

Reef Trust Partnership



Investment Strategy



Australian Government

REEF TRUST



Great Barrier
Reef Foundation

FOREWORD

First nations people of Australia continue an age old long established spiritual and physical bond with the Great Barrier Reef that has existed for over 60,000 years. The Reef is a place that is highly significant for sustaining cultural celebration and community wellbeing for over 70 Traditional Owner groups. Recent events occurring on the Reef, both natural and manmade, have had a disastrous impact on its state of health. Our tears of joy when connecting with the reef as young people has turned to tears of deep sadness as elders. We watch this wonder of the natural world show us that it needs our immediate care.

We the first nations people of Australia send an urgent call to all people of the world to please give us your help to turn back the clock of deterioration.

We believe it is no longer a question of resilience but a desperate need for intervention. With deep respect, we call out to all global citizens and international story tellers who have, in the past, and wish to in the future, experience the majesty of the Reef, to walk with us on this journey of courage, to give back her dignity, by nursing her back to health.

We the first nations people of Australia, acknowledge the Great Barrier Reef World Heritage Area is a natural wonder and a global asset and as such requires solutions to come from the global village to stop this tragedy from happening in our lifetimes. Let us be a generation of action and restoration. We must ensure the universal songlines of the Great Barrier Reef continue to endure for many generations to come.

Indigenous Reef Advisory Committee
(Great Barrier Reef Marine Park Authority) 2017

Acknowledgement

This strategy has been developed with the collective input of many individuals including those from the Great Barrier Reef Marine Park Authority, Australian Government, Queensland Government, the Reef 2050 Plan Independent Expert Panel, the Reef 2050 Advisory Committee, Australian Institute of Marine Science, James Cook University, CSIRO, Queensland University of Technology, University of Queensland, National Environmental Science Program Tropical Water Quality Hub, regional natural resource management organisations, Traditional Owner groups, community groups, citizen science groups, peak bodies, local government, and industry (tourism, agriculture).

Thank you so much for your commitment and dedication to the protection and restoration of the Great Barrier Reef and your contributions to the Reef Trust Partnership Investment Strategy.

The GBRF recognises Aboriginal and Torres Strait Islander peoples are the Traditional Owners of the Great Barrier Reef. We are committed to meaningful collaboration and engagement with Reef Traditional Owners throughout the delivery of the Reef Trust Partnership, including the co-design of policies, programs and investments.

Contents

Purpose of the Investment Strategy	4	Community Reef Protection	25
About the Reef Trust Partnership	5	What is the challenge?	25
About the Portfolio	7	What can be done?	25
Science and Innovation	8	Investment Strategy Priorities	26
Communication and Engagement	11	Strengthening and accelerating on-ground action	26
Sustainable Financing	11	Connecting community with decision making	26
Community and Traditional Owner Reef Protection	13	Building understanding, unity and hope	27
Component Level Investment Strategies	14	Fostering enduring funding, next-generation participation and partnerships	27
Water Quality Activities	15	Traditional Owner Reef Protection	28
What is the challenge?	15	What is the challenge?	28
What can be done?	16	What can be done?	29
Investment Strategy Priorities	17	Investment Strategy Priorities	29
Investment in on-ground actions	17	Land and sea action and investment planning	29
Investment in system-level change and innovation	17	Active Traditional Owner-led Reef protection measures	30
Crown-of-Thorns Starfish Control	19	Indigenous innovation, leadership and collaboration	30
What is the challenge?	19	Sustainable funding options	30
What can be done?	19	Integrated Monitoring and Reporting	31
Investment Strategy Priorities	21	What is the challenge?	31
Support existing in-water COTS control and drive towards improved efficiency	21	What can be done?	31
Lead a step change in surveillance for early COTS detection and early intervention	21	Investment Strategy Priorities	32
Explore alternative (non-manual) control methods to address COTS management at a broad scale in the future	21	Supporting critical monitoring activities identified via RIMREP	32
Reef Restoration and Adaptation Science	22	Catalysing technological innovation	32
What is the challenge?	22	A Reef-wide decision-making and forecasting platform	33
What can be done?	22	Understanding the value of community stewardship and disclosure of high-value information	33
Investment Strategy Priorities	23	Supporting partnerships and building a community of practice	33
Research and development to boost new intervention methods	23	Where to from here?	34
The social licence to operate	23	Appendix 1: Alignment of Reef Trust Partnership Activity Components with the revised Reef 2050 Plan (July 2018)	35
The right science and models underpinning the right decisions	23	Appendix 2: Guiding Principles for the Reef Trust Partnership	40
Making interventions a reality on the Great Barrier Reef	24		

Purpose of the Investment Strategy

The Reef Trust – Great Barrier Reef Foundation Partnership (Partnership) is a \$443.3 million six year grant between the Department of the Environment and Energy, which manages the Reef Trust, and the Foundation. It has been established to build on and support delivery of the joint Australian and Queensland Government Reef 2050 Long-term Sustainability Plan (Reef 2050 Plan).

The purpose of this document is to outline a high-level roadmap for the Partnership to deliver on each of the priority Components included in the Grant Agreement. The Investment Strategy includes core pillars around which all Components will revolve; key challenges and opportunities; and major themes to inform the next layer of work.

Detailed annual work plans will be developed for each Component – namely, Water Quality (\$201 million), Crown-of-Thorns Starfish Control (\$58 million), Reef Restoration and Adaptation Science (\$100 million), Traditional Owner and Community Reef Protection (\$22 million) and Integrated Monitoring and Reporting (\$40 million).

These detailed work plans will be developed throughout the first half of 2019 and completed by 30 June 2019 in accordance with the Grant Agreement. Subsequent work plans will be produced annually for the life of the Partnership. The Investment Strategy is a living document that will be updated and refined as the Partnership is delivered through an adaptive management approach.

There has been considerable consultation in the development of the Investment Strategy including with the Reef 2050 Plan Independent Expert Panel, Reef 2050 Advisory Committee, Department of the Environment and Energy, Queensland Government, Great Barrier Reef Marine Park Authority, community, industry, research organisations and Traditional Owners.

The Foundation’s broader network of experts, Partnership Management Committee, International Scientific Advisory Committee and Board also provided input and expertise throughout its development.

The scope of the Investment Strategy should be seen in the context of Schedule 2, Component 1 (Administrative Activities), Clause 1.2.1 (Scaling Up Activities) of the Grant Agreement.

The Investment Strategy should also be read in the context of, and seeks to incorporate elements from, other published plans including the Consultation Plan,

Governance Arrangements, Resourcing Plan, Communication and Engagement Plan, Collaborative Investment Strategy, and Monitoring and Evaluation Plan.

Figure 1: The Investment Strategy is one of a series of plans which underpins the Reef Trust Partnership



The Great Barrier Reef Foundation (Foundation) serves as the Commonwealth’s partner in the design, delivery and management of the Partnership.

We look forward to continuing to engage with partners and the Australian community on the development of the detailed Annual Work Plans, and hope this document serves to inspire the broader Reef community to participate in the activities and initiatives to be supported by the Partnership.

About the Reef Trust Partnership



The Great Barrier Reef is one of the most spectacular and wonderful things on the planet. The Reef is celebrated and loved for its beauty, its complexity, and an inherent resilience that has allowed it to thrive and grow over hundreds and thousands of years.

But that resilience is under threat.

The accumulated impacts of climate change, poor water quality and crown-of-thorns starfish outbreaks are having a dramatic and dire effect on the state of our Reef and the recent IPCC Report¹ paints a worrying future. The prognosis is that 99 percent of coral reefs on the planet will be lost in the next 80 years under a 2 degree temperature rise.

This is no longer an issue for future generations – this is happening on our watch and is a challenge for us to solve now. The collapse of the Great Barrier Reef would not only have a terrible environmental and economic consequence on this country – it would be a permanent scar on the Australian psyche.

This is our moment of truth . . . this is a moment for Australia.

The Reef needs a global solution to climate change – the biggest threat it faces. Curbing temperature rises to the lowest thresholds in the Paris Agreement is a must (and arguably we need to do better).

