five..... Ms Sheriden Morris, RRRRC

Sheriden Morris welcomed delegates to Day 5 of the MTSRF Research Synthesis Conference, introduced the RRRRC team. Also introduced Margaret Johnson of DEW to the audience. Margaret introduced herself, noting in particular that six staff support the Commonwealth Environment Research Facilities in Australia, and two staff supported the MTSRF.

Afternoon Session – Workshop Discussion

Note: The general discussion for Day Five is recorded here in note form only.

Sheriden Morris kicked off the workshop session with an overview of discussions from Thursday afternoon, and asked the audience to think about the overall projects and provide suggestions for potential links, whether management is working effectively and whether enough synthesis has been achieved.

Dave Wachenfield (GBRMPA) suggested that climate is a big issue with the potential for the greatest impacts on the Reef. You cannot research the Reef and disregard climate. With MTSRF's limited funds it is important to establish not just internal links but external ones as well. Take climate change impacts such as sea level rises and coral symbiosis – there needs to be long term vision to incorporate all the other aspects. The problem lies in the fact that MTSRF has limited funds.

Alan Butler (CSIRO) noted a lot of work has been done all over Australia regarding climate change. There would be value in holding a climate change conference in North Queensland to ensure all agencies are on track with each other.

Kirstin Dobbs (GBRMPA) noted the issue of climate change requires community awareness. Must understand what climate change means for them. Must communicate results of climate change research into the broader community.

Russell Reichelt agreed, noting there is not a lot of consensus. Not a lot about adaptation and resilience. It needs some standardisation. The Greenhouse Office is under-resourced in socio-economic capacity. Best strategy for adaptation is to manage variability. Do we need to get consensus on what it means to manage

adaptation before we communicate? Kirstin Dobbs responded with suggestion of generic messages of climate change to be communicated.

Laurence McCook (GBRMPA) said it was important to distinguish between research and actually taking action, doing something about it. So far most adaptive strategies aren't relevant to climate change – only the effects of climate change. So far there is very little knowledge in terms of how we directly adapt environmentally.

Russell Reichelt made an example, noting that if 90% of corals die, there is sufficient consensus within the community to do something. It's these sort of realistic scenarios that are needed for potential solution otherwise it's not meaningful for adaptive management.

Anne Clarke (QDPI&F) said it was more a contemplation on the amount of work being undertaken. Don't reinvent the wheel – maximise what we can achieve for our dollar. MTSRF can help give creative spin and take scenarios of land management into application of methods to reef research. We also need a consistent definition of resilience.

Russell Reichelt said the idea of risk assessment is more pervasive now. We need assessment of collective risk, e.g. GIS, vulnerability, resilience and resistance. We need spatial analysis and collective risk assessment. The Water Quality workshop on Wednesday agreed to this. Public dialogue is now occurring but it is a long way from effective data management and sharing. We can encourage this to enable top science into resilience and protection.

Sheriden Morris asked how should we report climate change knowledge and information into an Outlook report. Risk maps? Pressure, state, response?

Helene Marsh asked how do we integrate all this spatial information without it being too complex? How do we weight ecological and social consequences of social outcomes? How do we bring in policy makers and political response influenced by policy makers.

Alistair Birtles responded, noting Helene gives a convincing argument for adaptive management structure. Need social, ecological etc. components. It's all about management – a component needed in adaptive management. Do we need to tweak our plans or do we need radical new ideas in approaches to management. Do managers have enough science to make radical changes?

Sheriden Morris noted that community engagement will be important in Torres Strait. With that, Sheriden introduced Vic McGrath of the Torres Strait Regional Authority, noting that Vic participated in the AI Gore conference in November 2006.

Vic McGrath introduced himself as a non-scientist, noting "if I don't understand the impacts of climate change, the Torres community won't understand either. The Torres people have no idea what we're talking about. They know about weather and seasons but not on climate *per se*. Discussions should revolve around education and the local region, and not watching TV where everything is based on global issues. The Torres people are worried about rising sea levels – they don't want to leave their homes on islands that are threatened by rising sea levels." Sheriden added that Vic's work goes beyond climate change impacts in the Torres Strait.

Russell Reichelt moved discussion to the broader issue of emerging ways of talking about all this. Mitigation in a global picture. For example, the Kyoto Protocol, down to carbon responses, down to light bulbs. Adaptation is regional – in Cairns, move the hospitals to higher ground if the sea level rises. MTSRF puts the spotlight on values which feed into the debate for consensus and leads to policy change. We need to be clear on feeding into adaptive management.

