

Outcomes from the first stage of: Identifying R & D Needs and Priorities for the Great Barrier Reef Catchments

To fulfil the requirements of the Reef Water Quality Protection Plan

By Dr Joelle Prange
and the CIRM Reef Catchments Working Group

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Background and Introduction

Who is CIRM ?

The Consortium for Integrated Resource Management (CIRM) is a formal linkage network of research providers who share a common interest in natural resource management in Queensland and northern Australia. The current partners of CIRM include three Queensland State Government Agencies (including the Department of Natural Resources and Mines, Department of Primary Industries and Fisheries, Queensland Environmental Protection Agency); four universities (University of Queensland, Central Queensland University, Griffith University and James Cook University) and the Commonwealth Scientific and Industrial Research Organisation. The CIRM Board acts as a reference group for CIRM's activities, and is composed of the CEOs of each of the partner organisations.

The primary objective of CIRM is to support and facilitate the planning, coordination and collaboration of research and development initiatives through:

- Facilitating and enhancing cross-agency collaboration for the implementation of priority research for natural resource management initiatives
- Maximising the opportunities for science to form an effective and timely basis or policy, management and decision-making.
- Ensuring holistic, systems-based approaches to natural resource management research

It is now universally acknowledged that resource management issues extend far beyond the scope of any single agency or organisation – that they are the responsibility of us all and they need to be dealt with in an integrated, holistic way.

Because it is a process rather than an entity in its own right, CIRM does not undertake the activities of a centre or other formalised institutional structure. Nor should it be seen as in any way competing with, or usurping the role of, individual partners or their key staff. Rather, its aims are collaboration, brokerage, communication and a shared approach to common issues.

CIRM has established five working groups with its' partners and other organisations to facilitate the development of R&D priorities. The current working groups of CIRM include;

- Reef Catchments
- Social and Community Dimensions of NRM
- Aquatic Ecosystems
- Native Vegetation Management

CIRM Reef Catchment Working Group

Purpose

The Reef Water Quality Protection Plan (RWQPP) is an overarching policy, planning and implementation document focused on addressing diffuse pollution sources from broad scale land use in the Great Barrier Reef catchment, with the goal of '*Halting and reversing the decline in water quality entering the Reef within 10 years*'. The objectives of the RWQPP are to:

- 1) Reduce the load of pollutants from diffuse sources in the water entering the Reef
- 2) Rehabilitate and conserve areas of the Reef catchment that have a role in removing water borne pollutants

In order to achieve these objectives, and the overall goal, the RWQPP consists of nine key strategies, supported by various actions. The strategies are:

- A) Self-Management Approaches
- B) Education and Extension
- C) Economic Incentives
- D) Planning for Natural Resource Management and Land use
- E) Regulatory Frameworks
- F) Research and Information Sharing
- G) Partnerships
- H) Priorities and Targets
- I) Monitoring and Evaluation

Research and development (R&D) activities are a critical component underpinning most of the strategies and actions of the RWQPP. To date there has been no overall coordinating mechanism that addresses the R&D activities needed to support the Plan. In response to this, the CIRM Reef Catchment Working Group was initiated in October 2004, with the objective to develop implement a process to facilitate the development of research priorities in the Reef catchment to support the RWQPP.

The Working Group is comprised of representatives from each of the CIRM partner organisations with additional representatives from The Great Barrier Reef Marine Park Authority, Australian Institute for Marine Sciences, Cooperative Research Centre for the Great Barrier Reef World Heritage Area, Cooperative Research Centre for Tropical Rainforest Ecology and Management, CSIRO Water for a Healthy Country, BSES Ltd, FNQ NRM Ltd, Burdekin Dry Tropics Board for NRM, Mackay-Whitsunday NRM Group, Fitzroy Basin Association and the Burnett-Mary Regional Group for NRM.

Objectives and Outputs

The primary objective of the CIRM Reef Catchment Working Group is to *'Implement a process to facilitate the development of research priorities in the Reef catchment to support the Reef Water Quality Protection Plan'*.

To achieve this objective the Working Group Group agreed its primary tasks and products would be to;

- 1) Identify and collate the current R&D activities in the Reef catchment
- 2) Identify and report on the R&D needs and priorities to support the RWQPP

The outcomes from the CIRM Reef Catchment Working Group will be published in a two part series;

Series A – A document highlighting the current R&D activities being undertaken in the Reef catchment, including detailed information on the project and mapping of these activities across the RWQPP, Natural Resource Management themes and in a regional (NRM) perspective.

Series B – A document identifying the R&D activities required for the effective implementation and support for the RWQPP strategies and actions together with an prioritisation of these needs.

R&D needs and priorities for the Reef Catchment

Introduction

In the end this document will provide a synthesis of the research and development needs and priorities in the Reef Catchment, which are required for the support and implementation of the Reef Water Quality Protection Plan. The process behind the development of these R&D needs has been a step-wise progression derived from consultation with the CIRM Reef Catchments Working Group as well as number of other stakeholders, research providers and research users.

At this stage the document is aimed at providing an overview on the progress to date to facilitate the final stages to be undertaken by the Reef Catchment Working Group and the next Communications Manager (to be appointed in April, 2005).

Process for identifying R&D needs and priorities for the Reef Catchment

Stage 1: Preliminary gap analysis

To provide an overview on the magnitude of current R&D projects, how these projects relate to the RWQPP and what evident gaps there are within the RWQPP; the total number of projects against each of the RWQPP strategies and actions were evaluated. The total number of R&D related to each of the strategies and actions of the RWQPP are presented in Figure 1. This exercise highlighted that there are a number of Reef Plan actions that a) have a vast majority of R&D activities (e.g. F4, A3, B1) and b) have few or no R&D activities (e.g. Strategy E, Strategy C, Strategy G, and actions A5, F6, F7, D2, D9, I2, I3 and I9). The outcomes from this stage highlighted obvious R&D requirements for the RWQPP.

Stage 2: Workshops to identify R&D needs/gaps for the Reef Catchments to support the RWQPP

The second stage of identifying the R&D needs/gaps for the RWQPP involved workshops with the Reef Catchment Working Group and other key stakeholders. The identified needs were sent for comment to the Working Group, their respective organisation and other key stakeholders. The final R&D needs identified for each of the Reef Plan strategies and actions are outlined in Appendix A. Each of the needs are mapped against the specific RWQPP Strategy and Actions, including information on the linkages to other Reef Plan strategies; the magnitude of the need (i.e. project or program) and the scale required (e.g. Regional, catchment or property).

Stage 3: First stage of short listing R&D needs for the Reef Catchment

As an initial stage of the prioritisation of the R&D needs identified for the Reef Catchment, the identified needs were sent to the Reef Catchments Working Group, Regional Bodies and other stakeholders. It was requested that each of personnel rank the importance of the need (from 0 – not important to 5 – very important). In total between 13 and 15 responses were received from the stakeholders and 4

responses were received from the Reef Regional Bodies. The results from these responses were graphed separately for the stakeholders and regional bodies, including the minimum, maximum and average response (See Figure 2 and 3).

During the last Reef Catchment Working group Meeting (18th March 2005) the responses from the stakeholders and the regional bodies were reviewed. An overview of the lowest and highest rated needs (with the least variation in the responses); those which were considered as either high or low by both the stakeholders and the regional bodies and those needs where a distinct difference was identified by the two groups are presented in Table 1.

The following needs highlights those that were considered of high importance by both the stakeholders and regional bodies.

R&D Needs ranked high in both the stakeholders and regional bodies responses

- A1-2 (F4-1) Develop effective tools to enable landholders to self-manage sustainability at property scale - e.g. targeted decision support tools, risk management information.
- A3-1 Investigate the effectiveness and efficacy of BMP models for industry-led action in achieving change on the ground.
- A3-4 Determine the impact of management practices (including all aspects such as riparian vegetation, road maintenance etc) on water quality outcomes across industries and regions
- A3-8 (F3-4) Develop useful and robust tools to assist land managers achieve cost effective monitoring and evaluation with an adaptive approach for sustainable NRM.
- A3-9 Develop models to assess the cumulative impact on water quality from the adoption of management practices (i.e. actual adoption rates, v's targets)
- A4-3 Define the benefits and costs associated with sustainable (BMP) land management.
- B1-4 (D11-2) Develop a process for the inclusion of indigenous values and understandings in NRM.
- B2-1 Integrate economic models with environmental cost/benefit
 - a) at a property scale through financial planning and
 - b) at a regional scale through economic assessment
- D5-1 Undertake land resource and land use capability assessment for priority areas at the required scale and identify mechanisms for change (if deemed unsuitable).
- D5-2 (F4-5) Identify, prioritise and map areas of high conservation significance using biological assessment at the appropriate scale

- D5-3 Develop remote sensing tools/new techniques for land resource/risk assessment

- D5-4 Investigate how to include social and economic aspects with biophysical R&D as part of Agricultural Planning Systems

- D8-1 Undertake research to increase the understanding of the movement of nutrients, sediments, pesticide etc (for process understanding and to validate models) e.g. groundwater – surface water – coastal zone, how much, where is it going and how does it behave under various land types/ management systems?

- D8-2 Update land use and land cover mapping and expand to include current managerial practices.

- F1-1 (F4-6) (G3-3) Refine models (in a cost and resource efficient manner) to adequately parametrise the impact of changing land management practices. Data collection at individual property scale is vital.

- F1-5 Develop models of impact of management practices on water quality

- F3-1 Contribute to existing monitoring efforts for condition and trends on grazing land and cropping lands

- F3-2 (H4-1) (I7-3) Develop catchment models to integrate appropriate catchment datasets to assess and predict condition trend and ecosystem threshold

- F3-3 (I7-4) Develop criteria and a framework for condition and trend assessment to interpret indicators of ecosystem health

- F4-4 R&D for landscape processes understanding eg isotope tracing of sediment/nut sources

- H1-2 Contribute to the improvement of baseline biophysical data/characteristics to develop water quality targets

- H3-1 Investigate the most appropriate ways to integrate the social, economic and biophysical outcomes from a range of initiatives into day to day practices (for waterways, wetlands and riparian zones in good condition)

- I5-1 Identify most appropriate monitoring in the Reef Catchments to meet needs of different stakeholders e.g. Evaluate community monitoring for the social, economic and biophysical benefits or positive outcomes.

- I6-1 Identify most appropriate community monitoring to meet needs of different stakeholders e.g. Evaluate community monitoring for the social, economic and biophysical benefits or positive outcomes.

- I9-1 Develop appropriate monitoring methods to assess management systems (BMP) in determining desired NRM outcomes.

The following needs had distinctly different responses by the Working Group and the Regional Bodies, some possible reasons behind these differences are highlighted.

A4-4 Research ways of 'demystifying' EMS and making it more acceptable to land managers

This need was considered a lower priority by the regional bodies, whereas a more variable response was received from the stakeholder group. It was suggested by the regional bodies that there would be no necessity to 'demystify' EMS if simply the name stopping changing e.g. EMS/PRMP

D7-3 Identify direct actions that assist land managers to meet Management Action Targets relevant to the GBR.