All the science tells us that hand in hand with meeting these targets must be local actions that build the resilience of the Reef – helping it to bounce back and recover. This is where the Partnership's work is primarily focused.

At its core, the Partnership represents an elevation, and escalation of effort. For many years Australia has led the way in marine science, management and conservation.

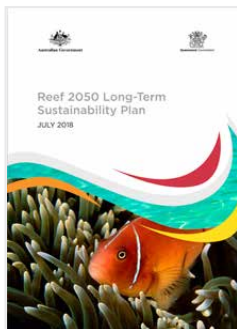
However the harsh reality facing everyone who works in the Reef space is that we are running out of time and what we are doing is not enough.

A landmark Commonwealth grant of \$443M, the largest single grant to the Reef in Australia's history, coupled with an ambitious campaign to grow this investment to up to \$800M through fundraising and partnerships, will deliver the strategic and sustained funding platform to appropriately deliver the scale and urgency of action required.

The Partnership's objectives are now well-established: improving water quality, tackling crown-of-thorns starfish, harnessing science to restore reefs and build resilience and adaptation, enhancing monitoring to manage and report on Reef health and resilience, and enabling greater work by Traditional Owners and the community to protect the Reef.

The goals and objectives of the Partnership are anchored in the Reef 2050 Plan – first conceived in 2015 by the Commonwealth and Queensland Governments as the overarching framework for protecting and managing the Reef until 2050. It was subsequently updated in 2018.

¹ IPCC (2018). Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte et al. (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.



A shared vision

The Reef 2050 Plan provides the overarching framework and shared pathway for Traditional Owners, government agencies, industry, researchers and the broader community to work together for the future of the Reef.

The Partnership operates within the context of the Reef 2050 Plan, including the Reef 2050 Plan Investment Framework, and our approach embodies its principles for protecting the Great Barrier Reef World Heritage Area.

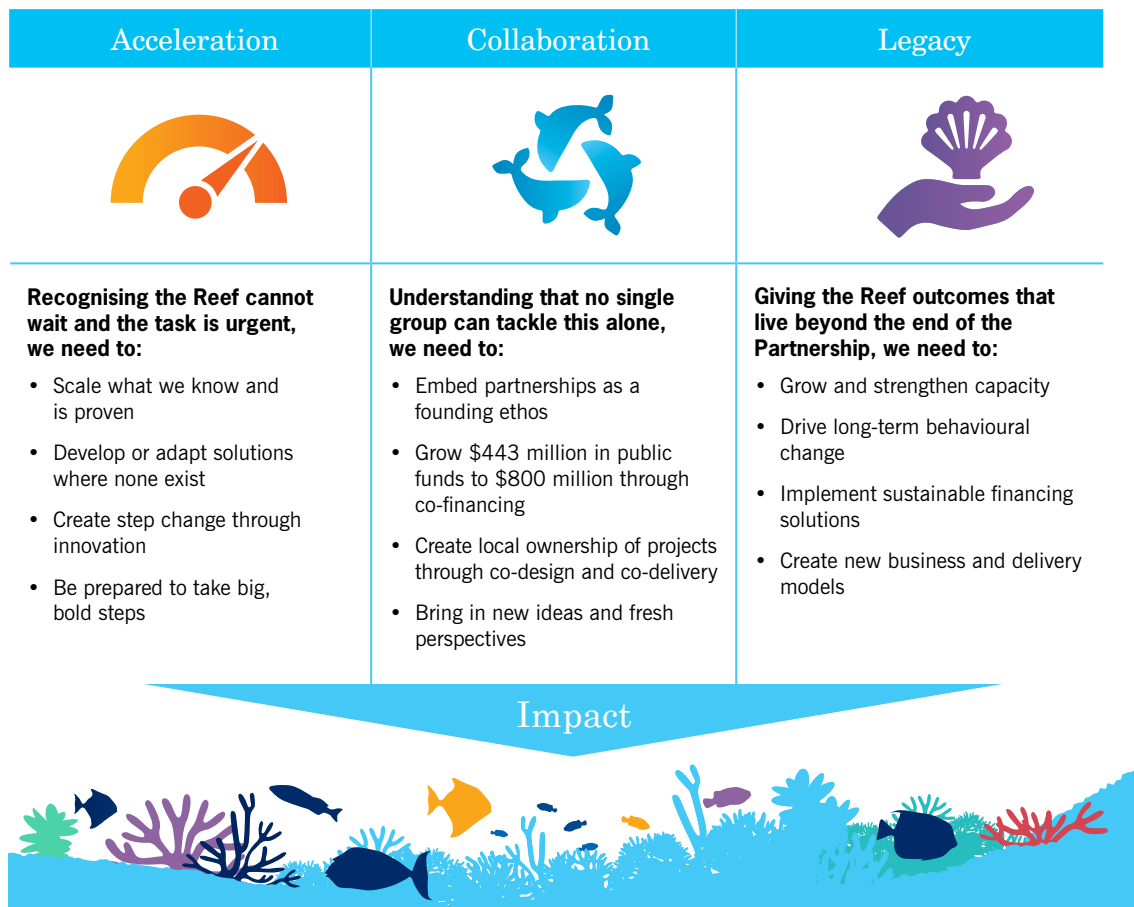
Each of the Partnership components is designed to deliver measurable improvements in the health of the Reef consistent with Reef 2050 Plan outcomes, targets and actions, including initiatives in the Great Barrier Reef Marine Park Authority's Reef Blueprint and actions under the Reef 2050 Water Quality Improvement Plan.

Appendix 1 maps relevant Reef 2050 Plan actions, targets, objectives and outcomes to each of the five Partnership components.

The Partnership brings us all together in one of the most exciting and important collective efforts of our time. It builds on the phenomenal work of many organisations and individuals, accelerating and amplifying their efforts for the benefit of the Reef.

This is not the entire solution – more must be done on climate change and more will need to be done to maintain momentum generated through this Partnership – but it is a turning point and a moment where the solutions will outshine the problems.

Figure 2: The Partnership’s design is structured around three core pillars



The full suite of Guiding Principles that underpin the Partnership is provided in Appendix 2.

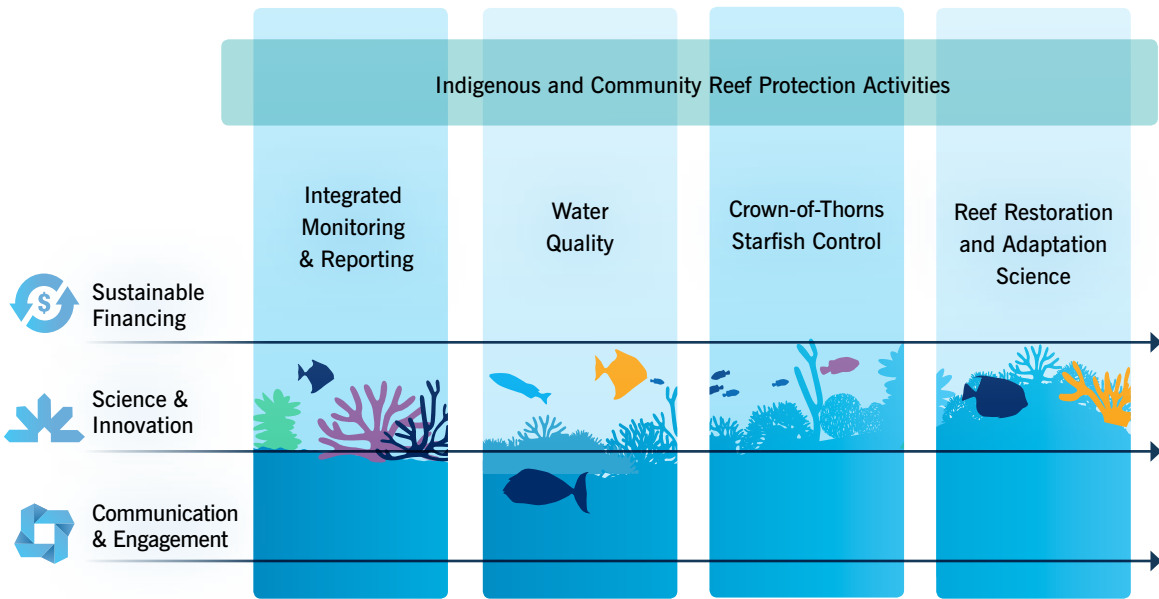
About the Portfolio

The value of the Portfolio is greater than the sum of its Component parts

The Partnership brings five important Components together into one Portfolio. This provides the opportunity for the Portfolio to be designed and delivered in an integrated way, maximising the co-benefits that can be achieved and providing considerable efficiency dividends as outcomes from one component can inform and strengthen the outcomes of others.