Andrew Chin (GBRMPA) said we don't need to invent more, we need to communicate what we have already done – a role for MTSRF?

Sheriden Morris moved discussion to species of conservation concern and asked the audience for their feedback on the MTSRF project. Kirstin Dobbs noted the presentation was good and advised that GBRMPA was working

closely with the project. There is good communication between researchers and managers which ensures the research can be picked up and best used. Running fairly well – other state agencies need to recognise the benefit of the research and will use it.

Russell Reichelt added that there are also unmanageable factors, “manage the avoidable and avoid the unmanageable.”

Kirstin Dobbs (GBRMPA) advised that cross jurisdiction problems do exist. Need agencies to work more closely to ensure the most benefits. It boils down to ensuring people have the information needed to make decisions and manage effectively.

Mark Hamann (JCU) raised two key issues – threats to green turtles and commercial use and effects of fishing. Helene Marsh (JCU) noted the perception that unless we know more about these two threats it is hard to obtain Indigenous input – Indigenous people are concerned that commercial harvest of turtles and Indigenous use of dugong is totally unregulated. We have no handle on the magnitude of the issues. The Indigenous people see these issues as unaddressed and ignored.

Vic McGrath (TSRA) supported the comment and said it has been a problem since 1984. Including all the stakeholders in the Torres means that you have to include all the villagers – internet communication is not effective as they don't have computers. Potential new plans will collapse due to a lack of effective support from international representation. Since the work of CRC Torres Strait and the Reef CRC, there is more understanding by the villagers with some good outcomes.

Peter Doherty (AIMS) raised a point that we can't manage animals, such as turtles and dugongs, that swim into the waters of other countries. MTSRF can't answer such massive questions and problems. Alistair Birtles (JCU) suggested these are species that are iconic and culturally vital. We can't just ignore the problem. Iconic species have resulted in socio-economic and ecological research – we can't waste that. It doesn't matter that we get tourism industry right if other close by countries don't act the same... Peter Doherty (AIMS) responded, “No, I was questioning whether it's MTSRF's highest priority given the small investment potential. Where are priorities for investing in MTSRF?”

Anne Clarke (QDPI&F) raised another process question, “We're suggesting policy changes here – where does MTSRF sit? Is it our role to suggest changes, to craft them or to sit them on the table?”

Russell Reichelt commented that it is about informing public policy which is a major MTSRF objective. Sheriden Morris added that MTSRF's role is to present information in a manner that can be picked up by policy makers. Alastair Birtles (JCU) said it is an opportunity for MTSRF to look at management and research and whether we have turned enough to react in a timely way to issues such as climate change. Sheriden noted that no, it's for management agencies who are represented in the MTSRF Steering Committees to pick up on. This process will mature as Steering Committees mature, information flow will be better. Alistair suggested we need the community on-side if policy makers are to be forced to make changes in order to respond a timely manner. I don't think MTSRF has the capacity to do this.

Laurence McCook (GBRMPA) said if MTSRF develops a new community engagement arm it will duplicate what is already existing. Needs to enhance current community engagement structures, re Steering Committees – informal communication with researchers level is fundamental – that's where dialogue originates and feeds up.

Rob Coles (QDPI&F) said, “Peter Doherty is right – we have no resources to extend into other countries. They've been arguing for ten years. It's outside the grip of MTSRF.”

Colin Simpfendorfer (JCU) referred to Laurence McCook's comment in that we facilitate managers in project teams to enable this.

Kirstin Dobbs (GBRMPA) suggested we just need to ensure MTSRF information feeds up to Papua New Guinea so they can pick it up. Sheriden Morris confirmed this was possible by passing information through DEW to Papua New Guinea.

Helene Marsh (JCU) suggested it was important to hear the islanders' concerns, they don't feel they are being heard. The Rainforests and Catchments workshop earlier in the week was a good example of how Indigenous interests can be heard and they can share the knowledge.