This need was considered a lower priority by the regional bodies, whereas the stakeholder group saw this R&D as a higher priority; it was suggested that this is part of the role that the regional bodies see themselves as fulfilling.

D8-6 Develop monitoring tools suitable for use in a regulatory framework

This need was considered a lower priority by the regional bodies, whereas the stakeholder group saw this R&D as a higher priority.

D9-1 Develop innovative approaches (e.g. remote sensing) to identify ASS risk areas

This need was considered a lower priority by the regional bodies, whereas the stakeholder group saw this R&D as a higher priority. ASS are an issues in areas/regions, thus research effort should be focused on the key areas.

F4-9 Develop of methods/ toolboxes for landholders and industry to manage priority degraded landscapes

This need was considered a lower priority by the regional bodies, whereas the stakeholder group saw this R&D as a higher priority. There was confusion over the way the need is stated i.e. Are new tools required to be 'developed' or rather is it more of a communication issue.

G2-3 (G3-6)

Assess how local/experiential/indigenous knowledge and technical/scientific knowledge brokered within the NRM sector?

This need was considered a lower priority by the stakeholder group than the regional bodies; the Regional bodies want to incorporate this information into the NRM sector.

G3-7 Define stakeholder engagement processes for effective, regionally-relevant R&D

This need was considered a lower priority by the regional bodies, whereas the stakeholder group saw this R&D as a higher priority; it was suggested that this is part of the role that the regional bodies see themselves as fulfilling.

H3-1 Investigate the most appropriate ways to integrate the social, economic and biophysical outcomes from a range of initiatives into day to day practices (for waterways, wetlands and riparian zones in good condition)

This need was considered a lower priority by the stakeholder group than the regional bodies; individual researchers or stakeholders may not see the need for the integration of socio-economic and biophysical factors; however it should be seen as a vital requirement for all research.

Stage 4: Criteria for prioritisation of R&D needs for the Reef Catchment

The working group acknowledged that although the above process has provided a short-listing of the R&D needs for the Reef Catchment, a number of criteria are required to undertake the prioritisation process, to ensure all responses are based upon parallel logic.

The following criteria will be used for the prioritisation of the R&D needs (in no particular order):

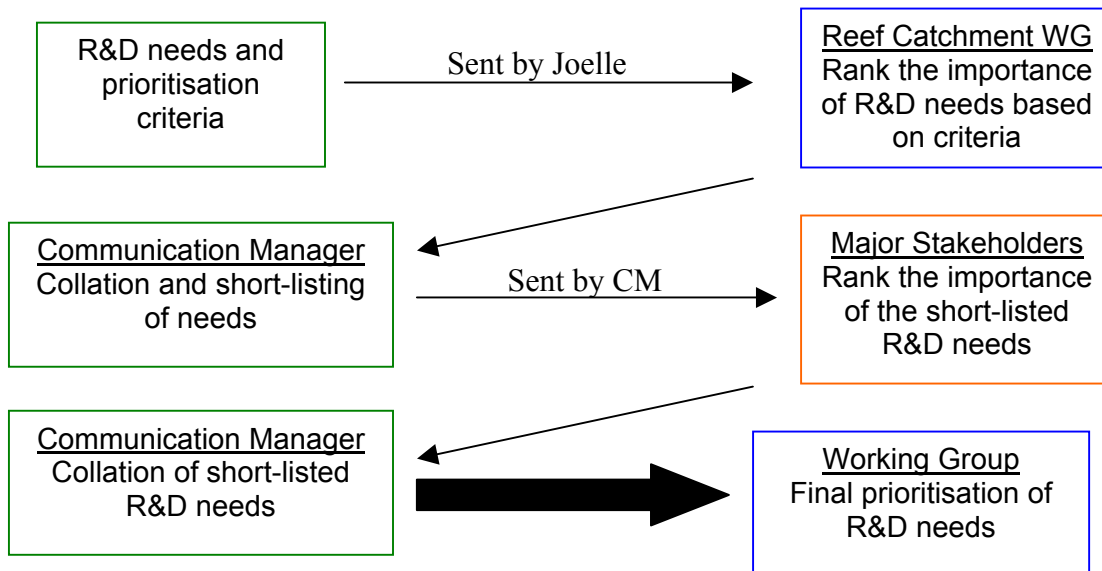
Criteria for prioritisation:

- 1) There is a broad acceptance by the majority of stakeholders (e.g. Regional bodies, industry group, government, researchers) that R&D need is a research requirement. (This should be a two-step process separately addressing R&D users and providers).
- 2) The R&D need is a high priority in either a) All of the Reef Catchment or b) Is a high priority for a specific region or sector
- 3) The R&D product lends itself for uptake by relevant stakeholders
- 4) The R&D will deliver within the Reef Plan timelines and is strategically targeted towards future requirements.

In response to this the R&D needs identified will be sent to the Reef Catchments Working Group, to allow a change in their responses based upon the above criteria. This will then allow a short-list of R&D needs to be circulated to the wider R&D stakeholder community to provide a broader response on the research and development needs for the Reef Catchment and finally a list of R&D priorities.

Final stages for the prioritisation process

The current Communications Manager (Joelle Prange) for the Reef Catchment Working Group will be finishing her contract at the end of March 2005. It is anticipated that another CM will be appointed by mid-April. The following provides an overview on the next stages of the process to develop R&D priorities for the Reef Catchments.



This will then lead into the next stage of the Reef Catchments Working Group, of scoping proposals based on R&D priority areas

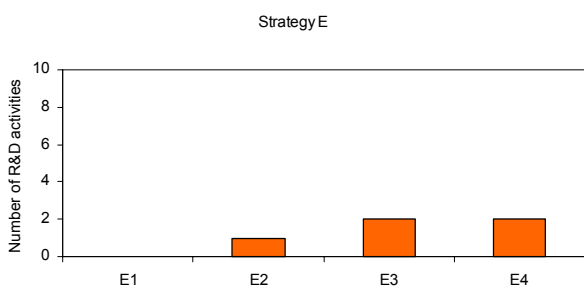
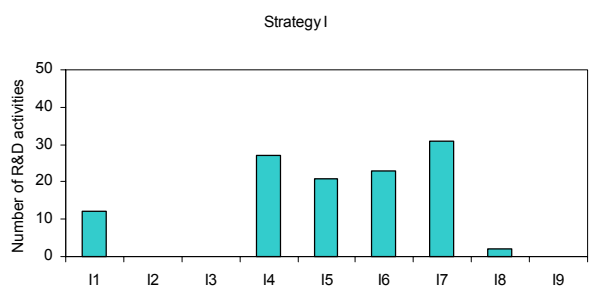
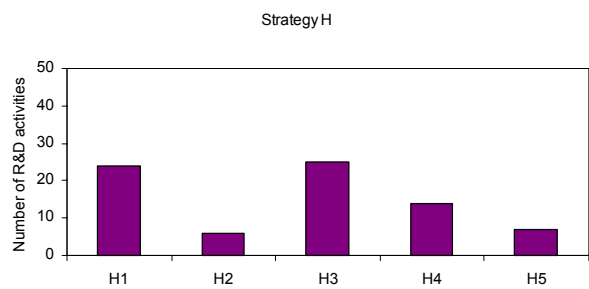
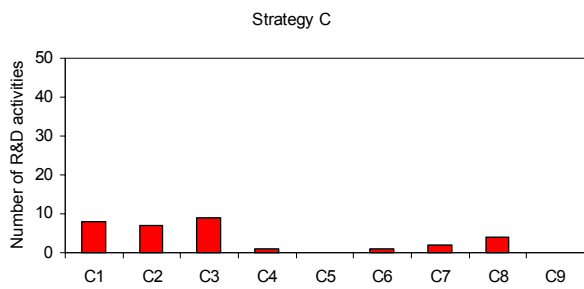
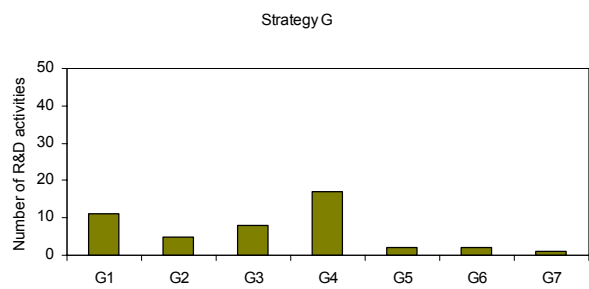
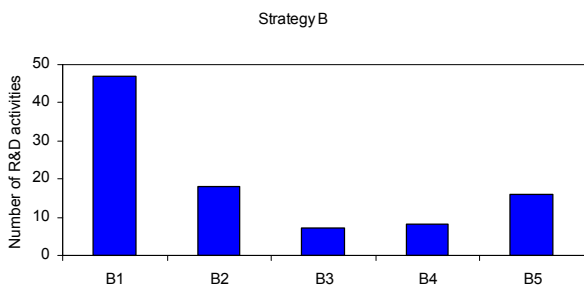
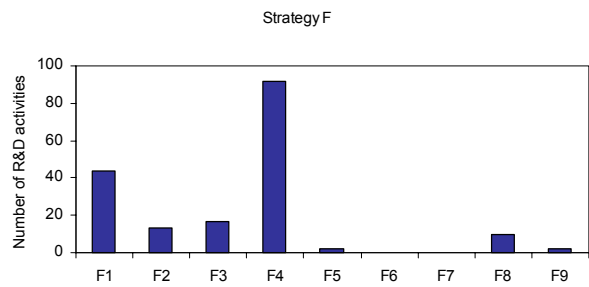
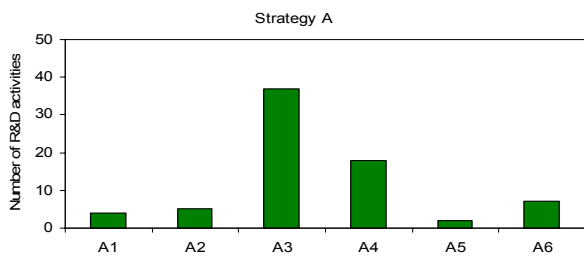


