Australian Government

REEF TRUST

FINAL REPORT

Part A. An evaluation of the Australian Government Reef Trust water quality Investments

May 2023

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Alluvium recognises and acknowledges the unique relationship and deep connection to Country shared by Aboriginal and Torres Strait Islander people, as First Peoples and Traditional Owners of Australia. We pay our respects to their Cultures, Country and Elders past and present.

Artwork by Vicki Golding. This piece was commissioned by Alluvium and has told our story of water across Country, from catchment to coast, with people from all cultures learning, understanding, sharing stories, walking to and talking at the meeting places as one nation.

This report has been prepared by Alluvium Consulting Australia Pty Ltd for the Department of 'Climate Change, Energy, the Environment and Water under the contract titled *'An evaluation of the Australian Government Reef Trust water quality investments and prioritisation to inform future water quality investment [Reference ID: 3600007426]'*.

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Summary

Background

The Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan) is the Australian and Queensland Government's overarching strategy for protecting and managing the Great Barrier Reef, which sets out objectives and management actions to preserve and improve the health of the Reef for future generations. To support the achievement of this Plan the Australian Government has committed greater than $160 million for on-ground water quality improvement activities to date, through the Reef Trust, with a further $201 million delivered through the Reef Trust Partnership with the Great Barrier Reef Foundation. This scope of this evaluation did not include Reef Trust Partnership projects.

The objective of this evaluation was to:

- provide an evidence base that can inform future Reef Trust investment and program design for water quality outcomes
- identify the success factors or key components that could be continued or enhanced
- identify the barriers and potential strategies for more effective program delivery, monitoring and evaluation
- provide recommendations, strategies or options to strengthen and improve future Reef Trust water quality investments going forward from 2022 for consideration by the Reef Branch of DCCEEW.

The outputs of this evaluation forms part of the Australian Government's Reef Trust Monitoring and Reporting Plan (Australian Government, 2016) and subsequent updates, serves to both:

- provide an opportunity for flexibility to respond to changing environmental and economic challenges facing the Reef and its communities
- support other forms of reporting by the Australian Government including reporting on management achievements in protecting the outstanding universal value of the Great Barrier Reef World Heritage Area.

An Evaluation Plan (Appendix B) outlines the methodology applied, this includes a first pass rapid KEQ assessment of all 43 funded projects using a limited set of indicators, followed by a second pass in-depth assessment of a representative sample comprising 19 projects which were assessed using additional indicators and data sources. The Evaluation Plan was presented to delivery partners and other stakeholders prior to its finalisation. They were also invited to review the draft Evaluation Plan.

Reef Trust projects are being delivered through a range of delivery mechanisms, dependent on the specific outcomes sought and allowing for collaboration, innovation and cost-effectiveness. In addition to competitive grants, the Reef Trust has employed a range of mechanisms to enable project delivery, including reverse tenders. One of the key aims of the Reef Trust has been to encourage greater use of market-based instruments to ensure the achievement of the greatest outcomes relative to cost.

Various management responses were utilised throughout the program with the aim of reducing sediment, nutrient and/or pesticide runoff through primarily management practice change adoption or landscape repair (i.e., on-ground management). These management responses varied depending on the type of land use, commodity and the type of pollutant being targeted.

Cost-effectiveness assessments have been undertaken by collating the costs and outcomes of projects, and comparing them using a common metric, such as dollars per tonne of sediment avoided. It should be noted that the robustness of the approach was constrained by the availability, consistency and quality of the data available, and this should be kept in mind when using this analysis to inform future policy decisions.

High level summary of results

The **annual total fine sediment pollutant savings** delivered by 27 Reef Trust water quality projects that reported sediment savings since 2014 is approximately 147,000 tonnes. More than 2,160,000 hectares of primarily grazing land has been subject to some form of landscape repair and/or management practice change. This includes one of the projects that targeted (and reported) a combination of sediment, DIN and pesticide savings/abatement.

The **total dissolved inorganic nitrogen (DIN) pollutant savings** of approximately 550,000 kilograms have been delivered by 14 Reef Trust water quality projects that reported DIN savings since 2014 over approximately 143,000 hectares of mostly sugarcane and other intensive forms of agriculture. This includes one project that targeted a combination of sediment, DIN and pesticide abatement.

In addition to both fine sediment and DIN, six projects aimed to improve **pesticide application.**

Pollutant targeted	Count of projects	Total RT investment	Annual total volume of pollutant abated ****	Total P2R area of practice change**
Fine sediment*	26	$82,874,648	**~146,796t**	2,160,042ha
DIN	13	$68,960,797	**~549,550kg**	143,105ha
Combined	2	$5,900,000		
TOTAL	**41*** **	**$157,735,445**		**2,303,147ha**

*Includes landscape repair and management practice change projects.
**The spatial area where a management practice change took place as verified by P2R. Includes 2 combined projects.
*** Excludes technical assistance projects. Includes Phase VII projects (refer to Table 9).
**** The Reef 2050 WQIP regional water quality targets seek to reduce fine sediment and DIN by 1,933,000t and 3,620,000kg respectively (Queensland Government, 2018). Includes the relevant sediment and DIN savings for the two combined projects.

In the case of sediment abatement, the most effective **delivery mechanism** was via competitive grants which formed the primary delivery mechanism for sediment abatement projects. While this is also the case for DIN where competitive grants delivered the greatest pollutant abatement and the greatest area of practice change, reverse tenders also delivered strong performance for DIN abatement. Phase VII projects that used the Regional Land Partnerships model assuming they successfully deliver on their planned DIN abatement will also deliver strong performances for DIN. [Refer to Section 5.1.4]

With regards to understanding the impact of different **management responses**, it is important to note that all projects demonstrated the use of multiple, integrated management responses and individual interventions to some extent. With regards to fine sediment the greatest annual total volume of pollutant abated, and area of practice change was delivered by the six sediment management practice change projects. The landscape repair projects delivered only slightly less pollutant abatement but in a more targeted area. It is important to note that the streambank projects generally did not report a practice change area due to the linear nature of these projects, so the area of practice change for landscape repair projects is an underestimate of the true area. [Refer to Section 5.1.4]

Pollutant targeted	Primary management response	Count of projects*	Annual total volume of pollutant abated	Total practice change area
Fine sediment	Grazing, sediment management (gully & streambank) **landscape repair**	20	72,280t	59,997ha
	Intensive agriculture and grazing, **sediment management practice change**	6	73,017t	2,100,045ha
DIN	Intensive agriculture, **nutrient management practice change**	13	535,550kg	143,105ha
Combined	**Combined** pollutant **management practice change**	2	1,500t 14,000kg	3,819ha**
		41*		

*Excludes sediment technical assistance projects.
**The pollutant abatement and practice area are from different projects.

Nine projects sought to systematically assess the **capacity** built as a result of the project. These include RT1.02 *(A-class Grazing),* RT2.12 *(Burdekin DIN management)*, RT3.02 - RT3.06 *(Reef Alliance)*, RT3.08 *(Grazing land management)* and RT6.01 *(Delivering tailored solutions).* This ranged from undertaking a landholder survey to assess an increase in knowledge and understanding to having an external evaluation completed, e.g., by Central Queensland University.

Reef Trust has delivered significant impact at both the institutional and organisation level as well as at the individual level. For example, organisational capacity for delivery partners has been developed in:

- project management especially for large scale programs of integrated activities (i.e., systems repair and practice change)
- technical assurance and quality processes (including data management). This also includes an increase in scientific understanding, for example, of how sediment savings are calculated
- leveraging other public and private investments
- reporting and science communication
- the use and interpretation of a range of modelling and decision support tools e.g., P2R, and P2R Projector
- capacity building of First Nations Peoples through the Cape York NRM, BMRG and Indigenous Land and Sea Ranger projects.

[Refer to Section 5.1.6]

Across all 23 projects funded by the Reef Trust that focussed on abating **fine sediment**, there was an **average cost-effectiveness** of $488/t. Of the 23 projects, cost-effectiveness ranged from $16/tonne to $17,805/tonne, three projects (13%) exceeded a cost-effectiveness of $10,000/tonne, while seven projects (30%) were below $500/tonne.

Pollutant targeted	Count of projects	Annual total volume of pollutant abated	Average cost-effectiveness ($/t or kg of annual load reduction achieved)	Average cost-effectiveness ($/ha)*
Fine sediment	23	124,118t	$488/t	$25/ha
DIN	10	385,550kg	$135/kg	$278/ha

* It is important to note that $/ha is not an accurate measure of project performance. It has been analysed as part of this assessment to primarily provide some data to support Part B of the project and validate various decision support tools.

Of the ten (10) projects assessed that focussed on **DIN abatement**, there was an **average cost-effectiveness** of $135/kg. Of the ten projects, cost-effectiveness ranged from $49/kg to $554/kg.

Of the seven (7) projects assessed that focussed on DIN abatement, there was an average cost-effectiveness of $278/ha. Of the ten projects, cost-effectiveness ranged from $97/ha to $526/ha. For cost-effectiveness in terms of dollars per hectare, across all 17 projects funded by the Reef Trust that focussed on abating fine sediment, there was an average cost-effectiveness of $25/ha[1].

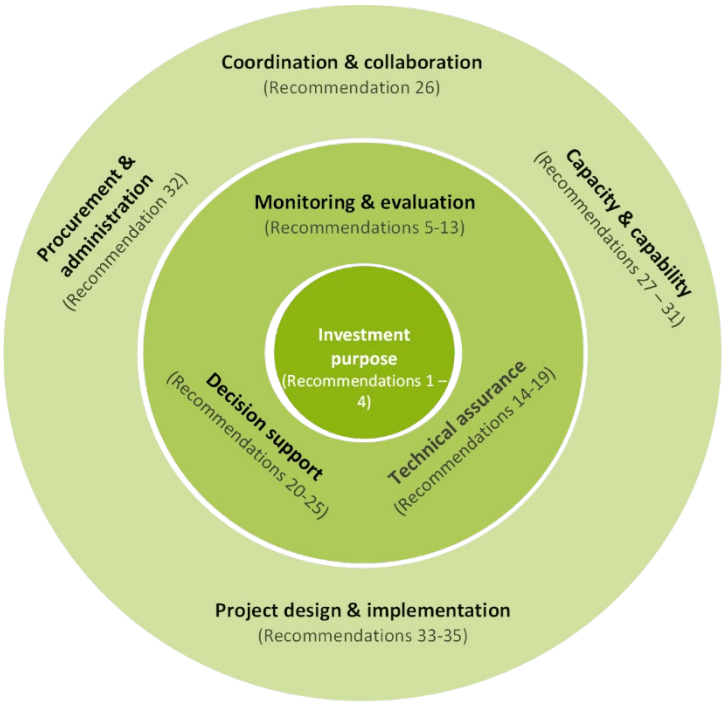
Results for the two various forms of sediment management (gully and streambank landscape repair, as well as hillslope management practice change) demonstrate that for the projects assessed, hillslope management practice change responses are relatively cost-effective (noting there were only four projects), while gully and streambank landscape repair were less cost-effective. There were 18 projects included within the gully and streambank responses that used primarily landscape repair interventions supported by some management practice change, with an average cost-effectiveness of $586/t. Hillslope sediment management responses comprising primarily management practice change activities had a cost-effectiveness of $379/t of sediment abated. [Refer to Section 5.3.1]

Reef Trust is commonly viewed by delivery partners as catalyst funding, and based on the data provided has attracted more than $57 million has been leveraged in the form of in kind contributions by landholders and other project partners. [Refer to Section 5.3.3]

[1] Project counts for $/ha cost-effectiveness are reduced due to the exclusion of nine projects where practice change area was unknown.

Summary of recommendations

As a result of the evaluation, 35 recommendations are outlined in Section 7.6.



<u>Investment purpose and planning</u>

Recommendation 1.
It is recommended that the Reef Trust establishes a stronger adaptive management framework and review cycle (i.e., every five years) that enables it to respond and align with updates to the Reef 2050 Plan and Reef 2050 WQIP.

<u>Investment purpose and impact pathways</u>

Recommendation 2.
Based on the previous Reef Trust investments and the Objectives and Goals identified in the Reef 2050 Plan, it is proposed that the future Reef Trust discontinue the use of investment phases and establishes discrete portfolios or impact pathways that recognise the diverse inputs and collective efforts required to improve water quality. The suggested portfolios are not intended to be mutually exclusive but rather represent the primary outcome being invested in:

i. *Research and development*. Undertake priority research into agreed knowledge gaps (i.e., by ISP). Research projects are underpinned by an appropriate and rigorous methodology and informed by a range of subject matter experts from across the research, practitioner and industry sectors.

ii. *Landscape repair*. Upscale and expand proven, and fit-for-purpose catchment and landscape repair management responses and interventions in priority locations and/or land uses to address multiple objectives (i.e., that align with the Reef 2050 WQIP and other regional-scale catchment/NRM plans).

iii. *Land and catchment management practice adoption*. Upscale and expand proven, and fit-for-purpose management practice change approaches and management responses in priority locations and/or land uses (aligned with the Reef 2050 WQIP and other regional WQIPs).

iv. *Natural (green) asset maintenance*. Continue to invest in maintaining sites and places that have previously received investment to ensure these assets continue to provide the 'as designed' performance or greater and therefore aim to prevent high risk sites from future degradation and protect existing healthy landscapes

v. *Social capital building and maintenance*. Invest in individuals and organisations so they continue to have access to the resources, tools, skills and knowledge to build and maintain the necessary capacity to deliver agreed place-based outcomes.

vi. *Monitoring and assessment.* Invest in the continual collection of appropriate and rigorous data and information linked to previous projects to continue to build our understanding of various management approaches over time.

vii. *Technical advice*. Ensure the Department, delivery partners and other Reef Trust stakeholders have access to consistent and practical advice and quality *assurance during project design and delivery*

Recommendation 3.
It is recommended that future Reef Trust water quality investment clearly maps and communicates how each project investment complements each other to collectively deliver on the current and future Reef 2050 Plan and Reef 2050 WQIP. Ensure Reef Trust water quality investments:

a) adopts a complementary and coordinated package of activities

b) targets delivery partners that are best suited to delivering the various portfolio outcomes (e.g., Research and development to ensure skills and capacities are used to optimal value with out competing unnecessarily).

Investment purpose and transparency

Recommendation 4.
Ensure future Reef Trust water quality investment maintains an open and transparent process for the selection of Reef Trust outcomes, objectives and projects that is supported by an effective and targeted communication process. Evidence of how previous investment lessons and results have informed future priorities is also valued by stakeholders and is a critical part of an adaptive management approach.

Monitoring and evaluation (M&E)

Recommendation 5.
Continue to work with all Reef investors to develop a Reef-wide, consistent reporting framework and platform that drives efficiency for delivery partners and investors and supports more efficient and accurate reporting to Ministers and the broader public.

Recommendation 6.
Ensure consistency and alignment with Queensland Government and other investors monitoring and reporting programs, KEQs, indicators and metrics to ensure efficiency for delivery partners and an enhanced ability to assess impact across the whole Reef region efficiently and transparently.

Recommendation 7.
Given the proposed updates to the Reef 2050 Plan and Reef 2050 WQIP as well as a potential redesign of the Reef Trust water quality investments, it is recommended to investigate the appropriateness of adapting the Reef Trust Partnership Monitoring and Evaluation Plan (Great Barrier Reef Foundation, 2021) for the Reef Trust water quality investments which presents a strong and comprehensive example of a program logic supported with meaningful KEQs, performance measures and importantly targets.

Recommendation 8.
Ensure there are clear roles and responsibilities in place to evaluate future Reef Trust programs including agreed methodologies and approaches to collect, assess and report on results and conclusions.

Recommendation 9.
Include a specific portfolio to enable investment in monitoring and evaluation that targets key knowledge gaps e.g., rates of disadoption over time. Agreed M&E projects or activities could be integrated across a region or catchment ensuring efficiency and/or targeted the most appropriate delivery partners who have demonstrated skills and relationships to undertake the required monitoring in a scientifically and rigorous approach.

Recommendation 10.
Provide delivery partners with increased support (financial and/or technical) to build capacity in and develop fit-for-purpose MERI plans that suit the needs of the project and aligns with DCCEEW's (and other investors') needs for evaluation at the program scale. This is especially important for R&D projects or projects in a 'start-up' phase. Coupled with this, will be to ensure the MERIT framework (or other monitoring platform (see Recommendation 12)) enables delivery partners to report consistently on the specific indicators and outcomes developed in each MERI plan.

Recommendation 11.
Project level MERI plans are required to comprise targeted, fit-for-purpose KEQ's, and agreed indicators and metrics for each KEQ, that aligns directly with the (revised) Reef Trust program logic and high-level evaluation framework. These should be agreed with delivery partners prior to project commencement. It is likely that some indicators may be applied across all portfolios, while some may be unique to a single portfolio.

Recommendation 12.
Investigate the adaptation of the Water Quality Dashboard developed by the GBRF for use by the Reef Trust Partnership. The Water Quality Dashboard and underpinning database allows for real time reporting. It is noted that one gap with the dashboard is that it does not have direct alignment to project MERI plans and their targets which would require further consideration.

Recommendation 13.
Continue to establish baseline knowledge to underpin future assessment of enduring legacy and specifically to identify the knowledge and attitudes that are considered important preconditions for enduring practice change adoption. Natural Decisions (2021) suggest some questions that could be included to support the development of possible indicators and data collection approaches.

Recommendation 14.
Establish a more targeted and coordinated implementation approach to monitoring, evaluation and reporting so that it is more efficient and cost-effective (i.e., by combining multiple project sites and geographies into a single contract), and effective (i.e., by contracting an appropriate specialist service provider with the appropriate equipment and skills). Some monitoring and evaluation will be most efficient and effective if undertaken by the delivery partners at the time of project delivery, whereas post-project monitoring is suggested to be undertaken under a separate contract that allows for specialised data collection for a larger number of related project sites.

Similarly reporting and data management should reside with appropriately resourced organisations and/or positions, such as the provision of a Monitoring and Evaluation Coordinator to oversee data capture and reporting, who in turn could coordinate inputs to P2R. GBRF also use a dedicated GIS specialist to upload and analyse some data sets to ensure data is efficiently and effectively reported.

Technical assurance and advice

Recommendation 15.
Establish fit-for-purpose and cross cutting technical assurance mechanisms for the different investment portfolios. Whilst there is no perfect arrangement, it is proposed that the most logical and efficient arrangement is to establish three primary technical advisory groups to support:

1. project investments in sediment abatement through sediment related
    a) R&D
    b) gully and streambank landscape repair
    c) Management practice change
    d) Green asset maintenance
    e) Monitoring and evaluation.
2. project investments in nutrient abatement through nutrient related:
    a) R&D
    b) Management practice change
    c) Monitoring and evaluation
3. project investments in maintaining and building social capital including social capital related:
    a) R&D
    b) Monitoring and evaluation
    c) Social capital building and maintenance.

Recommendation 16.
Ensure Reef Trust staff have sufficient technical understanding of key issues and the associated tools and guidelines to support effective and meaningful conversations with Delivery Partners and to enable continued improvement within the program.

Technical assurance: data collection and coordination

Recommendation 17.
Improve record keeping of projects funded under the Reef Trust by employing a systematic approach to tracking management activities against investment expenditure e.g., by using the financial reporting fields within the P2R Projector.

Recommendation 18.
Ensure project financial data includes detailed attribution to consistent activity categories (e.g., monitoring, on-ground works, etc.), to enable greater insight to be drawn from future analysis. This would result in more robust estimates of cost-effectiveness with fewer assumptions required (e.g., to apportion spending across years or activity categories)

Recommendation 19.
Develop standard approaches for collecting and reporting on in-kind and cash contributions to enable consistent reporting and to support delivery partners to adequately report on their project outcomes e.g., standard costs per hour of machinery and per hour of labour.

Recommendation 20.
Invest in further monitoring and measurement of disadoption and factors influencing enduring legacy ensuring there is a feedback loop between outputs of monitoring (i.e., levels of disadoption) and input parameters and assumptions for modelling in P2R Projector.

Reef Decision support tools

Recommendation 21.
Continue to prioritise and invest in an integrated suite of decision support tools, that are consistently applied across investors and delivery partners. Future tools need to be purpose-built around a clear need and clarity regarding the core purpose of the proposed tool and with substantial engagement across a range of end users as well as supporting agencies.

Recommendation 22.
Ensure each Reef tool has agreed standards and considerations for ongoing data collection and reporting, have fit-for-purpose long-term maintenance programs in place that ensures the latest data is accessible and can be used to influence decision making, and enable appropriate access for investors and key program partners.

Recommendation 23.
Individual tools require a fit-for-purpose governance structure to ensure transparency and to ensure clear communication and coordination with other stakeholders. P2R Projector provides a good example as it has a steering committee providing oversight, a clear maintenance contract, and a schedule of capacity building and training processes which includes the provision of technical advice to end users.

Recommendation 24.
Upgrades and improvements to Reef tools are released in a systematic manner and at intervals that has minimal impact on delivery partners (e.g., every two years). Upgrades are supported by a comprehensive communication and training program and sequenced so as to be seamlessly incorporated into projects in progress.

Recommendation 25.
Tools and associated data collection required during the course of project delivery need to be clearly identified up front either in project guidelines and/or funding agreements to ensure delivery partners account for the necessary resources in their budgets and project teams.

Recommendation 26.
Ensure delivery partners and personnel using the tools have some form of induction or accreditation or have undertaken Department approved training, prior to the first round of project progress reporting.

Coordination and collaboration

Recommendation 27:
Maintain and expand the Regional Water Quality Program Coordinator role (established by GBRF in theReef Trust Partnership) to sit across all investment portfolios in that region. These positions would have some form of consistent framework to report to support the:

- evaluation of portfolio impact, efficiency, effectiveness and appropriateness
- update a common database to enable real-time monitoring and reporting
- facilitate structured knowledge sharing.

Capacity and capability

Recommendation 28.
Work with the existing Regional Extension Coordinators funded by the Queensland Government to continue to assess, identify and prioritise individual capacity building needs of landholders, industry stakeholders, and service providers. This knowledge base is ideally used to inform the prioritisation of investment in social capital building projects.

Recommendation 29.
Provide new delivery partners and/or new staff of existing delivery partners with some form of induction or onboarding as part of project inception.

Recommendation 30.
Continue to work with other Reef investors and subject matter experts to build an understanding of what influences the achievement of enduring adoption and legacy, how it can be measured and what indicators and metrics can be developed and consistently rolled out by delivery partners.

Recommendation 31.
Findings linked to Recommendation 29 and other research activities should be progressively built into funding submissions, that is delivery partners must be able to detail how the adoption of critical management practice activities by landholders will be supported, and how the long-term maintenance will be addressed (i.e., how, by whom and when)

Recommendation 32.
Agreed short-term outcomes and associated indicators relating to adoption and maintenance should be built into project level MERI plans.

Procurement and administration

Recommendation 33.
Apply fit-for-purpose delivery mechanisms and procurement processes that aligns primarily to the targeted primary management response and primary desired outcome (see Section 7.2). The table below provides more specific procurement guidance:

Management outcome / investment portfolio	Suggested delivery mechanisms / investment approach
Research and development	Split between: a) Direct negotiation with credible research providers to deliver a specific research activity that has previously been identified and prioritised e.g.,., by the ISP b) Open competitive grants to address known knowledge gaps and drive knowledge advancement and transformative innovation.
Landscape repair	Open invitation to submit Expressions of Interest using competitive grants process to address specific investment criteria and guidelines. Successful EoI submissions receive small or seed grants and are invited to further develop, in collaboration with key stakeholders (including DCCEEW and TAG representatives), detailed proposals and project plans This could be in the form of individual projects or regional programs of integrated sub-projects. Final project agreements are directly negotiated with delivery partners. Ideally, the timing for finalising agreements is open (i.e., not within a specified funding window). Opportunities for First Nations organisations to deliver these programs should be promoted.
Land and catchment management practice adoption (for sediment, nutrients and pesticides)	Split between: a) Open invitation to submit Expressions of Interest using competitive grants process to address specific investment criteria and guidelines. Successful EoI submissions receive small or seed grants and are invited to further develop, in collaboration with key stakeholders (including DCCEEW and TAG representatives), detailed proposals and project plans This could be in the form of individual projects or regional programs of integrated sub-projects. Final project agreements are directly negotiated with delivery partners. Ideally, the timing for finalising agreements is open (i.e., not within a specified funding window). b) Smaller open competitive 'community-grants' to enable investment in specific priorities and/or locations. Opportunities for First Nations organisations to deliver these programs should be promoted.
Land and catchment management practice adoption (nutrients and pesticides)	Reverse tenders/auctions coordinated via a single deliver partner
Natural (green) asset maintenance	Open competitive grants at a regional or sub-catchment scale. i.e., one delivery partner to provide an integrated and coordinated work program. Opportunities for First Nations organisations to deliver these programs should be promoted. Or Regional Land Partnership agreements.

Social capital maintenance	Balance between: a) Open invitation to submit Expressions of Interest using competitive grants process to address specific investment criteria and guidelines. Successful EoI submissions receive small or seed grants and are invited to further develop, in collaboration with key stakeholders (including DCCEEW and TAG representatives), detailed proposals and project plans This could be in the form of individual projects or regional programs of integrated sub-projects. Final project agreements are directly negotiated with delivery partners. Ideally, the timing for finalising agreements is open (i.e., not within a specified funding window). b) Open competitive grants at a regional or sub-catchment scale. i.e., one delivery partner to provide an integrated and coordinated work program.
Monitoring and assessment (of agreed indicators)	Direct negotiation with credible research providers that can demonstrate a unique offering in a specific field of work. Or Open competitive grants at a regional or sub-catchment scale. i.e., one delivery partner to provide an integrated and coordinated work program. Opportunities for First Nations organisations to deliver these programs should be promoted.
Technical advice / TAGs	Expressions of interest by individuals (not organisations) followed by a direct negotiation of an agreement to sit on a TAG for a defined period (e.g.,., three years). Opportunities for First Nations peoples to sit on a TAG should be promoted.

Project design and implementation

Recommendation 34.
As part of the proposed building and maintaining social capacity investment portfolio, enable delivery partners in critical networking roles to apply for funding that allows them to 'maintain' outcomes in the region between project delivery so that they may maintain existing relationships and networks with landholders, continue regional planning and coordination, and subsequently maintain extension capacity in the region. See also recommendation 2.

Recommendation 35.
Adequately resource Regional Program Coordinators (if implemented) to promote information sharing and to support individual delivery partners to integrate best practice project design and delivery approaches (i.e., as identified in the Management synthesis framework).

Recommendation 36.

Collaborate with other Reef investors to review and integrate the lessons and findings on project design and delivery to enable shared learning for existing and new delivery partners, e.g., by updating the Management Synthesis for Reef Programs and Projects and revisiting the possible investment of the proposed Reef Project design website concept (Alluvium, 2020).

Glossary of terms

Adaptive management	An active culture of reflection comprising effective evaluation, rewards for thinking and reflection, appropriate communication for all project participants, and provision of mechanisms for incorporating learning into planning and management. Within the context of adaptive management, evaluation is an important organisational learning tool and business management practice through which lessons can be drawn and hypotheses tested to guide future work and form part of the corporate history.
Appropriateness	A determination made by comparing the program with the needs of the intended beneficiaries using any of the techniques of needs analysis.
Attribution	The causal link of one thing to another. For example, the extent to which observed (or expected) changes can be linked to a specific intervention in view of the effects of other interventions or confounding factors.
Capacity / capacity building	Capacity-building is defined as the process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt, and thrive in a fast-changing world (https://www.un.org/en/academic-impact/capacity-building). Capacity building occurs across three levels – individual, organisational and institutional – and involves a process of strengthening the abilities of individuals, organisations and systems to undertake a specific activity or program of activity and to continue to advance desired outcomes effectively, efficiently and sustainably (adapted from https://www.aciar.gov.au/capacity-building).
Cost-effectiveness	Cost-effectiveness is a measure how effective a given project is in achieving its outcomes relative to its cost. This can be calculated for a range of projects with similar objectives to determine which projects are the most cost-effective relative to alternatives.
Delivery mechanisms	The mechanism by which the individual Reef Trust projects have been selected and commissioned. Primary delivery mechanisms include: • Reef Trust Tender / Reverse Auction. This involved a direct invite to a delivery partner. Landholders invited to register interest to participate, resulting in individual project grant agreements with landholders. • Grant agreement - Direct invite to delivery partner, deliver on specified activities (by RT Program). • Targeted competitive grants - Investment prioritisation undertaken and allocation of funds via grant agreements (direct invite). • Technical assistance via competitive process • Direct co-investment – additional investment provided to an existing project. • Regional Land Partnership (RLP) – leveraged an existing competitive tender process to achieve Reef Trust water quality outcomes.
Delivery partner (grants)	The nominated proponent or lead agency accountable for the delivery of the grant agreement.
Direct engagement	Engagement that occurred one-on-one such as the provision of extension advice specific to a particular landholder or geographic location.
Efficiency	The notion of getting the highest value out of program or project resources.
End of catchment load	The pollutant load or load reduction estimate at the end of the Great Barrier Reef catchments. This represents the pollutant loads that are expected to be delivered (or prevented from being delivered) to the Great Barrier Reef blue lagoon.
Enduring adoption	Applying the sustainable management practice(s) or comprehensive practice suite/framework: • Across the whole farm or relevant areas • In a timeframe (cycle) that is appropriate for each management unit, e.g.,. yearly. • Over consecutive, multiple years in a sustained way (Natural Decisions , 2021).
Indirect engagement	Engagement that occurred in a group setting such as a field day or workshop including information sharing and imparting knowledge, but not necessarily including specific advice to particular properties or geographic locations.
Innovation	The degree to which the project was trialling a new, previously untested process or method and/or in a new previously untested context. Highly innovative projects will make a larger contribution to academic / thought leadership.

Knowledge legacy	The diversity of and access to knowledge developed as part of the project including scientific peer reviewed literature, traditional knowledge, grey literature and translated to meet the needs of target audiences e.g.,., landholders, decision makers, extension staff.
Landholder capacity	The skills and knowledge held by landholders that is required to adopt the targeted land management practice changes and related natural resource management outcomes. Capacity has been identified as one of three core 'supportive' attributes underpinning legacy.
Landholder engagement	The extent landholders (including agribusinesses) had regular, direct participation during the delivery or implementation phase of the project. There are three categories for this element: • Extensive – the proponents had regular and direct interaction with a wide diversity of stakeholders • Moderate – the proponents had some level of interaction, or informal/irregular interactions, with some stakeholders • Limited – there was little evidence of any interactions with stakeholders with regard to either the design or delivery of the project.
Landscape repair	Remedial actions undertaken to facilitate the recovery of entire gullied area/s or eroding streambank/s. Actions include temporary structures such as porous check dams, contour banks, mechanical gully reshaping, earth works, timber pile fields and earth works.
Learning culture	The value an organisation or team places on collecting, translating and disseminating knowledge and skills with others. The development of a learning culture is heavily influenced by the degree of collaboration.
Legacy	The extent to which the improved Reef water quality outcomes/impacts achieved by programs and projects funded by the Reef Trust will continue to contribute to the achievement of the Reef water quality targets after funding has ceased. As the legacy of projects has not been assessed to date, the assessment considered evidence of short-term outcomes that are 'supportive' of enduring legacy (Natural Decisions, unpublished) including: • Capacity (skills and knowledge of individuals and organisations) • Commitment (of landholders and organisations, including how organisations interact and work together, and the formalisation, evolution or cessation of any partnerships created during a funding period, maintenance) • Use of tools
Management intervention	For the purposes of this evaluation, management interventions refer to the specific management activities or practices adopted that are implemented during the course of the project. Each management response is delivered using a range of individual management interventions that work together to deliver the project's outcomes and outputs. For example, management interventions for management practice adoption for nutrient management could include development of nutrient management plans and trash blanketing.
Management response	The high level approach to addressing a known threat or group of related threats. For sediment management the two most common high level management responses are: landscape remediation (on-ground works) and management practice adoption (grazing). For nutrients the primary high level management response is management practice adoption (nutrients). Each management response is delivered using a range of individual management interventions.
Measures	The term 'measure' refers to any data or information source that would be used to measure a change in the condition, state, behaviour, and management actions. Here, measures include what others may term indicators, targets, characteristics, and/or parameters. Measures are typically linked to a data collection 'method' (sometimes multiple methods) to collect the data or information required to understand the result. A different or similar analytical 'method' may also be required to analyse the data for evaluation.
Monitoring	The regular collection and analysis of information to assist timely decision making, ensure accountability and provide the basis for evaluation and learning. It is a continuing function that uses methodical collection of data to provide management and the main stakeholders of an ongoing project or program with indicators of progress and achievement of objectives.
Outcomes	Outcomes generally are the intermediate and long-term results of the activities or initiatives. Outcomes describe the changes in the biophysical environment and/or capacity that is expected if the program is successful.
Outputs	The tangible deliverables or activities from projects than can be reported on. They can include services, reports, tools, workshops or products.

Paddock to Reef area of practice change	The spatial area where management practice change took place, sourced from the P2R team.
Paddock to Reef reported area	The total spatial area over which a project takes place, including the management practice area, sourced from the P2R team.
Performance indicator	A quantitative or qualitative factor or variable that provides a simple and reliable basis for assessing achievement, change or performance. It is a unit of information measured over time that can help show changes in a specific condition. A given goal or objective can have multiple indicators.
Phase	Refers to Reef Trust Phase. Each phase of the Reef Trust is supported by a targeted Investment strategy.
Program	Refers to Reef Trust Program. The Reef Trust is the Australian Government's flagship investment program to support the delivery of the Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan) – the Australian and Queensland Government's long-term framework for protecting and managing the Great Barrier Reef.
Program Manager	Refers to the designated Program Manager located within the Australian Government (unless otherwise specified) .
Project	Refers to Reef Trust project. Refer to Appendix A for a list of individual Reef Trust projects.
Project reach	The extent to which a program attracts and engages (directly or indirectly) its intended audience.
Project reported area	The total spatial area over which a project takes place, including the management practice area reported by the delivery partner in their six-monthly or end of project reporting.
Project practice change area	The spatial area where a management practice change took place reported by the delivery partner in their six-monthly or end of project reporting.
Project spill over	The extent to which the project added value or benefits beyond the "boundaries" of the project.
Project type	Refers to what industry the project was delivered by/for, the target pollutant and the type of management response.
Regional Land Partnership	A sub-program of the National Landcare Program Phase Two. Investment source for Reef Trust Phase 7, with direct procurement of services from preferred providers.
Regional Water Quality Program Coordinator	Builds on the GBRF Reef Trust Partnership Regional Partnership Coordinator role developed to: • Support delivery providers in identifying and connecting with potential partners and other relevant stakeholders, including landholders • Coordinate engagement and alignment between the program and other regional initiatives in order to foster collaboration, deliver co-benefits, maximise synergies and co-investment and minimise duplication and redundancies • Establish and coordinate the regional partners forum • Develop and implement strategies to address capacity and capability support needs • Participate in the program Steering Committee.
Research and development	Projects that are underpinned by an appropriate and rigorous methodology and informed by a range of subject matter experts from across the research, practitioner and industry sectors.
Service Provider (for Regional Land Partnerships - RLP)	The nominated proponent or lead agency accountable for the delivery of a Regional Land Partnership investment project (Reef Trust Phase 7).
Stakeholder engagement	The extent to which stakeholders had regular, direct interaction in the project design phase of the project. In some discussions landholders are discussed separately to other more general stakeholders. There are three categories for this element: • Extensive – the proponents had regular and direct interaction with a wide diversity of stakeholders • Moderate – the proponents had some level of interaction, or informal/irregular interactions, with some stakeholders • Limited – there was little evidence of any interactions with any stakeholders with regard to either the design or delivery of the project.

Technical partner	The Reef Trust program has engaged the services of recognised specialists across different fields to undertake targeted reviews and technical assessments for example of a specific management response such as landscape remediation for gullies.
Trials	A generally small-scale implementation of a process or method. It enables the testing of the effectiveness of the activity/s before rollout at a larger scale.
Value for money	Refers to the cost to deliver similar outputs across projects or cost per kg of pollutant saved (where possible). Value for money was assessed using a cost comparison assessment.
Water quality benefits	Reductions in nitrogen (DIN), phosphorus, sediment load and pesticide concentrations which adversely affect the condition of the Great Barrier Reef. Each project's contribution towards Reef 2050 WQIP water quality targets (KEQ1) was assessed in Part A and MIPs in Part B using the end-of-catchment load reductions as reported to P2R as at 2020/21. The focus of water quality benefits is on DIN as a measure of nitrogen and fine sediment.

Acronyms and abbreviations

6ES	SIX EASY STEPS
DAF	Queensland Department of Agriculture and Fisheries
DAWE	Australian Department of Agriculture, Water and the Environment (now DCCEEW)
DCCEEW	Australian Department of Climate Change, Energy, the Environment and Water (previously DAWE)
DES	Queensland Department of Environment and Science
DIN	Dissolved inorganic nitrogen
ESC	Executive Steering Committee
FG	Focus group
GBR	Great Barrier Reef
GBRF	Great Barrier Reef Foundation
IEP	Reef 2050 Plan Independent Expert Panel
ISP	Reef Independent Science Panel (Sub-committee to the IEP)
KEQ	Key Evaluation Question
LCAT	Land Condition Assessment Tool
MERI	Monitoring, Evaluation, Reporting and Improvement
MERIT	Monitoring, Evaluation, Reporting and Improvement Tool used by DCCEEW
M&E	Monitoring and evaluation
MAPS	Mackay Area Productivity Services
NESP	National Environmental Science Program
NQDT	North Queensland Dry Tropics NRM
NRM	Natural resource management
NRIP	Natural Resource Investment Program
OGBR	Office of the Great Barrier Reef, Department of Environment and Science
P2R	Paddock to Reef Integrated Monitoring, Modelling and Reporting Program
QFF	Queensland Farmers
QRWQP	Queensland Reef Water Quality Program
RAC	Reef Advisory Committee
R&D	Research and development
RCS	Resource Consulting Services
RT	Reef Trust
RTP	Reef Trust Partnership (managed by the Great Barrier Reef Foundation)
RTWQIP	Reef Trust Water Quality Investment Program
Reef 2050 WQIP	Reef 2050 Water Quality Improvement Plan

SCS	Scientific Consensus Statement
TSS	Total suspended sediment
WQ	Water quality
WQIP	Water quality improvement plan

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1 Introduction

1.1 Project scope

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) is seeking to evaluate aspects of the Reef Trust Water Quality Investment Program (RTWQIP) to identify improvements and look towards options for continued investment and delivery models for Reef Trust. The objective of this evaluation is to:

- Provide an evidence base that can inform future Reef Trust water quality investment and program design.
- Identify the success factors or key components that could be continued or enhanced.
- Identify the barriers and potential strategies for more effective program delivery, monitoring and evaluation.
- Provide recommendations, strategies or options to strengthen and improve future Reef Trust water quality investments going forward from 2022 for consideration by the Reef Branch of DCCEEW.

The outputs of this evaluation forms part of the Australian Government's Reef Trust Monitoring and Reporting Plan (Australian Government, 2016) and subsequent updates, serves to both:

- Provide an opportunity for flexibility to respond to changing environmental and economic challenges facing the Reef and its communities.
- Support other forms of reporting by the Australian Government including reporting on management achievements in protecting the outstanding universal value of the Great Barrier Reef World Heritage Area.

This evaluation draws on information and data provided by delivery partners who are required to report on progress of the Reef Trust program investments. Projects are monitored and reported through the Monitoring, Evaluation, Reporting and Improvement Tool (MERIT) located on the Atlas of Living Australia website. There are a mix of project reporting periods through each phase e.g., Phase IV projects report progress every six months through MERIT, whilst financial reporting is completed annually. Phase VII projects report quarterly. The evaluation included a desktop analysis of project reporting for all 43 Reef Trust projects, an online survey of delivery partners and key stakeholders, three focus groups, and eight interviews to inform an assessment of the key evaluation questions (KEQs).

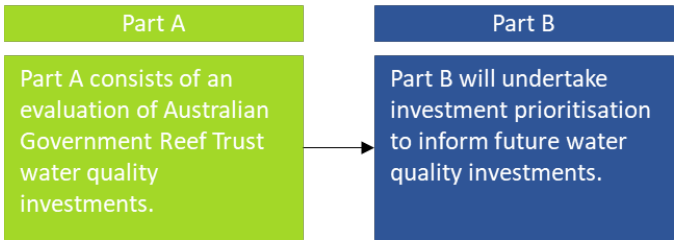
This evaluation has assessed how the Reef Trust water quality investment projects address Reef Trust Outcome 1 and ultimately contribute to the Reef 2050 Water Quality Improvement Plan (WQIP) targets. Refer to Section 2 for further details of the program logic.

The primary audience for this evaluation is the Australian Government, specifically DCCEEW. Secondary beneficiaries of the lessons and recommendations may include:

- the Queensland Government
- the Great Barrier Reef Foundation
- project delivery partners (current and future)
- other investors in the Great Barrier Reef region.

1.2 Next steps

This evaluation represents Part A of a two-part project undertaken by Alluvium for DCCEEW.



Part B of the broader project includes services to undertake investment prioritisation for future water quality investment. It will provide recommendations, strategies, or options to strengthen and improve future Reef Trust water quality investments going forward from 2022 for consideration by the Reef Branch of the DCCEEW.

2 Reef Trust Program

2.1 Context and background

The Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan) is the Australian and Queensland Government's overarching strategy for protecting and managing the Great Barrier Reef, which sets out objectives and management actions to preserve and improve the health of the Reef for future generations. To support the achievement of this Plan the Australian Government has committed more than $160 million for on-ground water quality improvement activities to date, through the Reef Trust, with a further $201 million provided to the Great Barrier Reef Foundation (GBRF) through the Reef Trust Partnership (RTP). This scope of this evaluation did not include the RTP projects.

The Reef Trust is the Australian Government's flagship investment program to support the delivery of the Reef 2050 Plan. The overall objective of the Reef Trust is to provide cost effective, strategic investment which goes above and beyond existing programmes to address key threats to the Great Barrier Reef and catchments for the long-term protection and conservation of the outstanding universal value of the Great Barrier Reef (Commonwealth of Australia, 2014).

The Reef Trust is designed to direct funding in a targeted and strategic way to deliver against four outcomes:

- Outcome 1 - Improve the quality of water entering the Great Barrier Reef from broad-scale land use to increase the health and resilience of the Great Barrier Reef.
- Outcome 2 - Improve the health and resilience of coastal habitats.
- Outcome 3 - Improve and protect marine biodiversity, including the reduction of crown-of-thorns starfish and protection of listed threatened and migratory species, such as dugongs and turtles.
- Outcome 4 - Any new development maintains or improves the condition of matters of national and state environmental significance through strategic delivery of offsets through the Reef Trust.

This evaluation focuses specifically on evaluating Reef Trust Water Quality Investments directed towards Outcome 1 only. Water quality investments (hereby referred to as Reef Trust Investment Program (RTIP) were implemented across seven phases, with initial trial investments based on the strength of available evidence about the key threats to the Great Barrier Reef and the effectiveness of actions that can be taken to address them.

Investment phases have generally been designed to:

- address the highest priority threats in the highest priority locations
- protect and improve critical assets through on-ground change
- complement previous and current investments in the Reef catchments
- deliver the most environmental benefit for each dollar invested (DAWE, 2022).