In developing the Investment Strategy several cross-cutting themes have emerged that will most benefit the Partnership by being considered at the Portfolio, rather than just at the individual Component, level. These are Science and Innovation, Sustainable Financing, Communication and Engagement, and Indigenous and Community Reef Protection Activities.

Figure 3: Partnership portfolio with cross-cutting themes





Science and Innovation

The Partnership, like the Great Barrier Reef Foundation, has a singular and unencumbered focus on benefiting the Great Barrier Reef, which is the sole measure of merit and reward for its investments.

Apart from the Reef Restoration and Adaptation Science Component, the Partnership investment is largely focused on on-ground action and outcomes. To maximise the impact of individual investments and to deliver benefits most efficiently, projects must be underpinned by the best available science. In some instances, targeted investment in scientific investigations may be required to address critical knowledge gaps.

Some specific challenges will require a step change, a transformation, that can only be achieved through strategic innovation. The Partnership will capitalise on the collaborative platform developed by the

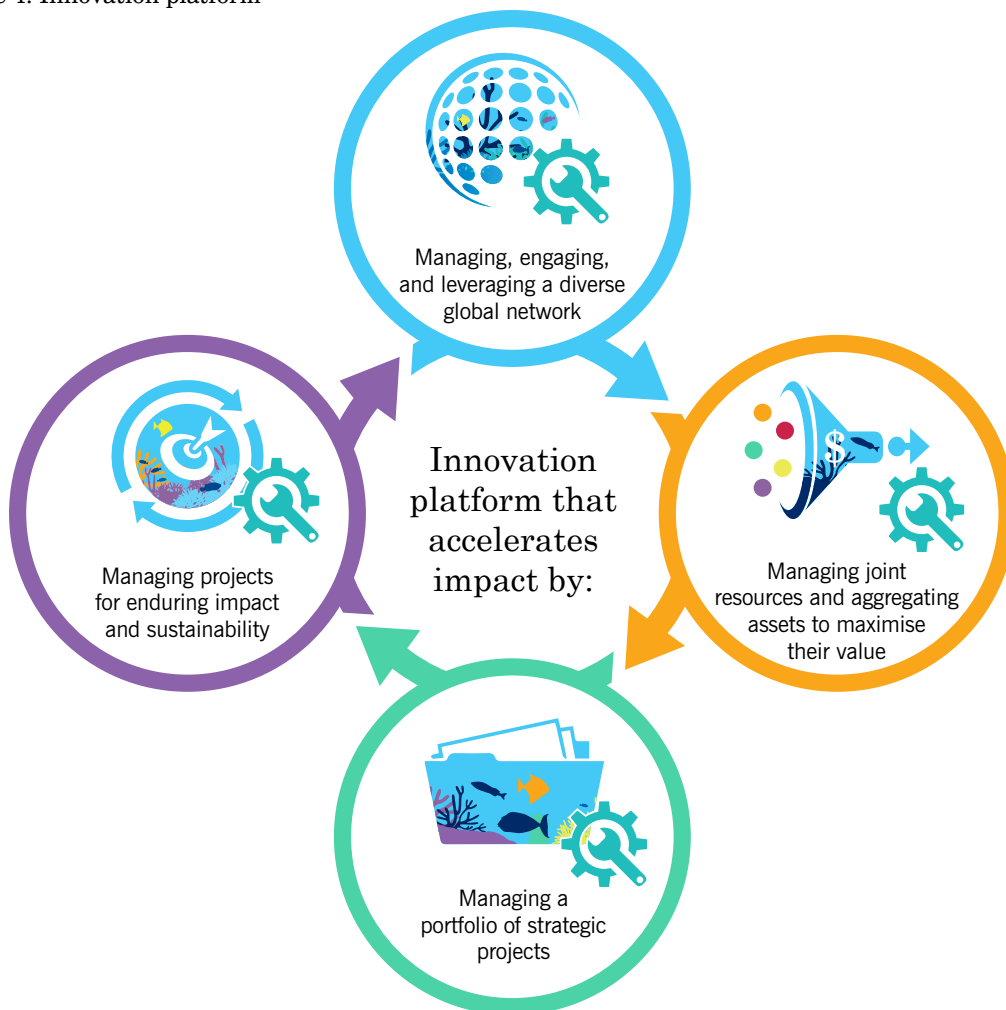
Foundation that catalyses and coordinates innovation to create enduring benefits for the Reef.

In this context the Partnership will drive innovation by managing a strategic portfolio of projects based on:

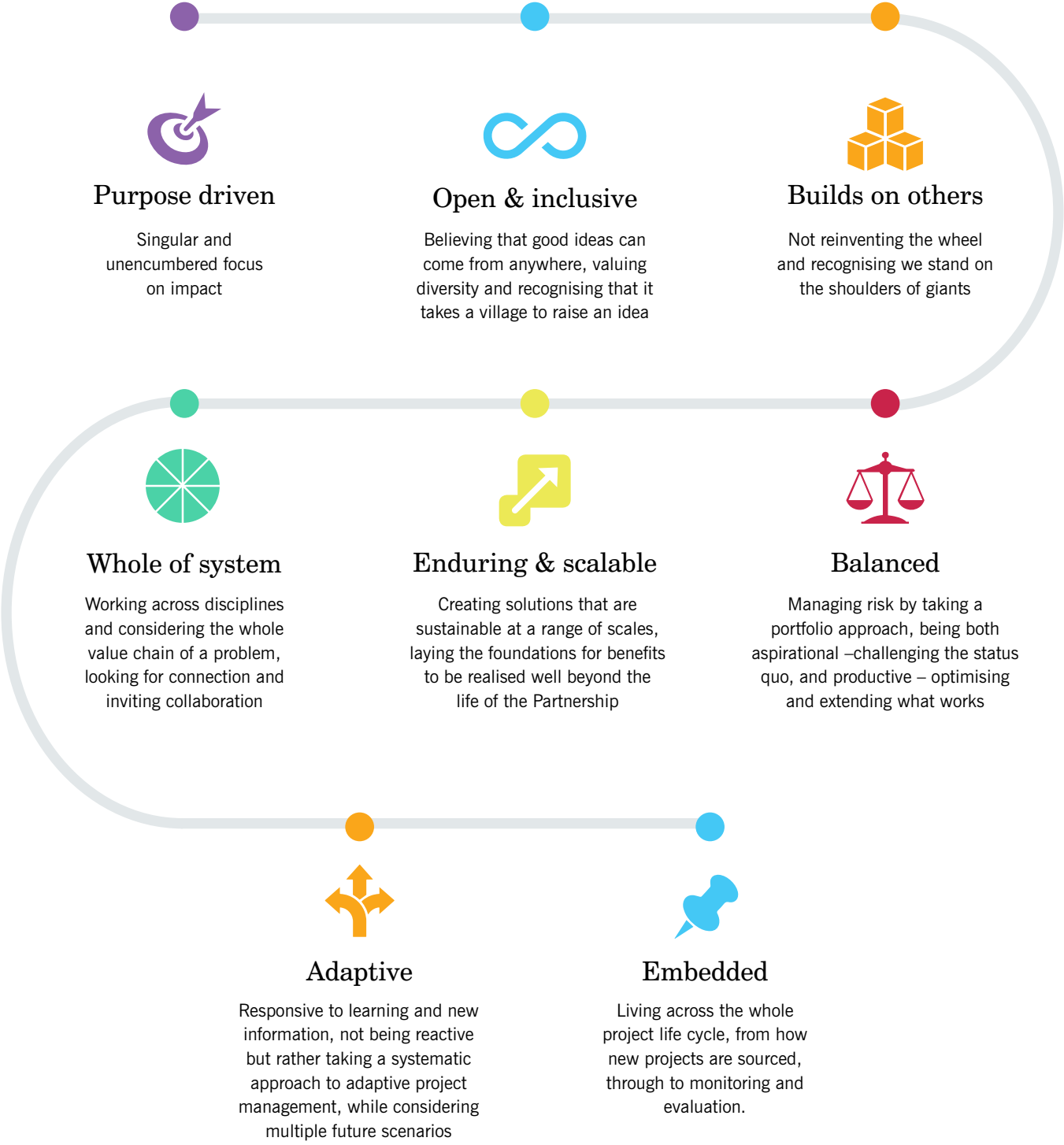
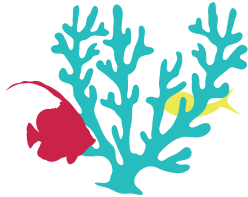
- Catalytic funding: nurturing high impact early stage ideas and helping these access mainstream funding sources, and
- Adoption funding: driving impact informed by science into Reef management interventions, including by providing the systems and tools to translate innovation.