Figure 1 – Total number of R&D activities for each RWQPP Strategy and Action

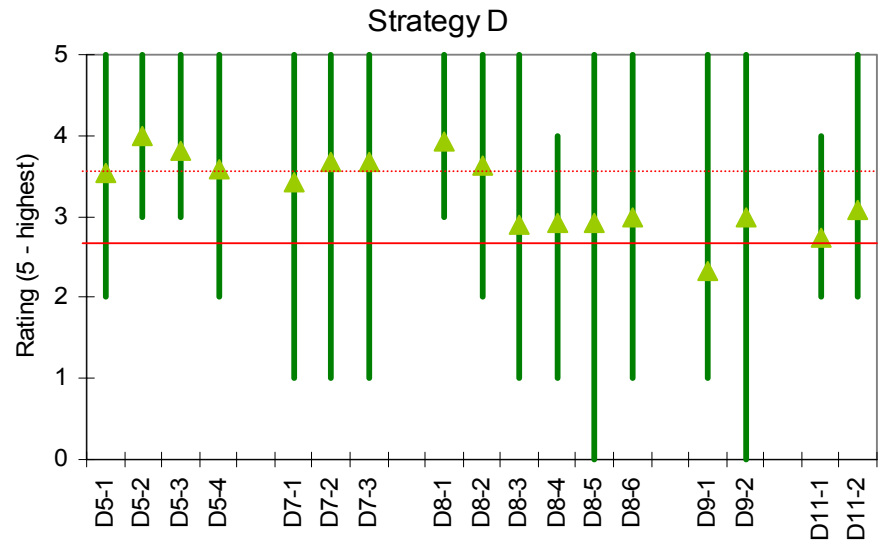
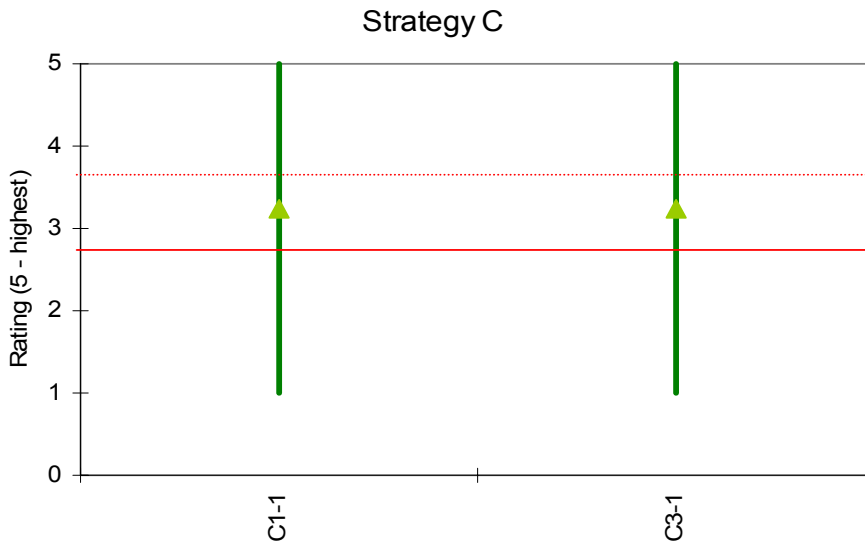
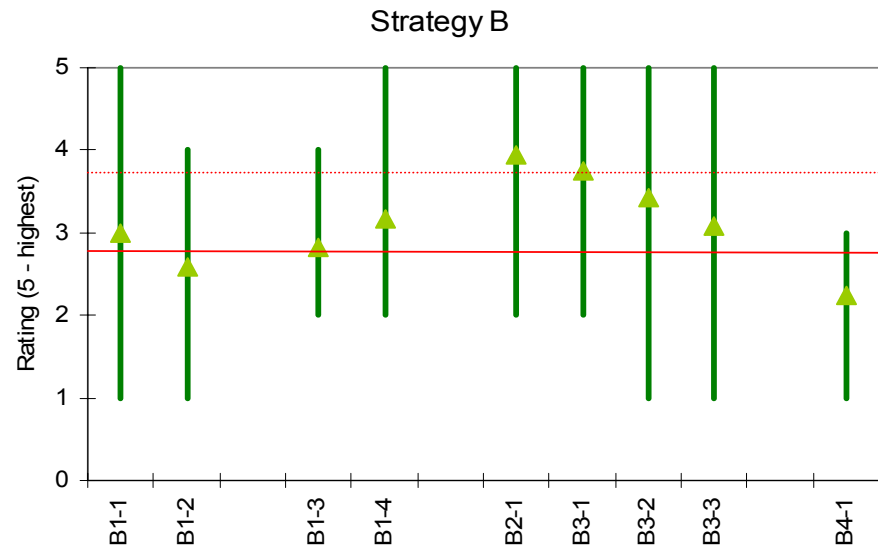
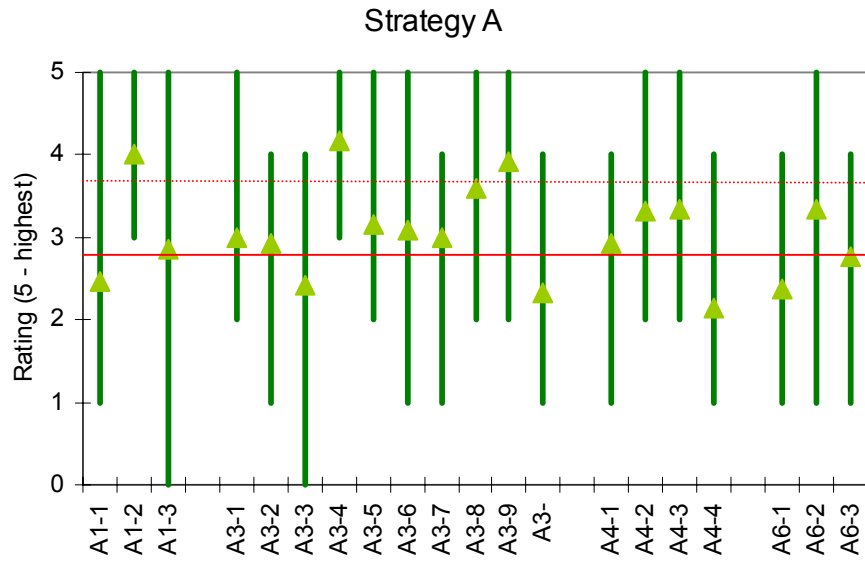


Figure 1a - R&D needs for the Reef Plan, as rated by key stakeholders, including the Reef Catchment Working Group and other personnel

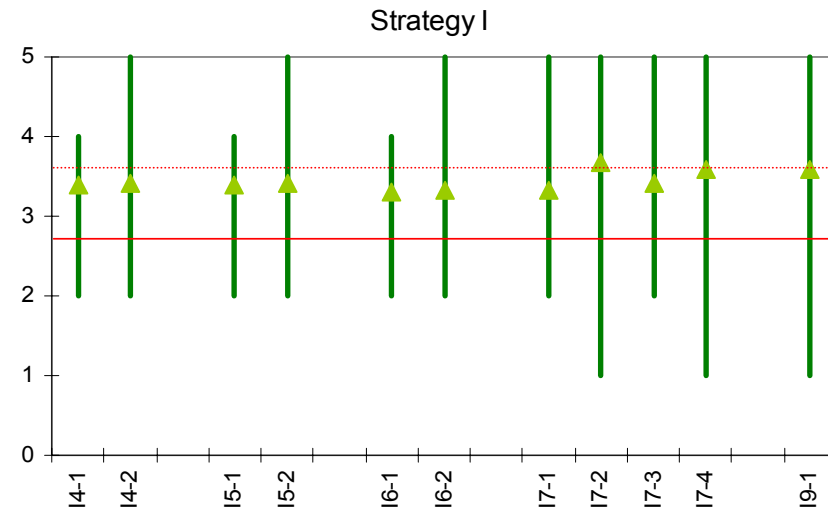
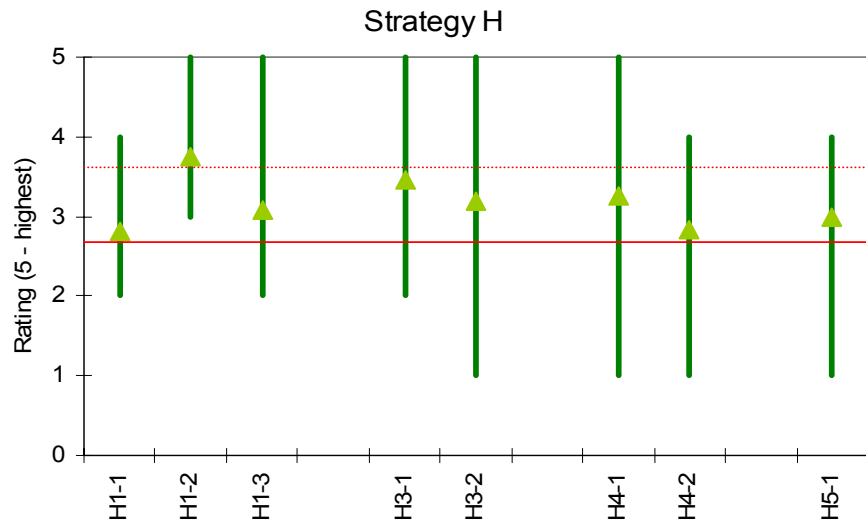
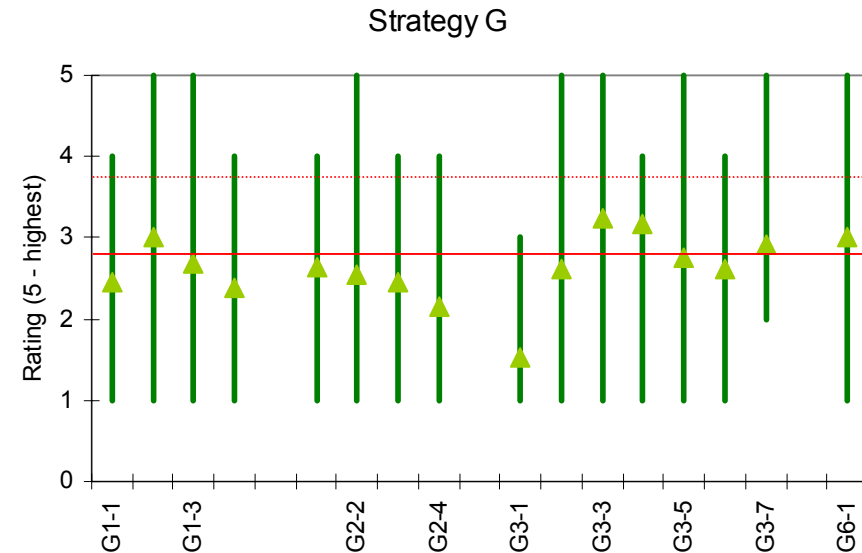
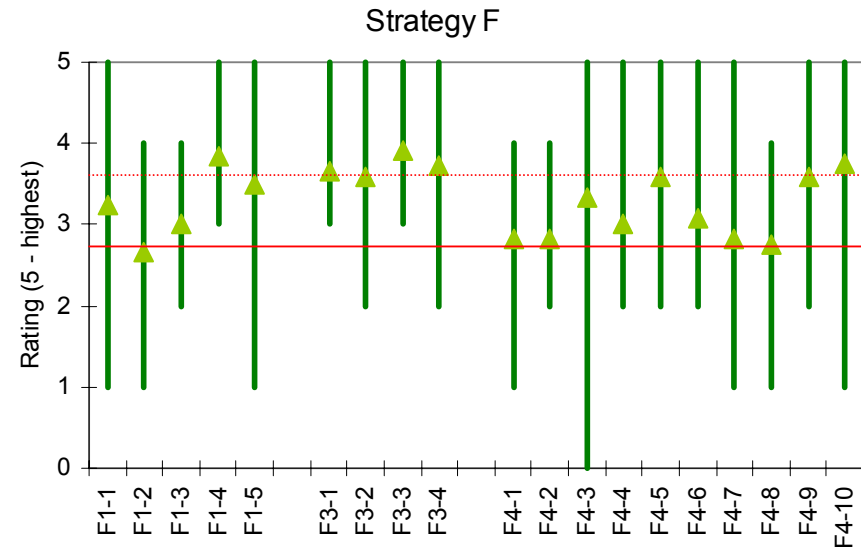