Previously, recommendations of projects for approval by the Minister for the Environment draw on advice from and endorsement by the Reef 2050 Independent Expert Panel to identify actions that will have a long-term impact and are most likely to be adopted across relevant industries.

2.2 Governance

The Reef Trust is delivered by the Australian Government. Governance and administrative arrangements are designed to ensure all funds are effectively managed and directed towards priority on-ground actions. These arrangements leverage and complement the broader governance structure and processes for the Reef 2050 Plan and the Reef 2050 Water Quality Improvement Plan 2017-2022 (Reef 2050 WQIP), which is aligned and nested under it.

Governance around water quality improvement for the Great Barrier Reef is complex. To support the Reef Trust water quality investment program consultation occurred through the Reef 2050 Plan Independent Expert Panel, Independent Science Panel, Queensland Government, Great Barrier Reef Marine Park Authority, science and industry representatives, regional organisations, non-government organisations and community as required.

Investment delivered through the Reef Trust, including the contracting and delivery of projects, is in accordance with the *Public Governance, Performance and Accountability Act 2013*, the Commonwealth Grant Rules and Guidelines and the Commonwealth Procurement Rules. The Reef Trust is administered through the Reef Trust Special Account which was established by the Finance Minister through a Determination to the *Public Governance, Performance and Accountability Act, 2013*. The Determination prescribes the purposes for spending of funds through the Reef Trust,

which must be for projects that improve water quality and coastal habitat, address threats, and protect, repair and mitigate damage to the Great Barrier Reef World Heritage Area.

2.3 Investment planning process

The Reef Trust Initial Design and Investment Strategy (Commonwealth of Australia, 2014) outlines the design of the Trust and identified initial priority investments to be implemented from July 2014. This Strategy outlines that Reef Trust investment will be delivered in line with the following principles:

- *Additionality and complementarity*—investments will build on and align with existing efforts, not duplicate or replace them.
- *Clear outcomes and targets*—investments are focused on delivering results.
- *Cost-effectiveness*—Reef Trust will invest in diverse, well-planned, cost-effective activities and consider a range of disbursement mechanisms including market-based instruments.
- *Cognisant of available funds*—investment priorities will consider the likely size of available funds in the Reef Trust and co-investment opportunities.
- *Collaboration and partnerships*—investments will consider how Reef Trust can best work with a range of interested parties to plan, identify, develop and deliver projects. Partners will include the community, volunteers, Landcare, natural resource management groups, Indigenous groups, industry groups and local government.
- *Effective delivery* – priority projects will be implemented based on sound scientific approaches and methodologies and using targeted monitoring and evaluation. This will support effective decision making and facilitate adaptive management.
- *Evidence based and scientifically defensible*—planning, identification and development of priority, targeted projects will be aligned with best available scientific and expert knowledge and guided by the outcomes of existing scientific and economic prioritisation initiatives.
- *Importance of leveraging*—increased focus on leveraging co-investment and funding contributions for the delivery of Reef Trust priorities for investment.
- *Targeted investments arising from offsets*—funded activities must target the relevant ecosystem or attribute of the Great Barrier Reef that is being impacted and be of sufficient magnitude to improve the ecological integrity of the Great Barrier Reef.
- *Strategic, on-ground change*—making the most of consolidated funds and collaborative efforts with a strong on-ground delivery focus and minimal administrative overheads (Commonwealth of Australia, 2014).

Table 1 provides a summary of the Reef Trust investment water quality priorities of each Reef Trust phase.

Table 1. Summary of Reef Trust investment water quality priorities per phase

Reef Trust Phase	Water quality investment priorities, objectives and/or focus	Source
RT Phase I commencing 2014-15	Addressing the very high and high risk pollutants and regions identified through the Scientific Consensus Statement and Reef Plan 2013. Focus will be placed on: • assisting landholders to improve land management practices and reduce the loads of nutrients, pesticides and sediment entering the Great Barrier Reef lagoon using cost-effective and innovative practice • accelerating the uptake of a number of diverse, innovative practices and strategic actions by focusing on greater assistance and engagement with landholders in priority catchments Priority investment for targeted on-ground actions which go above and beyond existing investments (with a focus on water quality): • $5 million Reef Trust Tender – Wet Tropics • $3 million Promotion of A-class grazing management practices to reduce sediment runoff in the Burdekin and Fitzroy regions	Commonwealth of Australia (2014) Reef Trust – Investment Strategy Initiative Design and Phase 1 Investment 2014-15.

RT Phase II commencing 2016	Further alignment with the Reef 2050 Long Term Sustainability Plan outcomes and targets · Comprehensive prioritisation process to identify potential projects against objectives and outcomes · Strategic balance of short-, medium and long-term investments · Balance between local and more strategic, Great Barrier Reef wide investments · Balance between prescribed or identified potential projects and funding of projects that allow for greater innovation to achieve desired outcomes. Phase two Reef Trust investments will focus on reducing nitrogen and sediment runoff into the Reef.	Commonwealth of Australia (2014) Reef Trust – Investment Strategy Initiative Design and Phase 1 Investment 2014-15. Commonwealth of Australia (2015) *Reef Trust Phase II Investments.*
RT Phase III	Reef Trust Phase III will: • deliver investments in an integrated manner with the Queensland Government, building on existing activities and integrating with planned initiatives across priority regions and industries. • build greater alignment and collaboration with the Queensland Government cane and grazing best management practice (BMP) programmes to deliver investment to reduce nutrient and pesticide losses from cane farming and erosion control in grazing landscapes.	Commonwealth of Australia (2015) *Reef Trust Investment Strategy Phase III*
RT Phase IV	Focus of investment will be to: • Engage with industry, the corporate sector and philanthropy to encourage greater collaboration and partnership in delivering the fourth phase of investments. • Invest in projects that further reverse auctions for nutrient reduction in the Wet Tropics and Burdekin natural resource management regions, trials of enhanced efficiency fertilisers on sugar cane farms, and management of stream bank and gully erosion.	Commonwealth of Australia (2016) *Reef Trust Investment Strategy Phase IV*
RT Phase V	Builds on previous phases of investment with a strong focus on partnerships and co-investment with the community and private sector to maximise benefits to the Great Barrier Reef.	Commonwealth of Australia (2017) *Reef Trust Investment Strategy Phase V*
RT Phase VI	Investment will deliver locally trusted expert agronomic support to help sugarcane farmers improve fertiliser use efficiency through nutrient management planning and on-farm implementation.	Commonwealth of Australia (2018) *Reef Trust Investment Strategy Phase VI*
RT Phase VII	Investment will focus on the following key principles: • Prioritising long-term and strategic projects. • Ensuring continued funding for improving the quality of water entering the reef, in line with Reef 2050 Water Quality Improvement Plan (WQIP) priorities and the most cost effective actions currently available. • Providing additional funding for outcomes and priorities that have had comparatively less funding in the past and where high impact, cost effective projects can be developed.	Commonwealth of Australia (2020) *Reef Trust Future Investment Overview 2020-2023*

2.4 Reef Trust project design and delivery – key terminology

2.4.1 Delivery mechanisms

Reef Trust projects are being delivered through a range of mechanisms dependent on the specific outcomes sought, and allowing for collaboration, innovation and cost-effectiveness. In addition to competitive grants, the Reef Trust has employed a range of mechanisms to enable project delivery. One of the aims of the Reef Trust has been to encourage greater use of market-based instruments to ensure the achievement of the greatest outcomes relative to cost.

For the purposes of this assessment, the following delivery mechanism categories were used:

- ***Direct invite to delivery partner*** - Investment prioritisation undertaken and allocation of funds via grant agreements (direct invite).
- ***Targeted competitive grants*** - Open invitation to submit a funding application for the delivery of projects and activities that align to the investment strategy (by RT Phase).
- ***Reef Trust Tender/reverse auction*** - This involved open tender procurements. Landholders were invited to register interest to participate, resulting in individual project grant agreements with landholders. Phases I, II and IV all included reverse tenders as a delivery mechanism.
- ***Technical assistance via competitive process*** – open invitation to submit a funding application for the delivery of a specified scope of technical work.
- ***Direct co-investment*** – Additional investment provided to an existing project previously funded by another investor.
- ***Regional Land Partnership (RLP)*** – Leveraged an existing competitive tender process to achieving Reef Trust outcomes.

2.4.2 Management responses

Various management responses were applied throughout the Reef Trust with the aim of reducing sediment, nutrient and/or pesticide runoff through management practice change adoption or landscape repair (i.e., on-ground management). These management responses varied depending on the type of land use, commodity and the type of pollutant being targeted.

For example, in the case of sugarcane being the land use, the aim was to manage nutrients using management practice change adoption approach. For each management response, there are a number of different management interventions that can be applied. Specific interventions included activities such as irrigation efficiency, nutrient budgeting, matching nutrient requirements etc. Table 2 identifies the range of management responses and interventions employed throughout the program relative to the industry and the pollutant being addressed.

For the purposes of this evaluation, the **management responses have been characterised by their primary effort** or investment and generally fall into one of two broad categories – management practice change (uses mostly non-structural interventions) or landscape repair (uses primarily on-ground or structural interventions).

Generally, the landscape repair management response aligns with on-ground management interventions such as establishment of culverts, table drains, porous check dams and the like, whilst the management practice change is heavily reliant on behaviour change such as altering stocking rates, improving ground cover as well as managing stock access and grazing pressure. It should be noted that in many instances projects used a combination of both systems repair and practice change interventions, but for the purpose of this evaluation, each project was categorised taking into consideration its primary management response.

Table 2. Management responses and management interventions by industry and pollutant type

Industry	Target pollutant	Primary management response	Examples of management interventions
Intensive agriculture	Nutrient management	DIN practice change	e.g., Matching Nitrogen and Phosphorus to crop requirements, use of mill mud, fertiliser application method, rates of application, nutrient budgeting
	Sediment management	Sediment practice change	e.g., minimum tillage, fallow land management crop residue cover, controlled machinery traffic, ground cover during fallow, controlling runoff (buffers), maintaining covered ground, inter-row management
	Combined pollution management	DIN, Sediment, Pesticide practice change	e.g., whole of farm integrated management, mixed management interventions
Grazing	Sediment management (Hillslope)	Sediment practice change	e.g., Stocking rates, groundcover thresholds, vegetation management (ground cover, stock access, grazing pressure, off-stream watering
	Sediment management (gully and streambank)	Landscape repair	e.g., revegetation, porous check dam, contour banks, gully reshaping, earthworks, whoa-boys, culverts, table drains

2.4.3 Project types

There are many known contextual attributes that affect the extent to which a project successfully and effectively delivers its desired outcomes and impact. Alluvium (2021) found that different types of projects will have very different needs, i.e., in relation to design, project management and governance, monitoring and evaluation and reporting. Different project types will also carry different levels of risk for the investor. Most importantly, it was identified that different project types will have different short-, intermediate, and long-term outcomes, objectives and goals.

Alluvium (2021) also found that the nature of a project's maturity was one project attribute that was found to impact the ability to deliver its intended outcomes. As a result, four project types were identified and used to describe a specific contextual feature in various KEQs especially those relating to adaptive management. The typology includes research and development (R&D) projects, start up or pilot projects that are testing a new intervention theory, standard projects that are expanding a successful concept, and franchise projects that are expanding into multiple locations. This project has therefore adopted the four project types summarised in Table 3 below.

Table 3. Project types

	PROJECT TYPE			
	Level 1: Research and development	**Level 2: Pilot**	**Level 3: Standard**	**Level 4: Franchise**
DESCRIPTION	Research projects are generally applying new and innovative approaches to fill a known knowledge gap and are supported by a rigorous research methodology and data collection.	Pilot projects are generally testing a new intervention approach to determine if it will result in the desired outcome, and to make refinements in a low risk environment.	Standard projects have generally gone through a pilot phase and the proof of concept or pilot has been successfully demonstrated.	Franchise projects have demonstrated their success in one or multiple locations and have commenced being rolled out in other locations due to their reputation. Commonly relates to management practice change projects
Maturity	Low	Low	Medium	High

3 Reef Trust projects

Table 4 includes a list of all 43 Reef Trust projects included in this evaluation including project name, the short title used for the purposes of this evaluation, the delivery partner, total project value and project status as at July 2022. Although still classified as active at the time of the evaluation, Phase IV and VII projects have been included in the evaluation as the Phase IV projects are very nearly complete and have completed the majority of its reporting. Both of these phases will also help provide the most up to date picture of the impact of the Reef Trust program to date. Phase VII projects have been excluded from the cost-effectiveness section of the report as these projects are still some way from completion and have not been required to provide pollutant load reduction information to the P2R program.

Table 4. Reef Trust Projects

Investment area	Project name	Project code / short title	Delivery Partner	Reef Trust Investment[2]	Status
Reef Trust Phase I				**$4,704,313**	
Reef Trust Tender - Wet Tropics	Reef Trust Tender Wet Tropics Grants to farmers	RT1.01 Grants for Farmers	FNQ NRM Ltd (Terrain)	$1,704,313	Completed
A-Class Grazing Practices - Burdekin & Fitzroy	Promotion of A-class Grazing (Burdekin and Fitzroy Regions).	RT1.02 A-Class Grazing	DEHP (now DES)	$ 3,000,000	Completed
Reef Trust Phase II				**$11,142,674**	
Gully erosion control in priority grazing landscapes	Fifty percent reduction in gully erosion from high priority sub catchments in the Normanby	RT2.01 Fifty percent reduction in Normanby subcatchments	Cape York NRM	$ 780,248	Completed
	Gully prevention and remediation on Normanby River, Kings Plains.	RT2.02 Normanby River remediation	South Endeavour Trust	$ 304,400	Completed
	Technical Support for Reef Trust Gully Erosion Control Programme (Procurement)	RT2.03 CSIRO Technical Support	CSIRO	$410,000	Completed
	Technical Support for Reef Trust Gully Erosion Control Programme – Reserve projects (Phase 2)		CSIRO	$115,608	Completed
	Point Source Sediment Management in the Burdekin Dry Tropics NRM region – East Burdekin	RT2.04 East Burdekin point source sediment management	NQ Dry Tropics	$906,000	Completed
	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management – Theresa Creek	RT2.05 Theresa gully remediation	Fitzroy Basin Association	$702,884	Completed
	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Fitzroy	RT2.06 Fitzroy gully remediation	Fitzroy Basin Association	$702,884	Completed
	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Mackenzie	RT2.07 Mackenzie gully remediation	Fitzroy Basin Association	$702,884	Completed
	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Isaacs	RT2.08 Isaac gully remediation	Fitzroy Basin Association	$702,884	Completed
	Don River Catchment sediment reduction project: Improving GBR water quality	RT2.09 Don River sediment reduction project	Greening Australia	$ 962,550	Completed

[2] Reef Trust investment data was provided by DCCEEW. Some values may differ between the financial information provided by delivery partners and in final financial acquittal documents.

Investment area	Project name	Project code / short title	Delivery Partner	Reef Trust Investment[2]	Status
	Gully management in highly erodible sub-catchments of the Mary River Catchment	RT2.10 Mary River catchment gully management	Mary River Catchment Coordinating Committee (MRCCC)	$ 808,760	Completed
	Point Source Sediment Management in the Burdekin Dry Tropics NRM region – Bowen Broken Bogie	RT2.11 Burdekin Region point source sediment management	NQ Dry Tropics	$906,000	Completed
Reverse Tender - Burdekin	Reef Trust Tender - Burdekin grants to farmers	RT2.12 Burdekin DIN management	NQ Dry Tropics	$3,137,572	Completed
Reef Trust Phase III				**$55,999,991**	
Water quality improvements	Project Catalyst Revamp - game changing farm management practices	RT3.01 Updated farm management practices	Catchment Solutions	$ 3,000,000	Completed
	Reef Alliance – Growing a Great Barrier Reef (Horticulture)	RT3.02 Improving Horticulture practices	Queensland Farmers Federation	$45,666,991	Completed
	Reef Alliance – Growing a Great Barrier Reef (Cane)	RT3.03 Improving sugar cane practices	QFF		Completed
	Reef Alliance – Growing a Great Barrier Reef (Dairy)	RT3.04 Improving dairy practices	QFF		Completed
	Reef Alliance – Growing a Great Barrier Reef (Grain)	RT3.05 Improving grain practices	QFF		Completed
	Reef Alliance – Growing a Great Barrier Reef (Grazing)	RT3.06 Improving grazing practices	QFF		Completed
	Mackay Whitsunday Isaac Sustainable Agriculture –Cane	RT3.07 Sustainable Cane Practices	Reef Catchments	$ 4,425,000	Completed
	Project Pioneer: Innovation in Grazing Land Management	RT3.08 Project Pioneer	Resource Consulting Services	$ 2,908,000	Completed
Reef Trust Phase IV				**$51,079,077**	
Repeated reverse auctions – Wet Tropics and Burdekin	Reef Trust Repeated Tenders - Wet Tropics	RT4.01 Wet tropics repeated tenders	Terrain	$ 6,719,020	Active
	Reef Trust Repeated Tenders - Burdekin	RT4.02 Wet tropics repeated tenders	NQ Dry Tropics	$ 7,381,889	Active
Trialling of enhanced efficiency fertilisers	Support of cane farmer trials of enhanced efficiency fertiliser in the catchments of the Great Barrier Reef	RT4.03 Cane farmer trials	Queensland Cane Growers Association	$5,000,000	Completed
Addressing stream bank and gully erosion	GRZ'M. Great Barrier Reef Riparian Zone Management - a Mary River Project Catchment	RT4.04 Mary Catchment Riparian Project	Mary River Catchment Coordinating Committee	$ 3,027,000	Active
	Scaling up Normanby Basin gully and stream bank Remediation in priority areas	RT4.05 Gully and stream bank remediation in priority areas	Cape York NRM	$ 4,000,000	Active
	Fitzroy subcatchment gully and stream bank erosion control program	RT4.06 Gully and stream bank erosion control program	Catchment Solutions	$ 3,891,070	Active
	Stream bank and gully erosion through improved practices in the Fitzroy	RT4.07 Stream bank and gully erosion in the Fitzroy	Fitzroy Basin Association	$ 3,867,325	Active
	Improving Reef Water Quality through Herbert River Catchment and Gully Remediation	RT4.08 Herbert River remediation	Terrain	$ 2,974,773	Active

Investment area	Project name	Project code / short title	Delivery Partner	Reef Trust Investment[2]	Status
	Gully restoration in priority reaches to improve water quality on the GBR	RT4.09 Gully restoration in the GBR	Greening Australia	$3,770,000	Active
	Laura Gullies Project, fix up and skills for the future	RT4.10 Laura gullies project	Indigenous Land and Sea Corporation	$ 2,065,000	Active
	Stomping out Sediment in the Burdekin – livestock impact for gully remediation.	RT4.11 Burdekin gully remediation	NQ Dry Tropics	$ 2,000,000	Active
	High priority stream bank erosion control in the Mackay Whitsunday region.	RT4.12 Controlling streambank erosion in the Mackay Whitsunday region	Reef Catchments	$4,000,000	Active
	Technical Support for Reef Trust Gully and Stream Bank Erosion Control Program (Phase 4)	RT4.13 CSIRO Technical Support	CSIRO	$ 2,383,000	Active
Reef Trust Phase V				**$4,520,780**	
Project Uplift Farming Systems Initiative	Project Uplift Farming Systems Initiative	RT5.01 Project Uplift	MSF Sugar	$4,520,780	Active
Reef Trust Phase VI				**$3,384,285**	
Complete nutrient management planning in sugarcane	Complete nutrient management planning in sugarcane	RT6.01 Delivering tailored solutions (CR161)	Department of Environment & Science - Qld Government	$3,384,285	Active
Reef Trust Phase VII				**$29,812,933**	
Water quality Regional Land Partnership	Improving land management practices and water quality in the Burnett River catchment	RT7.01 Improving water quality in the Burnett River Catchment	Burnett Mary Regional Group	$6,099,986	Active
	Water quality and soil improvements in grazing and cropping enterprises in the Fitzroy	RT7.02 Improving water quality in the Fitzroy basin	Fitzroy Basin Association	$5,700,000	Active
	Broadscale adoption of 'Tried and Tested' innovative precision agriculture techniques for improved use of nutrient, water and pesticide.	RT7.03 Precision agriculture used to reduce nutrients and pesticides entering the water	NQ Dry Tropics	$ 4,100,000	Active
	Streambank remediation in the Burdekin catchment	RT7.04 Streambank remediation in the Burdekin catchment	NQ Dry Tropics	$2,900,000	Active
	Targeted support to maximise soil, biodiversity and vegetation outcomes in the O'Connell and Proserpine Basins of the Mackay Whitsundays	RT7.05 Maximising ecosystem biodiversity on the O'Connell and Proserpine basins	Reef Catchments	$5,400,000	Active
	Mobilising the Murray and Mossman: an integrated place-based program delivering the step-change that is needed for the Reef.	RT7.06 Place-based program in the Murray and Mossman catchments	NQ NRM Alliance	$ 5,612,947	Active
			Sub total	**$160,644,053**	

4 Evaluation approach

The evaluation methodology was developed to provide a balance between assessing performance against Key Evaluation Questions (KEQs) for all seven Reef Trust phases, which includes 43 individual projects, as well as providing a cost-effective approach to enabling a deep analysis of a smaller representative sample of projects.

4.1 Evaluation Plan

An Evaluation Plan has been developed that outlines the methodology applied, this includes a first pass rapid KEQ assessment of all 43 funded projects using a limited set of indicators, followed by a second pass in-depth assessment of a representative sample containing 19 projects which were assessed using additional indicators and data sources. The Evaluation Plan was presented to delivery partners and other stakeholders prior to its finalisation. They were also invited to review the draft Evaluation Plan.

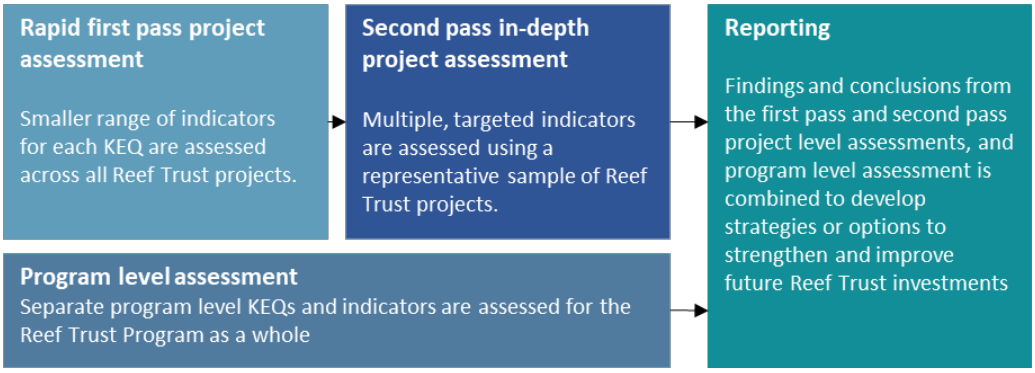


Figure 1. *Overview of evaluation approach*

As identified in Section 2.4, projects were categorised to consider industry type, target pollutant and their primary management response used to address the target pollutant. Primary management responses were largely drawn from the Queensland Government Paddock to Reef Water Quality Risk Management Frameworks (P2R) for each relevant industry. To identify a representative sample of projects for the second pass in-depth assessment, projects were selected based on these criteria, as well as ensuring there were a range of Great Barrier Reef regions, and delivery partners. It is noted that many project delivered both sediment and nutrient savings and commonly used a integrated suite of management responses, however Table 5 identifies projects according to their primary management response focus/investment. Table 5 also identifies in bold the projects that were selected for the 'second pass' assessment of indicators and analysis.

Table 5. Project classification categories and associated projects

Industry	Target pollutant	Management response	Examples of management intervention	Projects that represent this classification
Intensive agriculture	Nutrient management	DIN practice change	Matching Nitrogen and Phosphorus to crop requirements, use of mill mud, fertiliser application method, rates of application, nutrient budgeting	RT1.01 - Grants for Farmers **RT2.12 - Burdekin DIN management** **RT3.01 - Updated farm management practices** RT3.02 - Reef Alliance - Improving horticulture practices **RT3.03 - Reef Alliance - Improving sugar cane practices** RT3.04 - Reef Alliance - Improving dairy practices* RT3.07 - Sustainable Cane Practices RT4.01 - Wet tropics repeated tenders – Wet Tropics **RT4.02 - Wet tropics repeated tenders - Burdekin** **RT4.03 - Cane farmer trials** **RT5.01 - Sugarcane SRA farming system** **RT6.01 - Delivering tailored solutions** **RT7.03 - Precision agriculture used to reduce nutrients and pesticides entering the water** RT7.05 - Maximising ecosystem biodiversity on the O'Connell and Proserpine basins* **RT7.06 - Placed based program in the Murray and Mossman catchments**

Industry	Target pollutant	Management response	Examples of management intervention	Projects that represent this classification
	Sediment management	Sediment practice change	Minimum tillage, fallow land management crop residue cover, controlled machinery traffic, ground cover during fallow, controlling runoff (buffers), maintaining covered ground, inter-row management	RT3.05 - Reef Alliance - Improving grain practices **RT3.06 - Reef Alliance - Improving grazing practices****
Grazing	Sediment management (Hillslope management)	Sediment practice change	Stocking rates, groundcover thresholds, vegetation management (ground cover, stock access, grazing pressure, off-stream watering	**RT1.02 - A-Class grazing** **RT3.08 - Grazing land management** RT7.02 - Improving water quality in the Fitzroy basin
	Sediment management (streambank management)	Sediment practice change	Manage grazing pressure, fencing, off-stream watering, weed control, wet season spelling	**RT4.04 - Mary River catchment riparian project** **RT7.01 - Improving water quality in the Burnett River catchment** RT7.04 - Streambank remediation in the Burdekin catchment
	Sediment management (Gully and streambank management)	Landscape repair	Installation of erosion control structures, revegetation, porous check dam, contour banks, gully reshaping, earthworks, whoa-boys, culverts, table drains	**RT2.01 - Fifty percent reduction in Normanby subcatchments** RT2.02 - Normanby River remediation RT2.04 - East Burdekin point source sediment management RT2.05 - Theresa gully remediation RT2.06 - Fitzroy gully remediation RT2.07 - Mackenzie gully remediation **RT2.08 - Isaac gully remediation** RT2.09 - Don River sediment reduction project RT2.10 - Mary River catchment gully management RT2.11 - Burdekin region point source sediment management RT4.05 - Streambank remediation in priority areas RT4.06 - Gully and stream bank erosion control program RT4.07 - Stream bank and gully erosion RT4.08 - Herbert River remediation **RT4.09 - Gully restoration in the GBR** **RT4.10 - Laura gullies project** RT4.11 - Burdekin gully remediation RT4.12 - Controlling streambank erosion in the Mackay Whitsunday region **RT7.01 - Improving water quality in the Burnett River catchment** RT7.04 - Streambank remediation in the Burdekin catchment
Grazing	Sediment	Landscape repair	Technical assurance – sediment	RT2.03 - CSIRO Technical Support **RT4.13 - CSIRO Technical Support**

* RT3.04 and RT7.05 applied an integrated suite of both management practice change and landscape repair management interventions to deliver a combination of sediment, DIN and pesticide savings/abatement.

**RT3.06 used an integrated suite of both management practice change and landscape repair management interventions..

4.2 Key evaluation questions

Table 6 identifies the KEQs that were used to guide the evaluation. The Reef Trust Monitoring and Evaluation Plan 2021 (DAWE, 2021) developed a set of original KEQs, which were refined for the purpose of this evaluation. A summary of the changes can be found in the evaluation plan (Appendix B).

Key evaluation questions have been developed for different scales, focussing evaluative inquiry on the 43 funded projects at the 'project' scale, the seven Reef Trust Investment Phases, and the whole of the Reef Trust Investment Program.

Table 6. Key evaluation questions

Criterion	Key Evaluation Question	Scale (RT Program, phase, project)
Impact	What is the total combined pollutant saving delivered by the Reef Trust Program? What is the pollutant saving delivered by the project?	Program Project
	Which management responses, project type, and/or delivery mechanism had the biggest impact on delivery of pollutant savings?	Program
	What extent of overall water quality improvement (from Reef 2050 WQIP) can be attributed to the Reef Trust Program?	Program
	Did the project investment achieve pollution abatement and to what extent? Was it cost effective? *Refer also to 'Legacy'*	Project
	Were there any unanticipated costs, benefits or perverse outcomes of the project?	Project
	To what extent did the Reef Trust Program build enabling capacity for future water quality improvement in addition to direct pollutant savings?	Program
Effectiveness	Have the planned phases of water quality investment successfully delivered the deliverables and outcomes according to the original work plan?	Program Phase
	Was there evidence of adaptive management across the phases of investment?	
	To what extent have the Reef Trust Program (water quality investments) delivered on the KPIs identified in the Reef Trust Monitoring and Evaluation Plan 2021?	Program
	To what extent was the project completed in line with contract guidelines, reporting requirements and MERI procedures?	Project
	Were the investments / projects considered 'innovative' from an industry perspective? *Refer also to 'Legacy'*	Project Program
	Were the governance arrangements and reporting processes effective?	Project
	Were the governance arrangements and reporting processes effective?	Program
	Did delivery partners have access to appropriate internal and external resources and technical support during design and delivery? Did the internal Reef Trust team have access to appropriate internal and external resources and technical support during design and delivery?	Project Program
	Did delivery partners have the appropriate capacity and capability to design and deliver the project outcomes?	Project
	Were communication processes between Reef Trust program managers and proponents appropriate?	Program
Efficiency	Have the planned phases of water quality investment successfully delivered the deliverables and outcomes according to the original work plan? (*Moved to effectiveness*)	Program
	To what extent has the Reef Trust program achieved value for money and cost-effectiveness?	Program
	To what extent has the Reef Trust program water quality investment been leveraged/aligned with other programs?	Project Program
	How could the Reef Trust Program have been more efficiently delivered?	Program
Appropriateness	To what extent did the Reef Trust investment prioritisation and design process for each phase align with the needs of project partners and participants?	Program / Phase
	How appropriate and rigorous was the Reef Trust investment prioritisation and design process at the program and phase level? How appropriate and rigorous was the project design process?	Program Project
	Was there appropriate complementarity across different government funded projects/programs (i.e., Queensland government, Reef Trust Partnership)?	Program
	Which of the various delivery mechanisms applied during the various Reef Trust phases deliver the greatest water quality improvement?	Program Phase

Criterion	Key Evaluation Question	Scale (RT Program, phase, project)
	Which of the various management responses applied during the various Reef Trust phases deliver the greatest water quality improvement?	Program
Legacy	What were the lasting or enduring outcomes of the program?	Program
	What were the lasting or enduring outcomes of the project?	Project

4.3 Indicators and assessment criteria

As identified above, some KEQs and their indicators of performance are better suited to assess at the project scale while others are more relevant to the whole-of-Reef Trust Program or Phase scale. The following sections outline the indicators for each of these scales.

The KEQs, indicators and the approach to assessment to be applied to Reef Trust water quality investment projects are described in Table 7. This is supported by an additional rubric assessment table (Table 7) that can be found in the evaluation plan in Appendix B to provide transparency to the assessment approach and subsequent results obtained for each project. The KEQs, indicators and the approach to assessment to be applied to the Reef Trust water quality investment program are described in Table 8. For reporting purpose, the results of the two analyses were combined in section 5.

Table 7. Project scale indicators and metrics against relevant KEQ

Criterion	KEQ	First pass indicators of performance	Second Pass indicators of performance (applies to representative projects only)	Data/information source	Approach to assessment
Impact	What are the pollutant savings delivered by this project?	• Tonnes of sediment saved • Kilograms of DIN saved • Any other pollutant savings • Land and catchment targets i.e. groundcover	• Tonnes of sediment/hectare of practice change area • Kilograms of DIN/hectare of practice change area	P2R or other agreed data sets	Data analysis Confidence rating
	Were there any unanticipated costs, benefits or perverse outcomes resulting from the project?	• Evidence of positive additional outcomes (or project spill over) • Evidence of unanticipated benefits • Evidence of unanticipated costs • Evidence of unanticipated perverse outcomes	N/A	Document review	Thematic analysis Confidence rating
Effectiveness	To what extent were project outputs and outcomes delivered?	• Extent activities delivered planned outputs and outcomes	N/A	Document review	Assessment rating Confidence rating Thematic analysis
	To what extent was the project completed in line with contract guidelines, reporting requirements and MERI procedures?	• Presence/application of appropriate governance arrangements • Presence/application of a MERI plan • Reporting requirements met • Relevant policies and procedures met	N/A	Document review Survey	Assessment rating Confidence rating
Efficiency	Did the project investment achieve cost-effective pollution abatement?	• $/tonne or kilogram of pollutant saved	• Consideration of maintenance costs • Breakdown of costs related to design, landscape remediation, communications and engagement, and M&E	Document review Survey	Thematic analysis Confidence rating

Criterion	KEQ	First pass indicators of performance	Second Pass indicators of performance (applies to representative projects only)	Data/information source	Approach to assessment
			• Evidence of cost-sharing and co-investment • Evidence of coordination and planning with other services in the region		
	To what extend has the RTP water quality investment been leveraged?	• Portion of total budget funded through other investments sources, including in kind contributions	• Portion of project funded through other investment sources, including in kind contributions	P2R or other agreed data sets Document review Survey	Thematic analysis
Appropriateness	How appropriate and rigorous was the project design process?	• Presence/application of a stakeholder analysis and/or communication and engagement plan • Presence of a systems understanding process (water quality, social, economic, etc) Alignment to regional planning • Evidence that Traditional Owners been appropriately engaged in on-ground water quality improvement and monitoring activities where appropriate?	• Evidence of adaptive management • Evidence of prioritisation / planning scoping • Extent and type of landholder and stakeholder involvement in design • Extent and type of landholder and stakeholder involvement in delivery	Document review Survey	Assessment rating Confidence rating
Legacy	What were the lasting or enduring outcomes of the project?	• Evidence of improved skills and knowledge of individuals and organisations • Evidence of improved commitment of landholders and organisations • Use of tools such as decision support tools, improved farm technologies • Evidence of enduring partnerships and networks • Total project reach	• Consideration of maintenance costs / activities for on-ground works and ongoing enabling capacity (e.g.,. social capital)	Document review Survey	Assessment rating Confidence rating Thematic analysis
	To what extent did the project generate and share knowledge?	• Reported knowledge creation and sharing (workshops, conferences, journal articles etc); number of events/outputs as well as success of these	• Research impact – knowledge translation, dissemination, and access • Development of a learning culture/degree of collaboration (e.g.,., setting up a community of practice etc).	Document review Survey	Assessment rating Confidence rating Thematic analysis

Table 8. Program scale indicators and metrics against relevant KEQ

Criterion	KEQ	Indicators of performance	Data/information source	Approach to assessment
Impact	What is the total combined pollutant saving delivered by the Reef Trust Program?	• Total Tonne or Kilogram of pollutant savings across all projects • Total reported area of practice change reported • Total reported contributions for other specified Reef 2050 WQIP catchment and land management targets (e.g.,., groundcover) • Total reported other outputs (pending data availability)	P2R or other agreed data sets	Data analysis
	What extent of overall water quality improvement (from 2050 WQIP) can be attributed to the Reef Trust Program?	• Percentage of the Reef 2050 WQIP pollutant target delivered by Reef Trust water quality investments	P2R or other agreed data sets	Data analysis
	Which management responses, and/or delivery mechanism had the biggest impact on pollutant saving?	• Comparison of total pollutant savings for different deliver mechanisms, management responses, project types	P2R or other agreed data sets Document review	Comparative assessment
	Were there any unanticipated costs, benefits or perverse outcomes resulting from the Reef Trust Program?	• Summary of unanticipated costs, benefits or perverse outcomes	Document review Interview	Thematic analysis
	To what extent did the Reef Trust Program make changes that built enabling capacity for future water quality improvements in addition to direct pollutant savings? What foundations/capacity existed from other previous investment programs that has enabled the Reef Trust program to better achieve its outcomes?	• Summary of improved skills and knowledge of individuals and organisations • Summary of improved commitment of landholders and organisations • Summary of project reach • Summary of use of tools	Document review Survey Interview	Thematic analysis / synthesis of project level results
Effectiveness	To what extent did the Reef Trust Program deliver in accordance with guiding policies, procedures and principles (including those in the Reef Trust Monitoring and Evaluation Plan 2021)?	• Delivery of Outcome 1 key performance indicators	P2R or other agreed data sets	Data analysis
	Have the planned phases of water quality investment successfully delivered the outputs and outcomes according to the original work plan?	• Evidence of delivery on planned outputs and outcomes	P2R or other agreed data sets Document review	
	Were the investments / projects considered 'innovative' from an industry perspective?	• Evidence of industry benchmarking and review		
	What aspects of the Reef Trust program could have been improved to make it more effective:	• Reported challenges • Reported opportunities for improvement with regards to governance, resourcing, capacity and capability, communication etc.	Document review Survey Interview	Thematic analysis

Criterion	KEQ	Indicators of performance	Data/information source	Approach to assessment
	- Were the governance arrangements, MERI, and communication processes for the Reef Trust Program effective? - Did delivery partners have access to appropriate internal and external resources and support during design and delivery? - Did the internal Reef Trust team have access to appropriate internal and external resources and support during design and delivery? - Did delivery partners have the appropriate capacity and capability to design and deliver the project outcomes? - Were communication processes between Reef Trust program managers and proponents appropriate?			
Efficiency	To what extent has the Reef Trust program achieved value for money and cost-effectiveness	• $/tonne or kilogram of pollutant saved compared to other programs (e.g., QRWQP projects) • Breakdown of costs related to design, landscape remediation, communications and engagement, and M&E compared to other programs (e.g., QRWQP projects) • Perceptions of costs and benefits for landholders	P2R or other agreed data sets Document review Survey	Comparative assessment
	To what extent has the RTP water quality investment been leveraged?	• Portion of total combined program investment funded through other investment sources, including in kind contributions	P2R or other agreed data sets Document review	Comparative assessment
	How could the Reef Trust Program have been delivered more efficiently?	• Reported challenges and opportunities for improvement	Document review Survey Interview	Thematic analysis
Appropriateness	To what extent did the Reef Trust investment prioritisation and design process for each phase align with the needs of project partners and participants?	• Evidence of that the investment prioritisation and design processes identified and aligned to the needs of project partners and participants where it was reasonable to do so • Evidence that a process was followed to identify the needs of project partners and participants • Evidence that the investment prioritisation and design process responded to the needs of project partners and participants	Document Review Interview Survey	Thematic analysis
	How appropriate and rigorous was the Reef Trust investment prioritisation and design process at the program and phase level?	• Evidence of prioritisation that aligns with the Reef 2050 WQIP	Document review Survey	Thematic analysis

Criterion	KEQ	Indicators of performance	Data/information source	Approach to assessment
		• Degree of transparency in phase design, prioritisation, procurement and selection. Evidence of adaptive management / identified opportunities for improvement during reviews • Consideration of regional planning and other regional scale needs • Identification of other successful approaches, strategies, interventions • Opportunities to enhance approaches, strategies or interventions	Interview	
	Was there appropriate complementarity across different government funded projects/programs (i.e., Qld government, Reef Trust Partnership)?	• Extent of collaboration, co-investment and coordination between project and investment partners • Extent of common and consistent use of Reef Trust processes (e.g.,. assurance processes, reporting, alignment) • Evidence of coordination and planning with other services in the region • Extent of data and information sharing that has improved decision making • Stakeholder perceptions of complementarity	Document review Survey Interview	Thematic analysis
	Which of the various delivery mechanisms applied during the various Reef Trust phases is the most appropriate to deliver long-term water quality outcomes	• Extent to which the different delivery mechanisms delivered water quality improvement	P2R or other agreed data sets Document review	Thematic analysis
	Which of the various management responses (and specific interventions) applied during the various Reef trust phases is the most appropriate to deliver long-term water quality outcomes	• Extent to which the different management responses delivered water quality improvement	P2R or other agreed data sets Document review	Thematic analysis
Legacy	What were the lasting or enduring outcomes of the Reef Trust program?	General trends relating to the legacy of projects in terms of: • Evidence of improved skills and knowledge of individuals and organisations • Evidence of improved commitment of landholders and organisations • The requirements to maintain the legacy of on-ground works and ongoing project delivery capacity (e.g., social capital, skills and knowledge)	Document review Survey Interview	Thematic analysis

4.4 Data collection

A wide range of data sources have been used to identify evidence to support responses to the KEQs. These are outlined below.

4.4.1 Desktop analysis

As part of the first pass KEQ assessment, a desktop analysis was undertaken of project reporting for all 43 Reef Trust projects. In total, over 175 documents were reviewed as part of the desktop analysis. While the level of reporting varied among projects, all projects had the following reviewed as a minimum standard where available:

- Project MERIT reporting for each stage
- Project MERI plan
- MERIT outputs report (if available)
- Progress reports (if available)
- Final report (if available)
- Evaluation report (if available)
- Technical report (if available)
- DCCEEW project assessment reports.

The desktop analysis also included an analysis of water quality data and associated cost-effectiveness from a variety of sources, these are summarised in Section 4.5 below. Findings from the first pass assessment can be found in Appendix C and include a project summary, responses to each KEQ and an assessment criterion which is further detailed below.

4.4.2 Online survey

A total of 17 responses were received to the online survey of delivery partners and key stakeholders. This included project specific responses for 13 of the 43 Reef Trust projects. Those who provided project specific information included project managers, general managers, project team members or members of the governance committee or group. The survey included both multiple choice and open-ended questions (Appendix D).

An additional generic survey was established for other stakeholders to provide high level feedback on the Reef Trust Investment Program, which did not include project specific data collection and is included in Appendix E. A total of 18 responses were received to the generic survey. However, only 5 respondents provided feedback on the Reef Trust Investment Program, and the remaining 13 skipped these questions.

Survey responses will remain anonymous in the evaluation results, where we have drawn evidence from the survey results, these will be referred to as 's1-s17' within the report. Given the relatively low level of responses to the survey, this data is substantiated with evidence from project reports as well as focus groups and interviews further detailed below.

4.4.3 Focus groups

Three focus groups were held on the 5th, 6th and 7th July which included 16 participants from CSIRO, Australian National University, Griffith University, Queensland Department of Environment and Science and delivery partners responsible for implementing projects that were selected for the second pass assessment. The focus groups were conducted face-to-face in an on-line format that had a duration of 2 hours. Focus groups contributed to the second pass deep dive and program level KEQ assessment.

Focus group attendees will remain anonymous within the evaluation results, where we have drawn evidence from the focus groups, these will be referred to as 'f1 – f3' within the report.

4.4.4 Interviews

Eight interviews were held with senior staff from DCCEEW, the GBRF, P2R team and technical partners to discuss KEQs relating to the individual Reef Trust phases and the program as a whole. The semi-structured interviews were all conducted on-line in a face-to-face or video conference format and had a duration of 60 – 90 minutes.

Interviewees will remain anonymous within the evaluation results, where we have drawn evidence from the interviews, these will be referred to as 'i1 – i8' within the report.