Focus will be placed on collaboration, bringing together traditional and non-traditional players, and acknowledging the value of local knowledge and lived experience in driving innovation and impact, for example in the agricultural sector.

Figure 4: Innovation platform



Key principles underpinning the Partnership innovation strategy

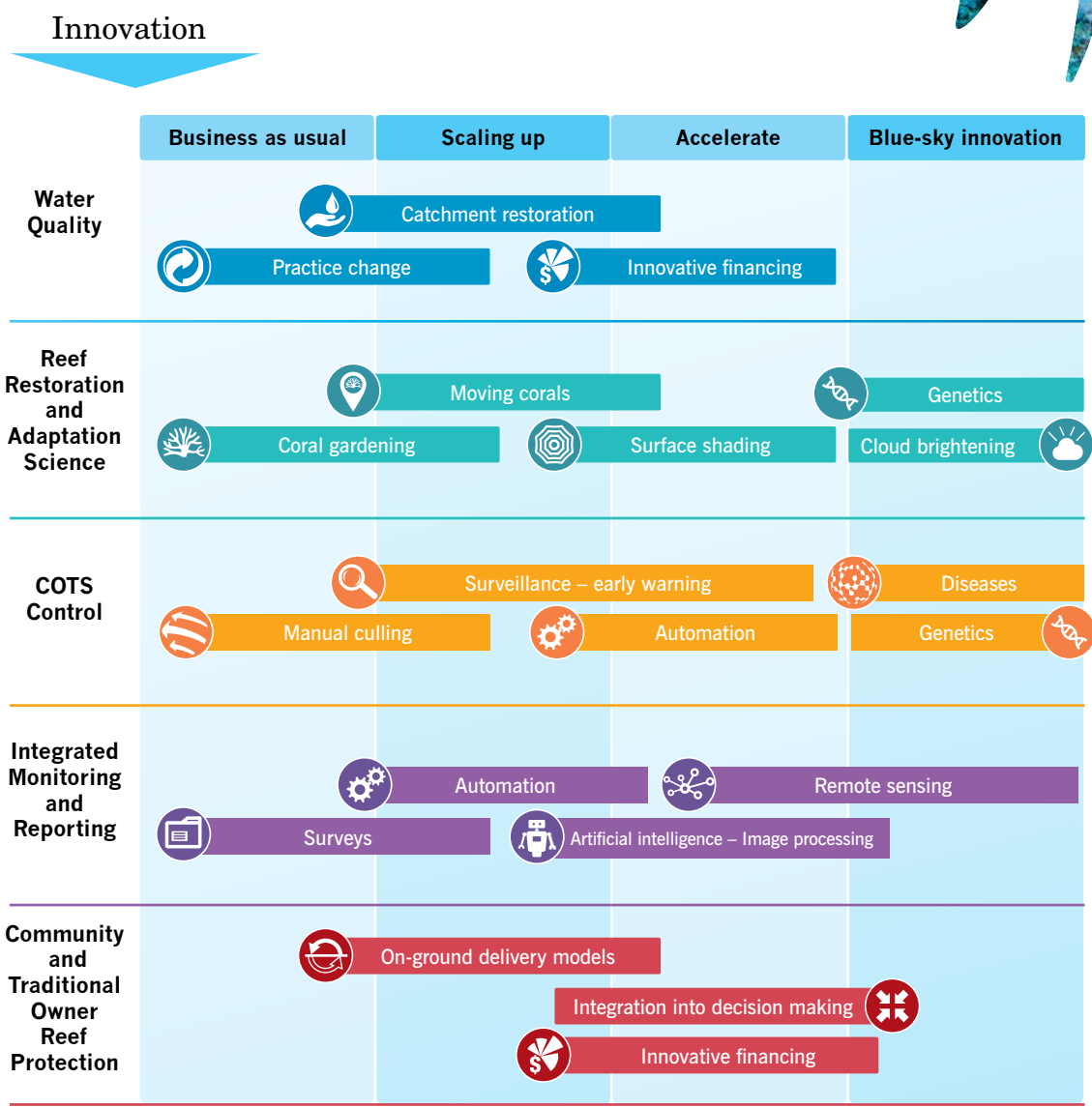


For the Partnership, innovation is not about developing ‘gadgets’, deploying a buzzword or forcing change for the sake of it. Rather it is an attitude to the design and delivery of projects across the entire spectrum, from ‘business as usual’, to scaling up good ideas, accelerating change, all the way to supporting transformational initiatives.

It’s about asking: how can we do it bigger, better and smarter?

Different Components will present different innovation profiles but overall these will be balanced across the spectrum from optimising current business as usual approaches through to blue-sky innovation.

Figure 5: Balanced approach to innovation across the portfolio²



² The examples provided in Figure 5 are illustrative only and do not presume to represent the entire project landscape or make any assumptions about future priorities.

Communication and Engagement

The way we talk about the Great Barrier Reef has reached a turning point. The loss of coral and the negative impacts of water quality and climate change have been well documented. The problem is people do not know or hear enough about the scientific and conservation efforts underway to tackle these challenges. A consistent message from scientists, tourism operators, the community, government agencies and advisory bodies is that communicating about both the threats to the Reef and the work being done to address them must be a fundamental part of the Partnership.

There is a strong desire for a more constructive, consistent and hopeful narrative and for steps to be taken to engage all parts of the community in this major conservation effort. Communication and genuine engagement of all Australians will underpin the Partnership's success, inspiring Australians to take positive action to contribute to the Reef's protection and restoration.

Collective impact

No one individual or organisation can tackle the issues facing the Reef alone. It will take the collective will and effort of all Reef organisations and the broader Australian and international communities to make a measurable impact.

The Partnership provides a new platform, within the overarching framework of the Reef 2050 Plan, to harness the great work and goodwill of government agencies, scientists, industry, Traditional Owners and communities, and provide the architecture to amplify government investment through corporate and private donations. Everyone has a role to play.

Partnerships and co-design

The Partnership provides an unprecedented opportunity for enabling the collaboration and action needed for the Great Barrier Reef, now and into the future. It starts from a page already filled to overflowing with existing investments, partnerships and initiatives, and a diverse and committed collective of organisations and individuals. Many of these provide critical infrastructure, skills and resources that will be vital for the effective delivery of investments. The Partnership will build on, accelerate and scale these existing efforts, fill critical gaps where required and support sustainable outcomes.

To achieve this, strong local buy-in and ownership is required. Building and maintaining this takes time and effort. We will leverage the work of others to demonstrate the value of a co-design process and will take a balanced approach, ensuring there is a mix of short, medium and long-term outcomes across projects and the broader portfolio.