Figure 1b - R&D needs for the Reef Plan, as rated by key stakeholders, including the Reef Catchment Working Group and other personnel

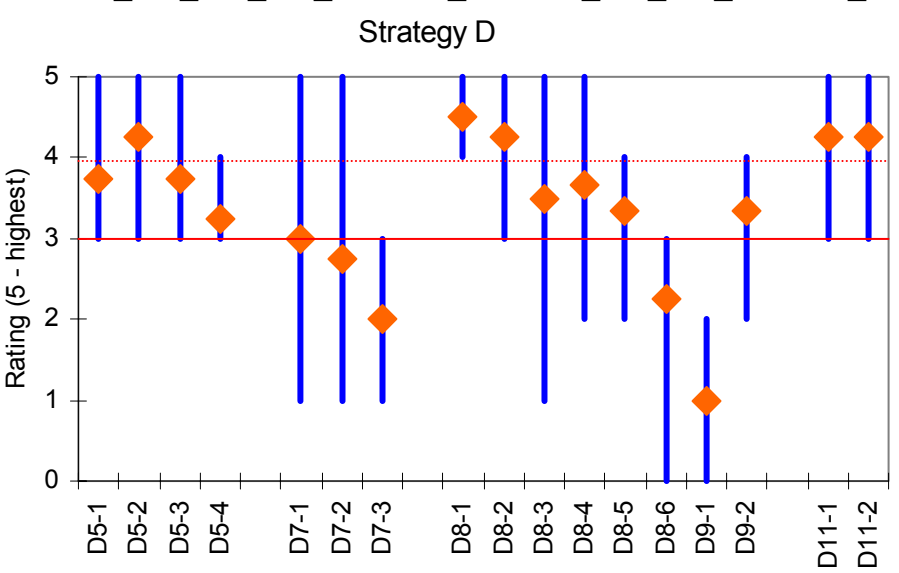
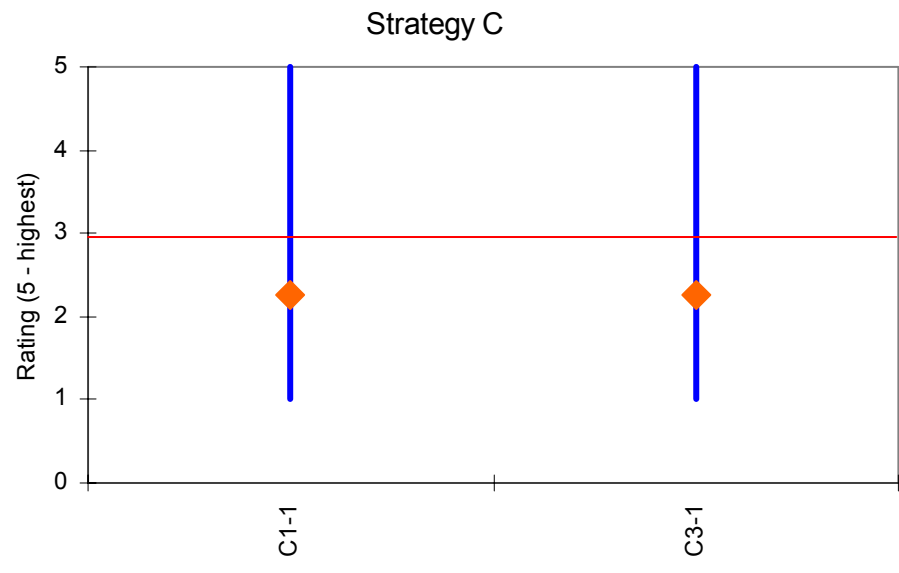
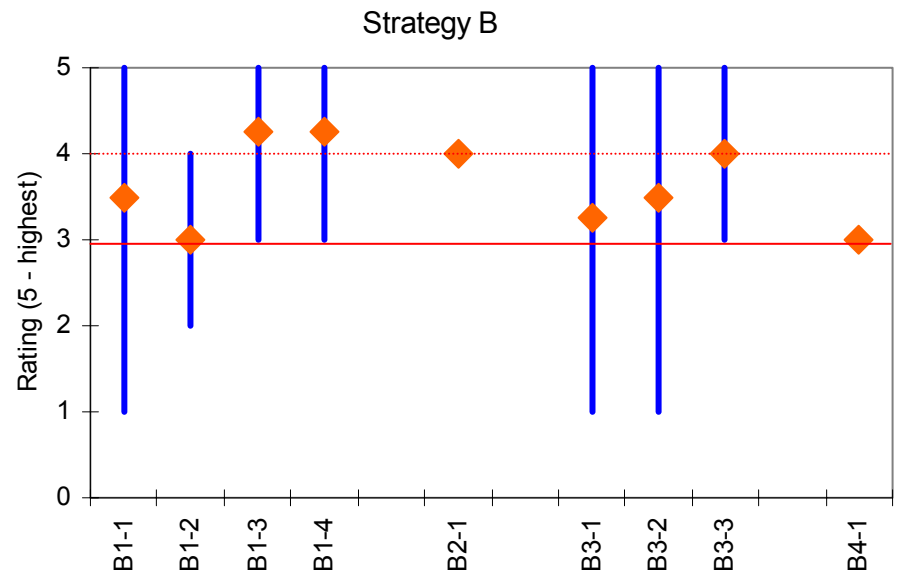
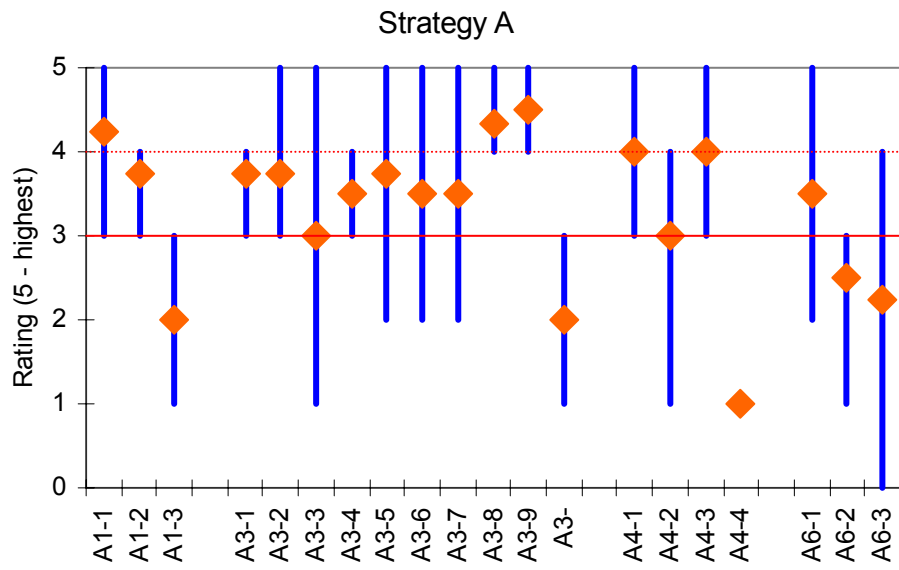