4.5 Cost-effectiveness

Cost-effectiveness assessments have been undertaken by collating the costs and outcomes of projects, and comparing them using a common metric, such as dollars per tonne of sediment avoided. Benchmarking in this way can inform future decision making around the cost-effective use of resources. Reductions in fine sediment loads and DIN loads were the focus of this assessment; however, it should be noted that there are many other outcomes that the projects may have achieved through implementation. The process followed for this assessment was as follows:

1. *Data collation* – Information on the costs and estimated load reductions for each of the projects was drawn from a range of sources. These primarily included project plans, performance reports, funding data from DCCEEW, and Paddock to Reef (P2R) modelling results from the Queensland Department of Agriculture and Fisheries (DAF). Data used as inputs for the assessment as well as cost-effectiveness at an individual project level are compiled in Appendix C.
2. *Calculation of cost-effectiveness* – The costs and load reductions were brought together to calculate estimates of cost-effectiveness ($/tonne of sediment or $/kilogram of DIN depending on the project, as well as $/ha of practice change where relevant).
3. *Categorisation and comparison* – Projects have been categorised together by their primary management response to provide comparable and insightful understanding of the cost-effectiveness of varying types of projects. These groupings are presented in the results section below.
4. The costs associated with each project have been assessed using a typical discounted cashflow analysis involving the discounting of costs with a discount rate of 7% over a 30-year period (noting that without ongoing maintenance costs, the costs are generally concentrated in the first 5 years or so).[1] The present value of cost was then divided by the reduction in annual loads for each project to determine cost-effectiveness (i.e. $/kg or $/tonne). These discount rates align with the Queensland Government's guidelines: (DSDILGP, 2021) [3].

It should be noted that the robustness of the approach was constrained by the availability, consistency and quality of the data available, and this should be kept in mind when using this analysis to inform future policy decisions.

There are three key applications of cost-effectiveness that can be particularly useful. All three applications are critical to achieving long-term outcomes but requires pollutant load reduction data to be captured and reported in a consistent way. There are different reasons for applying cost-effectiveness to decision-making, which often reflects the mix of policy mechanisms under consideration as well as who is seeking the outcome. The three key applications are further explained below:

1. *Funders seeking to evaluate program design and to optimise funds to achieve a target through prioritisation of management responses and spatial locations.*
   Management response costs are grouped to a sub-catchment scale and seek to understand where targeted reductions can be made at the cheapest cost across the landscape. These responses are often aggregated based on key parameters and ranked spatially to determine the most effective management practices and where to target future investment. These analyses often do not consider the landscape level actions (catchment areas managing hillslope into a gully) nor the long-term maintenance and management of site works (re-vegetation). This application also requires consideration of the policy mechanism and program, to ensure the cost-effectiveness values do not overestimate cost-effectiveness.

2. *Funding providers seeking to evaluate and validate individual management actions and investments to guide further investment and program design.*
   This application is based at a project scale allowing assessments to be based on on-ground works such as gully or streambank or for capital investments in irrigation, machinery or recycle pits. These projects include a mix of costs, such as engagement and on-ground works which are required during the initial stages of projects. Establishing vegetation and groundcover usually takes longer than the project timeframe, the costs for which are generally accounted for, however ongoing maintenance of projects is largely not. Monitoring that occurs beyond the project life is therefore very important to inform the effectiveness of such activities to further inform future project and program design.

[3] https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0013/55030/further-guidance-04-cost-benefit-analysis-guide.pdf

3. *Landholders seeking to understand the profitability and risk aspects of long-term adoption and maintenance of initial capital works and management practices.*

   There are a number of factors that impact landholders' decisions to adopt changed management practices in the long term. This includes relative advantage, risk, and social norms along with increased pressure to meet financial commitments. Land prices in cane lands now range between $6,000 to $25,000 and the range in grazing land between $1,500 to $10,000 (https://www.htw.com.au/industry-presentations/). Therefore, for a business to be viable long-term and for the change in management practice to be adopted long term, there must be a large enough profit margin to offset the risk. The majority of the benefit of streambank and gully works is considered public benefit and therefore these projects have been heavily funded.

   Profitability measures are a key part of monitoring for engagement with many landholders "looking over the fence", resulting in other landholders wanting to trial new methods. Also, if a landholder adopted low-level water quality risk management practices ends up worse off financially, this may serve to decrease the change of others adopting management practice change.

4.5.1 Data sources

Multiple sources of data were identified prior to the commencement of the evaluation to support the evaluation of impact and efficiency including cost-effectiveness. In terms of pollutant savings or abatement, the following sources were identified:

1. *Project reported pollutant savings* – pollutant savings provided in progress reports by delivery partners to their RT Program Manager via MERIT. This data was either reported as:
   a. End of catchment load or
   b. End of farm.
2. *P2R reported pollutant savings* – pollutant savings at the end of the catchment, which have been through quality assurance processes and are current as of June 2020.
3. *Technical assurance project* (sediment only) – pollutant savings that have been reviewed and recalculated based on the technical findings reports from Phases II and IV. (Wilkinson S. N., et al., 2019) (Wilkinson S. , et al., 2021).
4. *Project reported estimate of proposed pollutant savings* - for Phase VII Regional Land Partnerships projects only which are still active and have not yet reported via MERIT or P2R.

In terms of practice area change, the following data sources were identified:

1. *Project reported area* – The total spatial area over which a project takes place, including the management practice area reported by the delivery partner in their six-monthly or end of project reporting.
2. *Project practice change area* – The spatial area where a management practice change took place reported by the delivery partner in their six-monthly or end of project reporting.
3. *P2R reported area* – The total spatial area over which a project takes place, including the management practice area, sourced from the P2R team.
4. *P2R area of practice change* – The spatial area where management practice change took place, sourced from the P2R team.

A summary of the various input data values is provided in Table 9. A dash indicates no data was found within a particular category or reporting is yet to occur for active projects. Shaded cells indicate the load reduction data used to calculate cost-effectiveness and associated conclusions throughout the report. The report will clearly indicate where different data sources are used.

Table 9. Summary of input values and their sources

The green shading indicates the load reduction figures used to assess pollutant savings and cost-effectiveness. Section 4.5.2 provides the rationale as to which data was chosen and why for each project.

Primary management response	Project code / working title	Project reported area (ha)	Project practice change area (ha)	P2R reported area (ha)	P2R area of practice change (ha)	P2R load reduction	Project reported load reduction at end of catchment	Project reported load reduction on-farm	Technical assurance project load reduction	Proposed pollutant load reduction (MERI plan)
Grazing, sediment management (gully & streambank) **landscape repair**	RT2.01 Fifty percent reduction in Normanby subcatchments	35, 000	2,632	587	360	521t	-	1,177t	556t	-
	RT2.02 Normanby River remediation	41,267	-	44,247	44,139	18,030t *	1,236t (excludes practice change)	-	1,236t (excludes practice change)	-
	RT2.04 East Burdekin point source sediment management	-	-	-	-	-	589t	-	80t	-
	RT2.05 Theresa gully remediation	6,810	96,929	-	6,473	46t	73t	-	56t	-
	RT2.06 Fitzroy gully remediation	-	2,850	-	1,090	1,774t	573t	-	1,906t	-
	RT2.07 Mackenzie gully remediation	-	2,850	-	1,504	151t	270t	-	181t	-
	RT2.08 Isaac gully remediation	6,810	176,231	-	1,598	32t	653t	-	179t	-
	RT2.09 Don River sediment reduction project	-	604	262	262	40t	-	127t	51t	-
	RT2.10 Mary River catchment gully management	-	-	173	172	730t	1,934t	-	810t	-
	RT2.11 Burdekin Region point source sediment management	-	-	2, 116	2,114	807t	399t	-	565t	-
	RT4.05 Streambank remediation in priority areas	-	-	23	23	140t	482t	-	482t	-
	RT4.06 Gully and stream bank erosion control program	-	-	2,402	2,296	1,973t	6,664t	-	6,648t	-
	RT4.07 Stream bank and gully erosion	-	-	820	819	4,903t	6,037t	-	6,037t	-
	RT4.08 Herbert River remediation	-	-	17,863	631	1,221t	828t	-	828t	-
	RT4.09 Gully restoration in the GBR	-	-	225	225	2,626t	3,786t	-	3,512t	-
	RT4.10 Laura gullies project	-	-	7,770	7,770	1,231t	1,222t	-	1,222t	-

Primary management response	Project code / working title	Project reported area (ha)	Project practice change area (ha)	P2R reported area (ha)	P2R area of practice change (ha)	P2R load reduction	Project reported load reduction at end of catchment	Project reported load reduction on-farm	Technical assurance project load reduction	Proposed pollutant load reduction (MERI plan)
	RT4.11 Burdekin gully remediation	-	-	1,384	1,186	1,575t	1,984t	-	1,664t	-
	RT4.12 Controlling streambank erosion in the Mackay Whitsunday region	-	-	-	-	570t	9,566t	-	8,295t	-
	RT7.01 Improving water quality in the Burnett River Catchment	-	-	-	-	-	-	-	-	15,000t**
	RT7.04 Streambank remediation in the Burdekin catchment	-	-	-	-	-	-	-	-	
Intensive agriculture, **sediment management practice change**	RT1.02 A-class Grazing	353,710	67,029	57,549	44,085	2,046t	-	11,000		-
	RT3.05 Reef Alliance Improving grain practices	-	69,889	48,940	48,940	732t	-	-		-
	RT3.06 Reef Alliance - Improving grazing practices	-	1,619,727	2,769,983	1,373,024	45,569t	-	-	45,569t	-
	RT3.08 Project Pioneer	-	994,336	743,293	598,990	12,736t	-	-	-	-
	RT4.04 Mary River Catchment Riparian Project	-	-	897	7	208t	17,841t	-	11,934t	-
	RT7.02 Improving water quality in the Fitzroy basin	35,000**	-	-	-	-	-	-	-	-
Intensive agriculture, **nutrient management practice change**	RT1.01 Grants for farmers	-	-	19,728	15,859	31,167kg	-	262,722kg	-	-
	RT2.12 Burdekin DIN management	-	5,890	9,217	7,992	21,331kg	-	702,000kg	-	-
	RT3.01 Updated farm management practices	-	186,900	8,303	5,612	12,906kg	-	367,950kg	-	-
	RT3.02 Reef Alliance - Improving Horticulture practices	-	5,617	-	-	-	-	-	-	-
	RT3.03 Reef Alliance - Improving sugar cane practices	-	91,677	101,683	64,587	148,541kg	-	366,330kg	-	-
	RT3.07 Sustainable Cane Practices	-	34,893	44,138	9,498	8,294kg	-	-	-	-
	RT4.01 Wet tropics repeated tenders – Wet Tropics	-	-	-	-	-	76,764kg	1,054,538kg	-	-
	RT4.02 Wet tropics repeated tenders – Burdekin	-	-	-	-	-	28,841kg	949,171kg	-	-
	RT4.03 Cane farmer trials	-	-	-	-	-	-	-	-	-
	RT5.01 Project Uplift	-	18,401	11,340	11,112	52,532kg	-	197,000kg	-	-

Primary management response	Project code / working title	Project reported area (ha)	Project practice change area (ha)	P2R reported area (ha)	P2R area of practice change (ha)	P2R load reduction	Project reported load reduction at end of catchment	Project reported load reduction on-farm	Technical assurance project load reduction	Proposed pollutant load reduction (MERI plan)
	RT6.01 Delivering tailored solutions	13,867	5,446	-	-	5,175kg	-	-	-	-
	RT7.03 Precision agriculture used to reduce nutrients and pesticides entering the water	10,000	5,919	-	-	-	-	-	-	10, 000kg DIN; 12kg pesticides**
	RT7.06 Place based program in the Murray and Mossman catchments	13,000	13,000	-	-	-	-	-	-	140,000kg
Combined pollutant management practice change	RT3.04 Reef Alliance - Improving dairy practices	-	3,819	-	-	-	-	-	-	-
	RT7.05 Maximising ecosystem biodiversity on the O'Connell and Proserpine basins	-	-	-	-	-	-	-	-	1,500t and 14,000kg nitrogen** and pesticides

**P2R data was used for RT2.02 because the technical partner assurance data did not include the practice change results of the project in their study.

**Phase VII pollutant savings estimates, and project reported areas have been drawn from project MERI plans.

Technical assurance projects were not included in Table 9, as there no pollutant load reductions from these projects.

4.5.2 Data and assumptions

Due to the availability and quality of the input data there were several decisions and assumptions made to enable consistency and comparability of the analysis. They are as follows:

1. *Load reduction inconsistencies* – While most projects have load reduction estimates included in their performance reports, the estimates are not always comparable across years and do not match the most recent estimates from the *P2R Projector* provided by DAF. Furthermore, in some cases the pollutants reported on are not comparable across projects (e.g., nitrate versus DIN) and are not end-of-catchment estimates. As a result, for consistency and comparability across projects, P2R estimates of DIN load reductions provided by DAF on the 23rd May 2022 were used as the first point of truth for load reduction estimates for DIN projects. Landscape repair and practice change projects were reviewed by technical partners which in some cases resulted in different load reduction estimates to that reported by P2R. These technical partner estimates were used where available. If neither P2R nor technical assurance pollutant reduction estimates were available, the most recent project reported estimates were applied instead.
2. *Inconsistencies in timing and magnitude of spending* – Generally, project plans had the most detailed breakdown of cost across time and activity, however, understandably, over the course of the projects the timing and cost of the project activities varied. Due to the inconsistencies, the funding data from DCCEEW was used as the primary reference for the total costs and the distribution of spending across years. Where the planned or committed funding did not match the final acquitted amounts, the planned expenditure was used to apportion the acquitted funding across financial years for the discounted cashflow analysis.
3. *Lack of cost attribution to activities or outcomes* – Ideally, all cost-effectiveness calculations would only include costs that are directly aimed at achieving the relevant load reduction; however, in many cases this was not identifiable from the reporting. Costs were commonly broken down by year or milestone, both of which often encompass a range of activities trying to achieve different things (e.g., monitoring and evaluation or engagement). For Part A of the assessment, all costs except for in-kind contributions were included within the calculations. The second pass assessment provides a further breakdown of attributable costs for certain projects as well as in-kind contributions, allowing a more in-depth analysis of the effectiveness of specific actions.

4.6 Enduring legacy

As there is currently no agreed framework to assess enduring legacy in the context of the Great Barrier Reef, a bespoke legacy assessment guide was developed for the purpose of this evaluation to identify the presence of enabling factors that increase the likelihood that Reef Trust water quality projects would continue to deliver meaningful outcomes and/or the factors that may either support or impede the delivery of long-term outcomes.

The criteria used to assess enduring legacy within the assessment guide is largely subjective but is supported to some extent with multiple lines of evidence including the theory of change identified in the Framework for considering policy legacy for the GBR (Natural Decisions, 2021) and transitions theory for practice change (Rogers et al, 2021).

All projects were subjected to a high level assessement against seven criteria or enabling factors for enduring legacy and assessed on a one to five rating scale (Figure 2).

The enabling factors used in this assessment do not represent that actual achievement of long-term legacy outcomes, they only assess if project have the foundations in place to achieve long-term legacy by looking at short-term enabling factors present at the end of the project. Long-term adoption or legacy cannot be directly assessed at the end of a project life, we can only evaluate for the likelihood of long-term enduring outcomes beyond the life of the project.

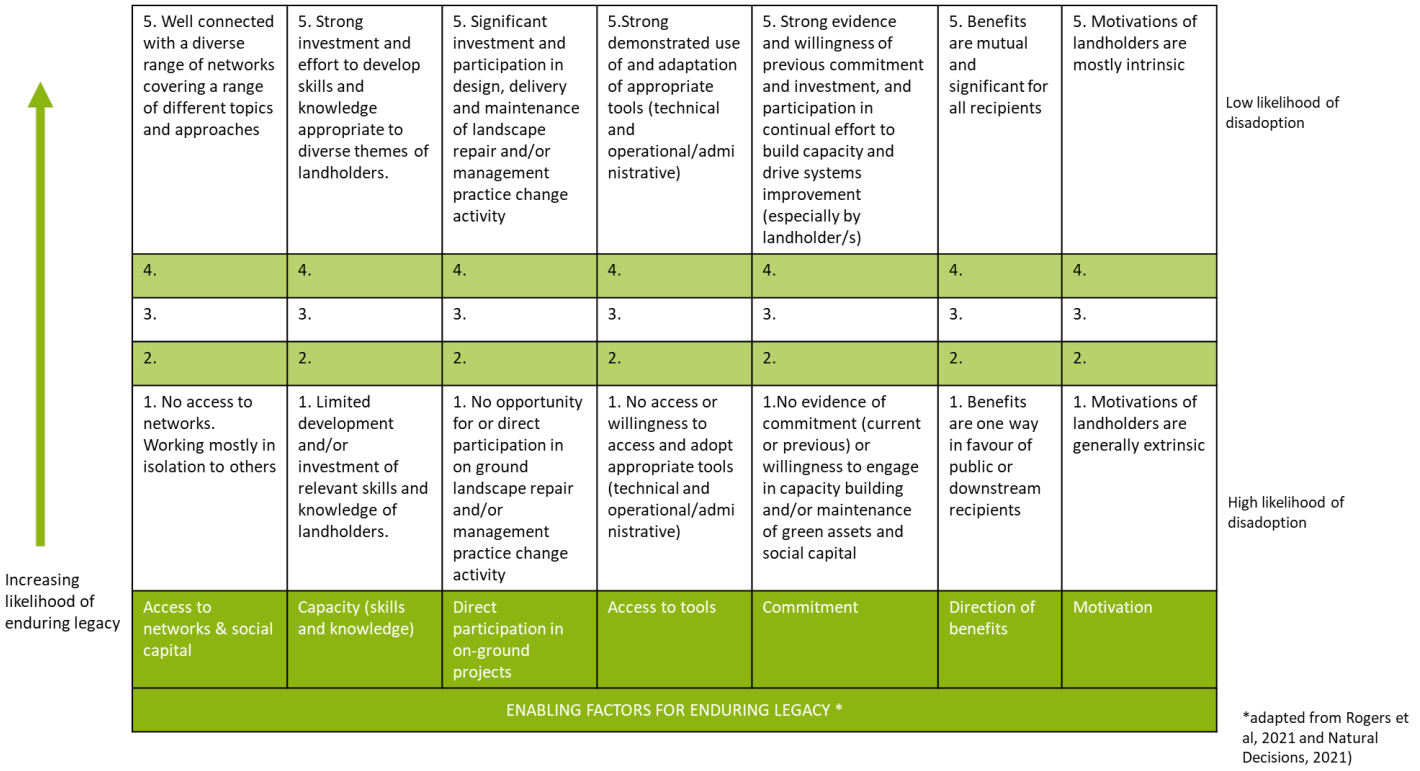


Figure 2. *Reef Trust enduring legacy assessment framework*

5 Reef Trust water quality investments evaluation – Summary of key results and findings

Forty-three (43) individual projects sought to improve water quality outcomes through the reduction of sediments, nutrients or pesticides flowing to the Reef through seven phases of Reef Trust water quality investments. A range of delivery mechanisms were used to achieve these outcomes such as reverse tenders, grant projects and Regional Land Partnerships. The project delivery partners included peak agricultural industry bodies, NRM groups and other groups such as community-based NRM groups, research agencies and private agronomic businesses.

Data to inform the largely qualitative individual project assessments was drawn from a range of sources. These primarily included MERI plans, MERIT reports, assessment reports and technical partner reports where applicable. Further information was drawn from survey data to fill identified data gaps. More detailed information was sought through the second pass assessment process which included a series of focus groups and interviews with key stakeholders to enable a deeper analysis of projects to inform responses to the KEQs. As a result of the evaluation, 36 recommendations are outlined in Section 7.

5.1 Impact – key results and findings

5.1.1 What are the pollutant savings delivered by individual Reef Trust projects?

Table 10 details the estimated load reductions for each project along with source of the load reduction information.

Table 10. Summary of pollutant savings by project

Project type	Project code / working title	RT investment	Load reduction estimate used	Load reduction source
Grazing, sediment management (gully & stream bank) **Landscape repair** **(Fine sediment)**	RT2.01 Fifty percent reduction in Normanby subcatchments	$780,248	556t	Technical partner
	RT2.02 Normanby River remediation	$304,400	18,030t	P2R
	RT2.04 East Burdekin point source sediment management	$906,000	80t	Technical partner
	RT2.05 Theresa gully remediation	$702,884	56t	Technical partner
	RT2.06 Fitzroy gully remediation	$702,884	1,906t	Technical partner
	RT2.07 Mackenzie gully remediation	$702,884	181t	Technical partner
	RT2.08 Isaac gully remediation	$702,884	179t	Technical partner
	RT2.09 Don River sediment reduction project	$962,550	51t	Technical partner
	RT2.10 Mary River catchment gully management	$808,760	810t	Technical partner
	RT2.11 Burdekin Region point source sediment management	$906,000	565t	Technical partner
	RT4.05 Streambank remediation in priority areas	$4,000,000	482t	Technical partner
	RT4.06 Gully and stream bank erosion control program	$3,891,070	6,648t	Technical partner
	RT4.07 Stream bank and gully erosion	$3,867,325	6,037t	Technical partner
	RT4.08 Herbert River remediation	$2,974,773	828t	Technical partner
	RT4.09 Gully restoration in the GBR	$3,770,000	3,512t	Technical partner
	RT4.10 Laura gullies project	$2,065,000	1,222t	Technical partner
	RT4.11 Burdekin gully remediation	$2,000,000	1,664t	Technical partner
	RT4.12 Controlling streambank erosion in the Mackay Whitsunday region	$4,000,000	8,295t	Technical partner
	RT7.01 Improving water quality in the Burnett River Catchment	$6,099,986	15,000t	MERI plan
	RT7.04 Streambank remediation in the Burdekin catchment	$2,900,000	6,178t sediment, 826kg particulate N; 505kg particulate P	MERI plan
	Sub total	**$43,047,648**	**72,280t**	

Project type	Project code / working title	RT investment	Load reduction estimate used	Load reduction source
Intensive agriculture, **sediment management practice change** **(Fine sediment)**	RT1.02 A-class Grazing	$3,000,000	2,046t	P2R
	RT3.05 Reef Alliance - Improving grain practices	$3,600,000	732t	P2R
	RT3.06 Reef Alliance - Improving grazing practices	$21,590,000	45,569t	P2R
	RT3.08 Project Pioneer	$2,908,000	12,736t	P2R
	RT4.04 Mary River Catchment Riparian Project	$3,027,000	11,934t	Technical partner
	RT7.02 Improving water quality in the Fitzroy basin	$5,700,000	-	-
	Sub total	**$39,825,000**	**1,401,972****	
Intensive agriculture, **nutrient management practice change** **(DIN)**	RT1.01 Grants for farmers	$1,704,313	31,167kg	P2R
	RT2.12 Burdekin DIN management	$3,137,572	21,331kg	P2R
	RT3.01 Updated farm management practices	$3,000,000	12,906kg	P2R
	RT3.02 Reef Alliance - Improving horticulture practices	$2,400,000	-	-
	RT3.03 Reef Alliance - Improving sugar cane practices	$17,574,991	148,541kg	P2R
	RT3.07 Sustainable cane practices	$4,425,000	8,294kg	P2R
	RT4.01 Wet tropics repeated tenders – Wet Tropics	$6,719,020	76,764kg	Project reported
	RT4.02 Wet tropics repeated tenders – Burdekin	$7,381,889	28,841kg	Project reported
	RT4.03 Cane farmer trials	$5,000,000	-	Innovation(R&D) project, no data reported.
	RT5.01 Project Uplift	$4,520,780	52,532kg	P2R
	RT6.01 Delivering tailored solutions	$3,384,285	5,175kg	P2R
	RT7.03 Precision agriculture used to reduce nutrients and pesticides entering the water	$4,100,000	10,000kg DIN 12kg pesticides	MERI plan
	RT7.06 Place based program in the Murray and Mossman catchments	$5,612,947	140,000kg	MERI plan
	Sub total	**$68,960,797**	**549,550kg****	
Combined pollutant management practice change **(sediment, DIN & pesticides)**	RT3.04 Reef Alliance - Improving dairy practices	$500,000	-	-
	RT7.05 Maximising ecosystem biodiversity on the O'Connell and Proserpine basins	$5,400,000	1,500t sediment 14,000kg DIN and pesticides	MERI plan
	Sub total	**$5,900,000**	**-**	

** Includes pollutant abatement of Combined pollutant management practice change projects.

5.1.2 What is the total combined pollutant saving delivered by the Reef Trust Program?

The **annual total fine sediment pollutant savings** delivered by 27 Reef Trust water quality projects that reported sediment savings since 2014 is approximately 147,000 tonnes. More than 2,160,000 hectares of primarily grazing land has been subject to some form of landscape repair and/or management practice change. This includes one of the projects that targeted (and reported) a combination of sediment, DIN and pesticide savings/abatement.

The **total dissolved inorganic nitrogen (DIN) pollutant savings** of approximately 550,000 kilograms has been delivered by 14 Reef Trust water quality projects that reported DIN savings since 2014 over approximately 143,000 hectares of mostly sugarcane and other intensive forms of agriculture. This includes one project that targeted a combination of sediment, DIN and pesticide abatement.

In addition to both fine sediment and DIN, six projects aimed to **improve pesticide application** (RT3.01, RT3.02, RT3.07, RT5.01, RT7.03 and RT7.05). With the exception of RT5.01 *(Project Uplift)* which aimed to reduce pesticide loads by 752kg per annum, there were no pesticide load reduction targets reported in project MERI plans.

Other projects clearly specified land management targets (RT2.01, RT2.02, RT2.09, RT3.08, RT7.01, RT7.04 and RT7.05). For example, 80% of participating properties to have 65% groundcover (RT3.08 – *Project Pioneer*) and exclude stock from 40,000ha and plant 20ha of gullies with native vegetation (RT2.02 *Normanby River restoration*), however, land management targets were not consistently included in project MERI plans.

The summary of total combined pollutant savings and area of practice change delivered by the Reef Trust is included in Table 11.

Table 11. Summary of total combined pollutant savings and area of practice change delivered by the Reef Trust

Pollutant targeted	Count of projects	Total RT investment	Annual total volume of pollutant abated ****	Total P2R area of practice change**
Fine sediment*	26	$82,874,648	**~146,796t**	2,160,042ha
DIN	13	$68,960,797	**~549,550kg**	143,105ha
Combined	2	$5,900,000		
TOTAL	**41*** **	**$157,735,445**		**2,303,147ha**

*Includes landscape repair and management practice change projects.
**The spatial area where a management practice change took place as verified by P2R. Includes 2 combined projects.
*** Excludes technical assistance projects. Includes Phase VII projects (refer to Table 9).
**** The Reef 2050 WQIP regional water quality targets seek to reduce fine sediment and DIN by 1,933,000t and 3,620,000kg respectively (Queensland Government, 2018). Includes the relevant sediment and DIN savings for the two combined projects.

Phases II and IV had the largest number of funded fine sediment projects, however Phase III produced the greatest total pollutant savings and greatest area of practice change. This can be largely attributed to RT3.06 R*eef Alliance – Improving Grazing Practices* which delivered close to 60,000t of fine sediment abatement across more than 2,000,000ha.

Similarly, Phase III projects also delivered the greatest pollutant abatement for DIN. As with fine sediment, the greatest contribution came from RT3.03 (*Reef Alliance – Improving sugar cane practices)* which abated 148,541kg of DIN from approximately 100,000ha of cane farm. Phase IV was also very impactful with more than 100,000kg of DIN abated primarily achieved by using reverse tenders.

Table 12 outlines the summary of pollutant savings and practice area change by Reef Trust phase, along with the corresponding total practice change area.

Table 12. Summary of total pollutant savings and practice area change by Reef Trust phase

Pollutant targeted	Reef Trust phase	RT Investment	Count of projects (in analysis)	Annual total volume of pollutant abated	Total practice change area
Fine sediment	Phase I	$3,000,000	1	2,046t	44,085ha
	Phase II*	$7,479,494	10	22,414t	57,712ha
	Phase III	$28,100,000	3	59,037t	2,020,954ha
	Phase IV*	$29,595,168	9	40,622t	12,957ha
	Phase V	-	-	-	-
	Phase VI	-	-	-	-
	Phase VII	$14,699,986	3	-	-
DIN	Phase I	$1,704,313	1	31,167kg	15,859ha
	Phase II	$3,137,527	1	21,331kg	7,992ha
	Phase III	$27,399,991	4	85,314kg	85,314ha
	Phase IV	$19,100,909	3	105,605kg	-
	Phase V	$4,520,780	1	52,532kg	11,112ha
	Phase VI	$3,384,285	1	5,175kg	5,446ha
	Phase VII	$9,712,947	2	150,000kg	18,919ha
Combined	Phase III	$500,000	1	-	3,819ha
	Phase VII	$5,400,000	1	1,500t 14,000kg	-
		$157,735,400	**41****		

* The gully and streambank rehabilitation works from Phases II and IV have delivered a total of 47,028 tonnes per annum of sediment reduction to the GBR. This does not include the practice change achievements which have been reported separately to P2R.
**Excludes CSIRO technical assurance projects.

5.1.3 What extent of overall water quality improvement (from 2050 WQIP) can be attributed to the Reef Trust Program?

The Reef 2050 WQIP sets a target of 25% reduction in anthropocentric end-of-catchment fine sediment loads which equates to 1,933,000 tonnes. The WQIP sets a target of 60% reduction in anthropocentric end-of-catchment dissolved inorganic nitrogen (DIN) loads which equates to 33,620,000 kilograms (Queensland Government, 2018). Figure 2 and Figure 3 show the total investment made by the Reef Trust to improve water quality across each catchment within the six GBR regions for sediment and DIN respectively.

Figure 2 shows total Reef Trust water quality investment in sediment reduction projects, while the Figure 3 shows the investment in DIN reduction projects. The legends show the percentage of pollutant reduction achieved by Reef Trust investment, relative to the Reef 2050 WQIP water quality target for each catchment. For example, Figure 2 shows $24.27 million Reef Trust funding has been invested in the Fitzroy catchment, resulting in sediment reduction relating to approximately 10% of the Reef 2050 WQIP water quality target for the Fitzroy Catchment.

Figure 3 shows $12.62 million Reef Trust funding has been invested in the Burdekin catchment to reduce DIN. This has resulted in a pollutant reduction relating to approximately 62% of the Reef 2050 WQIP water quality target for the Burdekin catchment. It is acknowledged the Queensland Government and the Reef Trust Partnership also provide investment to improve water quality to support the achievement of Reef 2050 WQIP targets which is not discussed in the evaluation. The corresponding data used to inform this analysis is provided in Table 13.

Due to the nature of P2R reporting and projects working across multiple catchments, a number of caveats exist when considering this information.

a) In analysing the projects which form part of this assessment, there are multiple instances where investment spanned across multiple catchments and/or regions. In this instance, investment and pollutant reduction was distributed according to the amount of targeted land use in the catchment (i.e., an investment targeting sugarcane across two catchments is divided by the amount of sugarcane area in each catchment relative to the total amount of sugarcane area across both catchments). This methodology therefore results in an approximation of investment and pollutant load reduction at a catchment scale.

b) Due to the methodology described in point a) the Burdekin, Mossman and Murray catchments have an approximate DIN reduction from Reef Trust programs only which is greater than that reported at 2020 from all

investment (including that from the Queensland Government and the Reef Trust Partnership). As an example, the DIN reduction in the Mossman catchment from Reef Trust investment results in an approximate 24% reduction to date, whilst the Report Card 2020 reports a 19% reduction.

c) Several investment projects have been excluded from this assessment, as no pollutant savings have been reported (as noted in Table 9). These include RT2.03, RT3.02, RT3.04, RT4.03, RT4.13, RT7.02 and RT7.04.

d) Projects which span across two localities (e.g., Mossman to Sarina) are attributed to adjacent coastal catchments between these two localities.

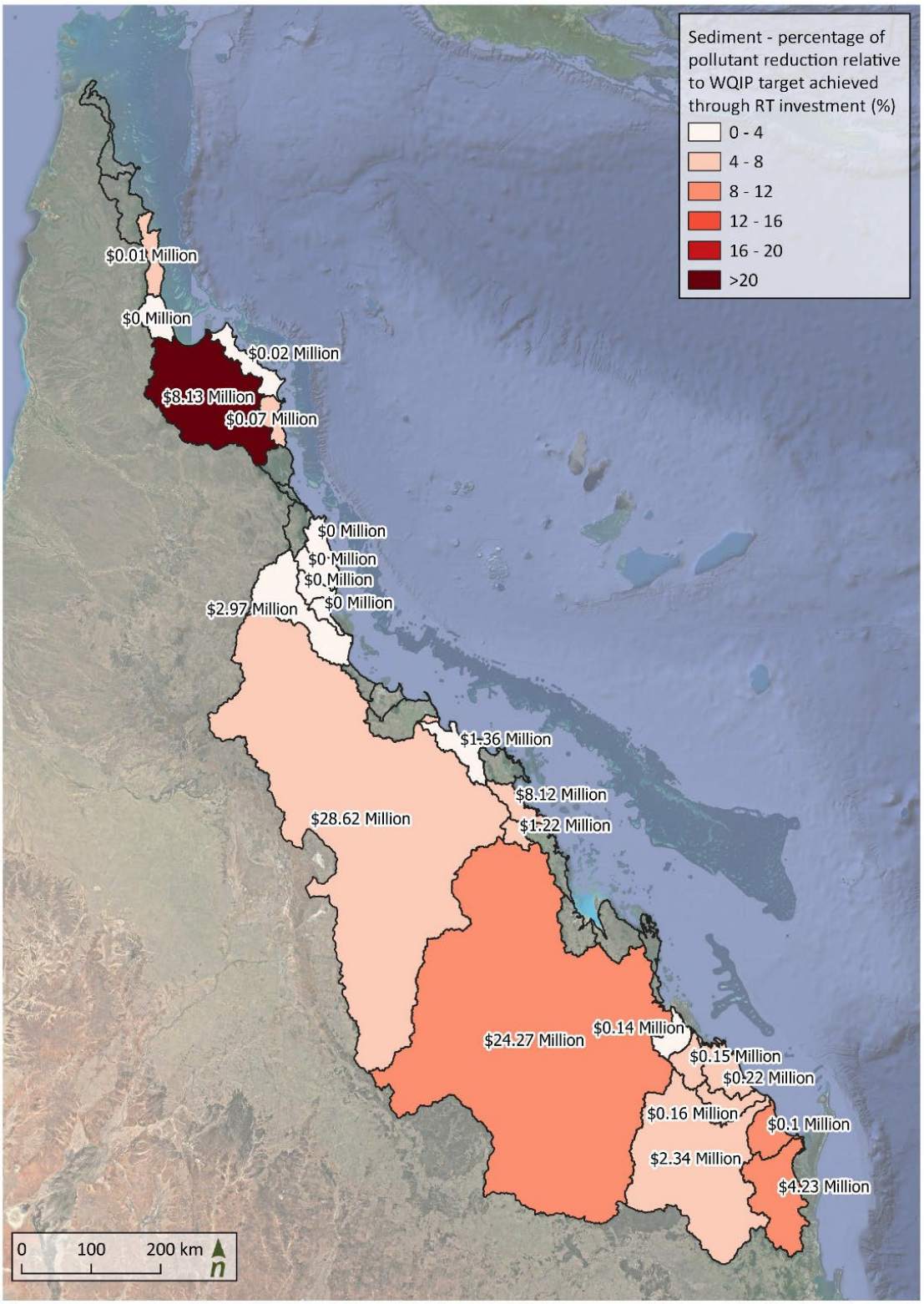


Figure 3. *Sediment reduction achieved through Reef Trust investment to date*

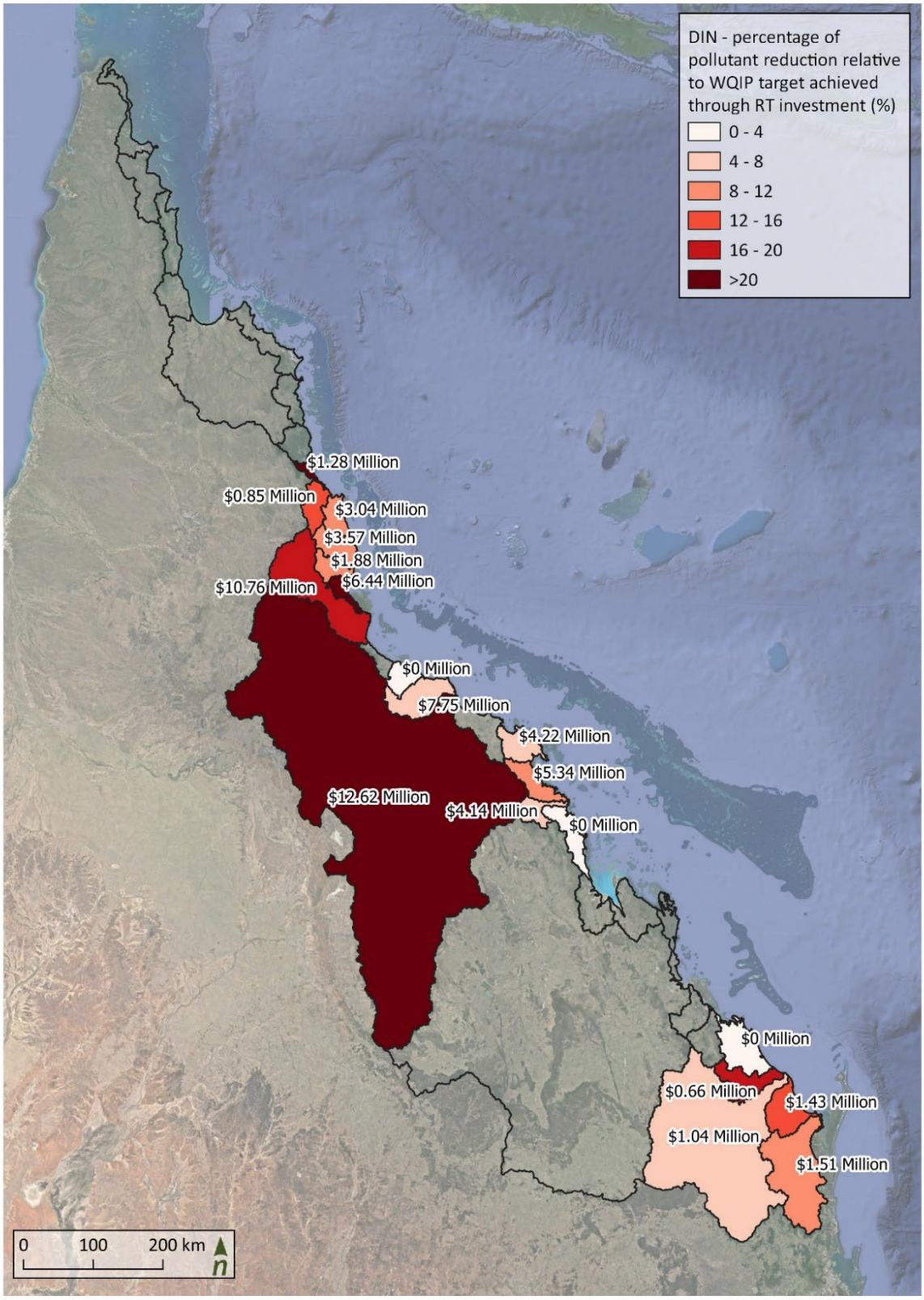


Figure 4. *DIN reduction achieved through Reef Trust investment to date*

Table 13. Pollutant reductions achieved through Reef Trust investment to date

Catchment	Sediment				DIN			
	WQIP Target		Reef Trust investment		WQIP Target		Reef Trust investment	
	Kilotonnes	*%*	*Kilotonnes*	*%*	*Tonnes*	*%*	*Tonnes*	*%*
Baffle	11	20	0.53	0.96	16	50	-	-
Barron	-	-	-	-	52	60	8	9.07
Black	-	-	0.10	No target**	-	-	-	No target
Boyne	6	40	0.36	2.39	-	-	-	No target
Burdekin	840	30	51.24	0.06	100	60	62*	36.95*
Burnett	85	20	5.02	1.18	150	70	9	4.11
Burrum	3	20	0.25	1.65	93	50	12	6.53
Calliope	15	30	0.34	0.69	-	-	-	No target
Daintree	-	-	-	-	-	-	3	No target
Don	55	30	0.77	0.42	-	-	-	No target
Endeavour	3	10	0.19	0.62	-	-	-	No target
Fitzroy	390	30	38.73	2.98	-	-	-	No target
Haughton	-	-	0.46	No target	640	70	44	4.76
Herbert	99	30	0.83	0.25	620	70	117	13.17
Jacky Jacky	-	-	0.05	No target	-	-	-	No target
Jeannie	2	6	0.07	0.21	-	-	-	No target
Johnstone	100	40	-	-	350	70	39	7.75
Kolan	6	20	0.39	1.32	34	50	6	8.26
Lockhart	1	2	0.04	0.09	-	-	-	No target
Mary	130	20	13.68	2.10	180	50	15	4.08
Mossman	-	-	-	-	52	50	25*	24.37*
Mulgrave-Russell	16	10	-	-	300	70	30	6.99
Murray	8	20	-	-	120	50	134*	55.94*
Normanby	15	10	22.80	15.20	-	-	-	No target
O'Connell	96	40	7.25	3.02	130	70	14	7.47
Olive-Pascoe	-	-	0.16	No target	-	-	-	No target
Pioneer	35	20	2.53	1.45	140	70	8	4.00
Plane	-	-	-	-	260	70	-	-
Proserpine	-	-	0.01	No target	110	70	8	4.96
Ross	-	-	0.18	No target	74	60	-	-

Catchment	Sediment				DIN			
	WQIP Target		Reef Trust investment		WQIP Target		Reef Trust investment	
	Kilotonnes	*%*	*Kilotonnes*	*%*	*Tonnes*	*%*	*Tonnes*	*%*
Shoalwater	-	-	0.29	No target	-	-	-	No target
Stewart	2	6	0.01	0.03	-	-	-	No target
Styx	-	-	0.47	No target	-	-	-	No target
Tully	17	20	-	-	190	50	17	4.57
Waterpark	-	-	0.06	No target	-	-	-	No target

**exceeds total current 2020 Report Card results – see caveat b).*

*** no target means no target has been identified for this catchment and/or pollutant in the Reef 2050 Water Quality Improvement Plan.*

5.1.4 Which delivery mechanism, and/or management response had the biggest impact on pollutant saving?

Delivery mechanisms

Section 2.4 describes six different delivery mechanisms applied by the Reef Trust during the seven phases. Appendix 1 identifies the delivery mechanisms for all Reef Trust projects. In the case of **sediment abatement**, the most effective delivery mechanism was via competitive grants (Table 14) which formed the primary delivery mechanism for sediment abatement projects.

While this is also the case for **DIN** where competitive grants delivered the greatest pollutant abatement and the greatest area of practice change, reverse tenders also delivered strong performance for DIN abatement. Phase VII projects that used the Regional Land Partnerships (RLP) model assuming they successfully deliver on their planned DIN abatement, will also deliver strong performances for DIN.