Sustainable Financing

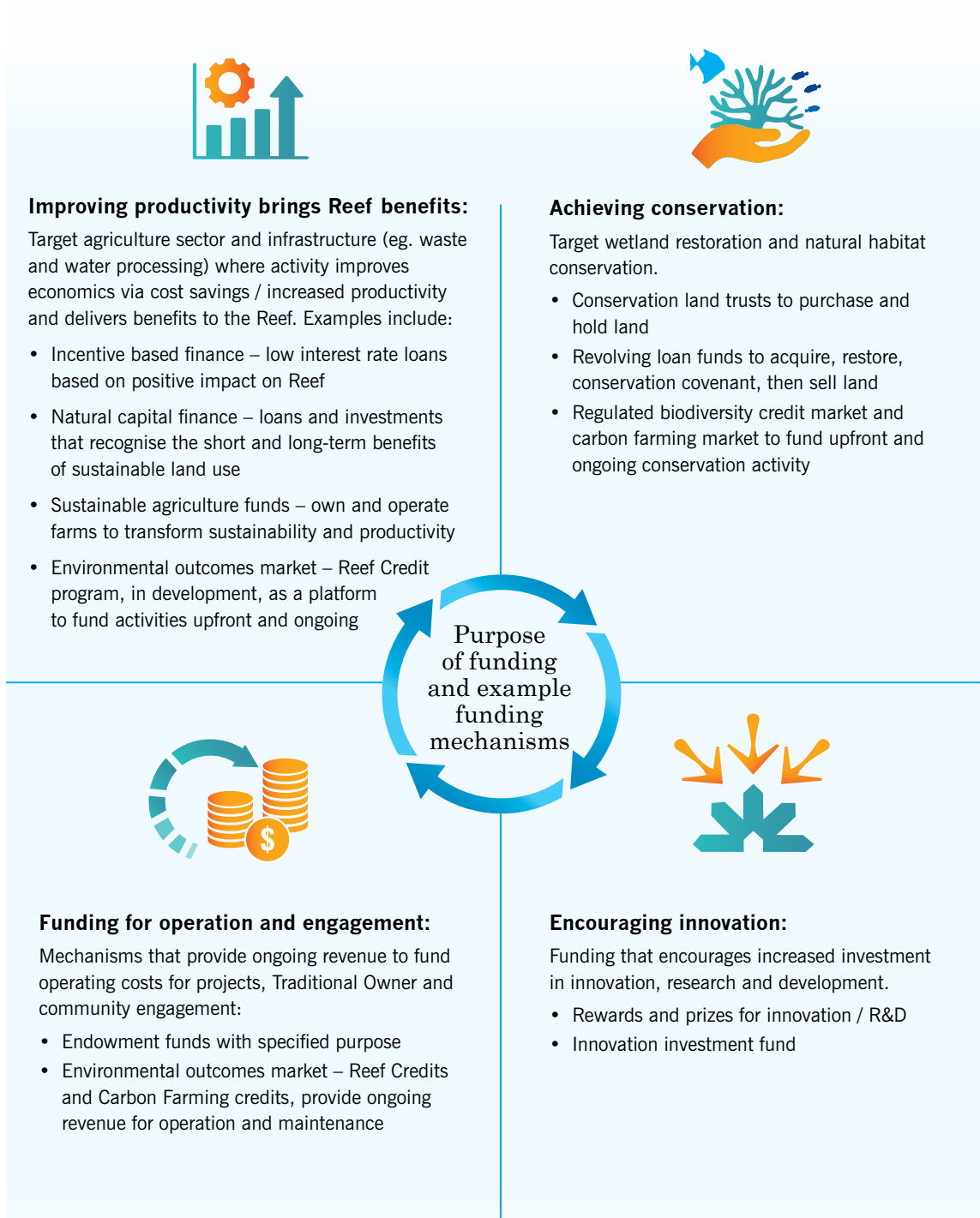
Government funding and philanthropic giving will continue to play a major role in supporting Reef initiatives, but these funding sources will always be constrained by the general strength of the economy and competing priorities. Mobilisation of capital at scale from private and institutional sources, such as superannuation and large private investment funds, is necessary to enable long-term impact and acceleration of innovation. Global and Australian investors are increasingly seeking opportunities to invest in social and environmental outcomes, alongside market returns.

We need a diversity of funding solutions, with different options required to target different activities and outcomes and also to reflect a wide range of economic investment drivers and priorities. Development of Reef-focused finance solutions creates an opportunity for the Partnership to identify activities that can be funded wholly or in part by finance rather than grants.



Figure 6 demonstrates the broad spectrum of potential innovative financing solutions that could be applied to the Partnership. At this point in time, the water quality component shows the greatest potential for attracting investment through innovative financing approaches, with many concepts currently under development or being piloted in this space.

Figure 6: Purpose of funding and example funding mechanisms



In investigating or supporting innovative funding solutions, the Foundation will adopt the following principles:

- Proactively engage across industry, finance and investment sectors to demonstrate the potential of finance to catalyse change in behaviour and practice and to enhance or replace existing funding methods for projects,
- Work with and support industry leaders, to build on capability and capacity in the development and delivery of innovative finance focused on the Reef 2050 Plan goals,
- Leverage the capacity and customer networks of existing finance providers and contributions to the Foundation's scientific and philanthropic network, and
- Prioritise scalable solutions with a pathway to long-term funding sustainability and pilot funding solutions to inform the development stage.

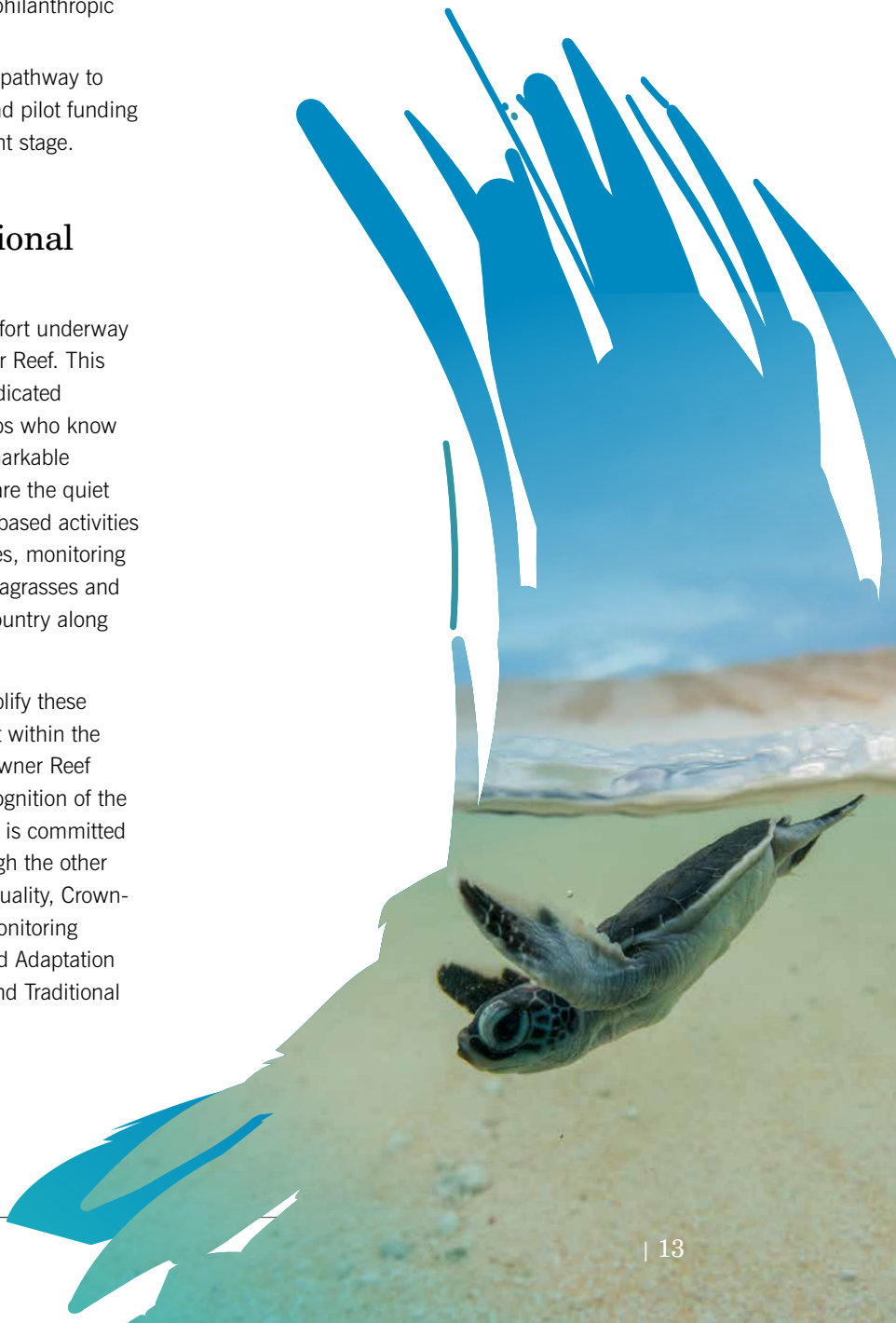
Community and Traditional Owner Reef Protection