Figure 2a - R&D needs for the Reef Plan, rated by the Reef regional NRM bodies

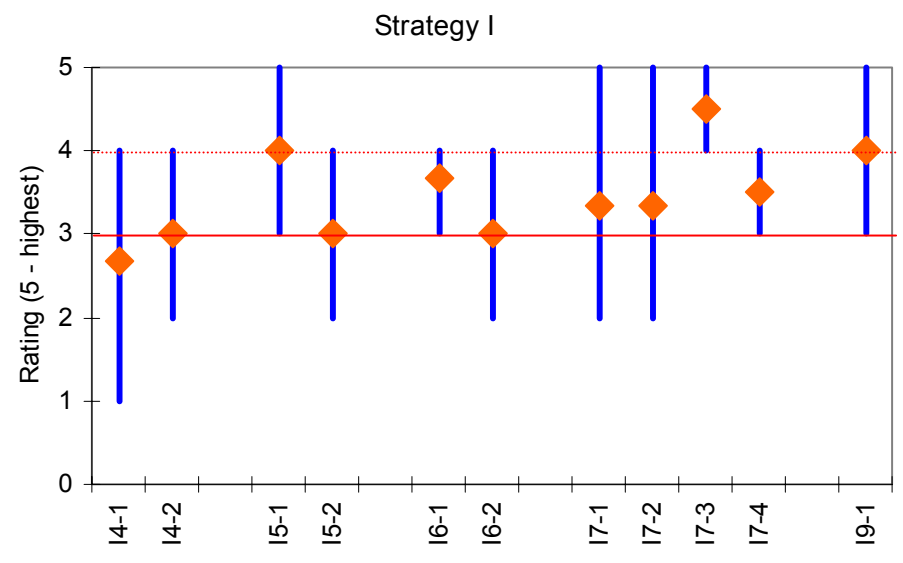
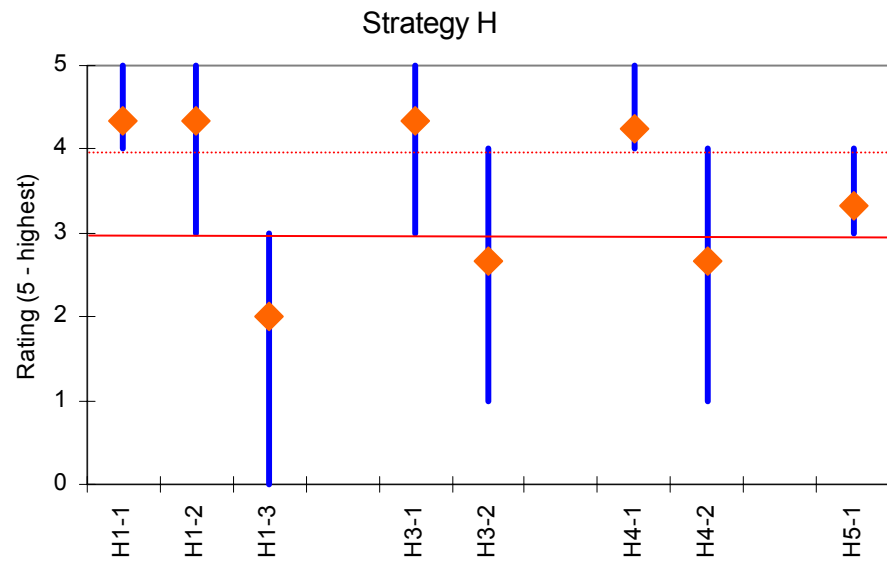
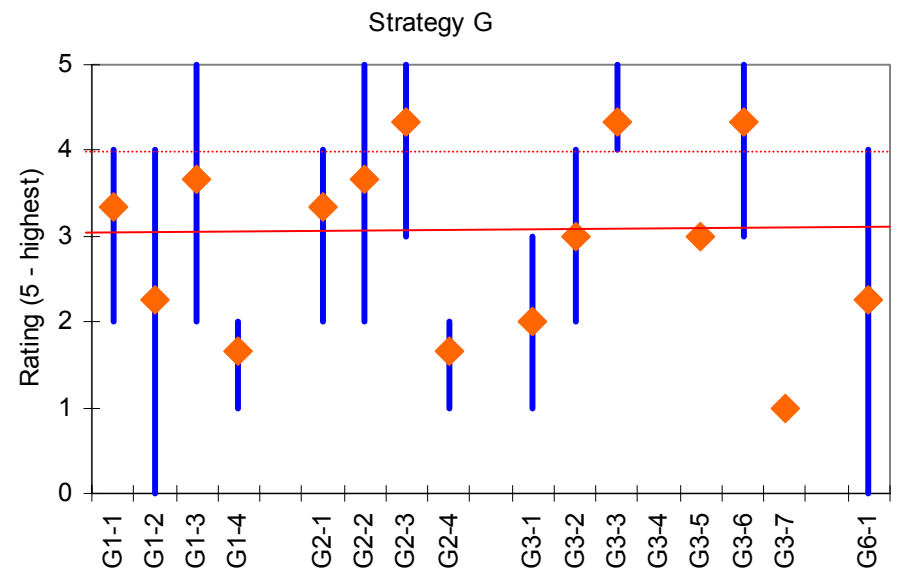
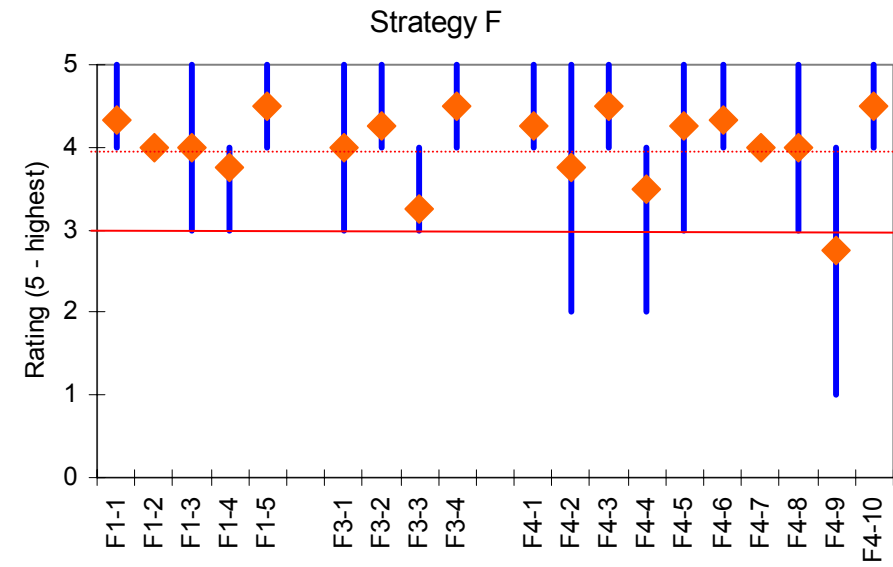


Figure 2b - R&D needs for the Reef Plan, rated by the Reef regional NRM bodies

Table 1 - Summary of the R&D needs highlighted as either of ‘high’ or ‘low’ importance by key stakeholders (the Reef Catchments WG + others, not including the regional body representatives) and the Regional Bodies.

Note: The overall column represents the needs that were considered high or low by both the stakeholders and regional bodies. Stakeholders n=13-15; Regional Bodies n=4.

	Other Linkages	Stakeholder		Regional Bodies		Overall		Not Aligned
		Low	High	Low	High	Low	High	
Strategy A – Self Management Approaches								
Action A1								
A1-1					High			
A1-2	F1-4		High		High		Low	
A1-3				Low				
Action A3								
A3-1			High		High		Low	
A3-2					High			
A3-3								
A3-4			High		High		Low	
A3-5					High			
A3-6					High			
A3-7					High			
A3-8	F3-4		High		High		Low	
A3-9	F4-10		High		High		Low	
A3-10				Low				
Action A4								
A4-1					High			
A4-2			High					
A4-3			High		High		Low	
A4-4				Low				Not Aligned
Action A6								
A6-1					High			
A6-2			High					
A6-3	G1-2; G6-1							
Strategy B – Education and Extension								
Action B1								
B1-1					High			
B1-2								
B1-3	D11-1				High			
B1-4	D11-2		High		High		Low	
Action B2								
B2-1			High		High		Low	
Action B3								
B3-1			High					
B3-2								
B3-3					High			
Action B4								
B4-1		Low		Low		Low		

Other Linkages	Stakeholder		Regional Bodies		Overall		Not Aligned
	Low	High	Low	High	Low	High	

Strategy C – Economic Incentives

The R&D needs identified under economic incentives need to be reviewed and scoped out in a more appropriate manner

Action C1

C1-1	C3-1							
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Action C3

C3-1	C1-1							
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Strategy D – Planning for NRM and Land Use

Action D5

D5-1								
D5-2	F4-5							
D5-3								
D5-4								

Action D7

D7-1								
D7-2								
D7-3								

Action D8

D8-1	F4-3							
D8-2								
D8-3								
D8-4								
D8-5	D9-2							
D8-6								

Action D9

D9-1								
D9-2	D8-5							

Action D10

D11-1	B1-3							
D11-2	B1-4							

Strategy E – Regulatory Frameworks

At this stage no R&D needs have been identified for regulatory framework, this needs to be reviewed

		Stakeholder		Regional Bodies		Overall		Not Aligned
		Low	High	Low	High	Low	High	
Strategy F – Research and Information Sharing								
Action F1								
F1-1	F4-6; G3-3							
F1-2	F4-7; G3-4							
F1-3	F4-8							
F1-4	A1-2							
F1-5								
Action F3								
F3-1								
F3-2	H4-1; I7-3							
F3-3	I7-4							
F3-4	A3-8							
Action F4								
F4-1								
F4-2								
F4-3	D8-1							
F4-4								
F4-5	D5-2							
F4-6	F1-1; G3-3							
F4-7	F1-2; G3-4							
F4-8	F1-3							
F4-9								
F4-10	A3-9							
Strategy G - Partnerships								
Action G1								
G1-1	G2-1							
G1-2	A6-3; G6-1							
G1-3	G2-2							
G1-4	G2-4							
Action G2								
G2-1	G1-1							
G2-2	G1-3							
G2-3	G3-6							
G2-4	G1-4							
Action G3								
G3-1								
G3-2								
G3-3	F4-5; F1-1							
G3-4	F1-2; F4-7							
G3-5								
G3-6	G2-3							
G3-7								
Action G6								
G6-1	G1-2; G6-1							

	Other Linkages	Stakeholders		Regional Bodies		Overall		Not Aligned
		Low	High	Low	High	Low	High	
Strategy H – Priorities and Targets								
Action H1								
H1-1					Blue			
H1-2			Green		Blue		Black	
H1-3			Green	Light Blue				Yellow
Action H3								
H3-1			Green		Blue		Black	
H3-2	H4-2		Green					
Action H4								
H4-1	F3-2; I7-3		Green		Blue		Black	
H4-2	H3-2							
Action H5								
H5-1					Blue			
Strategy I – Monitoring and Evaluation								
Action I4								
I4-1			Green					
I4-2	I5-2; I6-2		Green					
Action I5								
I5-1			Green		Blue		Black	
I5-2	I4-2; I6-2		Green					
Action I6								
I6-1			Green		Blue		Black	
I6-2	I4-2; I5-2		Green					
Action I7								
I7-1			Green					
I7-2			Green					
I7-3	F3-2; H4-1		Green		Blue		Black	
I7-4	F3-3		Green		Blue		Black	
Action I9								
I9-1			Green		Blue		Black	

Appendix A

Final list of identified R&D needs for the Reef Catchments

For the effective support and implementation of the Reef Water Quality Protection Plan

Strategy A: Self Management Approaches

A1 Promote existing and develop new guidelines and templates for preparing property resource management plans (PRMPs) that will assist in:

- Identifying issues relating to Reef water quality.
 - Implementing management strategies and actions to conserve and rehabilitate areas such as riparian zones and wetlands.
-

A1-1 Determine what are the features/characteristics of communities that support or hinder the achievement of planned goals?

- Differing world views
 - ways of using existing capacity
 - degree of engagement and dis-engagement within communities
 - issues of equity
- RWQPP – A1
 - Project/Program – program
 - Scale –

A1-2 Develop effective tools to enable landholders to self-manage sustainability at property scale - e.g. targeted decision support tools, risk management information.

- RWQPP – A1, F1 (F1-4)
- Project/Program – project
- Scale – regional (entrained into local management schemes)

A1-3 Develop engagement processes that recognise that land managers are business persons and motivated by self-interest

- RWQPP – A1
- Project/Program – project
- Scale – region

A2 Develop guidelines and templates to assist government agencies and landholders to establish and enter statutory covenants and agreements for nature conservation, natural resource management and other matters.

- No R&D needs listed

A3 Support industry led development of best management practice for land, natural resources and chemical use practices for the sugar, fruit and vegetable, broad-acre cropping, dairy and grazing industries in high risk Reef catchments. In the short term this will involve:

- Continued rollout of COMPASS (Combine Profitability & Sustainability in Sugar)
 - Support for further development of best management practice programs for broad-acre cropping
 - Continued support for implementing environmental management systems in agriculture.
-

A3-1 Investigate the effectiveness and efficacy of BMP models for industry-led action in achieving change on the ground.

- RWQPP – A3
- Project/Program – Program
- Scale – Industry focus

A3-2 Evaluate whether BMP will achieve the outcomes of the Reef Plan and what level of BMP adoption is required to fulfil these requirements.

- RWQPP – A3
- Project/Program – Program
- Scale – Community focused

A3-3 Define what best management practice means at a landholder scale and at different locations?

- RWQPP – A3
- Project/Program – Program
- Scale – Across industries and regions at a property focus

A3-4 Determine the impact of management practices (including all aspects such as riparian vegetation, road maintenance etc) on water quality outcomes across industries and regions

- RWQPP – A3
- Project/Program – Program
- Scale – Across industries and regions
- Comments – property focus

A3-5 Develop new best management options to achieve sustainable WQ outcomes

- RWQPP – A3
- Project/Program – program
- Scale – Across industries and regions at a property focus

A3-6 Conduct R&D (including biophysical, social and economic aspects) for alternative cropping/land use for lands unsuitable to existing cropping methods

- RWQPP – A3
- Project/Program – program
- Scale – Across industries and regions at a property focus

A3-7 Determine the current adoption rates of management practices

- RWQPP – A3
- Project/Program – program

- Scale – catchment, region and industry wide

A3-8 Develop useful and robust tools to assist land managers achieve cost effective monitoring and evaluation with an adaptive approach for sustainable NRM.