Table 14. Summary of delivery mechanisms and pollutant savings

Pollutant targeted	Delivery mechanism	Count of projects	Annual total volume of pollutant abated	Total practice change area
Fine sediment	**Targeted competitive grants**	22	**122,072t**	**2,080,957ha**
	Direct invite to delivery partner	1	2,046t	44,085ha
	Regional Land Partnership (RLP) – competitive tender	3	21,178*	35,000ha
	Technical assistance via competitive tender	2	-	-
DIN	**Targeted competitive grants**	3	**169,741kg**	**79,696ha**
	Direct invite to delivery partner	3	52,532kg	11,112ha
	Reverse tender / auction	4	158,103kg	23,851ha
	Regional Land Partnership (RLP) – competitive tender	2	150,000kg**	23,000ha
	Direct co-investment	1	5,175kg	5,446ha
Combined	Direct invite to delivery partner	1	-	- ha
	Regional Land Partnership (RLP) – competitive tender	1	1,500t* 14,000kg**	14,000ha
		43		**2,317,147ha**

*tonnes of fine sediment as estimated in the MERI plan
**kilograms of DIN as estimated in the MERI plan

Management responses

With regards to understanding the impact of different management responses, it is important to note that all projects demonstrated the use of multiple, integrated management responses and individual interventions to some extent. For example, extension and agronomic support was commonly used in conjunction with landscape repair projects. This is especially the case where management practice change or non-structural interventions were the focus. The primary management responses and the individual management interventions are detailed in Appendix 1.

With regards to **fine sediment** the greatest annual total volume of pollutant abated, and area of practice change was delivered by the six sediment management practice change projects (Table 15). The landscape repair projects delivered only slightly less pollutant abatement but in a more targeted area. It is important to note that the streambank projects generally did not report a practice change area due to the linear nature of these projects, so the area of practice change for landscape repair projects is very likely an underestimate of the true area.

Table 15. Summary of management responses and pollutant savings

Pollutant targeted	Primary management response	Count of projects*	Annual total volume of pollutant abated	Total practice change area
Fine sediment	Grazing, sediment management (gully & streambank) **landscape repair**	20	72,280t	59,997ha
	Intensive agriculture and grazing, **sediment management practice change**	6	73,017t	2,100,045ha
DIN	Intensive agriculture, **nutrient management practice change**	13	535,550kg	143,105ha
Combined	**Combined** pollutant **management practice change**	2	1,500t 14,000kg	3,819ha**
		41*		

*Excludes sediment technical assistance projects.
**The pollutant abatement and practice area are from different projects.

See recommendations 2, 32.

5.1.5 Were there any unanticipated costs, benefits and perverse outcomes?

There were a range of unanticipated costs, benefits and perverse outcomes identified across the projects. The most identified benefits included:

- The generation of an economic return to graziers by bringing erosion hotspots back into production.
- The installation of riparian fencing significantly reduced mustering timeframes.
- An increased use of technology by growers resulting in significant savings in time and labour.
- New knowledge developed through repeat tender projects was applied by farmers outside of the RT funded project areas which resulted in greater nitrogen savings than what had been originally contracted.
- Many participating growers became project advocates, sharing their knowledge with other growers through formal and informal mechanisms and grower networks, particularly via 'over the fence' conversations.
- Survey 123 App was trialled for ease of reporting.
- The use of legume fallow as a means of nitrogen usage efficiency promoted soil health which in turn supported plant vigour and increased productivity.
- Adoption of the Sugar Research Australia Farming System resulted in lower input and operational costs.
- The reverse tenders assisted to establish a foundation for the development and subsequent introduction of Reef Credits.
- The Reef Protection Bill was amended to exclude Cape York due to the progress made in on-ground implementation through project RT3.06 *Improving grazing practices* as reported by delivery partners.
- Stakeholders used a common language e.g., Sediment saved.
- Investment was made in the use of specialist data collection methods such as precision LiDAR.
- The efficiency of the agricultural sector has increased. Some Reef Trust projects have helped to keep small agribusinesses afloat during drought and tough market conditions. It has been reported that this is linked also to improved productivity. For example, RT4.03 (*Enhanced efficiency fertilisers)* has fast tracked necessary trials and research to facilitate their uptake by industry.

An additional common but anticipated benefit was the economic benefits to local suppliers and contractors through such activities as the purchase of native plants or engagement of local earthmoving services and consultants. In most cases, the specific economic benefits generated were not captured or reported by delivery partners, although most made note of the benefits in a general sense. Another anticipated benefit as articulated in project MERI plans was the provision of local employment opportunities, including for local First Nations Peoples. Again, the specific economic benefits of employment were not accurately captured in project reports but documented more generally.

The most identified unanticipated costs included adverse weather events, particularly in the case of multiple, severe weather events that were considered 'out of the ordinary'. The extent of such events went beyond what would normally form part of contingency planning in projects and resulted in the need for contract variations and delays. Dry weather conditions also impacted on the ability to establish vegetation as well as the willingness for landholders to

engage in projects due to diminished cash flows and the requirement to give attention to other activities such as feeding stock.

Other unanticipated costs are outlined below.

- The inability to secure appropriate contractors when needed at key times within projects and cases where properties changed ownership mid project or where parts of the property were sold off, resulting in the need for delivery partners to spend considerable time in renegotiating project participation with new owners.
- The time required to engage with landholders to secure participation and ensure the project was delivered effectively was significantly underestimated.
- Where landholders were not already committed or supportive of excluding stock as part of the suite of project activities f1, additional time negotiating and building trust with landholders and the technical partners to establish a mutually beneficial outcome was required. RT4.11.
- The impacts of COVID-19 also had to be actively managed where projects occurred within COVID lockdowns/periods of restrictions, with either virtual meetings or in-person engagement in line with corresponding health advice.

Few perverse outcomes were seen across the spread of projects but of those documented included:

- The timing of the release of the Queensland Reef Protection Regulations resulting in fewer landholders wishing to engage with delivery partners.
- Limited viable sites able to be identified within the Cape York area due to low sediment delivery ratios
- landholders fencing in such a way as to restrict the ability to reach proposed revegetation targets
- Keeping small, potentially inefficient and unsustainable farms operating through the support of grant funding and technical support
- Grants and investment timelines were found to have an unintended bias against some primary industries who had other production commitments and priorities at the time of funding release
- Some tools have been unintentionally and possibly intentionally misused to achieve a desired result. This has come about by people modifying some parameters without understanding of the implication of what the change means and/or a lack of technical understanding to use the tool properly.
- At a whole of program scale, there are many examples of unanticipated expenditure by a range of different organisations to ensure various models and prioritisation tools 'talked' to each other especially where upgrades and modifications were implemented in isolation to each other.
- Tools, such as the Gully and Streambank Toolbox maybe under-estimating performance efficacy of some landscape repair or on-ground management responses.

The lack of maintenance funding provided beyond the project life was identified as an emerging issue whereby 'overengineered' and more expensive solutions, particularly in relation to gully remediation, are implemented to prevent the need for extensive maintenance f2. This is becoming increasingly apparent as more on-ground works are completed f1. See also Section 5.5.

5.1.6 To what extent did the Reef Trust water quality investments make changes that built enabling capacity for future water quality improvements in addition to direct pollutant savings?

There are no consistently applied metrics or indicators for quantifying and assessing capacity levels in the Reef Trust program. There is also no baseline or benchmark to make a comparison with. The results and key findings identified below are based on qualitative information provided primarily by delivery partners and Reef Trust program managers.

Nine projects sought to systematically assess the capacity built as a result of the project. These include RT1.02 *(A-class Grazing),* RT2.12 *(Burdekin DIN management)*, RT3.02 - RT3.06 *(Reef Alliance - Grazing)*, RT3.08 *(Project Pioneer)* and RT6.01 *(Delivering tailored solutions).* This ranged from undertaking a landholder survey to assess an increase in knowledge and understanding to having an external evaluation completed, e.g., by Central Queensland University.

Reef Trust has delivered significant impact at both the institutional and organisation level as well as at the individual level. For example, organisational capacity for delivery partners has been developed in:

- project management especially for large scale programs of integrated activities (i.e., systems repair and practice change)
- technical assurance and quality processes (including data management). This also includes an increase in scientific understanding, for example, of how sediment savings are calculated

- leveraging other public and private investments
- reporting and science communication
- the use and interpretation of a range of modelling and decision support tools e.g., P2R, and P2R Projector
- capacity building of First Nations Peoples through the Cape York NRM, BMRG and the Indigenous Land and Sea Ranger projects.

A number of other knowledge forums and networking opportunities have also been identified that will continue to support organisational and individual capacity development into the future. These are further discussed in Section 5.5.

All Reef Trust projects invested to some extent in directly and/or indirectly building the individual capacity of project stakeholders. There is evidence of all except one project engaging directly with project stakeholders and the reasoning for this is that project RT2.02 (*Normanby River remediation)* was delivered by the property owners and did not require direct engagement. There were only three projects where evidence of indirect engagement techniques was not apparent (RT2.02 *Normanby River remediation*, RT7.03 *Precision agriculture used to reduce nutrients and pesticides entering the water* and RT7.04 *Streambank remediation in the Burdekin catchment*). A very wide range of techniques, approaches and tools have been used and adapted over time.

Nearly all projects reported that both the delivery partner's project team and stakeholders engaged directly and indirectly in the project increased their capacity in one or multiple skill and knowledge areas.

See recommendations 2,9, 10 and 13.

5.2 Effectiveness – key results and findings

5.2.1 To what extent were project outputs and outcomes delivered and to what extent were projects completed in line with contract guidelines, reporting requirements and MERI procedures?

Evidence from the MERIT and final assessment reports suggests that most projects were completed in line with contract guidelines, met the program's reporting requirements, and delivered upon project outcomes and outputs as contracted.

Each project developed a MERI plan and most projects reported accurately against the activity targets set out in the plan. MERIT reporting was used to document progress and to provide evidence of a range of activities including landholder agreements, photos of engagement activities, social media posts, site plans etc. There were many examples of projects needing to alter deliverables and project timeframes for a range of reasons including:

- adverse weather events
- poorer than expected uptake by landholders
- changes to delivery partners' staffing arrangements
- dry weather impacting revegetation projects
- the ability to secure the correct labour and machinery at an appropriate time in the project and in some cases changes from passive remediation works to active remediation works.

Delivery partners noted that where changes were needed, these were easily negotiated in partnership with DCCEEW [f1]. This was further supported by survey respondents whereby 93% (n=14) believed DCCEEW were easy to communicate with during project delivery and felt able to discuss variations and adaptive management opportunities as needed.

Survey respondents noted reporting expectations were clear and easy to respond to (85%), with delivery partners noting the reporting timeframes were appropriate [f1]. Whilst most delivery partners were supportive of the use of MERIT as a reporting tool, it was noted that it lacks the flexibility to be able to report accurately on a range of RT activities and therefore the ability of delivery partners to 'tell the story' about what their project had achieved [f1 f2]. See recommendations 10, 11 and 12.

5.2.2 To what extent did the Reef Trust water quality investment deliver on the KPIs identified in the Reef Trust Monitoring and Evaluation Plan 2021?

The Reef Trust M&E Plan is not explicit about who is responsible for collecting data to support the assessment of its KPIs, hence many of the KPIs had no specific data sources to make any accurate assessment regarding their achievement. Table 16, Table 17 and Table 18 provides a summary of evidence drawn from other KEQ indicators.

Table 16. Achievement of KPIs in relation to reducing anthropogenic end-of-catchment dissolved inorganic nitrogen loads

Reef Trust Program KPI	KPI achieved YES or NO	Evidence to support achievement
Increased uptake of BMPs by relevant enterprises.	YES	No benchmark of BMP uptake was identified prior to the commencement of Reef Trust, however, 9 of 15 projects that were primarily targeting DIN abatement reported an increased uptake of BMPs. Common BMPs were Smartcane BMP, Hort360, Banana BMP. Also, some of the projects did not use the Smartcane BMP as the methods used in the project were seen as innovations which needed trialling prior to inclusion in the BMP modules (RT3.01 *Updated farm management practices*). It is important to note that 'uptake' was considered as at the time of project implementation. To our knowledge no follow up assessment has been undertaken to determine if these projects/participating landholders continue to apply the BMPs today.
Increased compliance of the relevant enterprises with industry standards and regulation.	N/A	No industry compliance data was available. It is also unclear if this data is collected by industry or other compliance body.
Modelled trend of decreasing levels of DIN, based on the delivery of these actions.	N/A	No modelling was undertaken as part of this evaluation. The 2020 Reef Report Card references a +2.2% reduction in dissolved inorganic nitrogen, however, it is difficult to determine the impact the Reef Trust program has had on this trend.
Additional landholders for the relevant enterprises engaged in DIN-reducing actions.	YES*	Approximately 1,508 landholders across approximately 170 sites/properties were directly engaged in projects targeting the removal of DIN using activities primarily aimed at management practice change.
Increased engagement of industry bodies for the relevant enterprises (from producers to mills to markets) to increase uptake of BMPs.	YES**	13 of the 15 projects targeted landholders and some other industry body, Research and Development Institute (RDI), productivity services or other organisation within an agricultural supply chain. Example organisations involved in at least one project include: CANEGROWERS; BIFMAC; Burdekin Productivity Services; Growcom; ABGC; Herbert Cane, Tully Cane, Plane Creek, Mackay Area and Burdekin Productivity Services; Mossman Agricultural Services; Bundaberg Sugar Services; SRA; Dairyfarmers; Subtropical Dairy Program; Parmalat; Lion; Mackay Sugar; Wilmar; and SMARTCANE BMP.
Additional productive land area for the relevant enterprises managed using BMP	YES	P2R have reported an increase of 143,105ha of practice change area associated with projects targeting DIN reduction. Refer also to Section 5.1.
Longevity of the actions delivered (legacy).	N/A	Please refer to Section 5.5.
Increased late dry season-ground cover on grazing properties	N/A	No DIN projects reported ground cover improvement data. Please refer to the Statewide Landcover and Trees Study for further information on this KPI noting that attribution to Reef Trust is unlikely.
Grazing lands belonging to engaged farmers have greater average late dry season-groundcover than the regional average (this measure controls for loss of groundcover due to grazing by pest/wild animals and weather influences).	N/A	No projects reported on dry season groundcover. Please refer to the Statewide Landcover and Trees Study (Queensland Government, 2018) for further information on this KPI noting that attribution to Reef Trust is unlikely.

*The project reports do not consistently include information about whether landholders had been previously involved in reef funding projects prior to RT funding.

**The project reports do not readily identify whether delivery partners were previously engaged to deliver reef related projects prior to RT.

Table 17. Reducing anthropogenic end-of-catchment fine sediment loads

Reef Trust Program KPI	KPI achieved YES or NO	Evidence to support achievement
Longevity of the actions delivered (legacy)	N/A	Please refer to Section 5.5.
Increased late dry season-ground cover on grazing properties	N/A	Ten of the 26 sediment projects reported an increase in groundcover. Not all of these quantified the increase. Only one project reported in a quantitative sense, RT1.02 (*A-Class grazing*) reported above 70% groundcover for the project area in line with the WQIP target with mean ground cover being 83% in the Burdekin and 87% in the Fitzroy. Please refer to the Statewide Landcover and Trees Study for further information on this KPI noting that attribution to Reef Trust is unlikely.
Grazing lands belonging to engaged farmers have greater average late dry season-groundcover than the regional average (this measure controls for loss of groundcover due to grazing by pest/wild animals and weather influences)	N/A	No specific data was reported by delivery partners. Please refer to the Statewide Landcover and Trees Study for further information on this KPI noting that attribution to Reef Trust is unlikely.
Reduced sediment loss from targeted grazing lands	YES	147,000 tonnes of sediment was abated across 2,160,042 hectares of practice change area. Refer also to Section 5.1.

Table 18. Reducing end-of-catchment impacts of pesticides on aquatic species

Reef Trust Program KPI	KPI achieved YES or NO	Evidence to support achievement
Increased uptake of BMPs by relevant enterprises.	YES*	Six projects included reduction of pesticides in their MERI plan. Project RT3.02 *(Reef Alliance – Improving horticulture)* reported that pesticide reduction was achieved, with no further detail. RT7.03 *Precision agriculture used to reduce nutrients and pesticides entering the water* noted the development of farm management plans which include spatial pesticide plans that identify which chemical was applied and where for weed and pest control. Currently it is too early to report on actual reductions as this project is still active.
Increased compliance of the relevant enterprises with industry standards and regulation.	N/A	Since the revision of the *Environment Protection Regulation 2019*, the Department of Environment and Science have maintained a compliance dashboard which shows an increase from 9% to25% compliance with the Reef regulation and a decrease in non-compliance from 55%-35% (Queensland, 2022).
Increased engagement of industry bodies for the relevant enterprises (from producers to mills to markets) to increase uptake of BMPs.	YES	Greatest increase has been seen in the most recent phases. See also above.
Additional productive land area for the relevant enterprises managed using BMPs.	N/A	No data was recorded by delivery partners or collected by the Department to respond to this KPI.
Longevity of the actions delivered (legacy).	N/A	Please refer to Section 5.5

*The project reports note an uptake of BMP practices, but do not necessarily provide the benchmark from which this is measured.

5.2.3 Have the planned phases of water quality investment successfully delivered the deliverables and outcomes according to the original investment strategies?

Investment strategies were developed for six of the seven Reef Trust Phases. Phase VII did not have a clear investment strategy, rather it sought Cabinet approval to utilise the Regional Land Partnerships procurement model. The extent of strategic planning undertaken prior to the commencement and investment prioritisation process of each phase also differed.

Typical activities undertaken as part of each phase's investment planning included a gap analysis, consultation with individual experts in relation to specific focus areas, engagement with the Reef Executive Steering Committee (ESC), Independent Expert Panel (IEP), the Independent Science Panel (ISP – a working group of the IEP) and in some cases the Reef Advisory Committee (RAC).

Engagement with broader Reef stakeholders such as NRM groups, peak industry body representatives and/or other potential delivery partners generally did not regularly or consistently occur and where it did occur was found to be ad hoc. Justification for this focus on engagement with the IEP rather than other stakeholders is considered appropriate given there is clear recognition that the Reef Trust was to be one of the key mechanisms to assist in the delivery of the Reef 2050 Plan (Australian National Audit Office, 2016). The Reef 2050 Plan and the Reef 2050 WQIP are both developed in consultation with a wide range of stakeholders, hence these views were considered indirectly by ensuring the Reef Trust focussed on addressing the agreed priorities in these planning instruments.

It is noted that one of the primary roles of the IEP on its establishment was to advise the Australian Government Minister for the Environment and Energy (now CCEEW) on funding priorities for the Reef Trust (Australian Government, 2022).

A number of factors were found to influence the extent of investment planning. This included:

- alignment with election commitments
- time and resources allocated and/or available for strategic investment planning
- the value of the investment allocated to each phase
- feedback from the ESC, IEP and ISP regarding priorities
- opportunities presented by other funding investors (e.g., the Queensland Government).

Table 19 provides a summary of the findings of the assessment undertaken to determine the extent to which each investment phase had been successfully delivered its outcomes.

Table 19. Summary assessment of Reef Trust phase investment strategy implementation

Reef Trust Phase and water quality investment priorities, objectives and/or focus	Evidence to support achievement
RT Phase I • Address the very high and high risk pollutants and regions by: - assisting landholders to improve land management practices and reduce the loads of nutrients, pesticides and sediment entering the Great Barrier Reef lagoon using cost-effective and innovative practice accelerating the uptake of a number of diverse, innovative practices and strategic actions by focusing on greater assistance and engagement with landholders in priority catchments.	**Strong achievement** The Wet Tropics is identified as having very high and high priority for DIN[4]. Fourteen (14) landholders directly contracted to reduce fertiliser application/efficiency. DIN savings were considered the most effective of any DIN focussed project at $49/kg. Reverse tenders were considered an innovative market-based instrument at the time to achieve relatively high pollutant savings in priority areas. The Burdekin and Fitzroy are identified as having very high priority for fine sediment reduction. The project was focussed on building landholder capacity through the use of a wide range of extension and property management tools and grazing BMPs. Twenty-eight (28) landholders in the two catchments were directly engaged.
RT Phase II Focus on reducing nitrogen and sediment runoff into the Reef.	**Strong achievement** Many projects were funded in Phase II. Of the 12 projects 10 had a duration of 3 years. RT 2.01 *(Gully erosion in the Normanby)* had a 5 year duration and RT 2.12 *(Grants for farmers in the Burdekin)* 4.5 years. All GBR regions received some investment. The use of reverse

[4] In the Reef 2050 Water Quality Improvement Plan 2017-2022

• Comprehensive prioritisation process to identify potential projects against objectives and outcomes. • Strategic balance of short-, medium- and long-term investments. • Balance between local and more strategic, Great Barrier Reef wide investments • Balance between prescribed or identified potential projects and funding of projects that allow for greater innovation to achieve desired outcomes.	tenders continued to facilitate innovation at the farm scale, while large gully remediation projects supported investment in refining techniques and approaches in a range of different catchments and contexts. There is some evidence that investment planning involved a review of Phase I performance, gap analysis and formal and informal engagement with a range of stakeholders.
RT Phase III • Deliver investments in an integrated manner with the Queensland Government. • Build on existing activities and integrating with planned initiatives across priority regions and industries. • build greater alignment and collaboration with the Queensland Government cane and grazing best management practice (BMP) programs to deliver investment to reduce nutrient and pesticide losses from cane farming and erosion control in grazing landscapes.	**Low to Moderate achievement** There is limited evidence to support that any investments were developed in an integrated manner with the Queensland Government other than would have normally been undertaken. One project RT3.01 *(Project Catalyst)* built on pre-existing 'Project Catalyst ' being delivered in the Mackay Whitsunday region and enables it to be expanded to the Burdekin and Wet Tropics. The Reef Trust investment is levering originally NGO and philanthropic investment. RT3.02 – RT3.06 *(Reef Alliance)* involved a new and innovative approach to collaborating with the agricultural peak bodies via QFF and NRM groups. The commodity-focussed projects had coverage across 5 of the 6 GBR regions. RT3.07 (*Sustainable cane practices*) sought to promote use of the industry led Smartcane BMP, financial grants and extension to work individually with growers to promote management practice change. Private agronomist services were used to facilitate grower involvement.
RT Phase IV • Engage with industry, the corporate sector and philanthropy to encourage greater collaboration and partnership in delivering the fourth phase of investments. • Invest in projects that further reverse auctions for nutrient reduction in the Wet Tropics and Burdekin natural resource management regions, trials of enhanced efficiency fertilisers on sugar cane farms, and management of stream bank and gully erosion.	**Moderate achievement** Phase IV had a strong investment in trialling a range of approaches to address stream bank and gully erosion and the use of reverse tenders through RT4.01 (*Wet Tropics Repeat Tenders*) and RT4.02 (*Burdekin Repeat Tenders*). RT4.03 (*Trialling of enhanced efficiency fertilisers*) was the only project in Phase IV that had an agricultural industry group as the delivery partner and was established to continue to test new innovations to reduce DIN. There is no evidence that suggest greater collaboration with the corporate or philanthropic sectors.
RT Phase V No specific focus identified	**Low achievement** Given there is no clear focus for Phase V investment it is difficult to comment on delivery success of the investment strategy. RT5.01 (*Project Uplift)* did however continue previous strategies of working directly with industry to promote management practice change. This project had average cost-effectiveness.
RT Phase VI • Investment will deliver locally trusted expert agronomic support to help sugarcane farmers improve fertiliser use efficiency through nutrient management planning and on-farm implementation.	**Strong achievement** RT6.01 (*Delivering tailored solutions*) successfully delivered on each of the identified desired outcomes from Phase VI investment. This project had relatively low cost-effectiveness.
RT Phase VII • Prioritising long-term and strategic projects. • Providing additional funding for outcomes and priorities that have had comparatively less funding in the past and where high	**Low to moderate achievement** All of the six Phase VII projects currently have a duration of 2.5 years. Some evidence has been identified that suggests the funded projects were selected more for their ability to deliver timely outcomes rather than address strategic priorities.

impact, cost effective projects can be developed.	There is limited evidence to suggest Phase VII projects are delivering outcomes in areas that have had previously less funding, potentially with the exception of RT7.06 (*Place-based program in the Murray and Mossman catchments*). Funding within this phase went to five of the six reef regions (excluding Cape York), who have all received substantial funding in previous phases of Reef Trust. Cost-effectiveness is unable to be determined at this time due to the procurement approach which used the RLP.

The low or moderate alignment with the investment strategies is likely to reflect a lack of strategic planning rather than the wrong choice of projects. It is also thought that some investment strategies were developed with the preferred projects in mind.

During some phases (e.g., Phase III) of Reef Trust, a specific focus was placed on identifying and collaborating with new delivery partners and project partners to not only test and develop new capacity and resources to support the delivery of water quality improvement projects, but to also build ownership and grow accountability of different supply chain providers to contribute to water quality outcomes. For example, RT5.01 (*Project Uplift*) proactively sought to work with the mills not just growers and RT3.08 (*Project Pioneer*) contracted a private agribusiness and resource consulting service provider to deliver a range of on-farm services. There is a continued need to build more diverse relationships across the supply chain as well as seek other skilled organisations to deliver outcomes.

Testing new approaches and seeking cost-effectiveness as identified in Phase IV are not always compatible outcomes. It is generally accepted the R&D projects and pilots are likely to have higher costs and therefore lower cost-effectiveness, than established projects using proven technologies and approaches.

5.2.4 Were the investments/ projects considered 'innovative' from an industry perspective?

No direct engagement with industry (other than delivery partners) was undertaken during this evaluation to make any formal judgement on the KEQ. There are also no clear criteria of how innovation performance was to be measured.

It is noted that innovation can occur at a number of different levels. Innovation exists when both 'new' management responses and interventions are tested or applied on-ground as well as when previously applied management responses and interventions are tested in new contexts to which they may have been originally developed.

Innovation can also exist in the way a project is designed and delivered. For example, in the size and scale of a project, the delivery mechanisms used, the governance structures applied, and participatory and communication processes used, and even the way a project is monitored. For example, RT3.02 – 3.06 (*Reef Alliance – Growing a Great Barrier Reef)* demonstrated innovation both in the context of working directly with industry via a consortium approach (prior to this there had been only one small project (i.e., ~$300,000) where an industry/landowner had been contracted as the primary delivery partner, as well as applying management interventions and techniques that were not common at that time.

Different Reef Trust projects have demonstrated different forms of innovation. Five projects (excluding the technical advisory projects), were classified as R&D projects piloting or testing proof-of-concepts (refer to Section 2.4 for a description of project types). One example of where a project has directly invested in developing innovation is RT4.03 (*Enhanced efficiency fertilisers).* This project supported the testing of Enhanced Efficiency Fertilisers in a series of on-farm trials and was the most extensive evaluation of EEFs ever to be undertaken in the Australian sugarcane industry. It was implemented using a collaborative model with CANEGROWERS as a peak industry body, Sugar Research Australia as a research development institute (RDI), Regional Productivity Services, Queensland Department of Agriculture and Fisheries, and a large number of growers.

Nine of the 43 projects evaluated were also found to have an industry group (i.e., peak body or agribusiness) as the primary delivery partner with a further 20 projects identifying an industry peak body, RDI, CSIRO, agribusiness, or technical consultant as a project partner. This is possibly a very conservative number, however, this provides some reassurance that industry is playing a major role in projects providing an opportunity to ensure leading practices are applied or assisting in the enhancement of current techniques and approaches.

The IEP, ISP and RAC have also provided advice at the commencement of each investment planning phase regarding innovation. Specifically, members of these committees were instrumental in promoting the use of reverse tenders as an alternative delivery mechanism.

The Reef Trust established the Innovative Financial Mechanisms Panel in late 2015. The panel met three times over an 18 month period and discussed a range of possible conservation financing instruments and opportunities for participation by private investors in Reef conservation activities. Members on the panel included ANZ, Commonwealth Bank, NAB, Credit Suisse, Zurich, Philanthropy Australia and the Great Barrier Reef Foundation. The Panel ceased meetings in approximately 2016.

There has also been a more deliberate shift towards innovation in the system repair and gully remediation projects. Early Reef Trust projects focussed on small, low level interventions such as porous check dams and whoa-boys. Following some evaluation of these early projects there was a consensus view to move towards testing larger and landscape scale interventions. This has allowed the collection of additional data regarding the application of erosion controls and remediation at different scales.

5.2.5 What aspects of the Reef Trust program could have been improved to make it more effective:

- **Were the governance arrangements, MERI, and communication processes for the Reef Trust Program effective?**
- **Did delivery partners have access to appropriate internal and external resources and support during design and delivery?**
- **Did the internal Reef Trust team have access to appropriate internal and external resources and support during design and delivery?**
- **Did delivery partners have the appropriate capacity and capability to design and deliver the project outcomes?**
- **Were communication processes between Reef Trust program managers and proponents appropriate?**

Governance arrangements

The Reef Trust operates within a strong governance framework and is administered through the Reef Trust Special Account 2014 which was established by the Finance Minister through a Determination to the *Public Governance, Performance and Accountability Act, 2013* (Australian National Audit Office, 2016). The Minister for the Environment and Energy (now DCCEEW) is responsible for decisions on the allocation of Australian Government funding from the Special Account.

Both the ANAO Report and this evaluation found the primary opportunity for improvement with regards to governance relates to performance monitoring and technical oversight at the Program and project scale to support continual improvement. This is discussed in the next section.

Monitoring, evaluation and reporting

The current Reef Trust M&E Plan (Draft, 2021) includes a program logic that clearly reflects the Reef Trust Outcomes and Reef Trust Intermediate Outcomes. It also includes KEQs and Program alignment tables that demonstrate the alignment between Reef Trust phases, Reef Trust Program KPIs, Reef 2050 WQIP 2025 Targets, Reef 2050 Plan Management Actions, and Reef 2050 Plan objectives.

The Reef Trust M&E Plan identifies that an *'evaluation of the performance of Reef Trust projects in delivering activities and outputs against their contracted funding agreements and more broadly the Reef Trust outcomes is undertaken every six months and at the end of each project through processes established in MERIT'*. This evaluation has found evidence to support that all Reef Trust projects primarily using MERIT as the basis, are broadly reviewed by their respective Program Manager following their six monthly reporting and at the end of the project to ensure projects have successfully delivered against their milestone deliverables and MERI plans as this is an important financial procedure to enable invoice payment. However, feedback from some Delivery Partners noted that formal acknowledgement of these reviews and feedback on performance and outcomes could be stronger and would be appreciated.

It is noted that it is currently not easy for Delivery Partners to report against project outcomes in the current MERIT system, hence conclusions regarding their successful achievement or lessons for continual improvement are difficult to make. MERIT reporting is primarily based on reporting progress against activities and outputs not outcomes, that is, the monitoring section in the MERIT report does not require delivery partners to relate its monitoring activities to the project's original outcomes, KEQs or indicators. The lack of alignment between individual Reef Trust projects MERI (project level) outcomes and Reef Trust Program KPIs and the actual reporting undertaken by delivery partners in MERIT,

> *"Everyone needs to be measured against the same metrics"*
>
> [Interviewee i4]

also makes it challenging for the Reef Trust team to undertake a transparent assessment of how Reef Trust projects are collectively making impact against the intermediate and long-term outcomes for the Reef or identifying lesson for continual improvement at the conclusion of each Reef Trust phase.

The ANAO Report also noted that an interim program evaluation of the Reef Trust was to be undertaken in 2018-19. No publicly available evidence was found that this interim program evaluation had been undertaken or the results shared with Delivery Partners.

As outlined in Table 15, Table 16 and Table 17, very few of the Program KPIs could be answered with any confidence. Effective monitoring and evaluation of Reef Trust projects was generally constrained by the lack of clarity of how the Reef Trust M&E Plan KPIs would be measured and monitored, i.e., what metrics or parameters would Reef Trust projects be assessed against. Effective monitoring and evaluation of Reef Trust would also be enhanced by:

> *"Long-term monitoring is ad hoc … monitoring is critical to supply rigorous data to be able to inform better decision making".*
>
> [Interviewee i3]

- Developing baselines for program KPIs that indicate an 'increase' as the measure of achievement.
- Clarifying who is responsible for collecting data and/or analysing the data in order to make a sound determination of performance (i.e., a Delivery Partner or provider external to a project).
- Establishing consistent application of indicators used to assess the performance of projects delivering similar outcomes (e.g., individual delivery partners often are required to determine themselves how the KEQs will be monitored which also impacts on consistency, with the exception of pollutant savings through P2R).
- Ensuring projects delivering similar or identical outcomes are required to assess and/or report on the same indicators and/or metrics making comparison of project efficiency and effectiveness more appropriate.
- Ensuring projects, specifically sediment projects using primarily landscape repair interventions to deliver similar short-term outcomes, use similar processes and tools for estimating pollutant abatement. Evidence provided by both Technical Advisors and through the desk top assessment found projects have reported to varying degrees of accuracy. That is, some are providing high level estimates calculated at project commencement and others are reporting results following project completion and detailed scientific analysis. This does not allow for a level playing field or consistency in program level reporting or performance assessment. Many of these issues have been addressed in recent times with Technical Advisors now providing clear guidance on the calculation of estimated sediment reductions.
- Amending MERIT to only require Delivery Partners to report on outputs and outcomes that align with the project's original purpose or agreed outcomes/objectives in their approved MERI plan.
- Developing monitoring and evaluation tools that can be used consistently and more efficiently by all Reef project Delivery Partners regardless of the source of investment.
- Incorporating post project delivery monitoring as directed by a relevant Technical Advisory Group. Post project monitoring of short- and intermediate-term outcomes is currently not included or funded in Reef Trust projects regardless of the length of project duration. The general assumption is that the outcomes will be enduring beyond the project life, however there is limited evidence and data to support this. Where post-project monitoring is undertaken (e.g., as part of a research project) there is no evidence that results are communicated back to original delivery partners or stakeholders involved, or shared with other investors with the exception of the Scientific Consensus Process. Short-term funding programs compound this issue as project benefits are not necessarily being realised and therefore reported upon during the funding term.

MERIT is an online reporting system that aims to simplify and streamline reporting across Australian Government natural resource management programs. It provides funding recipients with the ability to provide information and submit data relating to their project such as output data, qualitative data, maps and to view project progress via a dashboard. The system is considered by some to be a useful tool for holding relevant documents and general project information. However, many delivery partners have reported that MERIT:

- is cumbersome and difficult to use (refer also to Section on Delivery partner capacity and capability to design and deliver projects below)
- has a reporting structure that is too rigid and not fit-for-purpose

- reporting requirements in six month blocks was laborious and time consuming and was inconsistent with other reporting frameworks, e.g., used by GBRF and the Queensland Government
- does not distinguish where work is being undertaken on previous sites.

Challenges with measuring impact have also been raised. Currently, project and program impact (i.e., pollutant abatement and practice change) reporting relies entirely on the P2R program. The delay in analysis and public reporting, as well as the aggregation of data means that continual improvement approaches are hard to put into place as decisions are often made without access to timely performance information.

Delivery partners have identified opportunities to undertake more innovative monitoring such as by using drones and other technologies which are difficult to build into current project MERI plans or seek funding to implement monitoring programs using novel techniques and technological advancements.

See recommendations 5 - 13.

Internal Reef Trust team access to appropriate internal and external resources and support during design and delivery

It has been identified that different operational structures have been used over the seven Reef Trust phases. There has been a gradual loss of institutional knowledge in the Reef Trust team since its commencement. Recent organisational restructures have brought together both Reef Trust strategic planning and delivery management which have at times been split between different teams to enabled more focused attention on these individual tasks.

Some concerns were raised that there are still insufficient resources to comprehensively undertake these activities as part of seamless end-to-end program management when you add in other related and often time-consuming administrative activities.

Some of the reported lack of transparency and general understanding of Reef Trust planning processes and outcomes can be partially attributed to a lack of dedicated communications resources and consistent messaging. It is understood that additional resources have been allocated in the form of a strong communications budget and communications team to provide the necessary expertise. It was noted that all team members will need to allocate time to supporting these roles and liaising with delivery partners.

Interviewees also raised the need to invest in internal training and capacity for some key tasks specifically with regards to the use of monitoring and evaluation tools such as MERIT and P2R, as well as the other technical tools linked to specific project types.

The evaluation has found that both delivery partners and Reef Trust Program Managers involved in reporting also require a greater appreciation and understanding of how the P2R program operates, what is involved in the data management process, how the data is used, and how much time needs to be allocated to this reporting element. This understanding is most valuable at the commencement of projects when initial data is being collected and reporting commences. This will not only improve the appreciation of how detailed the process is undertaken by the P2R team but also the importance of how the data can and cannot be used. Improved understanding and awareness also have beneficial flow on effects to reporting to P2R and Reef Report Cards and positively impacts the ability to report a clear narrative of Reef Trust program performance with confidence.

Delivery partner capacity and capability to design and deliver projects

Despite 93% of delivery partner survey respondents (n=14) reporting that they agreed or strongly agreed that the project manager had the existing capacity and capability to design, set up and establish Reef Trust projects, and 100% agreed or strongly agreed that the project team collectively had the existing experience and capability to design, set up and establish the project (Figure 3) additional evidence was identified that suggests this was not necessarily representative of all 43 project managers and project teams at project commencement.

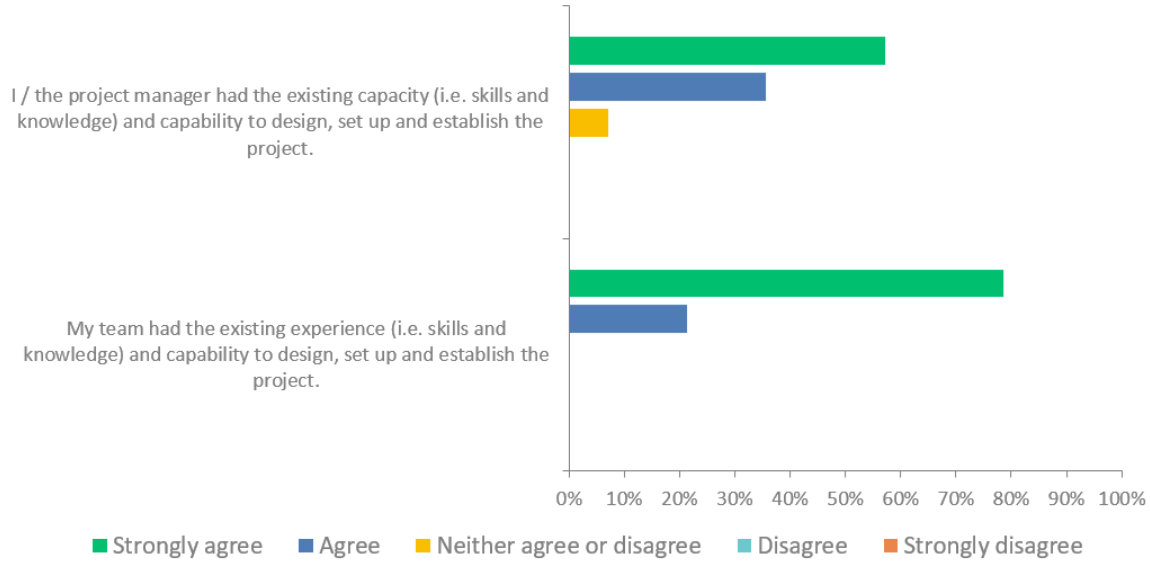


Figure 5. *Responses to survey question regarding project manager and project team capacity and capability during project design and initial establishment.*

Commonly, reported capacity and capability gaps within delivery partners include:

- Development and use of MERI plans. The Reef has a complex program logic and array of monitoring and evaluation processes, programs and systems such as the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP) and the Social and Economic Long-Term Monitoring Program for the Great Barrier Reef (SELTMP). How these plans and processes do or don't interface with individuals' projects provides an important context as does what indicators are best used for measuring performance of different outputs and outcomes. Understanding how effective MERI plans can support adaptive learning and management is also essential.
- The need to upskill on the use of MERIT. This is especially the case for new or fist-time Delivery Partners who may experience unanticipated time and costs in reporting without appropriate support and training.
- Paddock to Reef reporting. Many projects commenced prior to full roll out of the P2R program so projects had to 'catch up' with this reporting, while others commenced soon after it commenced but noted there were minimal details in project agreements and contracts regarding expectations or how to report. A lack of understanding by delivery partners regarding P2R reporting requirements at project commencement was also found to adversely impact the quality and timing of pollutant data reporting.

When asked what additional support and assistance would be beneficial to delivery partners 45% of respondents (n=11) identified both technical support and monitoring and evaluation the highest (Figure 4). While it is not very clear from the survey what type of technical support is needed, the lack of technical support and consistent technical advice was found to cause project delays. For example, one survey respondent noted that the Technical Working Group did not agree with the Department about how the project was to be delivered which caused problems and delays during the first 12 months, as agreement and endorsement was reached.

The rapid development of many decision support tools e.g., the Streambank and Gully Toolbox, along with the expectation that they be used as soon as possible, has also resulted in some confusion and project delays while users built the capacity to correctly use and interpret the tool.

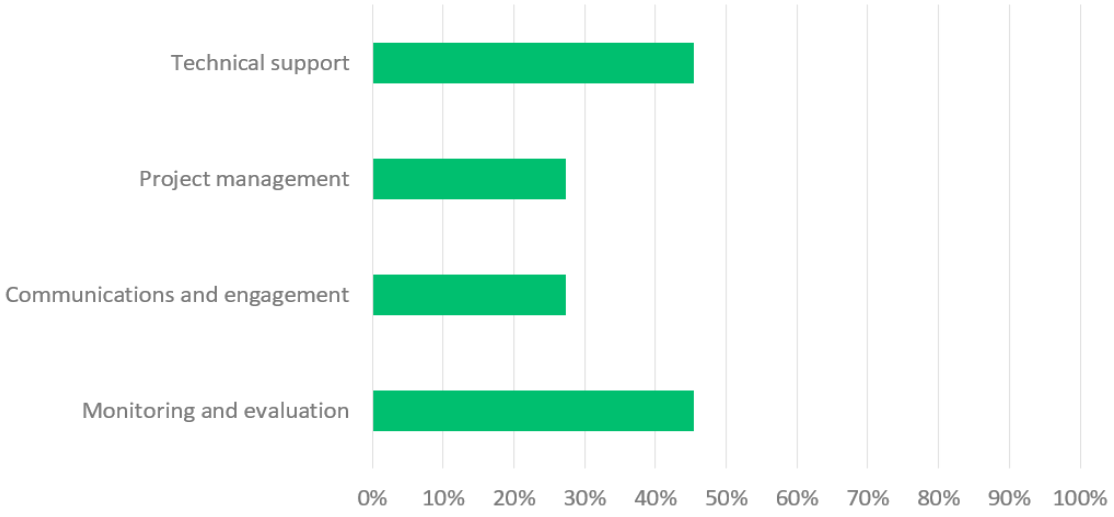


Figure 6. *Responses to survey question asking what kind of additional support or training would you and your project team have benefited from during the design and establishment phase.*

At the opposite end of project life, limited investment is being made to continue the long-term monitoring of projects to determine their success and performance over time. This information is critical to inform program and project design to measure enduring legacy and help determine future rates of adoption/disadoption. Importantly, there is a lack of clarity regarding whose responsibility it is to invest and oversee long-term monitoring and measure achievement of intermediate-term Reef Trust outcomes.

Communication process

A majority of survey respondents reported that it was easy to communicate with the Department and individual Reef Trust Program Managers with 72% agreeing or strongly agreeing to this statement (Figure 5). Some challenges were experienced where there was:

- a change in program manager during project delivery
- where there were multiple layers of agreements
- where the TWG requested changes to project activities that varied to the original agreements
- where there were required changes to data collection processes and reporting requirements.