Afternoon Session – Torres Strait Program Presentation and Workshop

Discussion

1. Program 3 – Torres Strait: Status, Use and Trends Dr Alan Butler, CSIRO

- Alan Butler gave an overview of the Torres Strait program which leads on from work conducted under the CRC Torres Strait.
- TSRA Marine Research Suppository – Google interface that allows you to search for research projects based in Torres Strait.
- Project 1.3.1 adds value to existing dataset – Year 1 project only.
- Project 1.3.2 run by Alan Duckworth, AIMS. Torres Strait sponge survey. Looking at genetic analysis, sponge recruitment, commercial sponge species distribution and abundance. This work picks up on some other species – a spin off for other projects.
- Research Plan exists up to Year 4 but it depends on the rest of the Torres Strait projects.
- Project 1.3.3 led by Sean Pascoe, CSIRO. Economic analysis – liaise with other economists as to what sort of resource economic projects are needed in the Torres Strait.
- Project 1.3.4 led by Vic McGrath, TSRA. The benefits of the Torres Strait Integrated Report Card – promotes collaboration.
- What do scientists expect from community input? What does the community expect from scientists?
- Project 1.3.5 – Potential for milestone report to only report on “work in progress” by June.
- Alan suggested ARP2 proposal to the RRRC by early 07/08 fiscal year. He wants to keep the current Year 1 funding amount.

Workshop Discussion

Note: The general discussion for Day Five is recorded here in note form only.

Andrew Chin (GBRMPA) commented on the strengths of consultation with the stakeholders, noting it has the support of people who own the data.

Sheriden Morris outlined the primary function of Project 1.3.5 is to feed into the Torres Strait Integrated Report Card. TSRA will drive the background – will link into formal reporting for Federal Government, etc. Starting to move in that direction.

Vic McGrath gave an overview of his work to date, noting he has been in the job for less than three months and hence the project started quite late. Responsible for compiling feedback from community. The community still needs to understand what all the talk of climate change and environmental issues means. Vic's job is co-funded by MTSRF and TSRA and deals with coastal erosion; NRM; climate change; capacity building for Native Title units; Traditional Owners; assist with community consultation; policy work; monitoring and evaluation of core fund-raising for TSRA Land and Sea Management Unit is NHT with input from MTSRF and TSRA. Contractual

milestone reporting with Damian Miley. Yorke Islanders employed on sponge research also – training; advice, etc. Community engagement TSRA web ready Sept/Oct. LGA collaboration but only on compliance. There will be no more community councils under the Local Government Act. A super-shire is to replace them – changes are taking place now. Workshop will be held for communities to look into NRM. MTSRF Torres Strait Steering Committee chaired by Damian Miley. ARP2 activities proposed. Discussion with communities – get people talking and identifying what they can feed into. Research has a low priority to communities of the Torres Strait. Written briefs to Environment Portfolio representative. Careers market. Yorke Island sponge project. Helene Marsh has input. Develop a new set of research protocols for TSRA.

Helene Marsh (JCU) raised concerns that Program 4 is disconnected to the Torres Strait Steering Committee and asked if the RRRC feels they have adequate formal connection with the decision making process? Sheriden Morris responded that better representation from Program 4 was required on the Committee and perhaps Helene should be invited to join as a Committee member, particularly for input into the Torres Strait Integrated Report Card project. Helene asked if this could be formalised.

Kirstin Dobbs (GBRMPA) said the community of Torres Strait needs to know this isn't the only program being conducted.

Russell Reichelt advised that at the second Steering Committee meeting, Damian Miley of TSRA proposed an email exchange process to pick up work of many others and make it known through Vic McGrath who can pass on to others. Vic McGrath (TSRA) advised he was happy to follow up but that he needed to receive the information in order to act on it – make sure we feed the information to them.

Alistair Birtles (JCU) said the Integrated Report Card is an integration process as much as a report card. Emphasis on information flow with community is perhaps a good model for process in longer term given work with engagement. Do the resource economics projects include tourism on the reefs? What does tourism mean for island communities?

Russell Reichelt noted that the Alliance for Sustainable Tourism has interests in the Torres Strait. AFMA were invited to have input into the Torres Strait program of MTSRF but declined. Too many other issues and gaps exist. Let's remain relevant to them. Helene Marsh (JCU) noted her appreciation for the challenge from AFMA. Challenge for Land and Sea management in the Torres Strait. Needs to be thought about if fisheries focus shifts again. Russell Reichelt added that it's a good strategy to just stick to current research focus.

Sheriden Morris added that Helene is right regarding obligations. We need to think about gaps and overlaps when setting MTSRF Torres Strait priorities. Any further questions? The climate change program does extend up to Torres Strait area – probably need more case studies because climate change will show up in Torres soon.

Alan Butler (CSIRO) said climate change may affect Torres Strait more than we think. What if ocean flows change? We have no idea what will happen. Vic McGrath asked, "What does the southern drought mean for Torres Strait? Increased river flows, turbidity, increased rainfall. Perhaps link up with other work. Food for thought."