There is a huge collective community effort underway to conserve and restore the Great Barrier Reef. This effort is being led by passionate and dedicated community and Traditional Owner groups who know that the Great Barrier Reef is a truly remarkable place, but that it needs our help. They are the quiet achievers, undertaking countless place-based activities such as tagging turtles, cleaning beaches, monitoring the health of waterways, mangroves, seagrasses and corals, and remediating land and sea country along the length of the Reef.

The Partnership will strengthen and amplify these efforts through a \$22 million investment within the dedicated Community and Traditional Owner Reef Protection Component. However, in recognition of the value of these activities, the Partnership is committed to ensuring that programs funded through the other four Partnership Components – Water Quality, Crown-of-Thorns Starfish Control, Integrated Monitoring and Reporting, and Reef Restoration and Adaptation Science – are inclusive of community and Traditional Owner efforts.

To support this integrated program design approach, **10% of the total value of the Partnership³ will be committed to Traditional Owner Reef protection actions across all of the Partnership Components, which equates to \$42 million.** This will ensure that a large-scale, coordinated, strategic plan of action can be co-developed with Reef Traditional Owners, building on and scaling the work already being done by more than 200 Indigenous Rangers and 70 Traditional Owner groups within the Reef catchment. This represents the largest ever single investment for Traditional Owner Reef protection and is an unprecedented opportunity to align the aspirations of Traditional Owners with high impact outcomes for the Reef for mutual benefit.

³ Excludes Component 1 of the Grant Agreement.



Component Level Investment Strategies

“You have to be optimistic.

I think people can solve things.

*Let’s stop worrying about the
scale of it and just get started.”*

Dr Ruth Gates

Water Quality Activities

Total investment: \$201 million

Purpose: Address water quality improvement targets impacting the Great Barrier Reef World Heritage Area through activities such as improved farming practices, reduced fertiliser user and uptake of new technology and land management practices

What is the challenge?

The Great Barrier Reef receives run-off from a large area of coastal Queensland – more than 42 million hectares of land across 35 major river basins. Over the past 150 years increased development and changing land use has resulted in a significant decline in the quality of water flowing into the Reef.

Efforts to address poor water quality have become increasingly critical given the cumulative impacts from other threats, such as climate change, crown-of-thorns starfish, tropical cyclones, coastal development and some aspects of direct use (such as fishing, shipping and port activities).

Agricultural land use is the main human-based source of the primary pollutants – nitrogen, sediments and pesticides. Rivers carry these pollutants from the catchments into the Reef at levels well above natural amounts. Other land uses, such as industrial, mining, port development, dredging and urban development contribute relatively small loads of pollutants to the Reef but can be locally significant.

The dominant source of nitrogen and pesticides is intensive cropping, predominantly sugarcane farms, where fertilisers and pesticides are used to maximise crop production. Through erosion, grazing lands contribute to the most sediment run-off (and associated particulate nutrients).

Pollution from human activities in Reef catchments is considered one of the most manageable pressures on the Reef. In response to these issues, the Queensland and Australian governments established the Reef 2050 Water Quality Improvement Plan. By setting clear objectives and targets in each catchment against land-based sources of water pollution, the Plan provides a platform for all levels of government, industry, science and the community to engage and work towards a common set of goals.

Over the last 10 years, hundreds of millions of dollars have been invested in water quality improvement programs by Queensland, Australian and local governments, often with very significant co-investments by landholders. Yet progress towards water quality targets has been slow. In 2016, the Great Barrier Reef Water Science Taskforce highlighted the importance of governance, communication and engagement in addressing the inherent complexity and fragmentation of the system.

“A healthy reef, that is resilient to the future impacts of climate change, needs clean water. To have clean water, we need to greatly reduce the amount of fertiliser, sediment and chemicals coming from all sources – farms, urban development and industry.”

Dr Geoff Garrett
2015, former Chair of the Queensland Government’s Water Science Taskforce.

What can be done?

The objective of the Partnership Water Quality Component is to deliver measurable progress towards the Reef 2050 Water Quality Improvement Plan long-term outcome, objectives and targets.

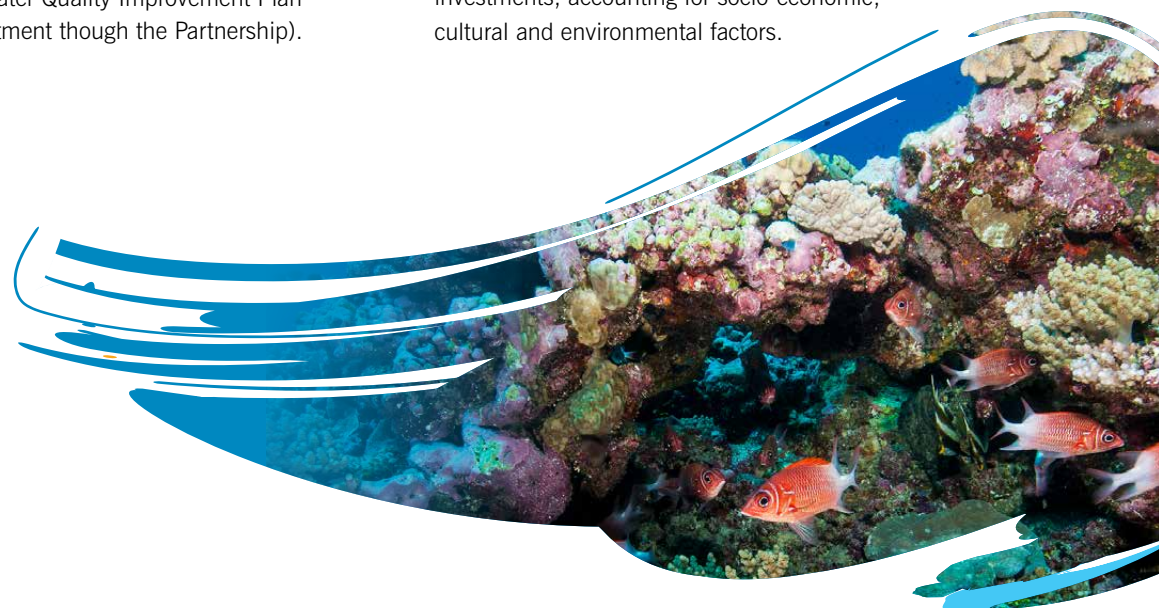
Progress made in recent years represents a great foundation to build on. Priorities for reducing pollutant loads are now established at a catchment scale. New models have been established to better track pollutants and their effects, as well as test the effectiveness of different land management practices. And voluntary partnerships to improve water quality have been, or are in the process of being, established along the coastline.

A study commissioned in 2016 by the Great Barrier Reef Water Science Taskforce, referred to as the 2016 Costings Study⁴, estimated that the total cost of achieving these water quality targets was in the order of many billions of dollars, based on a broad range of policy solutions. This provides a sense of perspective and \$201 million is simply not enough to meet all water quality targets, for all pollutants and in all regions. Nevertheless this represents a very large investment in water quality improvement and a unique opportunity to capitalise on progress to date while embracing transformational solutions.