> *"Great team to deal with across the board. Positive, interested, engaged, innovative, open and accessible".*
>
> [Survey respondent]

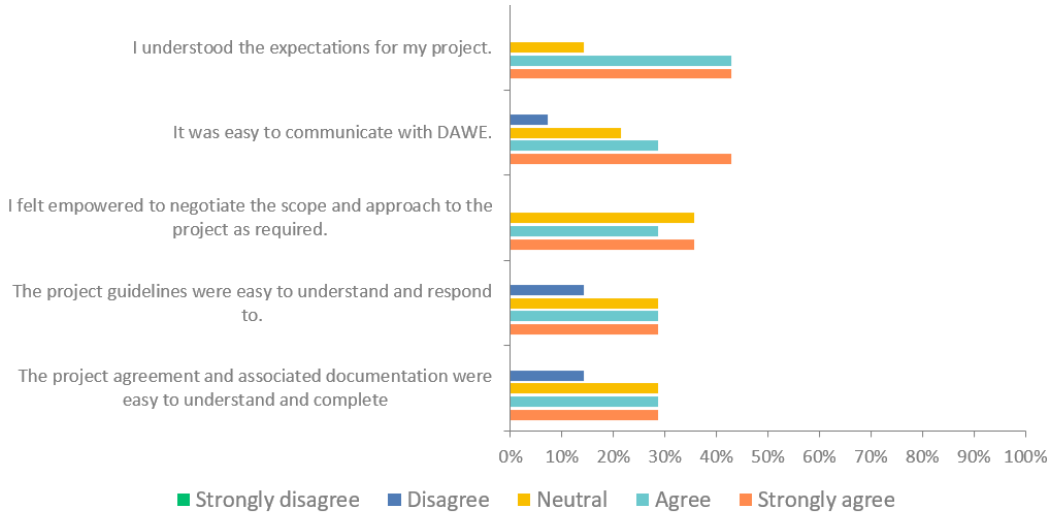


Figure 7. *Responses to survey question relating to communication with the Reef Trust Program Team during the design and delivery of projects.*

Since the commencement of Reef Trust, the extent and quality of communication with other investors and program partners has fluctuated. The evaluation found that at times it has been more challenging for Reef Trust stakeholders to proactively engage with and seek feedback from the Reef Trust team about opportunities to improve different program aspects or to discuss key findings. It was identified that this is likely due to multiple reasons, including insufficient levels of program staff to deal with the day-to-day operation of the program, differing leadership and communication styles, and low levels of technical understanding and knowledge of some staff (especially new staff).

> *"All DAWE Project Officers are excellent to work with and highly supportive of Delivery Partner Team. Delivery Team worked with three DAWE contact officers over the five year project (but all equality across the Reef Trust 4 project)".*
>
> [Survey respondent]

See recommendation 26.

Modelling and decision support tools

A suite of Reef-related decision support tools has been developed over recent years as a result of joint investment from Commonwealth, State and other government agencies, university and research agencies, and the private sector. They have included a large amount of in kind support from other non-government organisations such as NRM groups, and landholders.

However, evidence suggests that there is room to improve both effectiveness and efficiency at the individual tool scale, the intersect between individual tools, and as a whole suite of Reef tools.

Key areas for improvement relate to the need to improve transparency and clarify roles and responsibilities with regards to:

- Who and how various tools are maintained, especially with regards to system improvements, data quality assurance, who provides technical support on the use of tools to delivery partners and other stakeholders, and how information updates are incorporated.
- Ensuring other tool managers are made aware when changes to a particular tool are proposed or made (i.e. many tools need to talk to each other and changes to one tool can have a direct impact on the use and/or accuracy of another). For example, the update to the Gully and Streambank Toolbox took approximately six months' worth of work by government staff to ensure alignment with the P2R tool. While improvements are encouraged, there are important coordination, timing and resourcing issues to consider and plan for.
- Ensuring consistency and continuity in funding given the majority of tools are also funded by grant-based programs.

MERIT currently only records and focusses on the environmental aspects of projects and does not adequately capture other outcomes such as agricultural productivity, soil condition, carbon sequestration or cultural outcomes. Another concern raised with MERIT was the issue that it does not register follow up work or maintenance so that any reporting cumulates over time resulting in the doubling or tripling of outputs and impact (i.e., reported pollutant savings and practice change areas).

See recommendations 20-25.

Adaptive management

MERIT reports facilitate delivery partners to identify lessons and strategies for improvement. It is unclear as to what extent these improvements are a) implemented by the delivery partner, b) shared with other delivery partners or c) reviewed by the Reef Trust team to improve future investment planning. The change in approach between investment phases, also resulted in the inability of some delivery partners to adequately apply the lessons learnt from previous phases due to a change in focus.

See recommendation 1.

Project design and management

The evaluation identified several key themes and lessons related to project design and project management. During interviews and focus groups, project proponents reflected on project design and management to identify key success factors and challenges for their project. Central themes that emerged regarding *project planning and design* included:

- The value of early communication with the funding body to clarify expectations and develop a clear vision and outcomes for the project; this avoided confusion and doubling up effort during project design.
- Clarifying roles and responsibilities early on to ensure smooth delivery.
- Factoring in the timing and cycles of farming when developing project plans to avoid unforeseen delays and to ensure advice is available when needed.
- Factoring in the timing of wet seasons which prevent on-ground system repair delivery in many cases i.e. there should be a program/project cycle that sees key project stages (concept designs, approvals, detailed designs, indigenous engagement etc) all occur in such a manner as to maximise on-ground delivery of projects in the dry season.
- Factoring in an appropriate lead time for new projects where a network of landholders has not been established; expectations around milestone achievements are often too ambitious when relationships need to be established.
- Larger gully remediation projects working on multiple sites were found to be more efficient than projects occurring on a single site.

Central themes emerged in relation to engaging landholders, that should be factored into project design and delivery and included:

- Garnering landholder buy-in is critical to the success of the project, particularly those that rely on a large in-kind or co-investment contribution from the landholder. This often requires the ability to demonstrate the value proposition to a landholder such as economic benefits or other benefits.
- Projects are more likely to be successful when a long term, familiar and trusting relationship is established between the on-ground delivery agency and the landholder.
- Delivery partners are more successful when they have been able to maintain existing relationships with landholders between government funded projects. This relies on the retention of staff that have built relationships with landholders and the associated continuity of funding required.
- Landholder buy-in is easier to achieve when the project is able to consider a range of management responses that provides flexibility to suit the landholder's needs, and takes a whole-of-farm approach to practice change.
- One-on-one support was perceived to be the most effective mode of engagement when delivering management practice change projects.
- Establishing peer-to-peer learning opportunities and identifying 'champions' was perceived to be a highly effective mode of knowledge sharing and encouraged landholder participation in projects.
- Documenting a strong evidence base of the economic benefits of practice change (e.g.,. in nutrient management planning) that can be shared among landholders was an effective tool to dispel misinformation and overcome barriers to participation.
- Extension approaches are much more complex than single focus grant programs, in part because they are focused on changing the underlying drivers of management decisions rather than specific actions at the site level. Where both incentives and extension are applied, the costs of administration and technical knowledge are increased however may offer increased legacy outcomes.
- Enterprises differ, so there is substantial variation between them in the underlying drivers of management decisions and in the changes needed to better focus enterprises on sustainable management practices. In contrast, grant projects might focus on uniform actions (e.g.,. riparian fencing) for each enterprise, and market mechanisms rely on the landholder deriving how an outcome will be achieved.
- Time lags are inevitable and in extension programs where the focus is to change the underlying management drivers they may have subsequent flow-on impacts to management decisions.

Central themes that emerged in relation to how the Reef Trust water quality investment program is structured, and how this impacts the ability of project managers to deliver successful projects include:

- Long-term funding to enable project partners to develop and retain skills and capacity in the region and provide for more realistic timeframes for farmers to undertake complex land management changes with ongoing maintenance support.
- There is uncertainty regarding the longevity of systems repair interventions, as well as disadoption relating to management practice change projects, as funding is not made available for ongoing monitoring and maintenance beyond the life of the project.
- Flexibility in funding to take a 'place-based' approach to projects that align with landholder needs.
- The interviews with project partners highlighted that that there is a need to set an overarching investment framework which has a program logic with high level indicators that can be monitored. With more specific streams or investment options clearly identified and with further indicators. A framework developed in a hierarchical approach would allow the highest priority actions to be addressed first with others addressed over time allowing funding uncertainty to be addressed. This would also allow for transparency, guidelines and communication that then would be easier to implement for delivery partners.

See recommendations 33-35.

5.3 Efficiency – key results and findings

5.3.1 To what extent has the Reef Trust program achieved value for money and cost-effectiveness

All 43 Reef Trust projects were initially considered as part of the cost-effectiveness assessment. Of the 43 projects two were identified as technical advisory projects delivered by the CSIRO and funded for the exclusive purpose of providing technical support to delivery partners. These projects (RT2.03 and RT4.13) were excluded from Part A's comparative cost-effectiveness assessment as comparing them across a common metric was not possible.

Two projects being delivered by the Queensland Farmer's Federation (RT3.02 *Reef Alliance - Improving horticultural practices* and RT3.04 *Reef Alliance - Improving dairy practices*), were also excluded from the cost-effectiveness assessment due to a confirmed gap in pollutant reduction data availability.

All Reef Trust Phase VII projects have been excluded from the comparative cost-effectiveness component, as no confirmed pollutant reduction estimates are available from any of the collated data sources because they are not yet at their reporting stage to P2R. This lack of data was highlighted by P2R as a delay between the commencement of newer projects and the required modelling of associated pollutant reductions. Therefore, no projects within Phase VII could be assessed within the comparative cost-effectiveness component. Overall, the cost-effectiveness of 33 of the initial 43 projects were able to be assessed. These consisted of 23 projects assessed on fine sediment reduction and 10 projects assessed on DIN reduction.

Results are presented from the perspective of the Reef Trust water quality investments in terms of dollars (AUD) per tonne (fine sediment) or per kilogram (DIN) of annual load reduction achieved at the end of each project. In order to better understand the relationship between project expenditure and practice change area, results are also presented in terms of dollars per hectare for both fine sediment and DIN projects.

All results of annual load reductions for this assessment have been calculated at the end of catchment scale (in line with P2R estimations). It should be noted that the robustness of the data is moderate at best and low for many projects. This has two implications. Firstly, the quantitative estimates outlined should be treated with a degree of caution. Secondly, the systemic poor quality of the data should be of concern to program managers. This is discussed further in the conclusions and recommendations section below.

These estimates (which exclude in-kind and monitoring expenditures but use the total annual load reductions achieved by both government and other contributions) are presented below in Table 20 to 24.

Table 20. Total cost-effectiveness by pollutant type

Pollutant targeted	Count of projects	Annual total volume of pollutant abated	Average cost-effectiveness ($/t or kg of annual load reduction achieved)	Average cost-effectiveness ($/ha)*
Fine sediment	23	124,118t	$488/t	$25/ha
DIN	10	385,550kg	$135/kg	$278/ha

* It is important to note that $/ha is not an accurate measure of project performance. It has been analysed as part of this assessment to primarily provide some data to support Part B of the project and to validate values in P2R models.

Over 124,000t of fine sediment have been removed annually from the Great Barrier Reef lagoon, in addition to more than 385,550kg of DIN. This does not include the 11 projects excluded from the high-level assessment.

Across all 23 projects funded by the Reef Trust that focussed on abating **fine sediment**, there was an average cost-effectiveness of **$488/t**. Of the 23 projects, cost-effectiveness ranged from $16/tonne to $17,805/tonne, three projects (13%) exceeded a cost-effectiveness of $10,000/tonne, while seven projects (30%) were below $500/tonne. Cost-effectiveness for projects targeting sediment and funded by the QRWQP ranged from $300/t up to $1,000/t which indicates that Reef Trust funded projects are comparable to other projects (e.g., funded by through the QRWQP). (Alluvium, 2021).

Of the ten (10) projects assessed that focussed on **DIN abatement**, there was an average cost-effectiveness of **$135/kg.** Of the ten projects, cost-effectiveness ranged from $49/kg to $554/kg.

For cost-effectiveness in terms of dollars per hectare, there were seven projects assessed that focussed on DIN abatement and had data for hectares of practice change, these projects had an average cost-effectiveness of $278/ha[5]. For these seven projects, cost-effectiveness ranged from $97/ha to $526/ha. Across the 17 projects funded by the Reef Trust that focussed on abating fine sediment, there was an average cost-effectiveness of $25/ha[6]. For these 17 projects, cost-effectiveness ranged from $4/ha to $384,804/ha[7], three projects (13%) exceeded a cost-effectiveness of $4,400/ha, while seven projects (30%) were below $500/ha. Due to their substantially low cost-effectiveness ($/ha) values, when RT 2.02, RT 3.06 and RT 3.08 are removed from the analysis, cost-effectiveness ranges from $66/ha to $384,804/ha, three projects (13%) exceeded a cost-effectiveness of $10,000/ha, while only four projects (17%) were below $500/ha.

These aggregated results provide an average benchmark for the breakdown of results in the tables below.

[5] Project counts for $/ha cost-effectiveness are reduced for DIN due to the exclusion of three projects where practice change area was unknown.
[6] Project counts for $/ha cost-effectiveness are reduced for sediment due to the exclusion of six projects where practice change area was unknown.
[7] Note that the project with $348,804/ha (RT4.04) was somewhat of an outlier with only 2 other projects having results greater than $4,400/ha (RT4.05, and RT4.09).

Table 21. Cost-effectiveness by Reef Trust phase

Pollutant targeted	Reef Trust phase	Count of projects	Annual total volume of pollutant abated	Cost-effectiveness ($/t or kg of annual load reduction achieved)	Cost-effectiveness ($/ha)*
Fine sediment	Phase I	1	2,046t	$1,466/t	$68/ha
	Phase II	10	22,414t	$306/t	$73/ha
	Phase III	3	59,037t	$425/t	$12/ha
	Phase IV	9	40,622t	$630/t	$1,713/ha
	Phase V	0	-	-	-
	Phase VI	0	-	-	-
	Phase VII	0	-	-	-
DIN	Phase I	1	31,167kg	$49/kg	$97/ha
	Phase II	1	21,331kg	$137/kg	$365/ha
	Phase III	3	169,741kg	$131 /kg	$280/ha
	Phase IV	3	105,605kg	$176/kg	-
	Phase V	1	52,532kg	$71/kg	$335/ha
	Phase VI	1	5,175kg	$554/kg	$526/ha
	Phase VII	0	-	-	-

*It is important to note that $/ha is not an accurate measure of project performance. It has been analysed as part of this assessment to primarily provide some data to support Part B of the project and to validate values in P2R models.

Fine sediment abatement for projects funded by Reef Trust water quality investments were most cost-effective in Reef Trust Phases II and III, with abatement costs of $306/tonne and $425/tonne respectively.

Phases I and IV had higher associated costs of $1,466/tonne and $630/tonne respectively, noting that there was only one project in Phase I *(RT1.02 A-Class Grazing).* DIN abatement projects were most cost-effective during Phase I at $49/kg, with Phase V recording slightly higher costs of $71/kg. Phases II through IV presented similar cost-effectiveness of between $131/kg and $176/kg. Note that phases with project counts of one should be interpreted with a particularly low level of robustness.

Phase VI was the least cost-effective investment when considering DIN abatement at $554/kg. This phase comprised solely of the RT6.01 (*Delivering tailored solutions)* project, delivered by the Queensland Department of Environment and Science. The procurement for the project was via a co-investment to the Queensland Government to enable the continuation and expansion of a QRWQP funded project RP161 (*Delivering tailored solutions to Mackay-Whitsunday growers to improve nutrient management).* To determine this project's true cost-effectiveness it is important to analyse all investment contributions.

For cost-effectiveness in terms of dollars per hectare ($/ha), fine sediment abatement projects were most cost-effective in Reef Trust phase III, with abatement costs of $12/ha, noting that when RT3.06 and RT3.08 are removed, cost-effectiveness worsens to $66/ha. Reef Trust phase IV had a significantly higher associated cost of $1,713/ha, while phases I and II recorded similar costs of $68/ha and $73/ha, respectively (noting that there was only one project in phase I). When RT 2.02 is removed from the analysis 9due to it being a significant outlier), cost-effectiveness for phase II projects rises significantly to $1,084/ha, indicating its strong influence on the result for phase II $/ha cost-effectiveness.

DIN abatement projects were most cost-effective during phase I at $97/ha, with phase III recording a higher cost of $280/ha. Phases II and V recorded similar cost-effectiveness values of $365/ha and $335/ha, respectively. Note that phases with project counts of one should be interpreted with a particularly low level of robustness. A cost-effectiveness figure is not provided for Phase IV projects due to unknown Phase VI was the least cost-effective investment when considering DIN abatement at $526/ha.

Table 22. Cost-effectiveness by primary management response

Pollutant targeted	Primary management response	Count of projects*	Annual total volume of pollutant abated	Cost-effectiveness ($/tonne or kilogram of annual load reduction achieved)	Cost-effectiveness ($/ha)**
Fine sediment	Grazing, sediment management (gully & streambank) landscape repair	18	51,102t	$586/t	$385/ha
	Grazing, sediment (hillslope) management practice change	4	72,285t	$379/t	$14/ha
	Intensive agriculture, sediment management practice change	1	732t	$4,390/t	$66/ha
DIN	Intensive agriculture, nutrient management practice change	10	385,550kg	$135/kg	$278/ha

*Excludes Phase VII projects.

**It is important to note that $/ha is not an accurate measure of project performance. It has been analysed as part of this assessment to primarily provide some data to support Part B of the project.

When comparing fine sediment abating projects by their primary management response, a significant level of variability in cost-effectiveness becomes evident.

Results for the two various forms of sediment management (gully and streambank landscape repair, as well as hillslope management practice change) demonstrate that for the projects assessed, hillslope management practice change responses are relatively cost-effective (noting there were only four projects), while gully and streambank landscape repair are less cost-effective. There were 18 projects included within the gully and streambank responses that used primarily **landscape repair** interventions supported by some management practice change, with an average cost-effectiveness of $586/t. **Hillslope sediment management** responses comprising primarily management practice change activities had a cost-effectiveness of $379/t of sediment abated.

It is important to note that (RT3.08 – *Project Pioneer*) identified as targeting sediment using sediment (hillslope) management practice change has also been identified as a R&D project. It is not unexpected that R&D and to a lesser extent pilot projects would have lower cost-effectiveness. This relates to the need to ensure projects are assessed against appropriate outcomes and targets.

Cost-effectiveness for intensive agriculture sediment management projects were calculated at $4,390/t, noting that this only included RT3.05 (Reef Alliance - *Improving grain practices*). This project/practice had a present value of just over $3.2 million and abated 732 tonnes of fine sediment per annum. It should be noted that while the cost-effectiveness of this management response is considerably different to the other sediment management responses, the inclusion of this project in the weighted average cost-effectiveness for all sediment projects makes little difference to that estimate (i.e., the removal of RT3.05 from the calculation reduces the estimate for all sediment projects from $488/tonne to $465/tonne).

For cost-effectiveness in terms of dollars per hectare ($/ha), results for the three various forms of grazing - sediment management (gully and streambank), as well as hillslope management practice change demonstrate that for the projects assessed, hillslope management responses are relatively cost-effective, while gully and streambank are marginally less cost-effective. There are 12 projects included within gully and streambank sediment management responses that used primarily sediment systems repair interventions supported by some management practice change, with an average cost-effectiveness of $385/ha. When RT2.02 is removed from the analysis, cost-effectiveness worsens significantly to $1,440/ha, indicating its strong influence on the result for gully and streambank management $/ha cost-effectiveness. Hillslope sediment management responses comprising primarily management practice change activities had a cost-effectiveness of $14/ha of sediment abated. When RT3.6 and RT3.8 are removed from the analysis, hillslope management cost-effectiveness worsens to $125/ha.

Cost-effectiveness for intensive agriculture sediment management projects were calculated at $66/ha.

It is important to note here that practice change projects should also consider the rates of disadoption, which is a factor that has not been incorporated within the comparative assessment[8]. Disadoption is highlighted further within the recommendations section.

Table 23. Cost-effectiveness by delivery mechanism

Pollutant targeted	Delivery mechanism*	Count of projects	Annual total volume of pollutant abated	Cost-effectiveness ($/tonne or kilogram of annual load reduction achieved)	Cost-effectiveness ($/ha)
Fine sediment	Targeted competitive grants	22	122,072t	$471/t	$24/ha
	Direct invite to delivery partner	1	2,046t	$1,466/t	$68/ha
DIN	Targeted competitive grants	3	169,741kg	$131/kg	$280/ha
	Direct invite to delivery partner	2	52,532kg	$188/kg	$355/ha
	Reverse tender/auction	4	158,103kg	$107/kg	$187/ha.
	Direct co-investment	1	5,175kg	$554/kg	$526/ha

*Phase VII RLP and technical advisory not included

The cost-effectiveness of sediment abating projects when evaluated by delivery mechanism demonstrate that on average, targeted competitive grants are more cost-effective than direct invite to delivery partner projects. Observed cost-effectiveness of sediment abatement was $471/t and $1,466/t for the two respective delivery mechanisms. This may indicate that the *competitive* nature of the grants resulted in lower costs for a given outcome. It should also be noted that the targeted competitive grants were focussed on landscape repair projects, whilst direct invite to delivery partner was more focussed on grazing management practice change (note that this category only included one project).

For DIN abating projects, targeted competitive grants were again a more cost-effective mechanism than direct invite to delivery partner projects, with observed cost effectiveness of $131/kg and $188/kg, respectively. Again, this may indicate that the *competitive* nature of the grants resulted in lower costs for a given outcome. Reverse tender/auction delivered projects were even more cost-effective at $107/kg, while the one direct co-investment project (RT6.01 – *Delivering tailored solutions*) displayed higher costs of around $554/kg of DIN abated.

For cost-effectiveness in terms of dollars per hectare, the cost-effectiveness of sediment abating projects when evaluated by delivery mechanism demonstrate that on average, direct invite to delivery partner projects are less cost-effective than targeted competitive grants. Observed cost-effectiveness was $68/ha and $24/ha for the two respective delivery mechanisms. It should be noted that when RT2.02, RT3.06 and RT3.08 are removed from the analysis, cost-effectiveness worsens significantly for the targeted competitive grants delivery mechanisms, with cost-effectiveness worsening to $441/ha, indicating the strong influence that these projects have on this delivery mechanisms' $/ha cost-effectiveness.

Again, for DIN abating projects, the direct invite to delivery partner deliver mechanism was less cost-effective than targeted competitive grants. Observed cost-effectiveness was $335/ha and $280/ha for the two respective mechanisms. Reverse tender/auction delivered projects were more cost-effective at $187/ha, while the one direct co-investment project (RT6.01 – *Delivering tailored solutions*) displayed higher costs of around $526/ha of DIN abated.

[8] Disadoption refers to the abandonment (Walton et al., 2008) or discontinuance (Gedikoglu, 2019) of agricultural practices and technologies. More specifically, in this case it is the potential for growers to abandon new management practices (i.e. revert to the previous poorer management practices) if funding ceases to provide an incentive for maintaining practice levels.

Table 24. Cost-effectiveness by project type

Pollutant targeted	Project type	Count of projects	Annual total volume of pollutant abated	Cost-effectiveness ($/tonne or kilogram of annual load reduction achieved)	Cost-effectiveness ($/ha)
Fine sediment	R&D/pilot (low maturity)	6	33,984t	$244/t	$12/ha
	Standard (average maturity)	17	90,135t	$580/t	$32/ha
	Franchise (mature project)	-	-	-	-
DIN	R&D/pilot (low maturity)	4	105,030kg	$137/kg	$365/ha
	Standard (average maturity)	4	262,440kg	$122/kg	$265/ha
	Franchise (mature project)	2	18,081kg	$307/kg	$501/ha

The cost-effectiveness of **sediment** abating projects when evaluated by project type demonstrate that R&D/pilot projects were most cost-effective at $244/t compared to standard projects at $580/t. It is possible that R&D/pilot projects represent better performing approaches as they may contain a higher level of research and technology than approaches of a greater maturity. Consequently R&D/pilot may represent the best value for money because of this. R&D/pilot projects also often target a different group of landholders, a different location, or a different style of project to what has been done previously, and because of this there may be 'low hanging fruit' in terms of projects available. Whereas the established projects have been done many times targeting the same things and therefore have already captured the 'low hanging fruit', and now need to move to the less attractive (more difficult or costly) options. Standard projects focussing on **DIN** abatement were most cost-effective at $122/kg, followed by R&D/pilot projects at $137/kg, while the two franchised projects assessed were relatively less cost-effective at $307/kg.

For cost-effectiveness in terms of dollars per hectare, the cost-effectiveness of **sediment** abating projects when evaluated by project type demonstrate that R&D/pilot projects were more cost-effective than standard projects at $12/ha compared to $32/ha. Cost-effectiveness for the R&D/pilot and standard project types rise to $115/ha and $421/ha, respectively, when RT2.02, RT3.6 and RT3.8 are removed from the analysis.

It was also found that further discussion is required regarding when and to what extent cost-effectiveness is used as a measure of project and program performance, noting that other indicators may be equally important to measure. This is especially the case for R&D style projects.

A second pass assessment was undertaken to take a closer examination of project costs. As previously noted, projects were not required to undertake detailed financial reporting that itemised what activities costs aligned to, hence the robustness of these results is low. The list of projects selected for the second pass assessment are listed in Table 5, noting that several projects had insufficient cost data to inform a valuable level of analysis.

The comparison was undertaken by examining four main categories of activities that were common across projects:

- engagement and capacity building
- administration / project management
- monitoring and design
- on-ground and technical costs.

By focussing on individual cost categories, cost-effectiveness can be considered in a number of different ways. In general, cost-effectiveness was measured by dividing the relevant cost categories (e.g., engagement) by the outcome of interest (e.g.. number of landholders engaged). For example, RT3.01 (*Updated farm management practices)* spent $502,260 on engagement and training and engaged 320 landholders across the project, resulting in a cost-effectiveness figure of $1,570 per landholder engaged.

The proportion of administration (including monitoring and design) costs attributed to projects were similar to engagement costs, with the majority of projects recording costs of below 25% of the total project cost. Cost-effectiveness for administration, monitoring and design costs was calculated based on the $/t or kg of pollutant abated. All projects with sufficient data in the DIN abatement projects displayed cost-effectiveness of under $46/kg of DIN, with project RT3.03 (*Reef Alliance - Improving sugarcane practices)* being the most efficient for administration (including monitoring and design) recording costs of $1/kg of DIN abated.

Landscape repair projects displayed large variations in abatement cost-effectiveness when administration costs where attributed, ranging from $11/t to $1,513/t, whereas sediment practice change projects were more stable with a range of $29/t to $50/t, noting there were only two second pass assessment projects with sufficient data to draw upon. This could be attributed to the inconsistency in financial reporting which makes comparison difficult.

Engagement and capacity building costs contributed a similar proportion of total costs across projects with sufficient data, ranging from 4% (RT2.05 *Theresa gully remediation* and RT2.08 *Isaac gully remediation*), up to 18% (RT3.01 *Updated farm management practices*). Project RT3.01 (*Updated farm management practices)* engaged a total of 320 landholders, the second highest engagement rate across the second pass assessment projects. This higher engagement rate was a key objective of the project, requiring a higher proportion of the budget dedicated to engagement; however, in terms of cost per landholder engaged, it was also the most cost-effective. When cost-effectiveness across the other projects is considered at the individual engagement scale, project RT4.09 (*Gully restoration in the GBR)* displayed the highest $/landholder engaged at $142,960/landholder. This was a result of there being only three landholders engaged in the project which is not atypical of a landscape repair project which often focus on multiple sites across a small number of properties.

Efficiencies were noted by delivery partners in the case of large-scale gully remediation, such as in project RT4.11 (*Burdekin gully remediation)*, in comparison to planning for and implementing a number of small-scale gully remediation projects. Similarly, The Reef Alliance Project was thought to provide efficiencies[f1] because Queensland Farmers' Federation acted as a central point for coordination, contracting and reporting, whilst industry partners focussed on project delivery.

Coordination and planning between projects occurred in a number of ways. When asked about program coordination and collaboration 83% of all survey respondents considered other Reef projects in the region, whilst 85% of all respondents indicated collaboration and coordination with other Reef projects in the region. However, 51% of all respondents noted more effort could be put into ensuring complementarity of projects, with 28% responding that their project was competing with other Reef projects for both landholder interest and time [s1].

One of the ways coordination and planning was supported was the provision of information from the Australian Government to delivery partners about what else was happening in the region or in similar project types. The Reef Trust Gully and Streambank Erosion Control Forums provided an opportunity for delivery partners, landholders and technical partners to share knowledge and project successes and lessons; and the regional NRM bodies played a large coordination role between landholders as well as across the region more broadly [f1]. It is considered the NRM bodies can play this role because of relationships and trust built over a long period of time [f1]. Projects such as RT6.01 *Delivering tailored solutions* sought to establish partnerships with Productivity Services across three different regions to support project delivery and sharing of information [f1]. The Reef Trust Gully and Streambank Erosion Control Forums were seen as extremely valuable by delivery partners as they provided the opportunity for delivery partners to meet and share lessons and complete site visits. This relationship building and ability to discuss projects amongst delivery partners and landholders was invaluable and resulted in enduring landholder relationships [f1]. Project 4.12 *Controlling streambank erosion in the Mackay Whitsunday catchments* deliberately sought to bring together large groups of neighbours to

discuss remediation options with the aim of improving collaboration and strengthening the social outcomes of the project.

On-ground and technical costs made up the largest proportion of nearly all project budgets, generally between 56% and 82% of the total project cost. The cost-effectiveness of the on-ground and technical works component can best be attributed to pollutant abatement, that is $/tonne or $/kg of pollutant abated. When considering on-ground costs only, project RT5.01 (*Project Uplift)* was the most cost-effective DIN abatement project at $33/kg, whilst projects RT4.09 (*Gully restoration in the GBR)* and RT3.08 (*Project Pioneer)* were the most cost-effective landscape repair and sediment practice change projects respectively at $577/tonne and $77/tonne of sediment abated. These findings are different when compared to management responses documented in Table 21.

Table 25 shows the breakdown of all costs for projects included in the second pass assessment.

Table 25. Breakdown of second pass assessment project costs

Primary management response	RT Number	Total Present Value of Costs excluding in-kind ($)	Administration, design and monitoring costs ($) (% of total cost)	$/landholder engaged	Cost-effectiveness ($/tonne or $/kg	Engagement and/or capacity building ($) (% of total cost)	Landholders engaged (no.)	$/landholder engaged	On-ground or technical costs ($) (% of total cost)	$/tonne or kg
Sediment (gully and stream bank) landscape repair	RT2.01	$659,760	$120,270 (18%)	$60,137	$216/tonne	$85,940 (13%)	2	$42,970	$453,550 (69%)	$816/tonne
	RT2.05	$622,890	$84,720 (14%)	$16,943	$1,513/tonne	$35,040 (6%)	5	$7,010	$503,130 (81%)	$8,985/tonne
	RT2.08	$606,460	$84,720 (14%)	$16,943	$473/tonne	$33,360 (6%)	5	$6,670	$488,390 (81%)	$2,728/tonne
	RT4.09	$3,647,040	$1,192,970 (33%)	$397,657	$1,415/tonne	$428,890 (12%)	3	$142,960	$2,025,180 (56%)	$577/tonne
	RT4.10	$1,688,600	$188,950 (11%)	-	$155/tonne	$107,650 (6%)	-	-	$1,392,000 (82%)	$1,139/tonne
	RT7.01	-	-	-	-	-	-	-	-	-
Sediment practice change	RT1.02	-	-	-	-	-	-	-	-	-
	RT3.06	$19,270,930	$496,940 (3%)	$2,209	$11/tonne	-	225	-	-	-
	RT3.08	$2,596,040	$633,340 (24%)	$13,195	$50/tonne	$982,050 (38%)	48	$20,460	$980,650 (38%)	$77/tonne
	RT4.04	$2,431,720	$351,450 (14%)	$3,285	$29/tonne	$458,400 (19%)	107	$4,280	$1,621,870 (67%)	$136/tonne
DIN practice change	RT2.12	-	-	-	-	-	-	-	-	-
	RT3.01	$2,745,760	$408,070 (15%)	$1,275	$32/kg	$502,260 (18%)	320	$1,570	$1,835,440 (67%)	$142/kg
	RT3.03	$16,085,550	$395,940 (2%)	$594	$1/kg	-	667	-	-	-
	RT4.02[9]	$6,518,620	$1,157,450 (18%)	$9,260	$40/kg	-	125	-	$5,361,170 (82%)	$186/kg
	RT4.03	-	-	-	-	-			-	-
	RT5.01	$3,606,070	$1,857,620 (52%)	-	$35/kg	-	-	-	$1,748,450 (48%)	$33/kg
	RT6.01	-	-	-	-	-	-	-	-	-
	RT7.03	-	-	-	-	-	-	-	-	-
	RT7.06	-	-	-	-	-	-	-	-	-

[9] Note that for RT4.02 (Burdekin Reverse Tender), service provider fees were categorised under administration, monitoring and design costs, while Phase I to IV of grant funding was categorised as on-ground or technical costs.

Another consideration for efficiency is the long-term cost-effectiveness. The cost-effectiveness estimates presented are shown in dollars per kilogram or tonne of reduction in annual loads at the end of the project. This does not account for any longer-term dynamics like disadoption[10], wider adoption over time due to projects' influence, or continued spending to maintain the load reductions. For example, where disadoption is more likely, it is difficult to determine the true cost-effectiveness of the project? The longevity of load reduction outcomes is often dependent on maintaining projects over the longer-term, and it is important to consider how ongoing maintenance of projects might be funded to ensure the load reductions along with a degree of cost-effectiveness, are maintained over the long-term.

While these issues are beyond the immediate program design, they are vital to long-term and cost-effective load reduction. There is likely to be a trade-off between maintenance expenditure and disadoption. However, currently there is limited data available to inform assumptions about the magnitude of disadoption, or the likely maintenance expenditure required to avoid it. In particular, the likely extent of disadoption is poorly understood (see Gedikoglu, 2019). Despite the lack of data, there are a few key reflections that can be made regarding the impact of maintenance costs and disadoption on cost-effectiveness:

1. The more maintenance expenditure is required to maintain load reductions in the future, the less cost-effective the projects become.
2. In the absence of further funding for maintenance, greater disadoption rates may considerably worsen the cost-effectiveness of the projects.
3. As a general 'rule of thumb' if the % risk of disadoption in the long-term is greater than the % increase in lifecycle costs spent on maintenance, then the additional investment in long-term cost-effectiveness will be better. This has implications for funding contract design and length.

These reflections point to the importance of the other project objective and outcomes related to landholder engagement and capacity building which ideally would reduce the likelihood or extent of disadoption and therefore reduce the need for additional maintenance expenditure in the future.

These interactions should also be considered from the perspective of incremental cost-effectiveness (i.e., cost-effectiveness of using additional funding to maintain the load reductions in the future, excluding project costs). This may help to inform decisions around whether to continue to invest in these projects or to move on to other new projects. Where the cost of maintaining the load reductions is low, the cost-effectiveness of investing in this maintenance can be superior to undertaking new projects. In effect, where disadoption is a distinct possibility, investing in ongoing maintenance and mitigating the disadoption risk can be very cost-effective (i.e., locking in the gains you have made from previous investments is great value for money). It should be kept in mind however, that this result depends heavily on the disadoption rates and maintenance costs of an individual project.

[10] Disadoption refers to the abandonment (Walton et al., 2008) or discontinuance (Gedikoglu, 2019) of agricultural practices and technologies. More specifically, in this case it is the potential for growers to abandon new management practices (i.e. revert to the previous poorer management practices) if funding ceases to provide an incentive for maintaining practice levels.

5.3.2 How could the Reef Trust Program have been delivered more efficiently?

The level of resourcing and leadership within the Department has not been consistent over the life of Reef Trust and has resulted in some lack of continuity in investment planning and strategic direction. The use of multiple delivery mechanisms, sometimes at the same time, and each with their own procurement process has likely resulted in multiple inefficiencies. This has been exacerbated when the Department has experienced low levels of resourcing primarily due to COVID-19, and normal attrition and staff turnover.

High project administration workloads have, at times, impacted the Reef Trust team's ability to respond to inquiries by delivery partners, build and maintain relationships, be proactive in understanding project progress and challenges on-ground, develop their own technical understanding of key Reef-related matters and to proactively develop and implement solutions and program improvements.

The reported under resourcing has also had an impact on the ability for the Department to effectively communicate and promote the achievements of the program and the work of delivery partners. The extent to which Reef Trust program managers can be 'hands on' relates to both the level of resourcing within the Reef Delivery team and the requirements to manage related matters such as Ministerial briefings.

The current project management system, procurement process, and associated tools such as the Grants Hub, agreements and MERIT are disconnected. Furthermore, these tools do not connect with other Reef reporting tools such as P2R resulting in considerable duplication of reporting effort and double handling of data and information.

The challenge in moving forward will be to find a balance with regards to ensuring Department staff have a clear role and capability to positively influence project design and delivery while minimising the administrative burden.

The key areas for efficiency improvement and their beneficiaries are provided in Table 26.

Table 26. Key areas for efficiency improvement and beneficiaries

Area for efficiency improvement	Reef Trust Program	Reef Trust program partners /stakeholders*	Delivery partners
Investing in fewer larger projects	★		
Minimising the use of administrative intensive procurement processes and delivery mechanism	★		★
Improving the alignment of reporting requirements between MERI plans and MERIT (or future system)	★		★
Ensuring consistency between reporting tools and systems across the Reef including a standard approach to reporting in-kind/co-investment contributions	★	★	★
Enhancing proactive communication with stakeholders and delivery partners regarding future investment priorities, timing, sharing successes and lessons across projects, whole of program performance results	★		★
Improving communication and engagement with regards to template, tool or system upgrades and updates	★	★	★
Investing in real time data reporting to enable efficient and timely and meaningful reporting	★	★	★
Improved document management system and client relationships management (CRM) system	★		
Ensure technical advice/input is provided early in the project design	★		★
Ensure lessons learned and resources developed are readily available and shared	★	★	★

*Reef Trust program partners refers to other investors, P2R team, DAF Extension Officers etc.

See all recommendations.

5.3.3 To what extent has the Reef Trust water quality investment been leveraged?

Reef Trust is commonly viewed by delivery partners as catalyst funding, a way of initially engaging landholders and trialling approaches as a means of providing an evidence base before a broader uptake of a change in practice [f1]. Based on the data provided more than $57 million has been leveraged in the form of in kind contributions by landholders and other project partners.

There is some evidence of delivery partners leveraging the Reef Trust funding to support the delivery of projects funded by other sources such as the extension of programs previously funded by the Queensland Government Department of Environment and Science [RT6.1]. In one instance, disaster recovery funding was used for the assessment, design and construction of engineering works to reduce sediment loss on the riverbank following a disaster event, whilst Reef Trust funding was used for revegetation, fencing and ongoing weed control and maintenance [RT4.12].

Some delivery partners sought to integrate their project with other relevant projects such as Hort360 [RT3.2]. Hort360 is funded by the Queensland Government and provides funding for extension whilst the Reef Trust funding provided money for grower incentives. Project RT3.02 (*Reef Alliance – Improving horticulture practices*) sought to use existing funding from the Queensland Government Department of Environment and Heritage Protection (as it was then known) to train farmers in the use of the Better Bunch App, which complemented their Reef Trust project objectives.

Projects such as RT4.11 *(Stomping out sediment*) were able to attract external co-investment from Griffith University to fund LiDAR to support better monitoring and treatment options [f1]. In the case of project RT3.08 *(Project Pioneer),* Central Queensland's precision livestock management team also contributed to the project through the research of new digital tools and education practices to support adoption of currently available technology, including Walk Over Weigh (WOW) and data analysis systems, which could be used by landholders to improve pasture management and stock productivity by better matching carrying capacity to available ground cover.

Some projects provided evidence of cash and in kind contributions by both delivery partners and project participants, but this was not consistently reported across all projects. To better understand the levels of in-kind contributions, these contributions were analysed as a proportion of RT investment at the project phase level. Phases III (86%) and Phase V (63%) were found to possess significant in-kind contributions as a proportion of RT Investment. Analysis was also conducted for the various management responses. Projects categorised as DIN practice change were observed to have attracted significantly more in-kind contributions (average of 47%) than sediment abatement projects (average of 19%). DIN practice change projects that used the targeted competitive grants delivery mechanism were found to have had a high proportion of in-kind contributions (average of 127%) compared to sediment and DIN projects with other delivery mechanisms. This shows that significant in kind can be achieved through a competitive process and more accurately captured. Both sediment and DIN practice change R&D/pilot projects attracted more in kind contributions (average of 39%) than standard and franchise projects (average of 31%). Intensive agriculture projects also attracted more in-kind contributions (average of 55%) compared to grazing/sediment management and landscape repair projects (average of 19%).

Landholder in-kind and financial contributions were most commonly reported by industry delivery partners with evidence showing significant value for money. The range of cash contributions reported varied, being that for every $1 invested by Reef Trust, there was between a $1.03 landholder contribution but this also reached as high as a $8.24 landholder contribution. The types of activities reported as in-kind by delivery partners included provision of staff time. The types of activities reported as in-kind by project participants included labour (planting, weeding fencing), operation of machinery, maintenance costs, costs of materials; development of plans such as whole of property sediment management plans, and monitoring. Overall, delivery partners felt that the lack of consistency in reporting of in-kind and landholder contributions, resulted in under reporting of what was deemed a fairly significant contribution by landholders [f1]. Projects trialling Energy Efficiency Fertilisers generally resulted in high levels of landholder co-investment beyond the funded project life [f1].

A summary of the total reported in-kind contributions and in-kind contributions as a proportion of Reef Trust investment (where available) has been provided in Table 27.