- RWQPP – A3, F3 (F3-4)
- Project/Program – Program
- Scale –

A3-9 Develop models to assess the cumulative impact on water quality from the adoption of management practices (i.e. actual adoption rates, v's targets)

- RWQPP – A3, F4 (F4-10)
- Project/program – project
- Scale –

A3-10 Conduct market research on communities attitudes of land management and their interest in the adoption of improved technologies

- RWQPP – A3
- Project/program – project
- Scale –

A4 Promote adoption of sustainable land management and best management practices in high risk Reef catchments through programs such as:
o Best Management Practice (BMP).
o Property Resource Management Planning (PRMP).
o Environmental Management Systems (EMS) in agriculture.

A4-1 Determine the key social and economic drivers that influence property management

- RWQPP – A4
- Project/Program – project
- Scale –

A4-2 Investigate the impediments to the:
a) uptake of existing knowledge and advice
b) understanding and information needs of land managers

- RWQPP – A4
- Project/Program – Project
- Scale – Regional

A4-3 Define the benefits and costs associated with sustainable (BMP) land management.

- RWQPP – A4
- Project/Program – Project
- Scale – different scales required (property - on and off farm and regional)

A4-4 Research ways of 'demystifying' EMS and making it more acceptable to land managers

- RWQPP – A4
- Project/Program –
- Scale –

A5 Facilitate industry supported quality assurance schemes for AgVet chemicals that promote risk reduction processes for off-farm movement of pesticides/chemicals. Expand involvement with community groups looking to find local solutions through projects such as MAGIC (Managing Agricultural Chemicals in Communities).

- No R&D needs listed

A6 Develop management strategies and actions on relevant public lands to conserve, rehabilitate and protect areas such as riparian zones and wetlands.

A6-1 Identify the R&D needs to achieve sustainable management on public lands and add to baseline information on current asset condition of public lands (excluding leasehold).

- RWQPP – A6
- Project/Program – program
- Scale – across regions

A6-2 Assess what actions/management regimes (to conserve, rehab and protect riparian and wetlands) have worked and what have not in the GBR context.

- RWQPP – A6
- Project/Program - project
- Scale -

A6-3 Determine the most effective methods of integrating stakeholder capacity to develop/influence management plans?

- government
- industry and research
- community

a). How to enable government to effectively participate in community-based NRM process – How does/can govt be a good partner

b). How do local governments participate in regional NRM and at state level

- RWQPP – A6, G1 (G1-2), G6 (G6-1)
- Project/Program – Program
- Scale –

Strategy B: Education and Extension

- B1** In collaboration with Regional NRM bodies and peak agricultural industry bodies, develop and implement education and extension programs and undertake the trialing of practices to increase the voluntary uptake by producers of sustainable agricultural practices, tailored to particular land uses, locations and pollutants. These programs will:
- Aim to use local knowledge and insights.
 - Recognise the drivers for voluntary uptake. (e.g. practices need to be profitable, compatible with existing practices, easily observed and understood, and tried and tested).
 - Build on and enhance progress by industry bodies, such as with the Cotton BMP.
 - Focus extension services on high-risk Reef catchments and on changing those practices that can have detrimental impacts on water quality. In the short term this will include implementing a pilot comprehensive extension service delivery program in high-priority Reef catchments.
 - Increase landholder awareness of the value of wetlands and riparian habitat in maintaining
 - Target, as a priority, sediment, nutrient and chemical contributions from cattle grazing, and cropping activities in priority catchments.
 - Seek measurable increases in uptake of sustainable land management and best management practices.
-

B1-1 Review what elements of education and extension programs have been most effective change agents

- a) What are the commonalities
- b) What are the unique characteristics present at a regional level
- c) Which tools were most effective and identify the methods used.

- RWQPP – B1
- Project/Program – Project
- Scale – Regional

B1-2 Add to existing level of understanding of peoples learning styles and capacity from a land holder to an asset manager

- RWQPP – B1
- Project/Program – project
- Scale – Across regions and land use
- Comments –

B1-3 Assess the level of understanding amongst all stakeholders of the role that indigenous communities play in R&D

- RWQPP – B1, D11 (D11-1)
- Project/Program – Project
- Scale –

B1-4 Develop a process for the inclusion of indigenous values and understandings in NRM.

- RWQPP – B1, D11 (D11-2)
- Project/Program – Project
- Scale –

B2 Improve the integration and coordination of research information systems and relevant extension services to support regional Natural Resource Management (NRM), catchment and property resource management planning in the Reef catchments

B2-1 Integrate economic models with environmental cost/benefit
a) at a property scale through financial planning and
b) at a regional scale through economic assessment

- RWQPP – B2 (links to C)
- Project/Program – Program
- Scale – property and regional

B3 Facilitate exchange of information between Indigenous groups, Government agencies, Industry and landholders on natural resource management approaches with positive Reef water quality outcomes.

B3-1 Develop methods & undertake integrated state-wide wetland condition assessment, in collaboration with community initiatives.

- RWQPP – B3
- Project/Program - project
- Scale -

B3-2 Develop an integration framework for data management and analysis

- RWQPP – B3
- Project/Program –
- Scale –

B3-3 Develop information and knowledge management tools for multiple users at multiple scales including smart visualisation tools to support knowledge transfer/ engagement

- RWQPP – B3
- Project/Program -
- Scale -

B4 Develop and implement a community awareness raising campaign such as the Healthy Waterways model to achieve wide recognition and acceptance of the importance of Reef water quality and the need to protect and rehabilitate wetlands and riparian habitats within the Reef catchment.

B4-1 Research to determine the likely success of community awareness campaigns e.g Market feasibility and identifying key element

B5 Promote the benefits of management plans, conservation agreements and covenants for the protection of riparian areas and wetlands and management of vegetation cover over the land to landholders.

- No R&D needs listed

Strategy C: Economic Incentives

C1 Promote the adoption of existing incentive schemes that have the potential to encourage landholders to implement sustainable management practices and property level planning.

- C1-1 Review National R&D on incentives and their role in effectively achieving sustainable NRM e.g.
- Synthesis of successful v's unsuccessful schemes in Queensland in the last 20 years (C1)
 - Establish cost/benefit of NRM outcomes (C1)
 - Establish what communities are getting out of incentive options (C3)
 - Devise contracts (such as incentives to undertake management options) and establish who can best afford to meet NRM objectives?
 - RWQPP – C1 and C3 (C3-1)
 - Project/Program – Program
 - Scale – Regional

C2 Identify, prioritise and recommend changes to policies, incentives and subsidy schemes that may have a detrimental impact on the water quality of the Reef.

- No R&D needs listed

C3 Identify, prioritise and recommend policies and incentives (of a regulatory and non-regulatory nature), that governments could consider, through an analysis of their public and private benefits and costs, that will encourage the uptake of best management practices that lead to improvements in the water quality of the Reef.

- C3-1 Review National R&D on incentives and their role in effectively achieving sustainable NRM e.g.
- Synthesis of successful v's unsuccessful schemes in Queensland in the last 20 years (C1)
 - Establish cost/benefit of NRM outcomes (C1)
 - Establish what communities are getting out of incentive options (C3)
 - Devise contracts (such as incentives to undertake management options) and establish who can best afford to meet NRM objectives?
 - RWQPP – C1(C1-1) and C3
 - Project/Program – Program
 - Scale – Regional

C4 Use mechanisms outlined in the Queensland Draft State Rural Leasehold Strategy to enhance and improve environmental management through offering lease incentives such as increased security of tenure under the *Land Act 1994*. Seek accelerated uptake in priority Reef catchments on a voluntary basis.

- No R&D needs listed

C5 Investigate the potential for planning systems to be linked to preferential access to:

- Government financial support programs.
- Enhanced leasehold arrangements.
- Funding from Regional NRM Bodies.
- Water allocation.
- Other identified incentive options.

- No R&D needs listed

C6 Implement programs to establish conservation agreements and covenants to ensure protection and management of remnant bushland, riparian vegetation and wetlands that can produce water quality improvement outcomes for the Reef.

- No R&D needs listed

C7 Create mechanisms for trading natural resource products such as timber and carbon and other products and investigate market mechanisms for other ecosystem services.

- No R&D needs listed

C8 Implement a pilot auction program that targets the conservation of wetland, riparian and other remnant vegetation that has a direct relationship with water quality improvements in high-risk Reef catchments.

- No R&D needs listed

C9 Seek philanthropic investment as a source of finance for the protection and rehabilitation of important wetlands, riparian and other remnant vegetation that has a direct relationship with water quality improvements in high-risk Reef catchments e.g. the newly formed Queensland Trust for Nature.

- No R&D needs listed

Strategy D: Planning for NRM and Landuse

D1 Ensure Commonwealth, State and Local Government planning processes in Reef catchments are consistent with the goal and objectives of the RWQPP.

- No R&D needs listed

D2 Finalise the Regional Coastal Management Plans in high-risk Reef catchments, which include a focus on protecting and rehabilitating coastal wetlands as well as riparian and other vegetation important to water quality.

- No R&D needs listed

D3 Ensure vegetation management arrangements are in place across all tenures to provide adequate protection of wetlands, riparian zones and native vegetation important to maintain and improve water quality. The arrangements should apply at the regional and property level and promote ecologically sustainable land use, protect land prone to degradation and provide appropriate buffers to watercourses and tributaries.

- No R&D needs listed

D4 Promote development of Local Water Quality Improvement Plans to local governments and Regional NRM Bodies in high-risk high-priority catchments and give priority to their development and implementation where catchment communities have an interest and capacity to develop plans of a suitable standard.

- o Commence the preparation of Water Quality Improvement Plans (WQIPs) consistent with the Framework for Marine and Estuarine Water Quality Protection, and where accredited, implement those plans consistent with program requirements of the Australian Government's Coastal Catchments Initiative.
 - o Pursue interim water quality projects where WQIPs are being developed.
 - o Prepare and support the implementation of a Water Quality Improvement Plan for the waterways in the Douglas Shire. Implement interim water quality projects.
-

- No R&D needs listed

D5 Develop an agricultural planning policy as part of an Agriculture Planning System (APS). The policy will be based on identifying the suitability of land for new or intensified agricultural uses having regard to the potential for adverse side effects on the environment including water quality.

D5-1 Undertake land resource and land use capability assessment for priority areas at the required scale and identify mechanisms for change (if deemed unsuitable).