In addition, complementarity with other investments is a key principle of the Partnership. It is important to recognise that the Australian and Queensland governments have invested heavily in water quality improvements in the past and are continuing to invest with an estimated \$615 million over the five years of the Reef 2050 Water Quality Improvement Plan (including the investment through the Partnership).

To ensure maximum impact is achieved, the Partnership will apply the following principles:

- Make decisions based on the best available science while integrating the perspectives and knowledge of landowners, managers, industry, community and Traditional Owners,
- Focus on high priority pollutants and high priority locations with a bias towards actions that have a direct and measurable impact,
- Build on initiatives with a proven track record while driving innovative solutions where a step change or transformation is required,
- Support local community design and collaborative models to find solutions that are best suited for each location and community,
- Implement a balanced portfolio of activities and delivery mechanisms that remains targeted enough to achieve measurable benefits and deliver economies of scale,
- Identify and implement innovative sustainable financing models that recognise industry and community needs and support initiative and leadership,
- Design the Investment Strategy so that it can be adapted over the course of its implementation,
- Provide a strong foundation for long-term commitments and enduring improvements beyond the life of the Partnership, and
- Give due consideration to co-benefits of investments, accounting for socio-economic, cultural and environmental factors.



⁴ Alluvium (2016). Costs of achieving the water quality targets for the Great Barrier Reef by Alluvium Consulting Australia for Department of Environment and Heritage Protection, Brisbane



Investment Strategy Priorities

Investments in water quality improvement under the Partnership will work to deliver a mix of solutions comprising on-ground, practical actions, and system-wide reforms to scale up benefits, including applying incentives that help build collaboration and drive change.

Investment in on-ground actions

For the most part the Partnership will directly support a portfolio of on-ground measures that reduce pollution loads of sediment, nutrients, and pesticides in priority locations. These may include improving agricultural, industry, and urban management practices, active rehabilitation or restoration of wetland and landscape features, and consideration of actions that protect undisturbed catchment landscapes.

In October 2018, following a tender process, the Partnership commissioned the development of a model and tool to facilitate the design of investment scenarios. This work builds and improves on the 2016 Costings Study by integrating new water quality targets, modelling all 35 Reef river basins individually (as opposed to 5 regions), updating costing information and including pesticides in the list of target pollutants.

This unique system will allow the Partnership and any future investor to compare the water quality benefits and costs of different investment scenario options and optimise these scenarios based on a defined investment amount. This information will underpin a transparent decision-making process involving a broad range of stakeholders which will systematically consider costs, benefits and additional value drivers (for example, certainty of outcomes, capacity constraints, financing opportunities and co-benefits).

A subset of scenarios will be further investigated in the first half of 2019, looking at delivery models, risk and capacity constraints, sequencing of actions and design of specific monitoring and evaluation strategies. A preferred investment scenario will be identified and form the basis of Partnership Annual Work Plans, with the first iteration to be developed by 30 June 2019.

Through this process, some areas are likely to be identified where innovation is critical to make progress towards targets. A step-change may be required to maximise the impact of specific actions or to achieve water quality improvements which cannot be delivered efficiently using currently available techniques. In alignment with the Partnership's overarching innovation strategy, opportunities will be provided for innovative technologies or solutions to be explored, piloted, scaled and adopted.

Early investment opportunities (financial year 2018-2019) were identified for projects seeking to build on existing programs with proven beneficial water quality outcomes, addressing clearly articulated needs within Reef catchments, and laying the foundations for the delivery of the longer-term Investment Strategy. This led to a specific call for proposals which closed on 10 December 2018 (see *highlight 1*).

Investment in system-level change and innovation

In conjunction with on-ground actions and innovations, the Partnership will target transformational activities that benefit the entire system. These are meant to catalyse and accelerate change where it is necessary to maximise impact and to:

- improve the effectiveness, efficiency and sustainability of actions,
- better track the outcomes of investments, and
- remove barriers to change.

Priority areas for system-level innovation are:

Transforming technical support and knowledge sharing

Communication and extension have been front and centre in the effort to improve water quality via change in management practices. On-ground actors know what works and what does not, and there are great examples of locally driven initiatives that have been very successful at fostering stewardship and peer-to-peer learning. These approaches must now be scaled to a level that will accelerate progress towards water quality improvement targets.

Scaling up is not simply about doing more of the same. A constraint in on-ground extension capacity limits the ability to invest heavily in a targeted fashion. Whole-of-system solutions are required and the Partnership will engage with landowners, industry, providers, Natural Resource Management organisations and governments to accelerate existing efforts and support new initiatives to develop more coordinated approaches to extension. Better understanding and sharing the full story is key to a new approach. This transition will be enabled by strategic investments in responsive data systems and targeted, Reef-wide communication programs. These are articulated elsewhere in this Investment Strategy.

Innovative funding and financing for the future

Recognising the magnitude of the task, the Partnership will support and invest in a range of innovative funding mechanisms that will increase the total funding available. It will focus on mechanisms that are scalable and have a pathway to long-term sustainable funding.

The strategic approach will be to collaborate with established market leaders and innovators to develop targeted funding options that leverage both the partner's capacity and end-user networks and links to scientific institutions, governments and community. Mechanisms considered include:

- incentivised finance to accelerate uptake of proven practices and technology that improve water quality and productivity (such as low interest loans or rebate programs),
- equity investment funds for sustainable agriculture with targeted Reef outcomes, and
- use of market mechanisms that reward outcomes and simplify the investment process (such as Reef Credits).

Unlocking the collective value of data

Data on land condition, land use practices and water quality impacts is critical to guide investment and on-ground action. Such data is generated on a daily basis by landowners, industry, suppliers, service providers, researchers, governments, community groups and others. Historically there have been significant limitations in the sharing and coordinated use of this information, mostly for privacy and commercial reasons. The Partnership will explore and invest in alternative data sharing models and systems (such as data cooperatives and partnerships) that acknowledge these constraints but also return additional value to data owners and providers.

Tracking the performance of investments and adjusting investment as better and more timely information becomes available will allow for a move past static solutions towards an evolutionary and lasting approach. To enable this, it is critical for landowners, industry and community that generate the information to be able to have a say in how the data is used and to share in the value created from it.

Highlight 1

First water quality grants targeting capacity building

In September 2018, the Partnership identified a need for early investments in projects seeking to build on existing programs with proven beneficial water quality outcomes, addressing clearly articulated needs within Reef catchments, and laying the foundations for the delivery of the longer-term Investment Strategy.

A call for proposals was run from 13 November to 10 December 2018, for projects ready to commence by March 2019 in priority locations. GBRF Managing Director Anna Marsden explains the three key objectives of this first call for applications.

"This first round of project grants aims to build on previous investments that have a proven track record in contributing to and making progress towards the targets set in the Reef 2050 Water Quality Improvement Plan," Ms Marsden said.

"Demonstrable improvements have been made and it's important that we maintain this momentum and build on those successes through this new funding. Secondly, there are some projects which are time critical, so this funding will ensure high impact projects that have started will continue. And thirdly, we're aiming to build capacity through a network of skilled practitioners to deliver on-ground work within the Great Barrier Reef catchments. This capacity building will lay the foundation for future projects and is critical to the success of the whole water quality improvement program."



Crown-of-Thorns Starfish Control

Total investment: \$57.8 million

Purpose: Expand efforts to control crown-of-thorns starfish (COTS) to reduce coral mortality from COTS outbreaks in order to protect high ecological and economic value coral reefs in line with GBRMPA's COTS Control Strategy.

What is the challenge?

COTS are native to the Great Barrier Reef. When in outbreak mode, they are a voracious predator of live coral with a single adult consuming a dinner plate size amount of coral every day. They have a very high reproductive capacity with each adult female starfish capable of producing millions of eggs at one time, and a rapid growth rate. Numbers can reach millions during an outbreak causing extensive damage to coral reefs.