Table 27. Leverage of Reef Trust water quality investment

Management response	Project code / working title	RTP investment	Total in-kind contributions	In-kind contributions as proportion of Reef Trust Investment
Landscape Repair	RT2.01 Fifty percent reduction in Normanby subcatchments	$700,000	-*	-
	RT2.02 Normanby River remediation	$300,000	-	-
	RT2.04 East Burdekin point source sediment management	$910,000	-	-
	RT2.05 Theresa gully remediation	$700,000	$232,637	33.2%
	RT2.06 Fitzroy gully remediation	$700,000	$202,465	28.9%
	RT2.07 Mackenzie gully remediation	$700,000	$201,264	31.9%
	RT2.08 Isaac gully remediation	$700,000	$247,036	35.3%
	RT2.09 Don River sediment reduction project	$960,000	-	-
	RT2.10 Mary River catchment gully management	$810,000	$589,600	72.9%
	RT2.11 Burdekin Region point source sediment management	$910,000	-	-
	RT3.06 Improving grazing practices	$21,590,000	$6,006,759	27.8%
	RT4.06 Gully and stream bank erosion control program	$3,890,000	- Note: the latest project report notes the establishment of landholder agreements which include in-kind commitments and maintenance.	- Note: the latest project report notes the establishment of landholder agreements which include in-kind commitments and maintenance.
	RT4.07 Stream bank and gully erosion	$3,870,000	- The MERI plan notes participating landholders will make an in-kind contribution to the project in terms of resources, time, machinery/equipment.	- The MERI plan notes participating landholders will make an in-kind contribution to the project in terms of resources, time, machinery/equipment.
	RT4.08 Herbert River remediation	$2,970,000	- The MERIT report notes contributing partners have confirmed their financial and in-kind contribution to the project in writing.	- The MERIT report notes contributing partners have confirmed their financial and in-kind contribution to the project in writing.
	RT4.09 Gully restoration in the GBR	$4,270,000	$307,738	7.2%
	RT4.10 Laura gullies project	$2,070,000	-	-
	RT4.11 Burdekin gully remediation	$2,000,000	- The MERI plan notes graziers will contribute	- The MERI plan notes graziers will contribute

Management response	Project code / working title	RTP investment	Total in-kind contributions	In-kind contributions as proportion of Reef Trust Investment
			considerable in-kind support to the project, along with other project contributors providing technical advice and site plan development and further notes the intention to work closely with Greening Australia who are also implementing projects in the area.	considerable in-kind support to the project, along with other project contributors providing technical advice and site plan development and further notes the intention to work closely with Greening Australia who are also implementing projects in the area.
Sediment Practice Change	RT1.02 A-class Grazing	$3,000,000	-	-
	RT3.05 Improving grain practices	$3,600,000	$2,686,871	74.6%
	RT3.08 Grazing Land Management	$2,910,000	$5,296,179	182.1%
	RT4.04 Mary River Catchment Riparian Project	$3,030,000	$768,480	25.4%
	RT4.05 Streambank remediation in priority areas	$4,000,000	-	-
	RT4.12 Controlling streambank erosion in the Mackay Whitsunday region	$4,000,000	-	-
	RT7.01 Improving water quality in the Burnett River Catchment	$6,100,000	-	-
	RT7.02 Improving water quality in the Fitzroy basin	$5,700,000	-	-
	RT7.04 Streambank remediation in the Burdekin catchment	$2,900,000	-	-
DIN Practice Change	RT1.01 Grants for farmers	$1,700,000	-	-
	RT2.12 Burdekin DIN management	$3,140,000	-	-
	RT3.01 Updated farm management practices	$3,000,000	-	-
	RT3.02 Improving Horticulture practices	$2,400,000	$1,888,801	78.7%
	RT3.03 Improving sugar cane practices	$17,570,000	$27,241,248	155%
	RT3.04 Improving dairy practices	$500,000	$4,120,000	824%
	RT3.07 Sustainable Cane Practices	$4,430,000	$4,425,000	34.7%
	RT4.01 Wet tropics repeated tenders – Wet Tropics	$6,720,000	-	-
	RT4.02 Wet tropics repeated tenders – Burdekin	$7,380,000	-	-
	RT4.03 Cane farmer trials	$7,100,000	-	-
	RT5.01 Sugarcane SRA farming system	$4,520,000	$2,867,324	63.4%
	RT6.01 Delivering tailored solutions	$3,380,000	-	-

Management response	Project code / working title	RTP investment	Total in-kind contributions	In-kind contributions as proportion of Reef Trust investment
	RT7.03 Precision agriculture used to reduce nutrients and pesticides entering the water	$4,100,000	-	-
	RT7.05 Maximising ecosystem biodiversity on the O'Connell and Proserpine basins	$5,400,000	-	-
	RT7.06 Place based program in the Murray and Mossman catchments	$5,610,000	-	-
			$57,081,402	

*Indicates no quantitative in-kind contribution reported in project MERIT reports.

See recommendation 2, 32.

5.4 Appropriateness – key results and findings

5.4.1 To what extent did the Reef Trust investment prioritisation and design process for each phase align with the needs of project partners and participants?

No evidence was found to determine the extent to which the Reef Trust water quality improvement investment actively sought to understand the needs of project partners and participants. However, it is important to note that the Reef Trust's purpose is to support the achievement of the Reef 2050 WQIP outcomes. In doing this, the Reef Trust is also delivering on core priorities of the majority of delivery partners in the Reef region. However, at a program design level, delivery partners have identified a range of more specific needs and opportunities to enhance the planning process. these include:

- a desire for longer term projects with greater flexibility
- greater integration and alignment with regional planning activities and timing (e.g.,., NRM plans or regional WQIP's) rather than fragmented grants-based projects
- greater recognition of delivery partner and industry peak work periods and timing of funding proposals due dates (e.g.,., if proposals are required during peak harvesting period this is likely to bias against this industry if they do not have dedicated staff and sufficient lead in time to prepare submissions)
- greater alignment with the timing and focus of other funding and investment cycles
- great recognition that many R&D/pilot projects may require a longer lead in period before a project will be able to deliver peak performance, i.e., it is not uniform across each year of a funding duration.

See recommendations 26, 32.

5.4.2 How appropriate and rigorous was the Reef Trust investment prioritisation and design process at the program and phase level?

The establishment of the Reef Trust as a 'Special Account' has afforded program managers with a level of flexibility with regards to the nature of investment design and delivery. This flexibility has enabled the program to adapt in a timely manner and respond to changing contexts and advancements in management response knowledge and understanding.

Each phase was found to have a slightly different design and planning approach. For example, Phase I was built primarily around the 2013 election announcements of the Reef Trust investment program. Phase II had a strong strategic focus that included a gap analysis, an assessment of alignment with others plans and Reef strategy. It subsequently involved further development and refinement of the repeat tender proof-of-concept established in Phase I.

Phase III was considered relatively more structured with investment built following both formal and informal engagement processes. The engagement demonstrated a uniform view that extension services needed to be core to

investment. That is, there needed to be a focus on the whole property to help the water quality improvement. Phase III also coincided with the roll out of the water quality risk frameworks which also recognised the importance of the whole business. Ultimately Phase III used a mix of delivery mechanism with some small grants (e.g.,., RT3.01 *Updated farm management practices*) plus larger extension-based initiatives using standard grant rounds (i.e., direct invite) (e.g.,. RT3.02 – RT3.06 *Reef Alliance*). Phase III planning also sought to attract some new delivery partners e.g.,., Resource Consulting Services (RCS) in recognition of the growing capacity gap in project delivery. *Project Pioneer: Innovation in grazing land management* delivered by RCS, a private agronomy business, brought new skills and capacity into the mix.

> *"Investment procurement is considered cumbersome, with multiple levels of processes and approvals".*
>
> [Interviewee i1]

A large volume of projects was underway at the commencement of Phase IV. This coincided with an increased strain on human resources contributing to a reduced strategic planning effort and so Phase IV focussed on recognising and expanding known successes. Some focus on innovation continued with the commencement of *Trialling of enhanced efficiency fertilisers* (RT4.03) to establish a proof of concept and fill an important knowledge gap.

Phase V had a focus on increasing collaboration with industry specifically MSF Sugar with *Project uplift farming systems initiative* (RT5.01). Phase VI similarly had a very targeted approach to work with new partners with investment focussing on a single co-contribution to the Queensland Government's Reef Water Quality Program (QRWQP) to expand an existing project *Complete nutrient management planning in sugarcane* (RT6.01) being delivered by Farmacist, another private agronomic business.

Many of the Phase III projects were being completed at this time which allowed for some level of gap analysis to be undertaken to inform Phase VII project selection. No technical assurance process was established for Phase VII at its inception, however, has since been addressed through the provision of technical support and assurance processes commencing from May 2022 as an extension to the technical partners Phase 4 contract.

As per the guiding principles, the Reef Trust was established to support the delivery of the Reef 2050 Plan and Reef 2050 WQIP with regards to water quality. Rather than duplicate the extensive engagement and scientific work undertaken as part of these Plans, the aim is to align investment to the priority areas identified. This provides both transparency and confidence that the investment is being directed towards agreed threats and opportunities for water quality improvement. The level of institutional knowledge regarding the early phases of Reef Trust is now relatively low. The evaluation has found only moderate levels of continuity between the phases of investment with some phases being subject to detailed strategic planning processes and others less so. The IEP and the ISP were key groups associated with the consultation and endorsement of all RT phase projects whilst the RAC contributed to the prioritisation of the Reef 2050 Plan implementation. Other forms of engagement were limited to informal discussions with key experts and industry leaders. No evidence was identified that demonstrated broader stakeholder engagement.

The Reef 2050 Plan IEP provides scientific and expert advice related to the Great Barrier Reef, including support for the implementation and review of the Reef 2050 Plan, Reef 2050 WQIP and other matters, as requested. The Panel also advises the Australian Government Minister for CCEEW on funding priorities for the Reef Trust. The ISP provides strong independent science-based and technical advice to the Australian and Queensland governments on water quality science needs. It is a working group of the Reef 2050 IEP which provides broader scientific advice on implementing the Reef 2050 Plan.

The IEP and ISP were not engaged in the Phase VII as the decision for investment was approved via a Cabinet decision making process.

It is noted that the level of detail discussed with these consultative groups regarding investment priorities and projects has changed over time and now remains a fairly high level strategic process.

Staff within the Department are also in constant conversations with other investors, the scientific community, delivery partners and industry representatives so while there may have been limited formal and direct engagement with stakeholders, their views and needs are to some degree reflected in the planning and design albeit in an ad hoc fashion.

There continues to be concerns regarding the lack of high-quality quantitative data to determine if projects and phases of investment are delivering effective and efficient outcomes over time. This effectively means some decisions are being made on anecdotal and/or un-peer reviewed data. This is likely to continue to adversely impact on levels of transparency and the development of trust with various stakeholder groups.

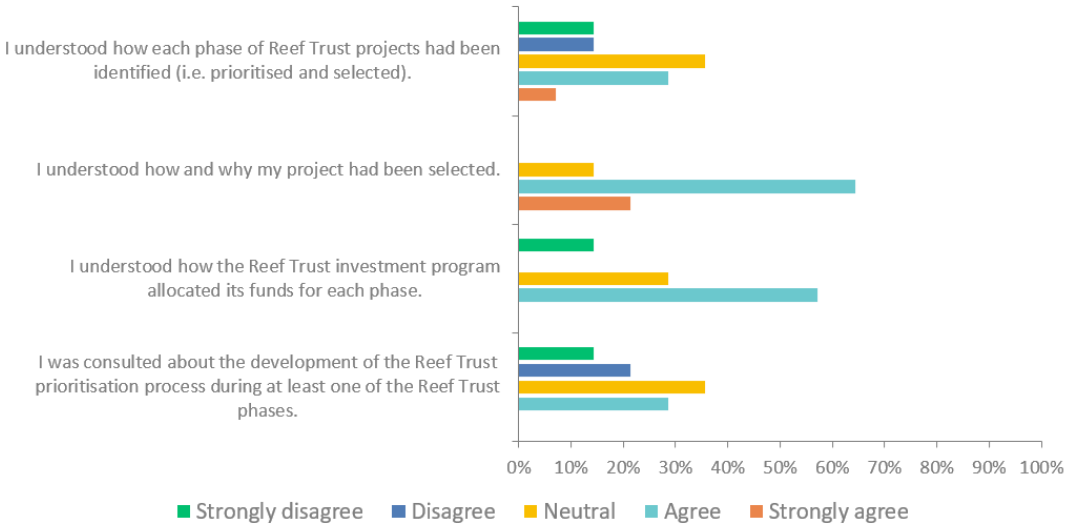


Figure 8. *Stakeholder understanding of Reef Trust prioritisation and project selection*

Survey respondents (n=17) indicated there was a lack of understanding as to how each phase of RT projects had been identified, with only 35% of respondents indicating they understood how the RTIP funds were prioritised and allocated. However, 85% of respondents indicated they understood how and why their project was selected for delivery, with 57% of respondents acknowledging they understood how the RTIP allocated its funds for each phase (See also section 5.2.5). See recommendations 3 and 4.

See recommendations 1 – 4.

5.4.3 Was there appropriate complementarity across different government funded projects/programs (i.e., Queensland Government, Reef Trust Partnership)?

In this KEQ, we consider complementarity to be, as a minimum, where projects and programs are designed and implemented so that they are not actively impeding other project's ability to deliver their outcomes. Ideally projects and programs will be designed to build on each other's success and support the achievement of water quality outcomes. This requires coordination and collaboration at multiple scales to occur. Complementarity also considers data and information sharing to improve decision making, and the alignment of data capture so that progress towards multiple outcomes can be captured consistently across the different government funded programs.

Extent of collaboration, co-investment and coordination

At a high level, the Reef Trust water quality investment program demonstrated strong alignment to the Reef 2050 WQIP, which is the central guiding policy document for all government funded Reef water quality programs. However, there is still a challenge across multiple Reef water quality projects and programs to implement the Reef 2050 WQIP in a coordinated way that results in complementarity.

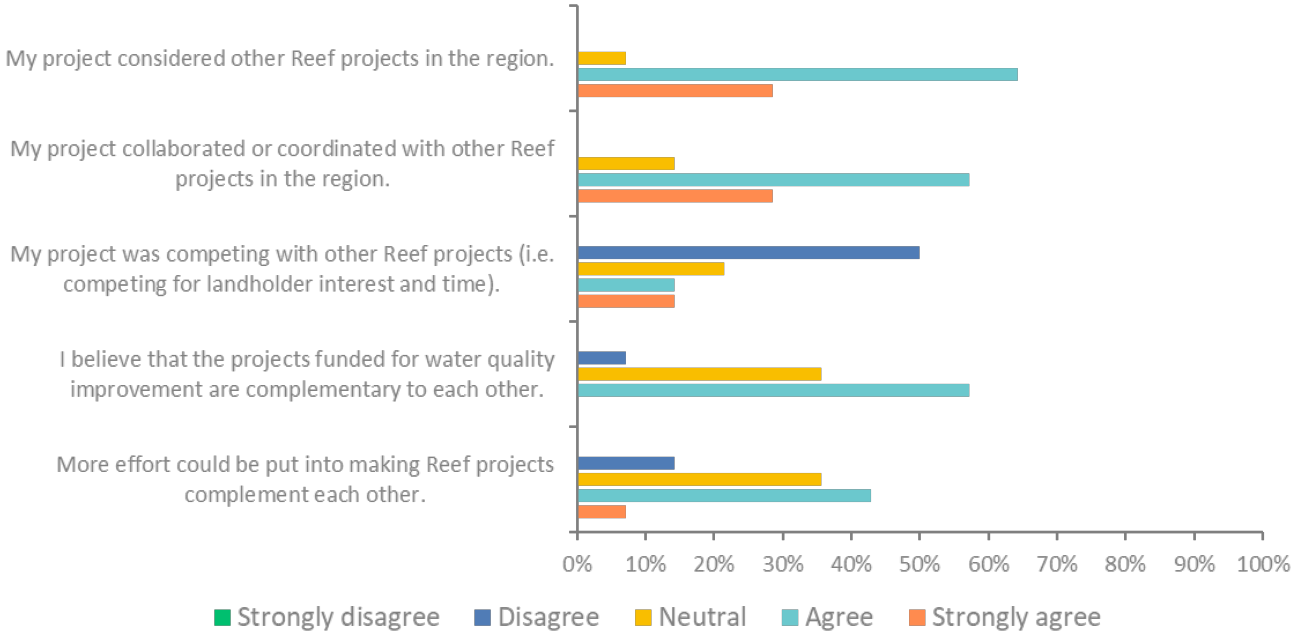
Evidence that supports effort towards collaboration, co-investment and coordination includes:

- Investment strategies for each phase did undertake an analysis of existing efforts to ensure investments are additional and complementary to existing efforts (the extent of this varied between phases).
- Co-investment with the QRWQP in Phase V (RT6.01 *Delivering tailored solutions).*
- Establishment of a single Technical Advisory Panel to provide technical assurance for gully and streambank projects
- Support for the use of pre-existing steering and project committees where they were fit-for-purpose.

- Utilisation of existing collaborative governance arrangements for water quality management e.g.,. the Executive Steering Committee of the Reef 2050 WQIP, Independent Science Panel, Independent Expert Panel.

In general, however, Reef Trust water quality investments are delivered as a series of independent projects which can make collaboration and coordination a challenge. This evaluation found evidence that suggests regional coordination is generally placed on regional NRM groups and delivery partners who are also actively involved in the delivery of other Reef Trust or government funded projects. This is not an agreed or funded role, but occurs out of a genuine desire to ensure landholders are not adversely affected by multiple projects or resources used inefficiently.

The survey results indicated that approximately 85% of delivery partners either 'agreed' or 'strongly agreed' that their project collaborated or coordinated with other Reef projects in the region. Approximately 90% of survey respondents either 'agreed' or 'strongly agreed' that their project considered other Reef projects in the region. Despite this, approximately 30% of survey respondents either 'agreed' or 'strongly agreed' that their project was competing with other Reef projects in the region. Almost 50% of survey respondents indicated that they felt more effort could be put into making Reef projects complement each other.



Extent of data and information sharing to improve decision making

Data and information sharing is a key component of complementarity because it enables decision makers to measure progress towards targets and desired outcomes across all projects and programs, and identity patterns and trends about what is working, and why. This is a core aspect of MERI that, in theory, should be complementary across all areas of Reef investment.

Evidence found in this evaluation suggests that:

- there is inconsistency MERI requirements and performance indicators across different government funded projects/programs - although P2R provides consistent reporting of pollution abatement
- data and information sharing exists but it is a challenge, however the use of consistent technical advisors and use of common tools or gully remediation projects has been beneficial
- delivery partners and technical partners continue to be impeded by the lack of data consistency, collection and information sharing.

See recommendation 20, 26.

5.4.4 How appropriate and rigorous was the project design process?

All Reef Trust projects were aligned to relevant national, state and regional priorities as evidenced through the development of MERI plans which clearly specified the plans/studies each project aligned to. For example, all projects aligned with the Reef 2050 Plan and most aligned with the regional NRM plan and other key documents such as the regional WQIPs.

Project planning in some cases was conducted in conjunction with a technical working group or landholder reference groups who helped to scope the project and prioritise areas for investment [f1]. However, largely the project scoping was completed by the delivery partners themselves, which occasionally included key stakeholders.

There is some evidence of landholder and stakeholder involvement in project design, and extensive evidence of landholder and stakeholder involvement in project delivery. Survey results show 57% (n=14) of respondents indicated significant landholder involvement in the design and set up of projects, followed by a further 35% who indicated some involvement of landholders and/or stakeholders in project design and set up.

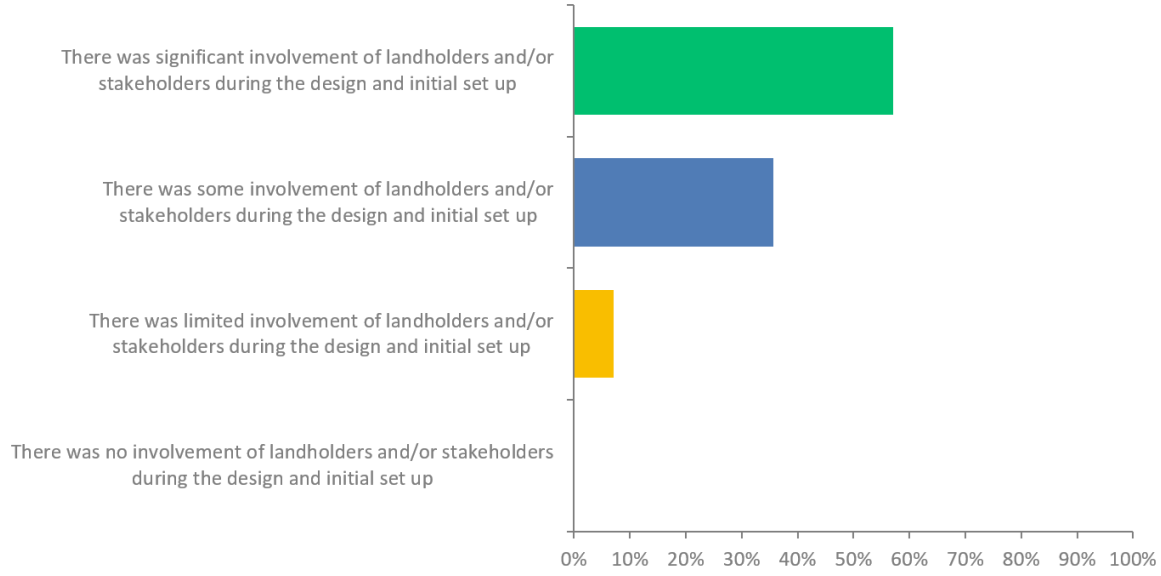


Figure 9: *Extent of landholder/stakeholder involvement in project design*

Most survey respondents (86%) indicated governance arrangements were established for their project, with 85% of respondents further noting the governance arrangements were appropriate and effective throughout project delivery and finalisation [s1].

Communication and engagement plans were developed by 80% of all survey respondents (n=14), with 63% of respondents completing a specific stakeholder analysis as part of the plan; 70% involved others in development of the plan; and 72% reviewed and updated the communication and engagement plan throughout the project as indicated in Figure 8 below [s1].

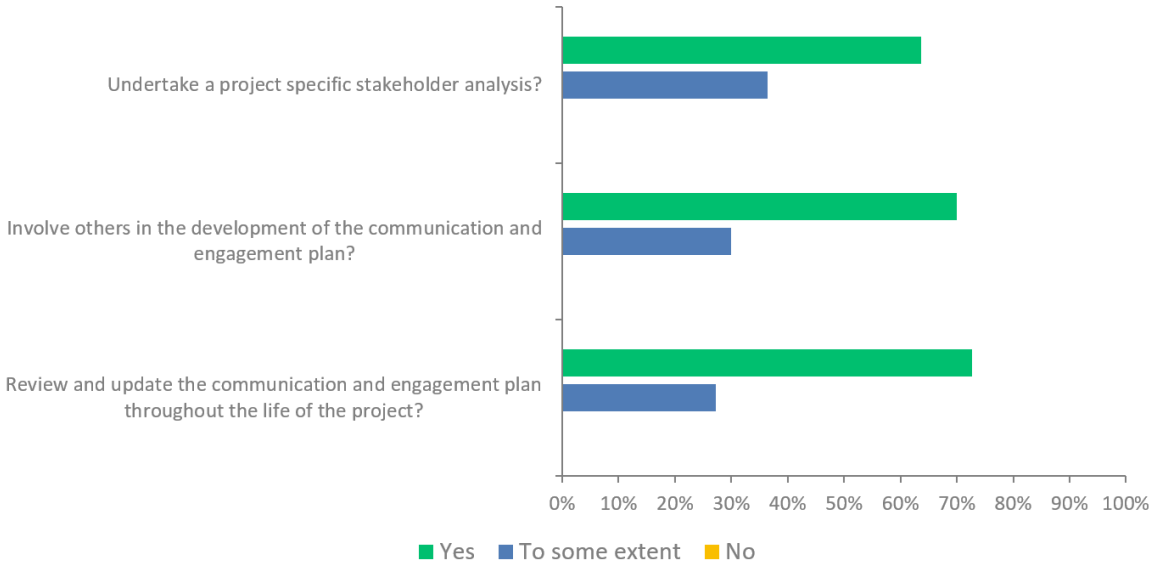


Figure 10. *Purpose of project communication and engagement plans*

Technical and industry experts were relied upon to inform the management practices and the on-ground works that were delivered through the programs in many cases, including the establishment of technical specifications that required approval and monitoring throughout the project life [f3]. This was particularly the case in relation to gully and streambank remediation projects, where technical partners played a key role in project design, checking sediment savings and ground truthing project implementation activities. In other situations, such as the nutrient management projects, agronomic and industry experts were utilised to inform project design and in the case of the Reef Alliance projects in Phase III, industry working groups were used to inform the MERI plan development to provide high level project oversight including project design and evaluation [f2]. Such groups were thought to provide value, particularly when projects needed to adapt to changing circumstances and delivery partners required support and advice.

Most projects demonstrated a systems' understanding in designing their projects, as evidenced through the MERI plans, but this was not reported upon specifically or consistently across all projects.

A key element of design in the nutrient management plan-based projects was collaboration with growers. In project RT6.01 *(Delivering tailored solutions)*, one grower from the original trial helped to refine the project design and enabled the on-ground landholder knowledge to be drawn upon at early stages of the project. This grew to be a formal arrangement with the landholder being contracted to provide monitoring support, capture feedback and ensure consistency in project delivery across different regions. Whilst fundamental components of the project model didn't change, there was the need to tweak certain elements to accommodate regional differences. The use of a grower advocate in this project improved the willingness of other growers to become involved in the project [f1]. Additionally, the option for landholders to trial a 'wildcard' treatment in RT4.03 *(Enhanced Efficiency Fertilisers)* gave a degree of ownership to growers, enabling them to trial additional ways of improving on-farm nutrient management that suited individual circumstances[f1].

Eight of the 43 projects included Traditional Owners and First Nations People in a range of different ways such as project design and MERI planning, project implementation such as seed collection, gully remediation works, participation in field days and other capacity building opportunities. Some projects such as RT4.05 *(Stream bank remediation in priority areas)* provided training in gully remediation techniques and the use of heavy machinery.

Project RT4.10 (*Laura gullies project*) built on effective local Indigenous ranger and corporate capacity to manage erosion threats on Crocodile and Welcome Stations, and the Ang-gnarra Aboriginal Lands Trust. Erosion control activities included destocking cattle from riparian areas and gullies, native revegetation of gully areas, weed and fire control, porous check dams in gullies, rock chutes at advancing young head cuts, and treatment of road gullies with water diversion banks. A core emphasis of the project was for local First Nations people to participate as Indigenous Land and Sea Corporation employees or as Ranger teams engaged to undertake works which provided cost-effective erosion control and built local capacity. Partner ranger groups assisted with monitoring and implementation and training activities which were open to all regional stakeholders.

The delivery partners for project RT7.01 *(Improving water quality in the Burnett Mary River catchment)* worked with local Traditional Owners and landholders in project design and delivery including an initial co-design phase to inform the selection of project sites, on-ground activities, monitoring sites and to provide an understanding of the geomorphology and hydrology of priority areas. The project further provided opportunities for the Gidarjil rangers to be trained in survey methods and understanding and aerial drone technology to support project monitoring.

Overall, First Nations Peoples engagement was more likely to occur in the landscape repair projects, whereas the DIN practice change projects were largely industry and landholder focussed. Focus group participants noted further opportunities for Traditional Owner and Indigenous involvement in future investment rounds including:

- involvement of Traditional Owners in site clearances prior to works and ensuring there is an agreed process in the case of cultural sites or materials being discovered during works implementation
- provide opportunities for First Nations companies to be contracted to deliver works, such as restoration projects
- continue to provide training/employment opportunities to build capacity
- consideration of cultural sites when prioritising works areas, particularly where sedimentation is impacting important downstream cultural areas
- provide First Nations-specific local community engagement field days or site visits to works areas.

Adaptive management appears to have occurred regularly and consistently throughout projects with relative ease. Relationships between delivery partners and the Department are long standing, so if there was a need to change parts of the project as it progressed, it was a simple process to make alterations f1. Further, 93% of all survey respondents indicated they were able to discuss variations or adaptive management opportunities with DCCEEW if neededs1.

Equally, by seeking continuous landholder feedback during project delivery, it was easier to address issues as they occurred, rather than wait till the end of the project f1. Projects such as RT6.01 *(Delivering tailored solutions)* were adaptive management in and of itself by bringing the Australian Government on-board to fund additional years of the project, this enabled data to be captured and reported on in a more comprehensive manner f1.

It was noted that the ability to attract landholders became easier over time as relationships and awareness of projects was built. In some cases, there are examples of landholder involvement across multiple phases of RT investment f1. One of the key elements for achieving landholder involvement was the need for adaptability and flexibility over the life of the project to accommodate landholders. This included taking a whole of enterprise approach to projects, rather than focussing solely on a water quality outcome f1.

One of the difficulties noted by delivery partners during the project design phase was the need to convert a 'reef investment' outcome to something that was attractive to landholder participants, that is, a NRM or productivity outcome that would encourage landholders to participate. This was noted as being particularly important for consideration in future rounds of investment, as those considered early adopters and innovators, have largely been captured in previous or current investment phases f1.

There were a number of barriers that prevented participation in projects including the fear of loss of productivity in the case of nutrient management; how data captured during projects would be kept and used; understanding the timing and cycles of farming and when is best for landholders to be able to participate in projects; and a consideration of the scale of investment required by landholders to participate and change practices in some instances, it is not just about whether a landholder is willing to change their behaviour, but having the financial resources to do so f1.

See recommendation 1, 16-18, 27-31, 33-35.

5.4.5 Which of the various delivery mechanisms applied during the various Reef Trust phases is the most appropriate to deliver long-term water quality outcomes?

This evaluation demonstrates there is no one single delivery mechanism that outperforms the other across a range of performance indicators (Table 27). It has also demonstrated that different short- intermediate-term outcomes may be better suited to different delivery mechanisms and procurement processes. The success of any delivery mechanism is also highly dependent on the capacity and capabilities of the delivery partner and their project partners, the project type or maturity of the management responses and approaches being applied, and the available human resources to plan, procure and administer the investment from the Department's perspective.

Delivery partners continue to experience a range of challenges with short-term or (less than three years) project funding durations.

Different delivery mechanisms require different levels of administration and internal transaction costs. Based on the data from this evaluation:

- Grants were found to have a relatively high administrative workload to design guidelines, coordination with the Australian Government's Grants Hub (https://www.grants.gov.au), market and assess applications, as well as moderate day-to-day project management oversight.
- Reverse tenders had a high administrative workload during the initial Phase I but reduced significantly as future rounds were implemented.
- The use of the Regional Land Partnership possibly has the lowest administrative workload associated with set up and day-to-day management as the program was pre-existing and required minimal effort to adapt for Phase VII Reef Trust projects.

Reverse tenders aimed to achieve a direct commitment from a farmer to undertake a change of their own choice and for them to advise what the cost of the output would be. Projects with the best value were funded. Reverse tenders were initially complex with multiple layers of agreements and contracting parties involved. Reef Trust program managers do not have any contact with the farmers themselves so are relying on the NRM group as the lead contracting entity to manage this process. Some stakeholders view that there is less uncertainty than other management responses, e.g., landscape repair, as the outputs are directly linked to economic drivers such as the price of fertiliser and it is believed that this can lead to a more long-term behaviour change. The focus was on providing an incentive to deliver an outcome in the short term rather than rely on a voluntary change in behaviour. However, there are data gaps in being able to confirm this.

In terms of delivery mechanism, DIN projects categorised as 'Direct invite to delivery partner' attracted a significantly high proportion of in-kind contributions (average of 117%) in comparison to DIN projects categorised as 'Reverse tender / auction' and 'Direct co-investment', which both attracted no in-kind contributions. For sediment abatement projects, the delivery mechanisms of 'Targeted competitive grants' and 'Direct invite to delivery partner' both attracted moderate proportions of in-kind contributions, with an average of 20% and 25%, respectively.

Table 28. Provides a summary of how different evaluation indicators performed across the various delivery mechanisms

Pollutant targeted	Delivery mechanism	Pollutant abatement	Cost-effectiveness	Practice Area	No. of landholders engaged
Fine sediment	Targeted competitive grants	★★★	★★★	★★☆	★★☆ Av. 11 landholders / project
	Direct invite to delivery partner	★☆☆	★★☆	★★★	★★★ Av. 55 landholders / project
	Regional Land Partnerships	★★★	n/a	★☆☆	★☆☆ Av. 7 landholders / project
DIN	Direct invite to delivery partner	★★★	★★★	★★★	★★★ Av. 221 landholders / project
	Reverse tender / auction	★★☆	★★★	★★☆	★★☆ Av. 10 landholders / project
	Regional Land Partnerships	★★☆	n/a	★★☆	★★☆ Av. 21 landholders / project
	Direct co-investment	★☆☆	★☆☆	★☆☆	★★★ Av. 211 landholders / project

★★★ Relatively high performance ★★☆ Relatively moderate performance ★☆☆ Relatively low performance

See recommendation 32.

5.4.6 Which of the various management responses (and specific interventions) applied during the various Reef trust phases is the most appropriate to deliver long-term water quality outcomes?

There is no distinct trend in the data with regards to one management response significantly or consistently outperforming another (Table 29 and Table 30). Sediment projects that primarily invested in systems repair also invested a portion of their funds in non-structural activities. For management response, DIN projects categorised as 'Intensive agriculture, nutrient management, management practice change' (which all DIN projects were categorised under) attracted a high proportion of in-kind contributions (average of 67%). Projects classified under the 'Grazing, sediment management, (hillslope management), management practice change' management response category attracted the highest proportion of in-kind contributions (average of 90%), while the 'Intensive agriculture, sediment management, management practice change' had an average of 75%. The 'Grazing, sediment management (gully management), on-ground management intervention' category had lower in-kind with an average of 16%, and the 'Grazing, sediment management, (streambank management), management practice change' category attracted an average of just 7%.

Table 29. Summary of top performing (sediment abatement) projects and key project and management response characteristics

Selected project characteristics	**RT2.02** *(Gully prevention & remediation on the Normanby Plains)*	**RT3.06** *(Reef Alliance – Grazing practices)*	**RT3.08** *(Project Pioneer)*	**RT4.04** *(Riparian management on the Mary River)*
Delivery partner type	Landowner led	Industry led	Private business led	Community NRM led
Landscape repair (structural interventions)	Small scale gully remediation (e.g.,. Head cut remediation, rock chutes, bunds, whoa-boys, porous check dams)	Small scale gully remediation (e.g.,. contour banks, rock chutes, whoa-boys, porous check dams)	-	-
Sediment practice change (non-structural interventions)	Destocking Revegetation	Property planning Stock exclusion Off-stream watering points Riparian management	Agronomic advice Property planning Grazing for profit training, Professional & business development Business analysis Stocking rates Improvements to groundcover	Streambank fencing Off-stream watering Riparian revegetation Training
Landholders engaged	1	339	95	12
Maturity	Pilot	Pilot	R&D	Standard
Cost-effectiveness	$16/tonne	$423/tonne	$249/tonne	$210/tonne

Table 30. Summary of top performing (DIN abatement) projects and key project and management response characteristics

Selected project characteristics	RT3.03 *(Reef Alliance – Improving sugarcane practices)*	RT4.01 *(Wet Tropics repeated tenders)*	RT5.01 *(Project Uplift)*
Delivery partner type	Industry led	NRM group led	Industry led
Sediment practice change	-	-	-
DIN practice change (non-structural interventions)	Nutrient management plans Nitrogen-use efficiency Water use efficiency Reduced soil compaction Extension Grant-based incentives	Nitrogen use efficiency Water use efficiencies	Adoption of SmartCane BMP Traffic control Legume fallow Nitrogen-use efficiency Grant-based incentives
Landholders engaged	885	14	36
Maturity	Pilot	Standard	Standard
Cost-effectiveness	$106/kg	$77/kg	$71/kg

It is important to note that the selection of management responses should be based on a number of criteria in addition to the indicators assessed during this evaluation. These include:

- scientific evidence of pollutant removal efficacy
- capacity and capability to design and deliver activities
- the ability to build on previous application and experience
- access to appropriate sites and landholders' willingness to participate
- available resources and expertise to design, deliver and maintain green and social capital
- ability to have a cost effective enduring legacy.

See recommendations 2, 32.

5.5 Legacy – key results and findings

5.5.1 What were the lasting or enduring outcomes of the Reef Trust program?

At a program level, the Reef Trust, and its predecessors, has facilitated a sustained commitment by the Australian Government over a long period of time into Reef water quality improvement and other priorities as identified in the Reef 2050 Plan. This continued effort demonstrates that the Australian Government recognises that water quality improvement requires a consistent and considered investment over time.

Using the Reef Trust enduring legacy assessment tool (Refer to Section 4.6) five projects were found to have Very High potential of achieving some degree of enduring legacy assuming the outcomes as reported are maintained. That is, these projects have successfully delivered short-term outcomes that may provide a strong foundation to support the long-term delivery of legacy outcomes. However, there are many factors that will impact on the these outcomes being sustained over time. These factors have been discussed in other sections of this evaluation.

Projects assessed as having delivered short-term outcomes that provides above average potential for achieving an enduring legacy have been provided in Table 31.

.

Table 31. Enduring legacy assessment results

Project title	Primary management response	RT Investment	Load reduction estimate	Area of practice change reported (ha)	Summary of enabling factors for legacy outcomes	Comments
RT3.01 - Project catalyst	Intensive agriculture, nutrient management practice change	$3,000,000	12,906kg	5,612 ha	Very high	Evidence that peer-to-peer and networking was strongest influencer towards practice change; strong emphasis on grower support network building; better working relationships developed. Trial reports; videos; 67 events; learning from trials shared peer-to-peer; complemented and communicated with other Reef Trust projects; Survey results indicated strong increase in skills and knowledge. 100 farming families participating; Growers involved in determining types of trials, design and implementation. Built on existing tools. Survey indicated strong commitment from strong community of growers. Evidence of cultural change. Five detailed stories on understanding motivations". Builds on Project Catalyst innovation project to enhance adoption of improved practices for environmental and production benefits. Expanded from Mackay Whitsunday to Burdekin and Wet Tropics. Early adoption and innovation trials with a focus on matching fertiliser rates to crop and soil requirements, precision ag, improved irrigation efficiency and soil health. Trial reports available to the public and share among growers. Strong emphasis on developing grower support network (peer to peer events. Growers not provided money for capital or inputs significant involved of landholders. Comms and engagement plan. Project complemented other Reef projects in the region and collaborated and communications with them.
RT4.12 - Controlling streambank erosion in the Mackay Whitsunday region	Grazing, sediment management (gully & streambank) landscape repair	$4,000,000	8,295t	-	Very high	Deliberately sought to bring together large groups of neighbours to discuss remediation options (improve collaboration and strengthen social outcomes); influential community members educating neighbours. Online survey to understand baseline landholder knowledge; Significant engagement with media and industry events to discuss project; well-attended flyover of projects; large number of workshops, presentations, etc. Grant recipients doing own works; large number of landholder agreements. Fulcrum reporting; K&S survey to inform comms products; Digital Elevation Models of Difference; User guide for sediment minimisation produced; several information sheets. Other funding successfully leveraged; ongoing commitment from landholders. Tens of thousands of plants provided by local supplier; employment; local contractor capacity reached; positive benefits for landholder recognised. Enthusiasm for the works; positive conversations about environmental and economic benefits
RT2.10 - Mary River catchment gully management	Grazing, sediment management (gully & streambank)	$810,000	810t	172ha	Very high	Community of Practice created; increase in awareness and implementation of projects; significant community involvement. Significant sharing of learning locally (field days, industry events, council meetings) and through presentations at conferences, etc. Large number of properties and participants involved. Template for site management plans developed; extension allowed some landholders to develop nurseries for revegetation plants; gully erosion monitoring toolbox refined to suite Mary River catchment. On-farm working bees;

Project title	Primary management response	RT Investment	Load reduction estimate	Area of practice change reported (ha)	Summary of enabling factors for legacy outcomes	Comments
	landscape repair					in-kind contributions. Strong participation and large number of events, opportunities to showcase work show high motivation from community.
RT1.01 - Grants for farmers	Intensive agriculture, nutrient management practice change	$1,700,000	31,167kg	15,859ha	Very high	Extension was critical element, active knowledge sharing. Direct tender process gave growers freedom to design interventions. Tool and video to support growers. Many project advocates. Document financial savings for growers. Success of pilot project resulted in 'repeated tenders', implemented in RT Phase IV.
RT3.02 - Reef Alliance - Improving Horticulture practices	Intensive agriculture, nutrient management practice change	$2,400,000	-	5,617ha	High	Led by integrated consortium of farmers, industry, NRM groups; emphasis and evidence of strengthening stakeholder links. Project communications group established. Direction and provision of skills to extension industry. Banana Women's Network. Soil masterclasses. 164 entities involved. Hort360 BMP program used. Realigned Banana BMP with Banana WQ risk framework; Better Bunch App training; Banana TAG. 50% co-investment. Pathway to environmental certificate for growers (growers reluctant to provide data). Reef regulations disincentives growers; other projects (bio-security, etc) took priority;"
RT3.03 - Reef Alliance - Improving sugar cane practices	Intensive agriculture, nutrient management practice change	$17,570,000	148,541kg	64,587ha	High	Integrated consortium led project. RAP Cane Working Group established. One on one extension provided. 885 growers engaged. 789 property improvement plans. 425 nutrient management plans. Property improvement and nutrient management plans. Benchmarked practices against P2R risk framework to identify improvements. High levels of co-contribution. New technology saved time and labour for growers. Local economy stimulated.
RT5.01 - Project Uplift	Intensive agriculture, nutrient management practice change	$4,520,000	52,532kg	5,446ha	High	Grower groups developed; stakeholder advisory committee engaged grower leaders; complemented and collaborated with other RT projects. Significant improvement in working relationships with landholders. Hosted Australian Regenerative Cane farming forum. Two members of project team shared knowledge through roles in SRA Soil Health Project Steering Committee. Involvement in SRA steering committee (above). Social science consultant engaged to upskill staff in influencing growers; landholder improved skills and knowledge moderately (survey results); Behaviour innovation report provided to 63 industry stakeholders. Wide range of tools used; Zonal Deep Ripping tool developed; economic benefit analysis tool for practice change developed; documented procedure for issuing grower loans and completing due diligence developed; Behavioural Innovation Report produced; video documenting project outcomes. Unexpected agronomic benefits of SRA Farming System; lower input and operation costs; promotion of soil health.
RT3.08 - Project Pioneer	Grazing, sediment (hillslope)	$2,910,000	12,736t	598,990ha	High	Survey indicated stronger relationships with landholders. Peer advisory board groups developed (ExecutiveLink Boards). Grazing for Profit school; BMP workshops; Next Steps Program training; mapping training workshops; one on one extension; project showcased at

Project title	Primary management response	RT Investment	Load reduction estimate	Area of practice change reported (ha)	Summary of enabling factors for legacy outcomes	Comments
	management practice change					Global Roundtable for Sustainable Beef. ProfitProbe™ used to analyse business of engaged landholders; digital tools researched (Walk over Weigh- WOW); pre-existing tools developed by RCS. Increased willingness from engaged landholders throughout life of project; in-kind contributions; evidence of increased commitment to WQ (survey). Strong emphasis on increasing profitability.
RT6.01 - Delivering tailored solutions (CR161)	Intensive agriculture, nutrient management practice change	$3,384,258	5,175kg	5,446ha	High	Survey indicated stronger relationships with landholders; strong emphasis on one-on-one agronomic advice; industry-based newsletters. One-on-one; training workshops, survey indicates significantly improved skills and knowledge of landholders. Nutrient management plans developed; 6 easy steps; on-farm testing of decision support tools; 'several tools utilised and developed by project teams' (i.e., 'cog calculators'). Extended QG RP161 project; survey indicates increased commitment to WQ improvement. Reduced nutrients to the Reef and improves business profitability and productivity. Positive cultural changes (*one of the few projects noted to have a significant impact on cultural changes).
RT4.10 - Laura gullies project	Grazing, sediment management (gully & streambank) landscape repair	$2,0635,000	1,222t	7,770ha	High	Core emphasis on Indigenous participation as Ranger teams or ILSC employees. Strong emphasis on training. Partner ranger groups assisted with monitoring and implementation; training open to all regional stakeholders. Built on local Indigenous ranger and corporate capacity. Complications led to a shift to consultant-led major structural works. Training to help with further employment opportunities; Indigenous people employed; 6 TO families consulted.
RT1.02 - A-class Grazing	Grazing, sediment (hillslope) management practice change	$3,000,000	2,046t	44,085ha	High	Working relationships with landholders have improved. Survey reported moderate within project; but knowledge sharing was very strong. 18 graziers engaged'; 10 given one on one support in Fitzroy. Study resulted in better understanding of motivations.
RT4.07 - Stream bank and gully erosion in the Fitzroy	Grazing, sediment management (gully & streambank management) landscape repair	$3,867,325	6,037t	819ha	High	Demonstration sites used to spread awareness; communications plans continued to be updated. Streambank erosion training day reported to be very effective; 2 field days. Survey123 apps for reporting trialled; Toolbox used. Volunteers involved in planting and propagation; CQU students completed tree planting and mulching (gaining on-ground experience).
RT2.04 - East Burdekin point	Grazing, sediment	$906,000	80t	-	High	Delivery provider developed additional in-house capacity and increase in sediment savings projects within catchment evident after projects. 2- 6 workshops; 2 case studies; 1 presented

Project title	Primary management response	RT Investment	Load reduction estimate	Area of practice change reported (ha)	Summary of enabling factors for legacy outcomes	Comments
source sediment management	management (gully & streambank) landscape repair					at int'l symposium on gully erosion. Sediment savings spreadsheet developed'; sediment management plans; method to quantify point source sediment savings developed. Economic returns for graziers.