- RWQPP – D5
- Project/Program – program
- Scale – across regions

D5-2 Identify, prioritise and map areas of high conservation significance using biological assessment at the appropriate scale

- RWQPP – D5, F4 (F4-5)
- Project/Program – program
- Scale – Across regions

D5-3 Develop remote sensing tools/new techniques for land resource/risk assessment

- RWQPP – D5
- Project/Program – program
- Scale –

D5-4 Investigate how to include social and economic aspects with biophysical R&D as part of Agricultural Planning Systems

- RWQPP – D5
- Project/Program – project
- Scale –

D6 As part of the Agricultural Planning System (APS) review the effectiveness and feasibility of regulatory and non-regulatory mechanisms (including voluntary, market based and statutory options) for managing agricultural activities known to be impacting on Reef water quality. This review will include options to manage:

- The application of fertilisers that increase nutrient levels in waterways.
- The application of pesticides and herbicides that affect aquatic ecosystems.

The review would also include investigating the feasibility of options recommended by the Productivity Commission and the Science Panel.

- No R&D needs listed

D7 Review current planning instruments and develop new planning or statutory instruments as appropriate to ensure that agricultural activities that may have a significant adverse impact on Reef water quality (including construction of drains and levee banks that may damage coastal wetland hydrology, structure and functioning) are assessable.

D7-1 Determine (where required) the adverse impacts of current agricultural activities eg land capability etc.

- RWQPP – D7
- Project/Program – program
- Scale – across regions

D7-2 Identify of contradictory planning activities that exist within current government strategies

- RWQPP – D7
- Project/Program – Project
- Scale – Regional

D7-3 Identify direct actions that assist land managers to meet Management Action Targets relevant to the GBR.

- RWQPP – D7
- Project/Program –

D8 Identify and establish nutrient sensitive zones within which extension services, property resource management planning and NRM funding will be focused to minimize impact of nutrients on the Reef.
Investigate further land use planning, regulatory, market and voluntary mechanisms that could be applied in these zones.

D8-1 Undertake research to increase the understanding of the movement of nutrients, sediments, pesticide etc (for process understanding and to validate models) e.g. groundwater – surface water – coastal zone, how much, where is it going and how does it behave under various land types/ management systems?

- RWQPP – D8, F4 (F4-3) (link to H and I)
- Project/Program – program
- Scale – across regions and land use

D8-2 Update land use and land cover mapping and expand to include current managerial practices.

- RWQPP – D8
- Project/Program – project
- Scale – Queensland Wide

D8-3 Add to existing research on the impact of climate change on natural resources (terrestrial, freshwater and marine) in key environments and industries, actual areas to be based on the output of climate projections

- RWQPP – D8
- Project/Program – Program
- Scale – Key areas identified

D8-4 Develop innovative approaches for the identification of biodiversity and impact risk hotspots, land use change etc. to complement modelling approaches

- RWQPP – D8
- Project/Program – project
- Scale –

D8-5 Determine appropriate indicators for condition and trend of key natural resources

- RWQPP – D8, D9 (D9-2)
- Project/Program – program
- Scale – Across regions and industries

D8-6 Develop monitoring tools suitable for use in a regulatory framework

- RWQPP – D8
- Project/Program – project
- Scale – Across regions

D9 Support the implementation of the State Planning Policy involving Acid Sulfate Soils by identifying areas of Acid Sulfate soil risk for planning schemes and the provision of quality technical advice for development assessment.

D9-1 Develop innovative approaches (e.g. remote sensing) to identify ASS risk areas

- RWQPP – D9
- Project/Program – project
- Scale –
- Comments –

D9-2 Determine appropriate indicators for condition and trend of key natural resources

- RWQPP – D8 (D8-5), D9
- Project/Program – program
- Scale – Across regions and industries
- Comments –

D10 Investigate implementation of an offsets policy based on achieving a net gain of riparian and wetland areas of State and regional significance to water quality in high risk areas of the Reef catchment.

- No R&D needs listed

D11 Negotiate Indigenous Land Use Agreements (ILUAs) in areas of particular significance to Indigenous people that recognise the linkages between land, waterways and the marine environment and implement strategies for maintaining water quality and ecosystem integrity. Provide mechanisms for Indigenous people to be involved in the management of areas under ILUAs.

D11-1 Assess the level of understanding amongst all stakeholders of the role that indigenous communities play in R&D

- RWQPP – B1 (B1-3), D11
- Project/Program – Project
- Scale –

D11-2 Develop a process for the inclusion of indigenous values and understandings in NRM.

- RWQPP – B1 (B1-4), D11
- Project/Program – Project
- Scale –

Strategy E: Regulatory Frameworks

E1 Investigate the potential to make declarations and undertake other actions under the *Water Act 2000* for appropriate high-risk sub-catchments within the reef catchments with the aim of preserving and improving water quality and regulating inappropriate land use

- No R&D needs listed

E2 Identify potential areas within high-risk areas of the Reef catchments where declarations under the *Vegetation Management Act 1999* might be made to secure protection of vegetation as a measure against land degradation.

- No R&D needs listed

E3 Develop, in co-operation with industry, guidelines to clarify the general environmental duty under the *Environmental Protection Act 1994* and the duty of care under the *Land Act 1994* that will assist land holders to determine reasonable and practical measures to minimise or prevent water pollution in the Reef Catchments.

- No R&D needs listed

E4 Ensure compliance programs and mechanisms for the *Environmental Protection Act 1994* and the *Land Act 1994* take into account the goal and objectives of the RWQPP, including an increased emphasis on application of the general environmental duty and duty of care for the land respectively in relation to diffuse sources of water pollution.

- No R&D needs listed

Strategy F: Research and Information Sharing

F1 Provide technical information and methods from research and monitoring on water quality entering the Reef to Regional NRM Bodies, landholders, industry peak bodies and the public.

F1-1 Refine models (in a cost and resource efficient manner) to adequately parametise the impact of changing land management practices. Data collection at individual property scale is vital.

- RWQPP - F1, F4 (F4-6), G3 (G3-3)
- Project/Program – Program
- Scale – property level (need to link property scale models to regional scale)

F1-2 Develop innovative and cost effective mechanisms for the collection of spatial and representative data for models

- RWQPP – F1, F4 (F4-7), G3 (G3-4)
- Project/program – project
- Scale –

F1-3 Improve modelling capacity by developing/or refining models that do not require rich datasets

- RWQPP – F1, F4 (F4-8)
- Project/program – project
- Scale –

F1-4 Develop effective tools to enable landholders to self-manage sustainability at property scale - e.g. targeted decision support tools, risk management information.

- RWQPP – A1 (A1-2), F1
- Project/Program – project
- Scale – regional (entrained into local management schemes)

F1-5 Develop models of impact of management practices on water quality

- RWQPP – F1
- Project/Program –
- Scale –

F2 Improve the integration and coordination of research information systems and relevant Provide technical resource information to landholders to assist in the preparation of property resource management plans.

- No R&D needs listed

F3 Investigate the ability to better coordinate future resource condition monitoring to meet the needs of a wide range of stakeholders including Regional NRM bodies, local and State governments, industry, landholders and the community.

F3-1 Contribute to existing monitoring efforts for condition and trends on grazing land and cropping lands

- RWQPP – F3
- Project/Program – program
- Scale – Across regions and industries

F3-2 Develop catchment models to integrate appropriate catchment datasets to assess and predict condition trend and ecosystem threshold

- RWQPP – F3, I7 (I7-3), H4 (H4-1)
- Project/program – program
- Scale – catchment

F3-3 Develop criteria and a framework for condition and trend assessment to interpret indicators of ecosystem health

- RWQPP – F3, I7 (I7-4)
- Project/Program – project
- Scale –

F3-4 Develop useful and robust tools to assist land managers achieve cost effective monitoring and evaluation with an adaptive approach for sustainable NRM.

- RWQPP – A3 (A3-8), F3
- Project/Program – Program
- Scale –

F4 Undertake coordinated research and development programs that will assist in delivering RWQPP objectives. These may include:

- Identifying and prioritising best practice land management
 - Chemical use practices.
 - Production systems.
 - Pilot field studies to investigate innovative approaches to water quality improvement.
 - Low impact agricultural production.
-

F4-1 Define the elements to achieve research linkages across scales (nested scales) e.g. landholder management scale (paddock/property) to sub-catchment strategic management scales; link property scale actions to management action targets in regional NRM plans

- RWQPP – F4
- Project/Program – program
- Scale – Property to catchment scale

F4-2 Undertake research to understand the concentration/loads and sources of nutrients/sediments etc in 'pristine' lands, and how to manage these sources

- RWQPP – F4
- Project/Program – project

- Scale – Across regions

F4-3 Undertake research to increase the understanding of the movement of nutrients, sediments, pesticide etc (for process understanding and to validate models) e.g. groundwater – surface water – coastal zone, how much, where is it going and how does it behave under various land types/ management systems?

- RWQPP –F4, D8 (D8-1) (links to H and I)
- Project/Program – program
- Scale – across regions and land use

F4-4 R&D for landscape processes understanding eg isotope tracing of sediment/nut sources

- RWQPP – F4
- Project/Program – project
- Scale –

F4-5 Identify, prioritise and map areas of high conservation significance using biological assessment at the appropriate scale

- RWQPP – D5 (D5-2), F4
- Project/Program – program
- Scale – Across regions

F4-6 Refine models (in a cost and resource efficient manner) to adequately parametrise the impact of changing land management practices. Data collection at individual property scale is vital.

- RWQPP - F4, F1 (F1-1), G3 (G3-3)
- Project/Program – Program
- Scale – property level

F4-7 Develop innovative and cost effective mechanisms for the collection of spatial and representative data for models

- RWQPP – F1 (F1-2), F4, G3 (G3-4)
- Project/program – project
- Scale –

F4-8 Improve modelling capacity by developing/or refining models that do not require rich datasets

- RWQPP – F1 (F1-3), F4
- Project/program – project
- Scale –
- Comments –

F4-9 Develop of methods/ toolboxes for landholders and industry to manage priority degraded landscapes

- RWQPP – F4
- Project/Program –
- Scale –

F4-10 Develop models to assess the accumulative impact on water quality from the adoption of management practices (i.e. actual adoption rates, v's targets)

- RWQPP – A3 (A3-9), F4
- Project/program – project
- Scale –

F5 Undertake a review of the herbicide Diuron.

- No R&D needs listed

F6 Implement a 'fertiliser sales by catchment' reporting system jointly developed by the fertiliser industry and Government agencies.

- No R&D needs listed

F7 Investigate the need for, and cost benefit of, a herbicide and pesticide reporting system.

- No R&D needs listed

F8 Facilitate exchange of information and experience between catchments where Water Quality Improvement Plans have been developed and other areas.

- No R&D needs listed

F9 Provide information on the market and non-market values of the Reef, and risks arising in catchments from socio-economic conditions to Regional NRM bodies, landholders, industry peak bodies and the public.

- No R&D needs listed

Strategy G: Partnerships

G1 Work in partnership with Regional NRM Bodies to determine water quality environmental values and objectives, and to develop aspirational and short-term resource condition and management action targets that reflect the goal of the RWQPP.

G1-1 Contribute to existing baseline information on resource condition from which a future can be envisioned (pre-baseline)

- RWQPP – G1 G2 (G2-1)
- Project/Program - program
- Scale -

G1-2 Determine the most effective methods of integrating stakeholder capacity to develop/influence management plans?