This was the first attempt in undertaking an assessment of this nature and while some of the criteria and assumptions can be refined over time, it presents a picture of many of the activities and initiatives that are commonly found in projects that rated higher than others and hence provides some indications of how enduring legacy could be further maximised and disadoption minimised.

Other key factors that are considered to impact on the achievement of long-term legacy outcomes are discussed below.

Technical assurance and technical advancement

Projects across each of the phases of Reef Trust investment employed a range of technological approaches for mapping, data collection, assessing land condition and for selecting the most suitable management responses for a project site. This included:

- Recognition for investment in advanced information technology such as LiDAR and drone-based data collection to inform decision making.
- Increased focus on using science to measure the management impact as part of an adaptive management approach.
- Established technical assurance processes and built enhanced levels of awareness regarding the need for rigorous and science-based data collection and analysis during project design (e.g.,., associated with site prioritisation) and delivery (e.g.,., associated with management techniques), and in monitoring and evaluation.
- The suite of Reef-related decision support tools has allowed for shared understanding of the 'cause and effect' of different management responses and interventions as well as the significance of site prioritisation and selection. Integration with other science programs e.g., the National Environmental Science Program (NESP) has played an important role in Phase IV with amendments to the Gully and streambank tool box and refinement of apps and guidelines being just one example.
- Although there is a recognised need for further improvement in monitoring and reporting across the board, it has been consistently recorded that the progress made towards developing consistent approaches and frameworks across Reef water quality improvement projects is substantial and the development of systems and tools such as P2R and Projector have been game changers.
- The Reef Tender rules developed in RT2.12 (*Burdekin DIN management)*, which have been adopted by *Reef Credits*, as the key framework underpinning their proposed methodology for 'Reduction in nutrient run-off through managed fertiliser application'.

Knowledge and networking forums

- One of the most commonly used mechanisms for sharing knowledge between delivery partners and landholders and from landholders to other landholders via peer-to-peer networking was through forums and workshops.
- A large number of local, regional and whole-of-Reef knowledge forums and networks have been developed and enhanced since the commencement of the Reef Trust water quality investments. The Reef Trust Gully and Streambank Erosion Control Forum is one legacy initiative that stems from the *Technical Support for Reef Trust gully erosion control program projects* (RT2.03, RT4.13). This Forum which is acting now as a community of practice creates space for different stakeholders to come together to share information, to listen and learn, and to discuss strategies to address known knowledge gaps and issues.
- The majority of other local and regional networks are semi-formal in that they have some form of governance mechanism and content structure, or informal where there is limited or no formal governance arrangement or structure. Examples of these knowledge sharing and networking forums most commonly raised by delivery partners and evaluation participants and linked to Reef Trust projects are listed below:
    - local grazing forums and BMP workshops
    - gully erosion field days and workshops
    - forage budgeting workshops
    - communities of practice
    - grazier groups e.g., Landscape rehydration groups and Grass groups)
    - support networks
    - ExecutiveLink Boards
    - Banana Women's Network
    - soil symposiums and masterclasses.

Institutional capacity

Water quality improvement across the Reef now relies on a much larger number of NRM, community, private business, industry and government organisations to support water quality outcome delivery. Collectively and in part due to the Reef Trust water quality investments over many years, there is evidence to suggest that there is now a greater institutional capacity to:

- Prioritise investments and understanding of key factors that need to be considered for successful program design.
- Collaborate across levels of government, across industry sectors and across disciplines. Transdisciplinary projects are now the norm not the exception. That is, there is a far greater willingness and respect for diverse experiences and perspectives to come together to address complex issues.
- Develop and use integrated suite of decision support tools including predictive models especially during Phase II and Phase IV.
- Greater integration and collaboration between research organisations (e.g.,. universities, CSIRO and agricultural RDIs) and delivery partners.
- Consider management responses within a systems and whole-of-landscape context.

While there is greater confidence in the use of science to inform prioritisation, it is likely this is the case only when a single management response or pollutant is the focus. The ability to prioritise investment for multiple, integrated and complementary outcomes is still lacking.

Landholder and stakeholder (individual) capacity

Building and maintaining individual capacity to design and implement projects is a vital component for ensuring successful project design and delivery but also for ensuring there is a legacy beyond the project life. A range of capacity building activities were delivered during the Reef Trust program including:

- The capacity building of Indigenous Land and Sea Rangers was a key focus for a couple of projects (e.g., RT2.01 5*0% reduction in the Normanby subcatchments*). This included short courses (e.g., seed collection and propagation, heavy machinery) as well as financial support for Indigenous Rangers to undertake more formal qualifications and higher degrees.
- In addition to participation in a range of broad knowledge sharing and networking opportunities, individual landholders were also commonly invited to participate in more structured learning opportunities and supported with subsidies or other financial incentives. Examples include GPS training, construction of erosion controls, business and property planning tools (e.g., Grazing for Profit), and BMPs.
- Project reach varied from project to project with some projects focussing on the participants only, whilst others sought to involve those not directly involved in on-ground works in a bid to share knowledge RT4.03 and in some cases, encourage behaviour change through a range of different mechanisms. Projects such as RT7.06 (*Place based program in the Murray and Mossman catchments)* sought to support and strengthen the capability of the extension and advisory network, leaving a legacy of ongoing improvement beyond the life of the project, driven by productivity and efficiency gains that also deliver water quality outcomes. Projects such as RT4.06 *(Gully and stream bank erosion control program)* sought to engage entire families to support farm succession planning and intergenerational knowledge transfer to secure long-term outcomes beyond project completion. Project RT4.07 (*Streambank and gully erosion)* provided the opportunity for Central Queensland University Environment and Land Management students to complete tree planting and mulching, providing hands on experience.

See recommendations 27-31, 33-35.

Landholder and industry commitment

Landholder and industry commitment is a vital component of the range of activities delivered through the RTWQIP, from supporting and encouraging landholders to change their practices or through implementing on-ground management interventions that result in water quality improvements.

Limited information has been identified that enables any assessment of a change in commitment as a result of Reef Trust's water quality investments.

Ongoing maintenance costs and provision for retaining social capital is generally being built into project design and delivery as a matter of course, although there have been some attempts to examine legacy impacts of individual projects such as RT6.01 *(Delivering tailored solutions)* [f1]. Some delivery partners noted whilst legacy was not always explicitly considered during project design and delivery [f1], there was a significant amount of extension, trialling of new approaches and knowledge generation over time. For example, during RT3.02 *(Reef Alliance – improving horticultural practices)*, technical staff spent 466 hours of extension effort to support growers. Overall, delivery partners noted the difficulty in reporting on legacy due to most of those outcomes occurring beyond the funded project life [f2]. Delivery partners further noted that the efforts in sharing knowledge, building capacity and trialling approaches have enabled the successful implementation of projects in subsequent investments such as the Reef Trust Partnership [f1], yet it is not clear from the evidence how the knowledge from the Reef Trust program is being shared amongst other investors who are seeking to achieve the same water quality outcomes.

Delivery partners identified the need to ensure practices being employed within individual projects are evidence-based and backed by research. There were instances identified where delivery partners sought to partner with universities for this purpose [f1]. However, delivery partners have expressed the need to establish a mechanism for ensuring research is up to date and shared regularly to inform project design and delivery. Delivery partners also identified the need to have a mechanism to provide feedback about knowledge gaps and the types of research that is needed within particular regions and industries to ensure the most effective project design and implementation [f1].

See recommendations 14 - 15.

However, there is evidence of commitment to maintaining project outcomes beyond the project life in a number of projects such as RT2.02 (*Normanby River remediation)* whereby the Trustee for South Endeavour Trust is responsible for ongoing maintenance and monitoring of the sites with support from technical partners. Other examples exist such as project RT4.05 *Streambank remediation in priority areas* where land management agreements were negotiated for monitoring and maintenance of sites, as well as other land management changes to reduce risks to erosion prone areas. Overall, 11 projects mention the intention to maintain outcomes in the project reports.

There is some documented qualitative evidence to suggest landholders/organisations became more committed or increased their skills and knowledge throughout and following project delivery. MERIT reports identified the use of pre and post project implementation surveys by a number of delivery partners to establish a baseline understanding of landholder knowledge and assess changes over time. For example, project RT4.12 *Controlling streambank erosion in the Mackay Whitsunday region* conducted an online survey to assess landholder's baseline understanding and perceptions of river management prior to project commencement to assess how this changed over time.

Use of tools

A large number of 'tools' and products were developed and/or adapted to new contexts during the life of the Reef Trust. Tools ranged from high-tech models and web-based applications to very low-tech, paper-based or spreadsheet-based templates. Tools were generally developed specific for a commodity and to support the following outcomes:

- Business planning
    - e.g., economic benefit analysis tool
- Property planning
    - e.g., Survey 1,2,3 App
    - plan templates
- Implementation of specific management responses and interventions
    - e.g.,.conceptual drawings
    - gully guidelines
    - sediment calculation spreadsheets
    - revegetation site selection matrix
    - BMP guidelines, fact sheets and case studies
    - Better Bunch App
    - Dairy self-assessment tool
    - Zonal deep ripping tool
- Systems understanding
    - e.g., conceptual models
    - site prioritisation
    - land condition assessment templates
    - MCAS-S decision support tool

- Digital Elevation Models of Difference
- Knowledge sharing
  - e.g., videos, field days, training packages, podcasts, case studies
- Project management
  - e.g., landholder agreement templates
  - Fulcrum reporting templates
- Monitoring, evaluation and reporting.

The sediment and erosion control forums held in Phases II and IV provided opportunities for delivery partners and landholders to showcase the work being completed and to exchange ideas and knowledge f1. This approach was seen as invaluable by delivery partners and participating landholders alike, and in some cases resulted in enduring relationships f1. Reporting of the knowledge generation and sharing activities focussed heavily on the reach of the activity such as 'number of landholders in attendance' or 'number of views on a website', although, there is some evidence to demonstrate the impact of these activities in changing behaviour. For example, survey respondents noted an improvement in landholder skills and knowledge, increased commitment to improving water quality and an improvement in working relationships with landholders s1. Figure 8 shows the extent of this impact, with 71% of survey respondents indicating landholders engaged improved their skills and knowledge 'a great deal' or 'a lot' and a further 14% indicating a 'moderate increase' in skills and knowledge. A further 92% of all survey respondents indicated landholders were more committed to improving water quality as a result of their project s1.

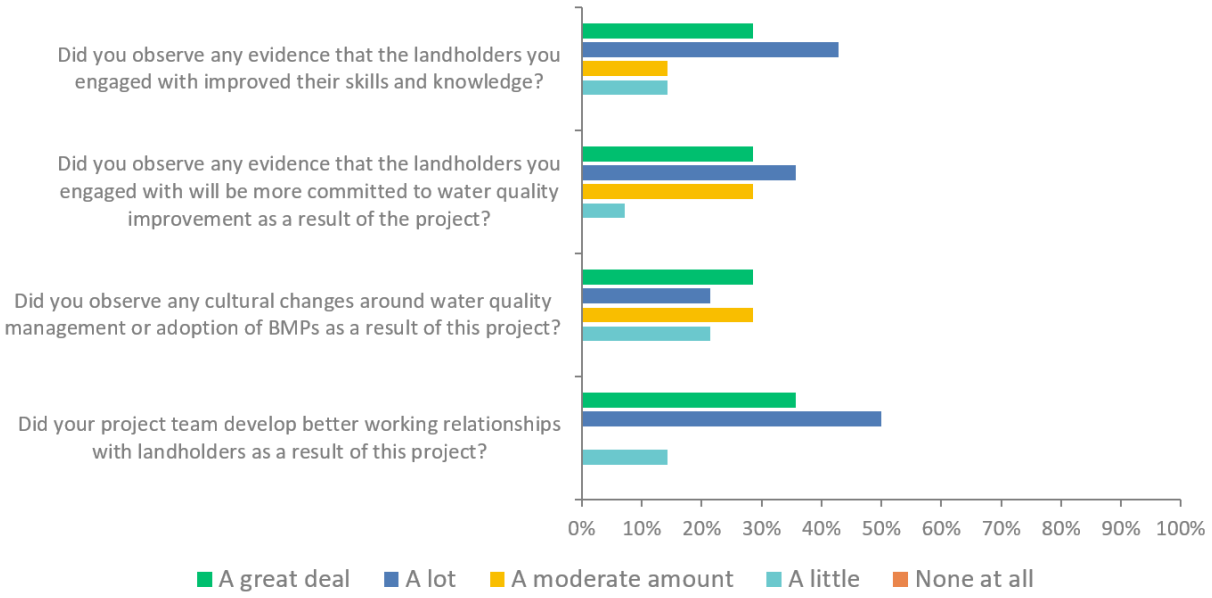


Figure 11. *Landholder relationships and behaviour change responses*

What isn't clear from the evidence is how the tools were shared between delivery partners to inform project design and delivery in later phases of the program or where the tools were kept beyond project completion.

See recommendations 26, 27-31, 33-35.

Maintenance of green assets

Until recently, Reef Trust guidelines have not generally permitted funding of maintenance and defect rectification or intervention 'fine tuning'' associated with the management of project sites and on ground activities post-delivery. As a result, the majority of projects were not designed with maintenance in mind. There has been some improvement in recent years but this is still to translate to actual on ground maintenance outcomes.

As the importance of maintenance grows with delivery partners, examples now exist where projects have sought to find alternative funds or shift costs to ensure some basic level of maintenance is included. Follow up inspections have also been identified as currently lacking in many projects.

There is some agreement that maintenance requires a separate investment and funding mechanism that sees these projects as 'green' assets requiring an operational expenditure budget just as project delivery requires a capital expenditure budget.

Alternative arrangements for maintenance of both systems repair and practice change interventions (e.g.,., capacity building) is required.

The lack of maintenance funding provided beyond the project life was identified as an emerging issue whereby 'overengineered' and more expensive solutions, particularly in relation to gully remediation, are implemented to prevent the need for extensive maintenance[f2]. This is becoming increasingly apparent as more on-ground works are completed [f1]. Additionally, it was noted that there is no way of knowing how much of the previously funded works are being maintained without appropriate monitoring and reporting in place beyond the project life [f1]. Several issues were raised by delivery partners including the lack of clarity regarding who is responsible for maintaining works beyond the initial investment as well as who is responsible for funding this work, particularly given much of the gully and streambank remediation works occur on private property [f1]. The short-term funding cycles were identified as a significant barrier in being able to support long-term monitoring, reporting and maintenance, in addition to the ability to maintain landholder interest and retain skills and capacity in the regions [f1 f2].

Additionally, it was noted that there is no way of knowing how much of the previously funded works are being maintained without appropriate monitoring and reporting in place beyond the project life [f1]. Several issues were raised by delivery partners including the lack of clarity regarding who is responsible for maintaining works beyond the initial investment as well as who is responsible for funding this work, particularly given much of the gully and streambank remediation works occur on private property[f1]. The short-term funding cycles were identified as a significant barrier in being able to support long term monitoring, reporting and maintenance, in addition to the ability to maintain landholder interest and retain skills and capacity in the regions [f1 f2].

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See recommendations 2, 32.

6 Summary of assessment ratings

Each project has been assessed using the assessment criteria outlined in the Evaluation Plan (Appendix B). Most projects from phases IV to VII are active and still have some way to go until project completion. Assessment ratings are therefore indicative of the evidence provided regarding progress made to date. Tables 32 to 35 below detail the assessment ratings for all RT projects. As per the evaluation plan in Appendix B, the impact KEQs did not have assessment criteria attached as they are largely quantitative in nature.

Strong performance / on track progress	Moderate performance / moderate progress	Minimal performance / progress	Gap in data availability

The projects in the first pass assessment were assessed against the indicators, along with a confidence score for each rating using the below star rating:

- * Low agreement and no/limited evidence
- ** Moderate agreement and moderate evidence
- *** High agreement and robust evidence.

Data gap refers to where there is a gap in the data provided and therefore an inability to provide an assessment.

The cost-effectiveness of projects was given extra consideration and each project is noted as either being below average cost-effectiveness, average cost-effectiveness or above average cost-effectiveness, with below average cost-effectiveness meaning the project was less expensive to deliver in terms of the pollutant reductions it achieved.

Table 32. Assessment ratings for phases I and II

Evaluation questions	RT1.01 Grants for Farmers	RT1.02 A-Class Grazing	RT2.01 Fifty percent reduction in Normanby subcatchments	RT2.02 Normanby River remediation	RT2.03 CSIRO Technical Support	RT2.04 East Burdekin point source sediment management	RT2.05 Theresa gully remediation	RT2.06 Fitzroy gully remediation	RT2.07 Mackenzie gully remediation	RT2.08 Isaac gully remediation	RT2.09 Don River sediment reduction project	RT2.10 Mary River catchment gully management	RT2.11 Burdekin Region point source sediment management	RT2.12 Burdekin DIN management
Current Status	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
To what extent were project outputs and outcomes delivered?	Strong ***	Strong ***	Moderate ***	Moderate ***	-	Strong ***	Strong ***	Strong ***	Strong ***	Moderate ***	Moderate **	Moderate ***	Moderate **	Strong ***
To what extent was the project completed in line with contract guidelines, reporting requirements and MERI procedures?	Strong ***	Strong ***	Strong **	Poor **	-	Strong **	Moderate **	Strong **	Moderate **	Moderate **	Moderate ***	Moderate ***	Strong ***	Strong ***
Did the project investment achieve cost-effective pollution abatement?	Strong *** Above average	Moderate *** Below average	Moderate *** Below average	Strong *** Above average	-	Poor *** Below average	Poor *** Below average	Strong *** Above average	Poor *** Below average	Poor *** Below average	Poor *** Below average	Moderate *** Below average	Moderate *** Below average	Moderate ** Average
To what extent has the RTP water quality investment been leveraged?	Strong **	Moderate **	Data gap	Data gap	-	Data gap	Strong **	Strong **	Strong **	Strong **	Strong **	Strong **	Moderate *	Moderate ***
How appropriate and rigorous was the project design process?	Strong **	Strong ***	Moderate *	Moderate **	-	Moderate **	Moderate **	Moderate **	Moderate **	Moderate **	Strong **	Strong ***	Moderate **	Moderate **
What were the lasting or enduring outcomes of the project?	Moderate **	Moderate **	Moderate **	Moderate **	-	Moderate **	Moderate **	Moderate **	Moderate **	Moderate**	Moderate **	Strong ***	Moderate **	Strong ***
To what extent did the project generate and share knowledge?	Moderate ***	Moderate ***	Moderate **	Moderate **	-	Moderate ***	Moderate *	Moderate **	Moderate **	Moderate **	Moderate ***	Strong ***	Moderate ***	Strong ***

Table 33. Assessment ratings for phase III

Evaluation questions	RT3.01 Updated farm management practices	RT3.02 Improving Horticulture practices	RT3.03 Improving sugar cane practices	RT3.04 Improving dairy practices	RT3.05 Improving grain practices	RT3.06 Improving grazing practices	RT3.07 Sustainable Cane Practices	RT3.08 Grazing Land Management
Current Status	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
To what extent were project outputs and outcomes delivered?	Moderate ***	Moderate ***	Moderate ***	Data gap	Moderate ***	Moderate ***	Moderate ***	Moderate ***
To what extent was the project completed in line with contract guidelines, reporting requirements and MERI procedures?	Moderate ***	Moderate ***	Moderate ***	Moderate ***	Moderate ***	Moderate ***	Strong ***	Moderate ***
Did the project investment achieve cost-effective pollution abatement?	Moderate ** Below average	Data gap	Strong ** Above average	Data gap	Moderate ** Below average	Strong ** Average	Poor ** Below average	Strong ** Above average
To what extent has the RTP water quality investment been leveraged?	Moderate **	Strong **	Strong **	Strong **	Strong **	Strong **	Strong **	Strong **
How appropriate and rigorous was the project design process?	Moderate **	Strong ***	Strong ***	Moderate **	Strong ***	Moderate ***	Moderate **	Moderate ***
What were the lasting or enduring outcomes of the project?	Moderate ***	Strong ***	Moderate **	Moderate **	Moderate **	Strong ***	Moderate **	Strong ***
To what extent did the project generate and share knowledge?	Strong ***	Strong ***	Strong ***	Moderate **	Strong ***	Strong ***	Strong ***	Strong ***

Table 34. Assessment ratings for phase IV

Evaluation questions	RT4.01 Wet tropics repeated tenders	RT4.02 Wet tropics repeated tenders	RT4.03 Cane farmer trials	RT4.04 Mary Catchment Riparian Project	RT4.05 Stream bank remediation in priority areas	RT4.06 Gully and stream bank erosion control program	RT4.07 Stream bank and gully erosion	RT4.08 Herbert River remediation	RT4.09 Gully restoration in the GBR	RT4.10 Laura gullies project	RT4.11 Burdekin gully remediation	RT4.12 Controlling streambank erosion in the Mackay Whitsunday region	RT4.13 CSIRO Technical Support
Current Status	Active	Active	Completed	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
To what extent were project outputs and outcomes delivered?	Strong ***	Strong ***	Moderate ***	Strong ***	Poor ***	Moderate **	Strong ***	Strong ***	Poor ***	Poor ***	Strong ***	Strong ***	N/A
To what extent was the project completed in line with contract guidelines, reporting requirements and MERI procedures?	Strong ***	Strong ***	Moderate **	Moderate ***	Moderate ***	Moderate ***	Strong ***	Moderate ***	Moderate ***	Poor ***	Moderate ***	Strong ***	N/A
Did the project investment achieve cost-effective pollution abatement?	Strong * Above average	Moderate * Below average	Data gap	Strong *** Above average	Poor *** Below average	Strong *** Average	Strong *** Above average	Poor *** Below average	Moderate *** Below average	Moderate *** Below average	Moderate *** Below average	Moderate *** Average	N/A
To what extent has the RTP water quality investment been leveraged?	Data gap	Data gap	Data gap	Moderate **	Data gap	Moderate *	Moderate *	Moderate ***	Moderate *	Data gap	Moderate *	Strong **	N/A
How appropriate and rigorous was the project design process?	Moderate **	Moderate **	Strong **	Moderate **	Moderate **	Moderate ***	Strong ***	Moderate *	Strong **	Moderate **	Moderate *	Moderate **	N/A
What were the lasting or enduring outcomes of the project?	Moderate **	Moderate **	Moderate **	Moderate **	Moderate **	Moderate **	Moderate **	Moderate **	Moderate *	Moderate **	Moderate *	Moderate **	N/A
To what extent did the project generate and share knowledge?	Strong **	Moderate ***	Moderate ***	Moderate **	Moderate **	Moderate **	Moderate *	Strong ***	Moderate *	Moderate *	Moderate ***	Strong ***	N/A

Table 35. Assessment ratings for phases V, VI and VII

Evaluation questions	RT5.01 Sugarcane SRA farming system	RT6.01 Delivering tailored solutions (CR161)	RT7.01 Improving water quality in the Burnett River Catchment *	RT7.02 Improving water quality in the Fitzroy basin *	RT7.03 Precision agriculture used to reduce nutrients and pesticides entering the water *	RT7.04 Streambank remediation in the Burdekin catchment *	RT7.05 Maximising ecosystem biodiversity on the O'Connell and Proserpine basins *	RT7.06 Place-based program in the Murray and Mossman catchments *
Current Status	Active	Active	Active	Active	Active	Active	Active	Active
To what extent were project outputs and outcomes delivered?	Strong ***	Strong **	Moderate *	Strong *	Moderate *	Moderate *	Moderate *	Data gap
To what extent was the project completed in line with contract guidelines, reporting requirements and MERI procedures?	Strong ***	Moderate ***	Moderate *	Moderate *	Moderate *	Moderate *	Moderate *	Moderate *
Did the project investment achieve cost-effective pollution abatement?	Strong ** Above average	Poor ** Below average	Data gap	Data gap	Data gap	Data gap	Data gap	Data gap
To what extent has the RTP water quality investment been leveraged?	Strong **	Strong ***	Data gap	Data gap	Data gap	Data gap	Data gap	Data gap
How appropriate and rigorous was the project design process?	Moderate **	Strong ***	Strong *	Moderate *	Data gap	Moderate *	Moderate *	Moderate *
What were the lasting or enduring outcomes of the project?	Strong ***	Moderate **	Moderate *	Moderate *	Moderate *	Moderate *	Moderate *	Moderate *
To what extent did the project generate and share knowledge?	Moderate ***	Strong ***	Moderate *	Strong *	Data gap	Data gap	Strong *	Strong *

*Phase VII projects are still active and therefore the project reports drawn upon to inform the assessment are incomplete. This means the pollutant load reductions included above are estimates based on the MERI plans. For this reason, for each criterion that has been assessed below, a corresponding 'low confidence rating' has been applied.

7 Conclusions and recommendations

The conclusions and recommendations associated with this evaluation are presented in a framework (Figure 12) that ensures the purpose and outcomes of the Reef Trust water quality investment program remain at the centre of program improvement.

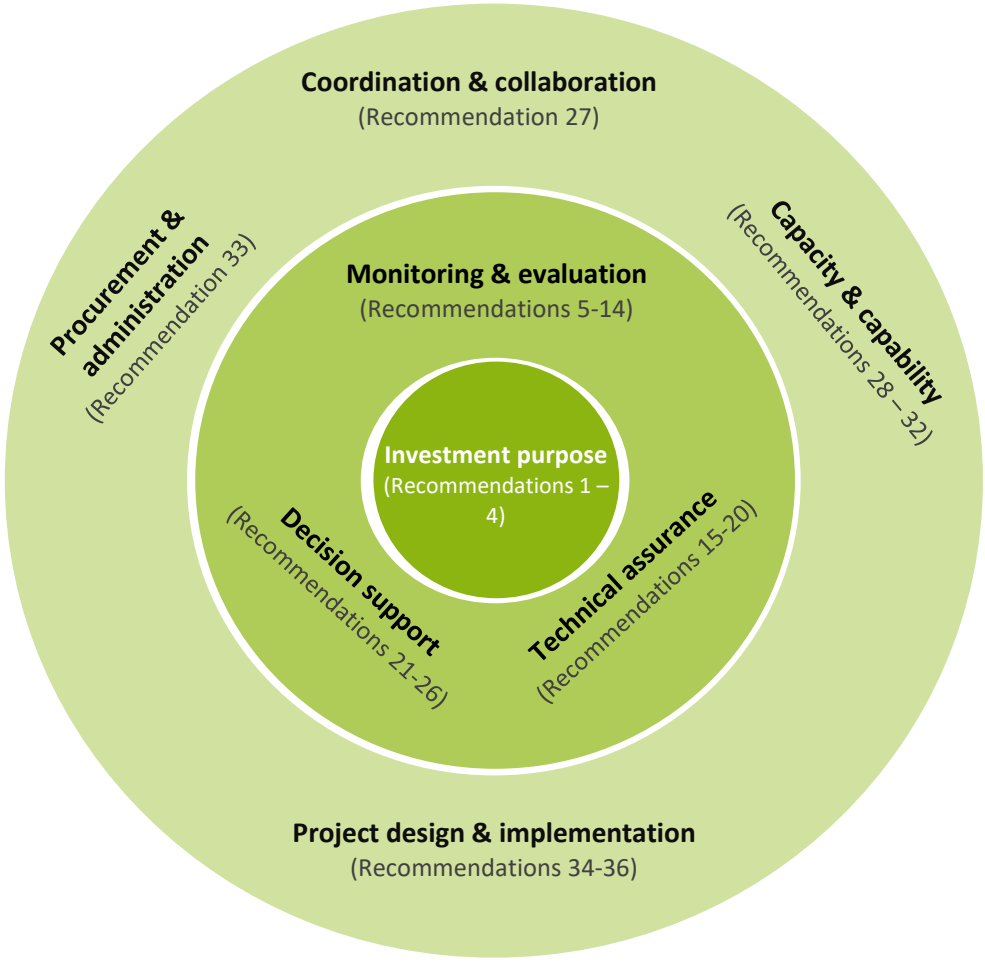


Figure 12. *Conclusions and recommendations framework*

7.1 Investment purpose and planning (Recommendation 1)

Reef Trust water quality investment planning is currently undertaken every 12-18 months. Projects typically receive investment for 3-5 years resulting in significant overlap of strategic investment planning, project procurement, project management, and project acquittal and closure activities happening at any one time. The review cycle of the Reef 2050 Plan and Reef 2050 WQIP provides an important opportunity for the Reef Trust to ensure alignment with their respective objectives and goals. Rather than review and plan for Reef Trust investment in phases.

Recommendation 1.	*It is recommended that the Reef Trust establishes a stronger adaptive management framework and review cycle (i.e., every five years) that enables it to respond and align with updates to the Reef 2050 Plan and Reef 2050 WQIP. This ensures that the science and high level policy and planning can inform Reef Trust decisions in a timely manner. This five (5) year review and planning cycle would Ideally project duration, especially for standard and franchise type projects, would align to this five year review cycle enabling projects to deliver maximum outcomes for the investment. also replace the current phases of Reef Trust investment.*

7.2 Investment purpose and impact pathways (Recommendations 2-3)

The Reef 2050 WQIP recognised that investment and effort is required in a number of complementary and inter-related areas i.e., improved land management, increased culture of stewardship, reduction in end-of-catchment pollutant loads, land and catchment management, and active engagement of communities and land managers to improve water quality outcomes.

This evaluation has found some inconsistency and lack of clarity regarding the process used for the selection of different projects during each phase and how the final projects were selected over other projects. During some phases, projects with very different short-term outcomes and objectives were viewed to be competing with each other and in some cases prompting delivery partners to over-promise and potentially exaggerate claims as to what the project could or was best placed to achieve i.e., in terms of pollutant savings or build capacity.

The lack of clarity regarding performance measures and targets for each project also resulted in them being evaluated and assessed (and judged) on the same measure regardless of their purpose and outcomes being delivered.

Recommendation 2. *Based on the previous Reef Trust investments and the Objectives and Goals identified in the Reef 2050 Plan, it is proposed that the future Reef Trust discontinue the use of investment phases and establishes discrete portfolios or impact pathways that recognise the diverse inputs and collective efforts required to improve water quality. The suggested portfolios are not intended to be mutually exclusive but represent the primary outcome being invested in:*

i. ***Research and development*+.*** *Undertake priority research into agreed knowledge gaps (i.e., by ISP). Research projects are underpinned by an appropriate and rigorous methodology and informed by a range of subject matter experts from across the research, practitioner and industry sectors.*

ii. ***Landscape repair+.*** *Upscale and expand proven, and fit-for-purpose catchment and landscape repair management responses and interventions in priority locations and/or land uses to address multiple objectives (i.e., that aligns with the Reef 2050 WQIP and other regional/catchment plans).*

iii. ***Land and catchment management practice adoption+.*** *Upscale and expand proven, and fit-for-purpose management practice change approaches and management responses in priority locations and/or land uses (aligned with the Reef 2050 WQIP and other regional WQIPs).*

iv. ***Natural (green) asset maintenance+.*** *Continue to invest in maintaining sites and places that have previously received investment to ensure these assets continue to provide the 'as designed' performance or greater and therefore aim to prevent high risk sites from future degradation and protect existing healthy landscapes*

v. ***Social capital maintenance+.*** *Invest in individuals and organisations so they continue to have access to the resources, tools, skills and knowledge to build and maintain the necessary capacity to deliver agreed place-based outcomes.*

vi. ***Monitoring and assessment*+.*** *Invest in the continual collection of appropriate and rigorous data and information linked to previous projects to continue to build our understanding of various management approaches over time.*

vii. ***Technical advice**** *. Ensure the Department, delivery partners and other Reef Trust stakeholders have access to consistent and practical advice and quality assurance during project design and delivery.*

*These investment portfolios could be potentially combined with Package 1 – Research and development.
+ Innovation is expected to be delivered across all portfolios.

Each of the different investment portfolios would have unique:

- outcomes, objectives and goals that align with the Reef 2050 Plan and Reef 2050 WQIP as appropriate with a revised Reef Trust MERI Plan providing the integration and line of site between the two
- key evaluation questions and performance indicators
- procurement and delivery mechanisms
- governance requirements
- levels of investment
- targeted delivery partners.

It is anticipated that the largest investment continues to focus on catchment repair and land and catchment management practice adoption but it is important to note that investment in these portfolio areas alone is unlikely to enduring legacy over time and should be coupled with technical support, building social capital and ensuring access to and application of research.

This approach is consistent with the concept of collective impact which aims to help develop a systemic approach to overcome the limitations and shortfalls of having individual organisations compete with each other for limited funds and then entrusting that these organisations will be able to successfully replicate their impact more widely (Kania and Kramer, 2011). Collective Impact is founded on a framework of collaboration that engages across sectors and groups who share a common interest to address a complex social issue.

Kania and Kramer (2011) suggest that key to working towards greater collective impacts is having:

1. *A common agenda* – for Reef Trust this means having an agreed and shared understanding of the priorities and outcomes being sought
2. *A shared measurement system* – such that organisations contributing to similar outcomes measure and report on common results or performance indicators
3. *Mutually reinforcing activities* – for Reef Trust this could mean encouraging each participating organisation to undertake the specific set of activities at which it excels in a way that supports and is coordinated with the actions of others, i.e. research and development, capacity building, or on-ground maintenance, monitoring etc.
4. *Continuous communication* – requires a common vocabulary and time for high levels of communication and coordination between activities and organisations.
5. *Backbone support organisations* – collective impact requires a separate organisation and staff with a specific set of skills as the backbone for the entire initiative, in this case this would be the Reef Trust program team in DCCEEW. Coordination takes time and dedicated resources. Expectations that collaboration can occur without the appropriate supporting infrastructure is one of the most frequent reasons why collective action fails. It also requires highly structured processes that leads to effective decision making, along with appropriate training, tools and resources that each participating organisation can use.

Recommendation 3.	*It is recommended that future Reef Trust water quality investment clearly maps and communicates how each project investment complements each other to collectively deliver on the current and future Reef 2050 Plan and Reef 2050 WQIP. Ensure Reef Trust water quality investments:* *a) adopts a complementary and coordinated package of activities* *b) targets delivery partners that are best suited to delivering the various portfolio outcomes (e.g., Research and development to ensure skills and capacities are used to optimal value without competing unnecessarily).*

7.3 Investment purpose and transparency (Recommendation 4)

Reef Trust investment strategic planning documents and associated processes were considered by stakeholders to lack transparency in both the development of the priorities and in the selection of individual projects to be funded by stakeholders external to the Department and the Reef Advisory Committees. This has a number of flow on effects including disempowerment of delivery partners.

While it is noted that both the ANAO Audit Report and this evaluation both found generally appropriate decisions had been made at the time with regards to investment priorities and project selection, effective external communication of these processes and criteria was lacking during most if not all phases.

Clarity as to how project selection aligns with the Reef 2050 WQIP, the Reef 2050 Plan and Scientific Consensus Statement as well as what other criteria will be used to determine investment priorities and assess project merit (regardless of delivery mechanism) is also required. It is noted that the criteria may (and should) change for different Reef Trust portfolio areas. Example criteria may include an ability to delivery enduring adoption outcomes (e.g., implementation of property plans, continual improvement process of adjustment).

Recommendation 4.	*Future Reef Trust investments need to maintain an open and transparent process for the selection of Reef Trust investment outcomes, objectives and targets supported by an effective and targeted communication process. Evidence of how previous investment lessons and results have informed future priorities is also valued by stakeholders and is a critical part of an adaptive management approach.*

7.4 Monitoring and evaluation (Recommendations 5-14)

Strong monitoring, reporting and evaluation enables the Reef Trust to meet its obligations to report outcomes, account for the use of public funds and enable continuous project and program improvement. Several challenges were identified in relation to this theme, both at a program level, and individual project MERI level.

7.4.1 Program level monitoring and evaluation

The Reef Trust Monitoring and Evaluation Plan (Draft 2021) outlines the current monitoring, evaluation, reporting and improvement (MERI) approach and the responsibilities of Reef Trust funding recipients and the Australian Government. The current Reef Trust Monitoring and Evaluation Plan 2021 establishes a program logic, and framework that suggests that project reporting will allow the Reef Trust Investment program to track its key performance indicators. However, the evaluation found there is limited alignment between the KPIs established in this planning document and project scale reporting. This has resulted in a lack of relevant and consistent data available to support a program level. Project level MERI plans do not require project partners to report on any consistent KEQ's or indicators that can be rolled up to view collective achievements at the program level.

While some reporting mechanisms do exist that attempt to facilitate consistent reporting e.g., for pollutant savings and practice change through the P2R program, delivery partners are still reporting using inconsistent metrics for some indicators and using different methods, tools and approaches to calculate these outputs and outcomes. Program level evaluation is also hindered by a lack of long-term monitoring data, which would require monitoring beyond the life of funded projects. Like many NRM projects, most Reef water quality projects will experience a time lag before the environmental benefits of a project can be directly or fully measured.

An important perverse outcome identified was the vastly different reporting requirements between the Queensland and Australian Governments, and GBRF, noting there is an opportunity for consistent reporting processes to improve efficiencies and to negate the need for delivery partners to navigate two different processes and systems. This is particularly important, given it is often the same people delivering projects for both levels of government $_{f1}$. Approximately 28% of survey respondents indicated their project was competing with other Reef projects, particularly in relation to securing landholder interest and time $_{s1}$.

The effectiveness of reporting approaches is strongly linked to the nature of the delivery mechanism, project design and agreement requirements. For example, grant-based projects commonly assume that projects can deliver consistent outputs and outcomes each year of the project. The reality commonly is that new or 'start up' projects are likely to take additional time in the first and second years to refine the design and delivery approach, resolve any recruitment and resourcing matters, and implement key strategies to establish appropriate relationships and engagement with landholders and other stakeholders such as Traditional Owners. This may mean project outcomes are not realised for some time or would benefit from long term funding in which benefits can be realised and reported on.

Clear roles and responsibilities and/or processes to evaluate future Reef Trust water quality investments is required. Any data that is collected needs to have a clear purpose and someone assigned to analyse, interpret, and communicate the results back to the key audience (e.g., landholders, industry bodies or investors).

Recommendation 5.	*Continue to work with all Reef investors to develop a Reef-wide, consistent reporting framework and platform that drives efficiency for delivery partners and investors, and supports more efficient and accurate reporting to Ministers and the broader public.*
Recommendation 6.	*Ensure consistency and alignment with Queensland Government and other investors monitoring and reporting programs, KEQs, indicators and metrics to ensure efficiency for delivery partners and an enhanced ability to assess impact across the whole Reef region efficiently and transparently.*
Recommendation 7.	*Ensure there are clear roles and responsibilities in place to evaluate future Reef Trust programs including agreed methodologies and approaches to collect, assess and report on results and conclusions.*
Recommendation 8.	*Given the proposed updates to the Reef 2050 Plan and Reef 2050 WQIP as well as a potential redesign of the Reef Trust water quality investments, it is recommended to investigate the appropriateness of adapting the Reef Trust Partnership Monitoring and Evaluation Plan (Great Barrier Reef Foundation , 2021) for the Reef Trust water quality investments which presents a strong and comprehensive example of a program logic supported with meaningful KEQs, performance measures and importantly targets.*

7.4.2 Project level MERI Reporting

Monitoring and evaluation is completed to assess the impact of projects or program through the collection of information to form evidence of outcomes from a series of inputs.

The definition of 'evidence' varies depending on the field or subject (e.g., law vs medicine) and it is highly context specific. A useful definition below suggests that:

"Evidence is information that comes closest to the facts of a matter. The form it takes depends on the context. The findings of high-quality, methodologically appropriate research are the most accurate evidence. Because research is often incomplete and sometimes contradictory or unavailable, other kinds of information are necessary supplements to or stand-ins for research. The evidence base for a decision is the multiple forms of evidence combined to balance rigour with expedience – while privileging the former over the latter…where there is uncertainty or disagreement about practice or when new therapies are proposed, research is a way of providing evidence as to the most effective choice" (Source: What is Evidence? (caresearch.com.au); Lamont et al., (2007)). To obtain data or evidence, we often need to undertake monitoring at a site or sites to generate the data that forms the evidence.

The current difficulty is that there is no clear purpose for how the evidence is used to assess projects, programs and the multiple line of evidence to address this.

Monitoring is undertaken to collect evidence for different reasons and to answer different questions. This evaluation highlights the importance of the project proponents understanding how what data will be used where. The approach used will depend on the some of the reasons monitoring is undertaken include:

- Determining the key sources of pollutants within a catchment to support targeting of interventions.
- Understanding landscape processes and validating sediment and nutrient concentrations and yields.
- Verification of the predicted reductions in pollutants following rehabilitation and supporting to calibrate modelling frameworks.
- Assessing on ground costs and effectiveness of remediation options.
- Checking for site integrity of rehabilitation sites.
- Understanding human behaviour and management decisions.
- Feedback and engagement to data collectors and landholders.
- Providing data to support new investment models (e.g., Reef Credits).
- Reporting on the outcomes of the implementation of a funding project.

Our findings identified substantial differences among delivery partners in their understanding of a MERI plan purpose, processes and approaches, and in how to optimise the value and benefits of good MERI plan implementation and reporting. We also found inconsistency in how delivery partners described their intended

project outcomes with some confusing outcomes with outputs or activities, and some not sufficiently articulating achievable short- and intermediate-term outcomes.

Inconsistent use of and/or immeasurable output and outcome metrics for demonstrating success was also commonly found. There was also limited consistency or clear measures for outcomes where they were documented, and a lack of consistency about where the information was reported in MERIT. This is likely due to both inexperience and insufficient knowledge of MERI planning and reporting by some delivery partners as well as Reef Trust team members.