- government
- industry and research
- community

- a). How to enable government to effectively participate in community-based NRM process – How does/can govt be a good partner
- b). How do local governments participate in regional NRM and at state level

- RWQPP – A6 (A6-3), G1, G6 (G6-1)
- Project/Program – Program
- Scale –

G1-3 Determine methods for the best use of partnerships and sectoral arrangements to distil targets and objectives (social focus from diverse communities for concern) to maximise the effectiveness of NRM issues, including stakeholder vision and integration of values

- RWQPP – G1, G2 (G2-2)
- Project/Program – project
- Scale –
- Comments –

G1-4 Develop alternative models to the existing community and government engagement practices, so that input from diverse community members into decision-making is increased.

- RWQPP – G1, G2 (G2-4)
- Project/Program – Program
- Scale –
- Comments –

G2 Ensure Indigenous People are involved in ongoing consultation and support Indigenous Peoples' desire to be involved in the protection and healing of country and culture for future generations.

G2-1 Contribute to existing baseline information on resource condition from which a future can be envisioned (pre-baseline)

- RWQPP – G1 (G1-1), G2
- Project/Program - program
- Scale -

G2-2 Determine methods for the best use of partnerships and sectoral arrangements to distil targets and objectives (social focus from diverse communities for concern) to maximise the effectiveness of NRM issues, including stakeholder vision and integration of values

- RWQPP – G1 (G1-3), G2
- Project/Program – project
- Scale –

G2-3 Assess how local/experiential/indigenous knowledge and technical/scientific knowledge brokered within the NRM sector?

- RWQPP – G2, G3 (G3-6)
- Project/Program -
- Scale -

G2-4 Develop alternative models to the existing community and government engagement practices, so that input from indigenous people into decision-making is increased.

- RWQPP – G1 (G1-4); G2
- Project/Program – Program
- Scale –

G3 Create a research and development program in partnership with research institutions and Regional NRM bodies, to develop effective modelling tools to support regional target setting processes through the NAP State-wide Water Quality Work Plan.

- G3-1 Develop methods and approaches for vision and objective setting
- RWQPP – G3
 - Project/Program – project
 - Scale –
- G3-2 Develop a model for partnerships to maximise effectiveness in research and for effective partnerships to support the reef plan among diverse sectors
- RWQPP – G3
 - Project/Program – project
 - Scale –
- G3-3 Refine models (in a cost and resource efficient manner) to adequately parametise the impact of changing land management practices. Data collection at individual property scale is vital.
- RWQPP - F4 (F4-5), F1 (F1-1), G3
 - Project/Program – Program
 - Scale – property level
- G3-4 Develop innovative and cost effective mechanisms for the collection of spatial and representative data for models
- RWQPP – F1 (F1-2), F4 (F4-7), G3
 - Project/program – project
 - Scale –
- G3-5 Develop conceptual models for regional catchments (incl: drivers and vectors, with a consistent methodology across regions) to identify key target areas
- RWQPP – G3
 - Project/program –
 - Scale –
- G3-6 Assess how local/experiential/indigenous knowledge and technical/scientific knowledge brokered within the NRM sector?
- RWQPP – G2 (G2-3), G3
 - Project/Program -
 - Scale -
- G3-7 Define stakeholder engagement processes for effective, regionally-relevant R&D
- RWQPP – G3
 - Project/Program – Project
 - Scale –

G4 Work in partnership with research organisations to develop innovative sustainable production systems aimed at encouraging improvements in water quality entering the Reef, such as; CSIRO (Healthy Country Program -Reef Region), AIMS, CRCs, Universities and Industry Research Bodies.

- No R&D needs listed

G5 Build on existing partnership with industry to ensure implementation of the Plan. As a component of this process develop eco-efficiency agreements that improve water quality and enhance industry competitiveness, including an Eco-efficiency Agreement with the fertiliser industry that promotes the responsible use of fertiliser, and an Agreement with CANEGROWERS on the promotion of COMPASS and best management practices in the sugar cane industry.

- No R&D needs listed

G6 Work with Local Government to ensure the successful implementation of the Plan. Support the LGAQ project on building the capacity of local governments to effectively participate in sustainable NRM planning arrangements at the local and regional context, particularly in relation to water quality improvement processes.

G6-1 Determine the most effective methods of integrating stakeholder capacity to develop/influence management plans?

- government
 - industry and research
 - community
- a). How to enable government to effectively participate in community-based NRM process – How does/can govt be a good partner
- b). How do local governments participate in regional NRM and at state level
- RWQPP – A6, G1 (G1-2), G6 (G6-1)
 - Project/Program – Program
 - Scale –
 - Comments –

G7 Encourage Regional NRM Bodies and River Improvement Trusts to develop closer links to ensure compatible and co-ordinated planning, actions and work programs

- No R&D needs listed

Strategy H: Priorities and Targets

- H1** Develop water quality targets for the Reef catchment waterways with a major focus on:
- Improving water quality.
 - Investing in remedial action that ensures adequate protection and rehabilitation of wetlands, riparian and other vegetation important to water quality.
-

H1-1 Study the effects of water reuse on Regional NRM water quality targets

- RWQPP – H1
- Project/Program – project
- Scale – across regions

H1-2 Contribute to the improvement of baseline biophysical data/characteristics to develop water quality targets

- RWQPP – H1
- Project/Program - program
- Scale – Across regions (need upper catchment data (have significant amount of river mouth data); spatial and temporal gaps in data; year to year and other levels of temporal variation)

H1-3 Establish approaches for integrating rehabilitation plans into Regional NRM plans and strategies

- RWQPP – H1
- Project/Program -
- Scale -
- Comments –

H2 Incorporate the water quality targets established by the Regional NRM Bodies into the evaluation process of the RWQPP.

- No R&D needs listed

H3 Identify waterways, riparian areas and wetlands that are in good condition and should be preserved to protect water quality.

H3-1 Investigate the most appropriate ways to integrate the social, economic and biophysical outcomes from a range of initiatives into day to day practices (for waterways, wetlands and riparian zones in good condition)

- RWQPP – H3
- Project/Program - project
- Scale -

H3-2 Improved data collection to refine risk models and allow link to numerical models.

- RWQPP – H3, H4 (H4-2)
- Project/Program - Project

- Scale -

H4 In partnership with Regional NRM Bodies identify sub-catchment “hotspots” responsible for delivering disproportionate quantities of sediment, nutrient and pesticides to the Reef.

H4-1 Develop catchment models to integrate appropriate catchment datasets to assess and predict condition trend and ecosystem threshold

- RWQPP – F3 (F3-2), I7 (I7-3), H4
- Project/program – program
- Scale – catchment

H4-2 Improved data collection to refine risk models and allow link to numerical models.

- RWQPP – H3 (H3-2), H4
- Project/Program - Project
- Scale -

H5 In partnership with Regional NRM Bodies make wetland and riparian rehabilitation a high priority in high-risk Reef catchment areas.

H5-1 Establish where and what are high priority areas and at a higher resolution than is currently available. e.g. Is a high priority area based on biophysical attributes, or landholder willingness to change

- RWQPP – H5
- Project/Program - project
- Scale –

Strategy I: Monitoring and Evaluation

I1 Report through the Great Barrier Reef Ministerial Council to the Prime Minister and the Premier of Queensland on the implementation of the Reef Water Quality Protection Plan.

- No R&D needs listed

I2 Ensure that implementation of the actions in the Plan are regularly and independently audited.

- No R&D needs listed

I3 Incorporate the goal of the RWQPP into the State and Commonwealth Government's Evaluation Process for regional natural resource management planning.

- No R&D needs listed

I4 Implement a water quality and ecosystem health long-term monitoring program in the Great Barrier Reef lagoon to track the effectiveness of the Reef Water Quality Protection Plan. Funding for this action will be settled as part of future budget considerations.

I4-1 Identify most appropriate monitoring for the GBR lagoon to meet needs of different stakeholders e.g. Evaluate community monitoring for the social, economic and biophysical benefits or positive outcomes.

- RWQPP – I4
- Project/Program – project (periodic)
- Scale -

I4-2 Develop a biophysical framework to integrate the community, catchment and lagoonal aspects of the water quality monitoring program (Actions I4, I5 and I6).

- RWQPP – I4, I5 (I5-2), I6 (I6-2)
- Project/Program - Program
- Scale -

I5 Implement a coordinated water quality monitoring program in high-risk catchments to track long-term trends in water quality entering the Great Barrier Reef lagoon. Funding for this action will be settled as part of future budget considerations.

I5-1 Identify most appropriate monitoring in the Reef Catchments to meet needs of different stakeholders e.g. Evaluate community monitoring for the social, economic and biophysical benefits or positive outcomes.

- RWQPP – I5
- Project/Program – project (periodic)
- Scale -

I5-2 Develop a biophysical framework to integrate the community, catchment and lagoonal aspects of the water quality monitoring program (Actions I4, I5 and I6).

- RWQPP – I4 (I4-2), I5, I6 (I6-2)
- Project/Program - Program
- Scale -

I6 As part of the coordinated water quality monitoring program support and improve community and industry based water quality information collection programs in high-risk Reef catchments. Actions would include expanding the Waterwatch network to cover high-risk sub-catchments.

I6-1 Identify most appropriate community monitoring to meet needs of different stakeholders e.g. Evaluate community monitoring for the social, economic and biophysical benefits or positive outcomes.

- RWQPP –I6
- Project/Program – project (periodic)
- Scale -

I6-2 Develop a biophysical framework to integrate the community, catchment and lagoonal aspects of the water quality monitoring program (Actions I4, I5 and I6).

- RWQPP – I4 (I4-2), I5 (I5-2), I6
- Project/Program - Program
- Scale -

I7 Develop improved indicators for long-term water quality monitoring in reef catchments in conjunction with the Co-operative Research Centre (CRC) Reef and CRC Rainforest.

I7-1 Investigate new (cost effective) technologies (eg remote sensing) for monitoring and evaluation of water quality

- RWQPP – I7
- Project/Program - Project
- Scale -

I7-2 Improve and expand indicators for long-term water quality monitoring to cover all GBR regions.

- RWQPP – I7
- Project/Program - project
- Scale –

I7-3 Develop catchment models to integrate appropriate catchment datasets to assess and predict condition trend and ecosystem threshold

- RWQPP – F3 (F3-2), I7, H4 (H4-1)
- Project/program – program
- Scale – catchment

17-4 Develop criteria and a framework for condition and trend assessment to interpret indicators of ecosystem health

- RWQPP – F3 (F3-3), 17
- Project/Program – project
- Scale –

18 Ensure the monitoring and implementing of local water quality improvement plans and environmental flow objectives, are reviewed and addressed in other planning processes.

- No R&D needs listed

19 Evaluate and report publicly on the environmental impacts of agricultural industries in relation to water quality entering the Reef. and the management practices being implemented and developed by industries to address the issue.

19-1 Develop appropriate monitoring methods to assess management systems (BMP) in determining desired NRM outcomes.

- RWQPP – 19
- Project/Program –
- Scale –