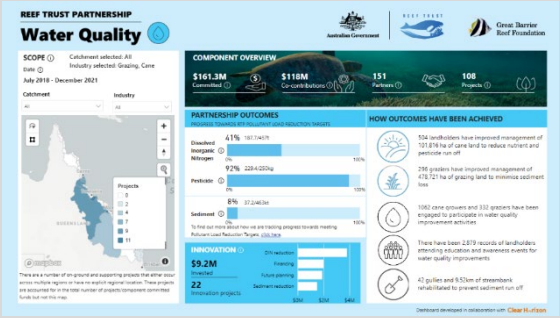
An additional problem identified during interviews and focus groups was the inability to identify the long-term outcomes resulting from individual projects, without resources and funding for long-term monitoring programs. The added value of long-term monitoring is the ability to identify where disadoption has occurred, to allow accurate measurement towards water quality targets. A further benefit of a project or site-scale long-term monitoring program would be the ability to identify and capture legacy outcomes where they have occurred (Alluvium, 2021).

The incongruence of the project partner interview results from Figure 3 and Figure 4 indicates that there need to be increased capacity both with technical and monitoring and evaluation. This is also apparent when the cheapest reductions are industry led where there is a clear understanding of the production outcomes and goals, existing trust, existing large networks of interactions with landholders which industry have already engaged with on other matters. This indicates that there is strong technical knowledge and understanding of how the production system works and how changed management practices fit within the production paradigm.

Technical advisory groups offer an approach to addressing the increased need for technical support and potentially could be within the programs team, although in the interviews some project partners found this frustrating, it may help address the initial technical design issues. Similarly, a M&E coordinator for the program would allow overall program goals to be monitored and transparent given the probity regarding public money. These components of the broader program should be managed by the departments as a part of the Program.

The current M&E framework is primarily focused on reporting on the outcomes of the implementation of funding a project, resulting in data being collected in numerous ways, and some more broad scale outcomes collected through Paddock to Reef.

Recommendation 9.	*Include a specific portfolio to enable investment in monitoring and evaluation that target key knowledge gaps e.g., rates of disadoption over time. Agreed M&E projects or activities could be integrated across a region or catchment ensuring efficiency and/or targeted the most appropriate delivery partners who have demonstrated skills and relationships to undertake the required monitoring in a scientifically and rigorous process.*
Recommendation 10.	*Provide delivery partners with increased support (financial and/or technical) to build capacity in and develop fit-for-purpose MERI plans that suit the needs of the project and aligns with DCCEEW's (and other investors') needs for evaluation at the program scale. This is especially important for R&D projects or projects in a 'start-up' phase. Coupled with this, will be to ensure the MERIT framework (or other monitoring platform (see Recommendation 12)) enables delivery partners to report on the specific indicators and outcomes developed in each MERI plan.*
Recommendation 11.	*Project level MERI plans are required to comprise targeted, fit-for-purpose KEQ's, and agreed indicators and metrics for each KEQ, that aligns directly with the (revised) Reef Trust program logic and high-level evaluation framework. These should be agreed with delivery partners prior to project commencement. It is likely that some indicators may be applied across all impact pathways, while some may be unique to a single portfolio.*

Recommendation 12.	*Investigate the adaptation of the Water Quality Dashboard developed by the GBRF for use by the Reef Trust Partnership. The Water Quality Dashboard and underpinning database allows for real time reporting. It is noted that one gap with the dashboard is that is does not have direct alignment to project MERI plans and their targets which would require further consideration.*
	
Recommendation 13.	*Continue to establish baseline knowledge to underpin future assessment of enduring legacy and specifically to identify the knowledge and attitudes that are considered important preconditions for enduring practice change adoption. Natural Decisions (2021) suggest some questions that could be included to support the development of possible indicators and data collection approaches.*
Recommendation 14.	*Establish a more targeted and coordinated implementation approach to monitoring, evaluation and reporting so that it is more efficient and cost-effective (i.e., by combining multiple project sites and geographies into a single contract), and effective (i.e., by contracting an appropriate specialist service provider with the appropriate equipment and skills). Some monitoring and evaluation will be most efficient and effective if undertaken by the delivery partners at the time of project delivery, whereas post-project monitoring is suggested to be undertaken under a separate contract that allows for specialised data collection for a larger number of related project sites.* *Similarly reporting and data management should reside with appropriately resourced organisations and/or positions, such as the provision of a Monitoring and Evaluation Coordinator to oversee data capture and reporting, who in turn could coordinate inputs to. Paddock to Reef. GBRF also use a dedicated GIS specialist to upload and analyse some data sets to ensure data is efficiently and effectively reported.*

Note: it is acknowledged that MERIT is currently used across a number of Australian Government investment programs e.g., National Landcare Program. Recognising the need for whole of government reporting as well, a compromise may include carefully identifying which outcomes and indicators, and targets where relevant, are reported in a fit-for-purpose reporting framework (such as that currently used by the RTP) on a quarterly or six-monthly basis and which outcomes and indicators continue to be reported in MERIT i.e., on an annual or at end of project basis). Alternatively, this is done manually by the Department.

7.5 Technical assurance and advice (Recommendation 15-16)

Technical assurance is critical to ensure Reef investments are underpinned with scientific evidence and knowledge (western and cultural), reflect the latest understanding and consensus, and work to build public confidence in data collected and in the outcomes being delivered. Data integrity and measurable outcomes are also critical to being able to assess cost-effectiveness and value for money with confidence.

At the project level, (45% of survey respondents (n=17) also indicated that they would like additional technical support or training. This evaluation has also found that projects that involved technical working groups were very successful, particularly where the technical groups were involved from the start of the project. The quality of data collected, and use of models and tools was also higher when experts worked collaboratively with delivery partners. For example, P2R has previously undertaken a data audit for NQDT with the audit identifying simple things that they could improve. It highlights that the inclusion of data assurance processes as part of future Reef Trust projects could provide a number of efficiencies for both delivery partners and program stakeholders.

A number of benefits have also been noted when scientists and other experts have opportunities to listen to and work with landholders to ensure on-ground practicalities and real-life challenges are better understood and integrated into future thinking.

Recommendation 15.	*Establish fit-for-purpose and cross cutting technical assurance mechanisms for the different investment portfolios. Whilst there is no perfect arrangement, it is proposed that the most logical and efficient arrangement is to establish three primary technical advisory groups to support:* *1. Project investments in sediment abatement through sediment related* *a) R&D* *b) gully and streambank landscape repair* *c) Management practice change* *d) Green asset maintenance* *e) Monitoring and evaluation* *2. Project investments in nutrient abatement through nutrient related:* *a) R&D* *b) Management practice change* *c) Monitoring and evaluation* *3. Investments in maintaining and building social capital including social capital related:* *a) R&D* *b) Social capital building and maintenance* *c) Monitoring and evaluation.*
Recommendation 16.	*Ensure Reef Trust staff have sufficient technical understanding of key issues and the associated tools and guidelines to support effective and meaningful conversations with Delivery Partners and to enable continue improvement within the program.*

The role of each technical advisory group (TAG) would be to:

- inform the design of the Reef Trust investment strategy for each portfolio, ensuring alignment with the Reef 2050 Plan, Reef 2050 WQIP and scientific consensus statement work
- ensure consistency regarding advice to delivery partners and government advisors
- establish and maintain data assurance and quality needs (including P2R reporting)
- provide advice on project delivery efficiency and effectiveness to the Department (i.e. QA)
- help to ensure clear communication with stakeholders.

Each TAG would comprise:

- a clear scope and terms of reference
- an independent Chair (i.e., has no vested interest in the outcomes of decisions)
- a range of specialists from academia, research organisations, practitioners, government and industry.

The various TAG Chairs would report to a senior representative of DCCEEW as well as a line of communication to the Chair of the Independent Science Panel.

Ideally, these TAGs are established across all forms of investment i.e., Queensland Government, GBRF, and other philanthropic funding to support and facilitate investor, technical partners, and delivery partner collaboration and consensus building.

If a consistent and co-funded approach were to be developed across all Reef investors, then it may be more appropriate for the TAG Chairs to report to the ESC and still have a line of communication to the ISP.

In the case of the existing Sediment Working Group, the recommended TAG for the Landscape Repair portfolio could be reviewed and expanded take on this role.

It is envisaged that sub-working groups may still be required on a case-by-case or issue-by-issue basis.

7.6 Technical assurance: data collection and consistency (Recommendations 17-20)

Based on the findings of the economic analysis a number of recommendations to address inefficiencies in data collection and reporting have been suggested in particular.

Recommendation 17:	*Improve record keeping of projects funded under the Reef Trust by employing a systematic approach to tracking management activities against investment expenditure e.g., by using the financial reporting fields within the P2R Projector.*
Recommendation 18:	Ensure p*roject financial data includes detailed attribution to consistent activity categories (e.g., monitoring, on-ground works, etc.), to enable greater insight to be drawn from future analysis This would result in more robust estimates of cost-effectiveness with fewer assumptions required (e.g., to apportion spending across years or activity categories)*
Recommendation 19:	*Develop standard approaches for collecting and reporting on in-kind and cash contributions to enable consistent reporting and to support delivery partners to adequately report on their project outcomes e.g.,* standard costs per hour of machinery and per hour of labour.

This would ensure that records are consistent and comparable across projects and portfolios, enabling effective evaluation in the future. This would specifically involve ensuring records of spending include consistent and marginally more detailed information on the activities where money is being expended and the expected outcome (e.g., reduction in DIN loads) from those activities.

Ensure this data also includes information around the timing of activities and spending, at least at an annual level. This finding is common across investments in load reduction at all scales of project. It may be prudent to enhance financial data collections across the GBR program to ensure that value for money can be demonstrated with an increased level of confidence. A practical solution to this problem could be minor modifications to, and actual use of, the financial reporting fields within the P2R Projector. Ideally this could also be tied back to standardised funding agreements that provide a direct line of sight between funding, actions and ongoing delivery.

Understanding disadoption would enhance the true understanding of cost-effectiveness of alternative actions. For example, understanding the long-term maintenance requirements for landscape repair projects and how they may or may not degrade over time. There is probably now sufficient data collected to develop a quantitative understanding of the risk of disadoption by industry and/or broad activity type (e.g., what attributes of a program are associated with a higher probability of disadoption?) with further analysis.

Developing a robust understanding of disadoption risk would also significantly enhance the opportunity to prioritise actions, design more efficient contracts/agreements, and ultimately, reduce GBR program delivery risks.

Recommendation 20.	*Invest in further monitoring and measurement of disadoption and factors influencing enduring legacy ensuring there is a feedback loop between outputs of monitoring (i.e., levels of disadoption) and input parameters and assumptions for modelling in P2R Projector.*

7.7 Decision support tools (Recommendations 21 – 26)

Decision support tools are playing an increasingly important role in analysing and interrogating Reef-related project data. Since the commencement of Reef Trust there has been a rapid development of new tools (e.g.,., P2R Projector, Gully and Stream Bank Toolbox) and substantial investment in improving the functionality of existing tools (P2R and Source). While this has resulted in improved data analysis outcomes and knowledge, it has also led to some frustration and inefficiencies as delivery partners respond to changing requirements and requests often with limited provision of technical assistance and training support. This is exacerbated when delivery partners work with multiple investors each with slightly different requirements and expectations.

Continue effort and consensus is required to improve the quantification and understanding (and communication) of the various gully and streambank, and hillslope management responses and methods for calculation of realistic load reductions. The standardisation of terminology so all partners are all talking the same language is also important. The P2R Projector tool is now being increasingly used and is helping to

improve the integration. Increasingly it is also becoming important to develop agreed methods to quantify erosion rates over time and the likelihood of partial adoption and dis-adoption.

There is a reported negative impact on landholder willingness to participate when there are limited and timely feedback loops of short-term outcome and impact. There is a growing demand for real-time information to support effective and efficient decision making and program improvements. The GBRF through the Reef Trust Partnership have developed fit-for-purpose tools to capture and report project performance information in real time and in user friendly platforms. See also recommendation 11.

Recommendation 21.	*Continue to prioritise and invest in an integrated suite of decision support tools, that are consistently applied across investors and delivery partners. Future tools need to be purpose-built around a clear need and clarity regarding the core purpose of the proposed tool and with substantial engagement across a range of end users as well as supporting agencies.*
Recommendation 22.	*Ensure each Reef tool has agreed standards and considerations for ongoing data collection and reporting, have fit-for-purpose long-term maintenance programs in place that ensures the latest data is accessible and can be used to influence decision making, and enable appropriate access for investors and key program partners.*
Recommendation 23.	*Individual tools require a fit-for-purpose governance structure to ensure transparency and to ensure clear communication and coordination with other stakeholders. P2R Projector provides a good example as it has a steering committee providing oversight, a clear maintenance contract, and a schedule of capacity building and training processes which includes the provision of technical advice to end users.*
Recommendation 24.	*Upgrades and improvements to Reef tools are released in a systematic manner and at intervals that has minimal impact on delivery partners (e.g., every two years). Upgrades are supported by a comprehensive communication and training program and sequenced so as to be seamlessly incorporated into projects in progress.*
Recommendation 25.	*Tools and associated data collection required during the course of project delivery need to be clearly identified up front either in project guidelines and/or funding agreements to ensure delivery partners account for the necessary resources in their budgets and project teams.*
Recommendation 26.	*Ensure delivery partners and personnel using the tools have some form of induction or accreditation or have undertaken Department approved training, prior to the first round of progress reporting.*

It is also acknowledged that some flexibility is required to enable innovation and accommodate novel project design and delivery, however any requests to move away from recommended tools and approaches should be approved or endorsed by the relevant Technical Advisory Group. This outcome should also be recognised in the project's MERI plan to ensure appropriate monitoring and reporting of these activities.

7.8 Coordination and collaboration (Recommendation 27)

The evaluation identified that there is some, albeit ad hoc coordination happening between Reef project delivery partners as well as some challenges and opportunities for project coordination and collaboration. This was most observable at the regional scale where multiple water quality projects are being delivered in high priority catchments. A lack of coordination can cause multiple issues such as inefficiency, competition among proponents, inconsistent messaging, and stakeholder fatigue.

These challenges have also been documented in the review report of practice change, education, and extension in Reef Catchments (Coutts, 2017), the Regional Extension Coordination Collaboration Report (Hardy, 2019) and the evaluation of the QRWQP (Alluvium, 2022). Conversely, there are multiple benefits for successful coordination at a regional scale, such as working with regional stakeholders to prioritise effort where significant outcomes are likely to be attained and creating project efficiencies through resource and knowledge sharing.

Recommendation 27:	*Maintain and expand the Regional Partnership Coordinator role (established by GBRF in their water quality program) to sit across all investment portfolios in that region*. These positions would have some form of consistent framework to report to support the:* • *evaluation of portfolio impact, efficiency, effectiveness and appropriateness* • *update a common database to enable real-time monitoring and reporting* • *facilitate structured knowledge sharing.*

*It is acknowledged that there may be some locations where the need for project coordination may not meet local needs or represent value for money.

The GBRF Regional Partnership Coordinator role currently:

- supports delivery providers in identifying and connecting with potential partners and other relevant stakeholders, including landholders
- coordinates engagement and alignment between the program and other regional initiatives in order to foster collaboration, deliver co-benefits, maximise synergies and co-investment and minimise duplication and redundancies
- establishes and coordinates a regional partners forum
- develops and implements strategies to address capacity and capability support needs
- participates in the program Steering Committee (Clear Horizon, 2021).

7.9 Capacity and capability (Recommendation 28-32)

There are many and varied definitions of capacity-building – the United Nations been defined capacity building as the process of developing and strengthening the skills, instincts, abilities, processes and resources that organisations and communities need to survive, adapt, and thrive in a fast-changing world (https://www.un.org/en/academic-impact/capacity-building). In the natural resource management world (Coutts, Roberts, and Frost, 2005) describe capacity building as "increasing the abilities or resources of individuals, organisations and communities to manage change". Capacity building occurs across three levels – individual, organisational and institutional – and involves a process of strengthening the abilities of individuals, organisations and systems to undertake a specific activity or program of activity and to continue to advance desired outcomes effectively, efficiently and sustainably (adapted from https://www.aciar.gov.au/capacity-building).

With an increasing number and diversity of landholders, delivery partners and service providers playing a role in Reef water quality improvement, there is an ongoing need to better understand the state of capacity (i.e., skills and knowledge) and capability to deliver agreed outcomes (e.g., resources, attitude, motivation, willingness) required at the individual, organisational and institutional level to enable the sustainable adoption of management practice change. It should not be assumed that all delivery partners, landholders or service providers will have the necessary context and understanding (technical and management) to support effective and efficient project design, delivery and reporting.

Recommendation 28.	*Work with the existing Regional Extension Coordinators funded by the Queensland Government to continue to assess, identify and prioritise individual capacity building needs of landholders, industry stakeholders, and service providers. This knowledge base is ideally used to inform the prioritisation of investment in social capital building projects.*
Recommendation 29.	*Provide new delivery partners and/or new staff of existing delivery partners with some form of induction or onboarding as part of project inception. Key topics include:* • *High level Reef governance arrangements and key threats (i.e., why is water quality a priority)* • *Expectations and how to develop meaningful MERI plans and adaptive management processes* • *Reporting and communication expectations including use of MERIT (or equivalent) and P2R reporting* • *Where to find key resources and support.*

Secondly, there is no agreed framework or indicators to measure or report on capacity change. There are also no established baselines by which you can compare a change in specific skill. Supportive legacy outcomes (Natural Decisions , 2021) have been used to enable some comparable measure of capacity change. The legacy assessment framework identifies the important of capacity, commitment and use of tools as key supporting outcomes to enable enduring adoption (Figure 13).

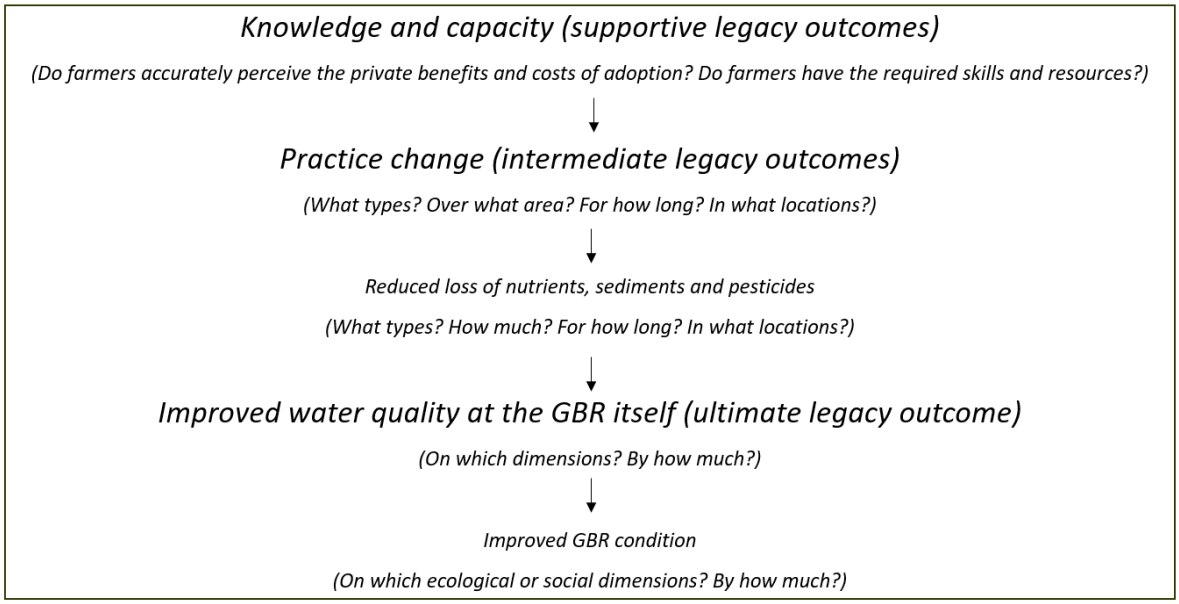


Figure 13. *Chain between practice change and ultimate outcomes. (Source: Natural Decisions , 2021).*

Recommendation 30.	*Continue to work with other Reef investors and subject matter experts to build an understanding of what influences the achievement of enduring adoption and legacy, how it can be measured and what indicators and metrics can be developed and consistently rolled out by delivery partners.*
Recommendation 31.	*Findings linked to Recommendation 29 and other research activities should be progressively built into funding submissions, that is delivery partners must be able to detail how the adoption of critical management practice activities by landholders will be supported, and how the long-term maintenance will be addressed (i.e., how, by whom and when)*
Recommendation 32.	*Agreed short-term outcomes and associated indicators relating to adoption and maintenance should be built into project level MERI plans. See also section 7.4.2.*

7.10 Procurement and administration (Recommendation 33)

Maintaining the flexibility of the Reef Trust Special Account will be essential to continue to enable a truly adaptive investment program. New information regarding management response efficacy, behaviour change, opportunities for delivering multiple benefits, funding arrangements, driving enduring legacy, and program administration is continuously being gained. Reef Trust has played an important leadership role in testing new concepts such as Reverse tenders/auctions, for example, where industry may be unwilling to invest in high risk activities or where the outcomes are predominantly in the public's interest.

This evaluation has identified that the selection of delivery mechanism needs to follow the selection of investment priority and/or outcome. For example, the reverse tenders/auctions have been found to perform strongly for DIN abatement and can be targeted to specific landholders or geographies.

Recommendation 33.	*Apply fit-for-purpose delivery mechanisms and procurement processes that aligns primarily to the targeted primary management response and primary desired outcome (see Section 7.2). The table below provides more specific procurement guidance:*
Management outcome / investment portfolio	***Suggested delivery mechanisms / investment approach***
Research and development	*Split between:* *a) Direct negotiation with credible research providers to deliver a specific research activity that has previously been identified and prioritised e.g., by the ISP* *b) Open competitive grants to address known knowledge gaps and drive knowledge advancement and transformative innovation.*
Landscape repair	*Open invitation to submit Expressions of Interest using competitive grants process to address specific investment criteria and guidelines.* *Successful EoI submissions receive small or seed grants and are invited to further develop, in collaboration with key stakeholders (including DCCEEW and TAG representatives), detailed proposals and project plans This could be in the form of individual projects or regional programs of integrated sub-projects.* *Final project agreements are directly negotiated with delivery partners. Ideally, the timing for finalising agreements is open (i.e., not within a specified funding window).* *Opportunities for First Nations organisations to deliver these programs should be promoted.*
Land and catchment management practice adoption (for sediment, nutrients and pesticides)	*Split between:* *a) Open invitation to submit Expressions of Interest using competitive grants process to address specific investment criteria and guidelines.* *Successful EoI submissions receive small or seed grants and are invited to further develop, in collaboration with key stakeholders (including DCCEEW and TAG representatives), detailed proposals and project plans This could be in the form of individual projects or regional programs of integrated sub-projects.* *Final project agreements are directly negotiated with delivery partners. Ideally, the timing for finalising agreements is open (i.e., not within a specified funding window).* *b) Smaller open competitive 'community-grants' to enable investment in specific priorities and/or locations.* *Opportunities for First Nations organisations to deliver these programs should be promoted.*
Land and catchment management practice adoption (nutrients and pesticides)	*Reverse tenders/auctions coordinated via a single deliver partner*
Natural (green) asset maintenance	*Open competitive grants at a regional or sub-catchment scale. i.e., one delivery partner to provide an integrated and coordinated work program. Opportunities for First Nations organisations to deliver these programs should be promoted.* *Or* *Regional Land Partnership agreements.*

Social capital maintenance	*Balance between:* *a) Open invitation to submit Expressions of Interest using competitive grants process to address specific investment criteria and guidelines.* *Successful EoI submissions receive small or seed grants and are invited to further develop, in collaboration with key stakeholders (including DCCEEW and TAG representatives), detailed proposals and project plans This could be in the form of individual projects or regional programs of integrated sub-projects.* *Final project agreements are directly negotiated with delivery partners. Ideally, the timing for finalising agreements is open (i.e., not within a specified funding window).* *b) Open competitive grants at a regional or sub-catchment scale. i.e., one delivery partner to provide an integrated and coordinated work program.*
Monitoring and assessment (of agreed indicators)	*Direct negotiation with credible research providers that can demonstrate a unique offering in a specific field of work.* *Or* *Open competitive grants at a regional or sub-catchment scale. i.e., one delivery partner to provide an integrated and coordinated work program. Opportunities for First Nations organisations to deliver these programs should be promoted.*
Technical advice / TAGs	*Expressions of interest by individuals (not organisations) followed by a direct negotiation of an agreement to sit on a TAG for a defined period (e.g., three years). Opportunities for First Nations peoples to sit on a TAG should be promoted.*

7.11 Project design and implementation (Recommendations 34-36)

Section 5.2.5 identifies a wide range of lessons identified by delivery partners and project stakeholders that relate to improving the effectiveness and efficiency of project design and implementation. Many of these have been previously identified as challenges or opportunities for delivery partners in numerous other evaluations of Reef related projects such as the QRWQP evaluation (Alluvium, 2021), the Reef management synthesis (Alluvium, 2020), the review report of practice change, education, and extension in Reef Catchments (Coutts, 2017), and the Regional Extension Coordination Collaboration Report (Hardy, 2019), as well as other non-Reef related evaluations such as the evaluation of the Natural Resource Investment Program NRIP (EcoFutures, 2021).

In particular, many of these findings and central themes are largely consistent with or sit within the ten management principles for successful design and delivery of Reef projects (Alluvium,2020) which is summarised in Figure 14.

During the evaluation, it was also apparent that a vast number of resources have been developed in individual projects such as factsheets, videos, template plans for nutrient management and property management and the like. The development of such resources is time consuming and there is likely to be similar content across projects. However, there is no common platform where the resources that have been developed through the Reef Trust program and other investment programs are housed. This is a missed opportunity to capture lessons learnt and create inefficiencies across program delivery.

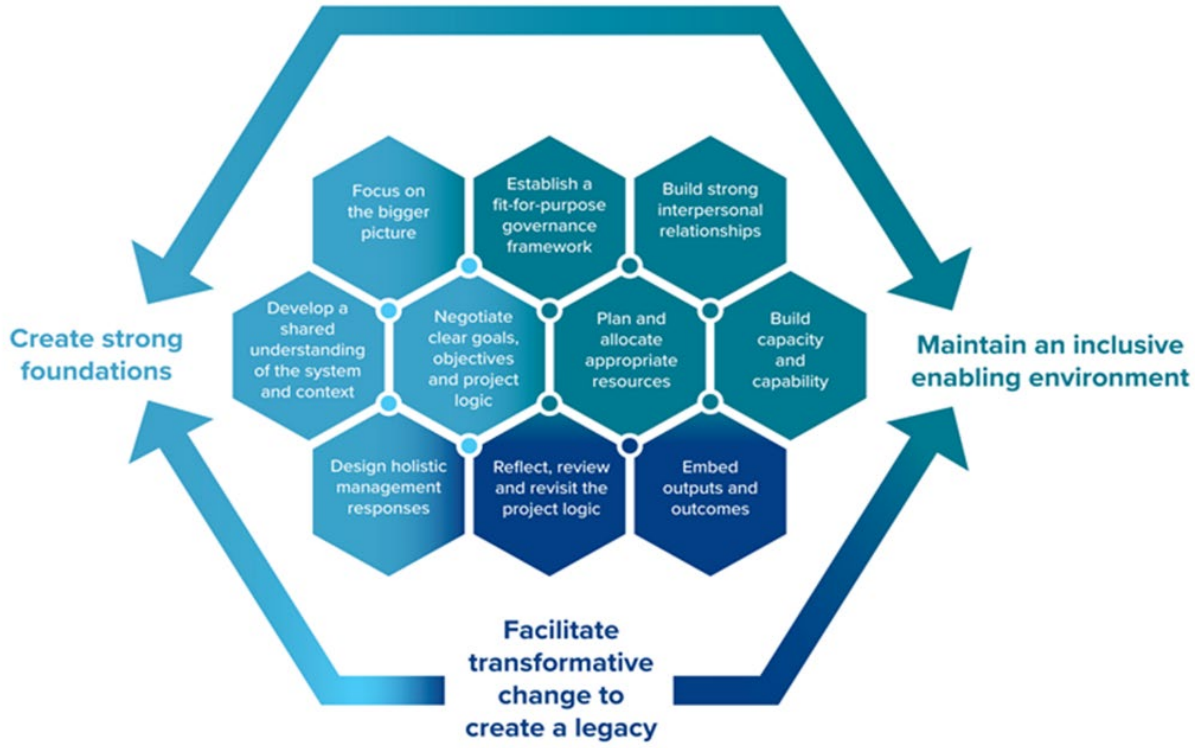


Figure 14. *Management synthesis framework* (Alluvium, 2020)

Supporting project partners to design and deliver successful projects relies on sharing lessons, and building the capacity of individual and organisations. This can be facilitated in numerous ways such as by providing opportunities for training, support and advice, and by providing access to resources and tools.

Recommendation 34.	*As part of the proposed building and maintaining social capacity investment portfolio, enable delivery partners in critical networking roles to apply for funding that allows them to 'maintain' outcomes in the region between project delivery so that they may maintain existing relationships and networks with landholders, continue regional planning and coordination, and subsequently maintain extension capacity in the region. See also recommendation 2.*
Recommendation 35.	*Adequately resource Regional partnership coordinators (if implemented) to promote information sharing and to support individual delivery partners to integrate best practice project design and delivery approaches (i.e. as identified in the Management synthesis framework).*
Recommendation 36.	*Collaborate with other Reef investors to review and integrate the lessons and findings on project design and delivery to enable shared learning for existing and new delivery partners, e.g., by updating the Management Synthesis for Reef Programs and Projects and revisiting the possible investment of the proposed Reef Project design website concept (Alluvium, 2020)*

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Appendix A. Project summary – expanded view

Appendix A - Project summary – expanded view

Project #	Project name (Contract)	Delivery partner	Reef region	RT investment ($)	Start date	End date	# years	Project type (maturity)	Commodity/ landuse	Water quality / WQIP focus	P2R Area of practice change (ha)	Tonnes of sediment saved	DIN kg	Primary management response	Delivery Mechanism
RT1.01	Reef Trust Tender - Wet Tropics	Terrain NRM	Wet Tropics	$1,704,313	2/09/2014	30/03/2018	4	R&D/Pilot	Sugar cane	DIN	19,278		31,167	Intensive agriculture, nutrient management practice change	Reef Trust Tender / Reverse Auction
RT1.02	Promotion of A-class Grazing (Burdekin and Fitzroy Regions)	Department of Environment and Science	Burdekin Dry Tropics	$3,000,000	22/01/2015	31/12/2018	3	R&D/Pilot	Grazing	Sediment	44,085	2,046		Grazing, sediment (hillslope) management practice change	Direct invite to delivery partner
RT2.01	Fifty percent reduction in gully erosion from high priority sub catchments in the Normanby	Cape York NRM	Cape York	$708,248	13/06/2017	30/06/2022	5	R&D/Pilot	Grazing	Sediment	360	556		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.02	Gully prevention and remediation over 11,000 ha on Normanby River, Kings Plains	The Trustee for SOUTH ENDEAVOUR TRUST	Cape York	$304,400	6/05/2016	30/06/2019	3	R&D/Pilot	Grazing	Sediment	44,139	18,030		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.03	Technical support for Reef Trust Gully Erosion Control Program (procurement & phase 2)	CSIRO		$525,608				R&D/Pilot	Grazing	Sediment	-	-	-	Sediment, technical assistance	Technical assistance through competitive tender
RT2.04	Point Source Sediment Management in the Burdekin Dry Tropics NRM region - East Burdekin	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$906,000	6/05/2016	30/06/2019	3	Standard	Grazing	Sediment	-	80		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.05	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Theresa	Fitzroy Basin Association Inc	Fitzroy	$702,884	21/03/2016	30/06/2019	3	Standard	Grazing	Sediment	6,473	56		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.06	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Fitzroy	Fitzroy Basin Association Inc	Fitzroy	$702,884	5/05/2016	30/06/2019	3	Standard	Grazing	Sediment	1,090	1,906		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.07	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Mackenzie	Fitzroy Basin Association Inc	Fitzroy	$702,884	5/05/2016	30/06/2019	3	Standard	Grazing	Sediment	1,504	181		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.08	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management - Isaac	Fitzroy Basin Association Inc	Fitzroy	$702,884	21/03/2016	30/06/2019	3	Standard	Grazing	Sediment	1,598	179		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants

Project #	Project name (Contract)	Delivery partner	Reef region	RT investment ($)	Start date	End date	# years	Project type (maturity)	Commodity/ landuse	Water quality / WQIP focus	P2R Area of practice change (ha)	Tonnes of sediment saved	DIN kg	Primary management response	Delivery Mechanism
RT2.09	Don River Catchment Sediment Reduction Project: Improving GBR water quality.	Greening Australia	Burdekin Dry Tropics	$962,550	21/03/2016	30/06/2019	3	R&D/Pilot	Grazing	Sediment	262	51		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.10	Gully management in highly erodible sub-catchments of the Mary River Catchment	MRCCC	Burnett Mary	$808,760	21/03/2016	30/06/2019	3	Standard	Grazing	Sediment	172	810		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.11	Point Source Sediment Management in the Burdekin Dry Tropics NRM Region	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$906,000	21/03/2016	30/06/2019	3	R&D/Pilot	Grazing	Sediment	2,114	565		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT2.12	Reef Trust Tender - Burdekin	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$3,137,527	18/09/2015	28/02/2020	4.5	R&D/Pilot	Sugar cane	DIN	9,217		21,331	Intensive agriculture, nutrient management practice change	Reef Trust Tender / Reverse Auction
RT3.01	Project Catalyst Revamp - game changing farm management practices	Catchment Solutions	Wet Tropics Burdekin Mackay Whitsundays	$3,000,000	6/05/2016	30/06/2019	3	Franchise	Sugar cane	DIN	8,303		12,906	Intensive agriculture, nutrient management practice change	Targeted competitive grants
RT3.02	Reef Alliance – Growing a Great Barrier Reef HORTICULTURE	Queensland Farmers' Federation	Burnett Mary Fitzroy Burdekin Cape York Wet Tropics	$2,400,000	6/05/2016	13/12/2019	3.5	Standard	Horticulture - Bananas	DIN, Sediment & Pesticides	-	-	-	Intensive agriculture, nutrient management practice change	Targeted competitive grants
RT3.03	Reef Alliance – Growing a Great Barrier Reef CANE	Queensland Farmers' Federation	Burnett Mary Burdekin Wet Tropics	$17,574,999	6/05/2016	13/12/2019	3.5	Standard	Cane	DIN	101,683		148,541	Intensive agriculture, nutrient management practice change	Targeted competitive grants
RT3.04	Reef Alliance – Growing a Great Barrier Reef DAIRY	Queensland Farmers' Federation	Burnett Mary Wet Tropics	$500,000	6/05/2016	13/12/2019	3.5	Standard	Dairy	DIN	-	-	-	Combined pollutant management practice change	Targeted competitive grants
RT3.05	Reef Alliance – Growing a Great Barrier Reef GRAIN	Queensland Farmers' Federation	Cape York Burdekin Dry Tropics Fitzroy Burnett Mary	$3,600,000	6/05/2016	13/12/2019	3.5	Standard	Grain	Sediment	48,940	732		Intensive agriculture, nutrient management practice change	Targeted competitive grants
RT3.06	Reef Alliance – Growing a Great Barrier Reef GRAZING	Queensland Farmers' Federation	Cape York Burdekin Dry Tropics Fitzroy Burnett Mary	$21,592,000	6/05/2016	13/12/2019	3.5	Standard	Grazing	Sediment	1,373,024	46,569		Grazing, sediment (hillslope) management practice change	Targeted competitive grants
RT3.07	Mackay Whitsunday Isaac Sustainable Agriculture Cane	Reef Catchments	Mackay-Whitsunday	$4,425,000	6/05/2016	30/06/2019	3	Standard	Sugarcane	DIN	44,138		8,294	Intensive agriculture, nutrient management practice change	Targeted competitive grants
RT3.08	Project Pioneer: Innovation in Grazing Land Management	Resource Consulting Services	Cape York Burdekin Fitzroy Burnett Mary	$2,908,000	6/05/2016	30/06/2019	3	R&D/Pilot	Grazing	Sediment	598,990	12,736		Grazing, sediment (hillslope) management practice change	Targeted competitive grants
RT4.01	Reef Trust Repeated Tenders - Wet Tropics	Terrain NRM on behalf WTSIP	Wet Tropics	$6,719,020	18/11/2016	30/06/2023	7	Standard	Sugarcane	DIN	-		76,764	Intensive agriculture, nutrient management practice change	Reverse tender / auction

Project #	Project name (Contract)	Delivery partner	Reef region	RT investment ($)	Start date	End date	# years	Project type (maturity)	Commodity/ landuse	Water quality / WQIP focus	P2R Area of practice change (ha)	Tonnes of sediment saved	DIN kg	Primary management response	Delivery Mechanism
RT4.02	Reef Trust Repeated Tenders - Dry Tropics	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$7,381,889	18/11/2016	30/06/2023	7	Standard	Sugarcane	DIN	-		28,841	Intensive agriculture, nutrient management practice change	Reverse tender / auction
RT4.03	Support of cane farmer trials of enhanced efficiency fertilisers in the catchments of the Great Barrier Reef	Queensland Canegrowers Organisation L td	Burnett Mary, Burdekin, Mackay-Whitsunday , Fitzroy and Wet Tropics	$5,000,000	1/05/2017	30/06/2021	4	R&D/Pilot	Sugarcane	DIN	-		-	Intensive agriculture, nutrient management practice change	Direct invite to delivery partner
RT4.04	GRZ'M. Great Barrier Reef Riparian Zone Management - a Mary project	Mary River Catchment Coordinating Committee (MRCCC)	Burnett Mary	$3,027,000	7/06/2017	30/06/2022	5	R&D/Pilot	Grazing, sugarcane and dairy	Sediment	7		11,934	Grazing, sediment (hillslope) management practice change	Targeted competitive grants
RT4.05	Streambank remediation in priority areas	Cape York NRM	Cape York	$4,000,000	7/06/2017	30/06/2022	5	R&D/Pilot	Grazing	Sediment and other landuse and catchment targets	23	482		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.06	Fitzroy subcatchment gully and stream bank erosion control program	Catchment Solutions	Fitzroy	$3,891,070	22/05/2017	30/06/2022	5	Standard	Grazing	Sediment	2,296	6,648		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.07	Stream bank and gully erosion control through improved practices in the Fitzroy	Fitzroy Basin Association Inc	Fitzroy	$3,867,325	2/06/2017	30/06/2022	5	Standard	Grazing	Sediment	819	6,037		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.08	Improving reef water quality through Herbert River catchments & gully remediation	Terrain NRM	Wet Tropics	$2,974,773	7/06/2017	30/06/2022	5	Standard	Grazing	Sediment	631	828		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.09	Gully restoration in priority reaches to improve water quality in the GBR	Greening Australia	Burdekin Dry Tropics	$3,770,000	24/05/2017	29/06/2022	5	Standard	Grazing	Sediment	225	3,512		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.10	Laura Gullies Project, fix up and skills for the future	National Indigenous Pastoral Enterprises Pty Ltd (Indigenous Land and Sea Rangers Corporation)	Cape York	$2,065,000	13/06/2017	30/06/2022	5	Standard	Grazing	Sediment	7,770	1,222		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.11	Stomping out Sediment in the Burdekin - livestock impact for gully remediation	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$2,000,000	7/06/2017	30/06/2022	5	Standard	Grazing	Sediment	1,186	1,664		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.12	High priority stream bank erosion control in the Mackay Whitsunday	Reef Catchments	Mackay-Whitsunday	$4,000,000	13/06/2017	30/06/2022	5	Standard	Grazing	Sediment	-	8,295		Grazing, sediment management (gully & streambank) landscape repair	Targeted competitive grants
RT4.13	Technical support for Reef Trust Gully and Stream Bank Erosion Control Program	CSIRO	All	$2,383,000	1/08/2016	1/06/2022	6	R&D/Pilot	Grazing	Sediment	-	-	-	Sediment, technical assistance	Technical assistance through competitive tender

Project #	Project name (Contract)	Delivery partner	Reef region	RT investment ($)	Start date	End date	# years	Project type (maturity)	Commodity/ landuse	Water quality / WQIP focus	P2R Area of practice change (ha)	Tonnes of sediment saved	DIN kg	Primary management response	Delivery Mechanism
RT5.01	Project Uplift Farming Systems Initiative	MSF Sugar	Burdekin Dry Tropics Wet Tropics Burnett Mary	$4,520,780	30/03/2017	30/06/2022	5	R&D/Pilot	Sugarcane	DIN, sediment, pesticide	11,340		52,532	Intensive agriculture, nutrient management practice change	Direct invite to delivery partner
RT6.01	Delivering tailored solutions to Mackay-Whitsunday growers supporting improved farm management and profitability (Central Region - CR161)	Department of Environment and Science	Mackay-Whitsunday	$3,384,258	11/04/2018	30/04/2022	4	Franchise	Sugar cane	DIN			5,175	Intensive agriculture, nutrient management practice change	Direct co-investment
RT7.01	Improving land management practices and water quality in the Burnett River catchment	Burnett Mary Regional Group (BMRG)	Burnett Mary	$6,099,986	4/01/2021	30/06/2023	2.5	Standard	Grazing	Sediment	-	15,000		Grazing, sediment management (gully & streambank) landscape repair	Regional Land Partnership (RLP) - competitive tender
RT7.02	Water quality and soil improvements in grazing and cropping enterprises in the Fitzroy	Fitzroy Basin Association Inc	Fitzroy	$5,700,000	8/01/2021	30/06/2023	2.5	Standard	Grazing and grain growers	Sediment	-	-	-	Grazing, sediment (hillslope) management practice change	Regional Land Partnership (RLP) - competitive tender
RT7.03	Broadscale adoption of "Tried and Tested' innovative precision agriculture techniques for improved use of nutrient, water and pesticide	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$4,100,000	4/01/2021	30/06/2023	2.5	Standard	Sugarcane	DIN	-		10,000 DIN 12 pesticides	Intensive agriculture, nutrient management practice change	Regional Land Partnership (RLP) - competitive tender
RT7.04	Streambank remediation in the Burdekin catchment	NQ Dry Tropics Ltd	Burdekin Dry Tropics	$2,900,000	4/01/2021	30/06/2023	2.5	Standard	Grazing	Sediment, Particulate Phosphorus and DIN	-	6,178	826 particulate N; 505 particulate P	Grazing, sediment management (gully & streambank) landscape repair	Regional Land Partnership (RLP) - competitive tender
RT7.05	Targeted support to maximise soil, biodiversity and vegetation outcomes in the O'Connell and Proserpine Basins of the Mackay Whitsundays	Reef Catchments	Mackay-Whitsunday	$5,400,000	4/01/2021	30/06/2023	2.5	Standard	Grazing/Sugarcane	Sediment/DIN /Pesticides	-	1,500	14,000 DIN and pesticides	Combined pollutant management practice change	Regional Land Partnership (RLP) - competitive tender
RT7.06	Mobilising the Murray and Mossman: an integrated place-based program delivering the step-change that is needed for the Reef	NQ NRM Alliance Ltd	Wet Tropics	$5,612,947	4/01/2021	30/06/2023	2.5	Standard	Growers/Sugarcane	DIN	-			Intensive agriculture, nutrient management practice change	Regional Land Partnership (RLP) - competitive tender

Appendix B. Evaluation Plan

Appendix C. First pass assessment findings

Appendix D. Delivery partner survey

Appendix E. Generic survey