The frequency and severity of outbreaks are influenced by multiple factors including coral abundance, a reduction in natural predators, water circulation patterns and water quality. For example, during major flood events, excess nutrients from land can cause phytoplankton blooms in the ocean, which can sustain COTS larvae, allowing them to reach plague proportions. The Water Quality Component of the Partnership focuses on this specific issue at its source.

Efforts to reduce the impact of COTS predation on coral have become increasingly critical given the cumulative impacts from other threats, such as coral bleaching, tropical cyclones and decreased water quality. There are concerns about the possibility of reefs surviving mass bleaching events only to be later consumed by COTS. The Great Barrier Reef Blueprint for Resilience⁵, published by GBRMPA, identified COTS control as one of the most feasible actions to reduce coral mortality and improve resilience on the Great Barrier Reef.

This Component focuses on efforts to control COTS to reduce coral mortality and protect high ecological and economic value coral reefs. This Investment Strategy targets the multiple stages of the COTS cycle (see *Figure 6*) in an integrated fashion to give coral reefs their best chance to resist the impact of outbreaks of this natural predator.

What can be done?

Historically, management of COTS has been largely focused on surveillance to detect outbreaks and on culling adult starfish during an outbreak phase. The current method to kill COTS is time-consuming and relies on divers manually injecting each starfish with a custom-designed liquid that is toxic to COTS but harmless to the marine environment. With numbers in the millions during an outbreak, this control method cannot, and in fact does not, aim to completely contain the outbreak or eradicate COTS. Instead it focuses on protecting a small number of reefs, identified as high priority based on their high economic (tourism) or ecological value.

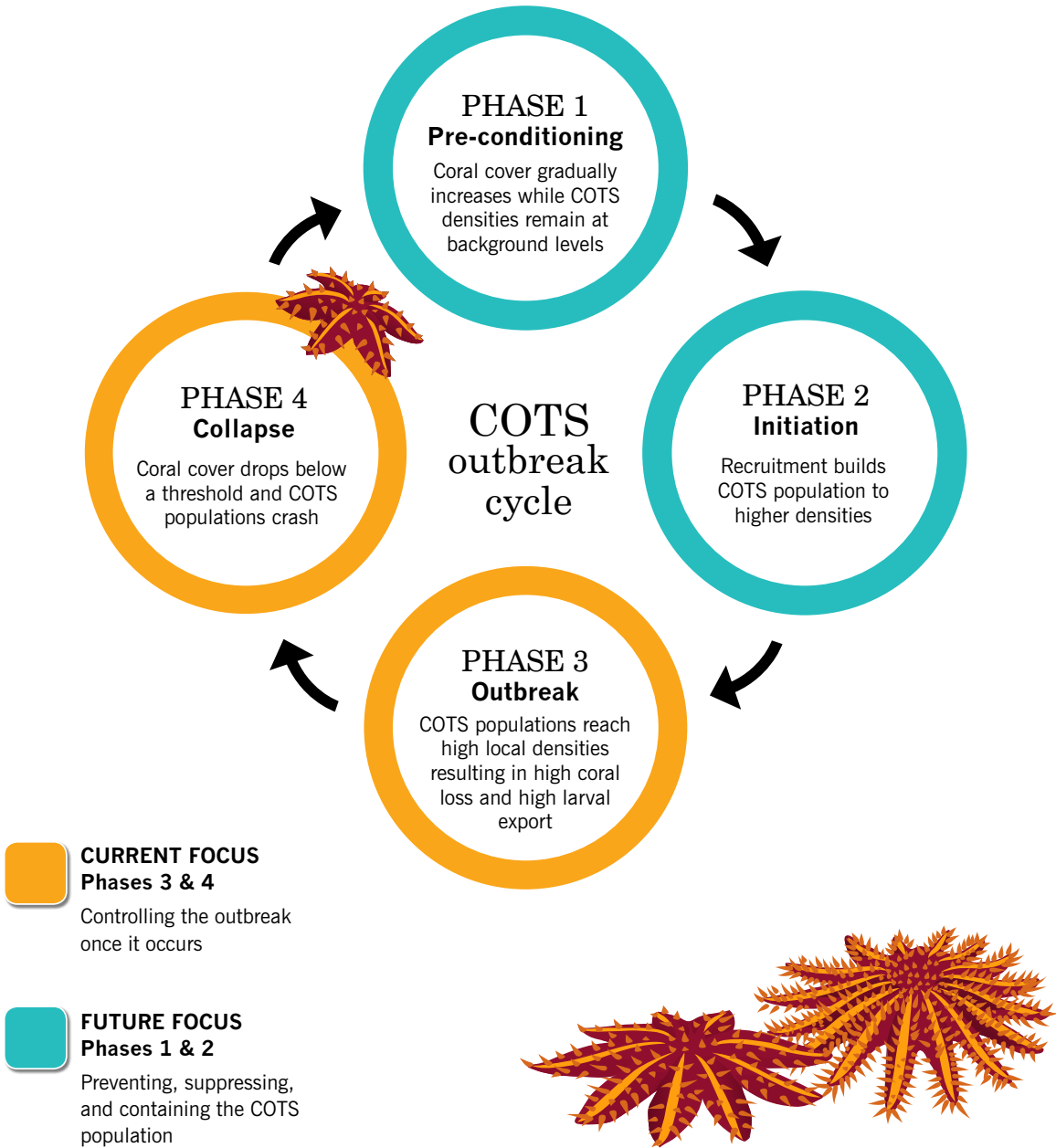
Recognising that manual control of COTS during outbreaks is not, on its own, an ideal long-term solution, new efforts were launched in 2016 to develop an Integrated Pest Management approach for COTS (as part of the National Environmental Science Program), led by CSIRO and many partners. This approach relies on understanding COTS distribution, movement and population dynamics, targeting critical locations and exploring new and more effective control methods. This involves both improving the efficiency and effectiveness of the current methods while also focusing efforts on the pre-conditioning and initiation phases.

The COTS Component of the Partnership will build on this Integrated Pest Management approach and existing efforts by governments, research providers, industry and community. It must be used to drive significant progress and advancement in controlling COTS well beyond current methods.

Investments will be delivered in a partnership approach with Traditional Owners, GBRMPA, Reef-dependent industries, Reef users and researchers. As an initial step, a COTS symposium will be organised in the first half of 2019 which will bring together these key groups, along with experts from overseas and related disciplines, to review the current state of scientific knowledge and identify opportunities for innovation.

⁵ Great Barrier Reef Marine Park Authority (2018). From Blueprint to action: Great Barrier Reef Blueprint for resilience: progress report. GBRMPA, Townsville

Figure 6: Crown-of-thorns starfish cycle and control



A COTS outbreak goes through a cycle which is reflected in the design of this strategy. In the lead up to an outbreak, as coral cover increases, COTS densities remain low (pre-conditioning). In sites referred to as initiation zones, coral cover and local conditions become favourable to COTS and their densities increase rapidly (initiation). As COTS numbers and size increase, they start affecting coral cover and produce huge numbers of larvae that can move with water currents to other sites (outbreak). Ultimately coral cover at this initial site will be so low that COTS will run out of food and starve (collapse). Once a primary outbreak is established, a similar sequence of events is then repeated along the Reef as secondary outbreaks occur.

Investment Strategy Priorities

Support existing in-water COTS control and drive towards improved efficiency

Manual control of COTS remains the most currently understood and demonstrated option available to Reef managers to protect coral cover. Developing alternative non-manual methods will take time and it will be important, in the meantime, to support the current in-water manual control program at priority sites.

An independent peer-review of the current program will be conducted to identify areas where there would be scope to improve its effectiveness, efficiency and responsiveness. Investments will aim to accelerate the development and adoption of data management and decision-support systems to improve the prioritisation of control efforts at the site and regional level. Opportunities to explore and implement novel innovations will be considered, such as the use of chemical repellents or attractants to improve control efficiency at target sites.

Lead a step change in surveillance for early COTS detection and early intervention

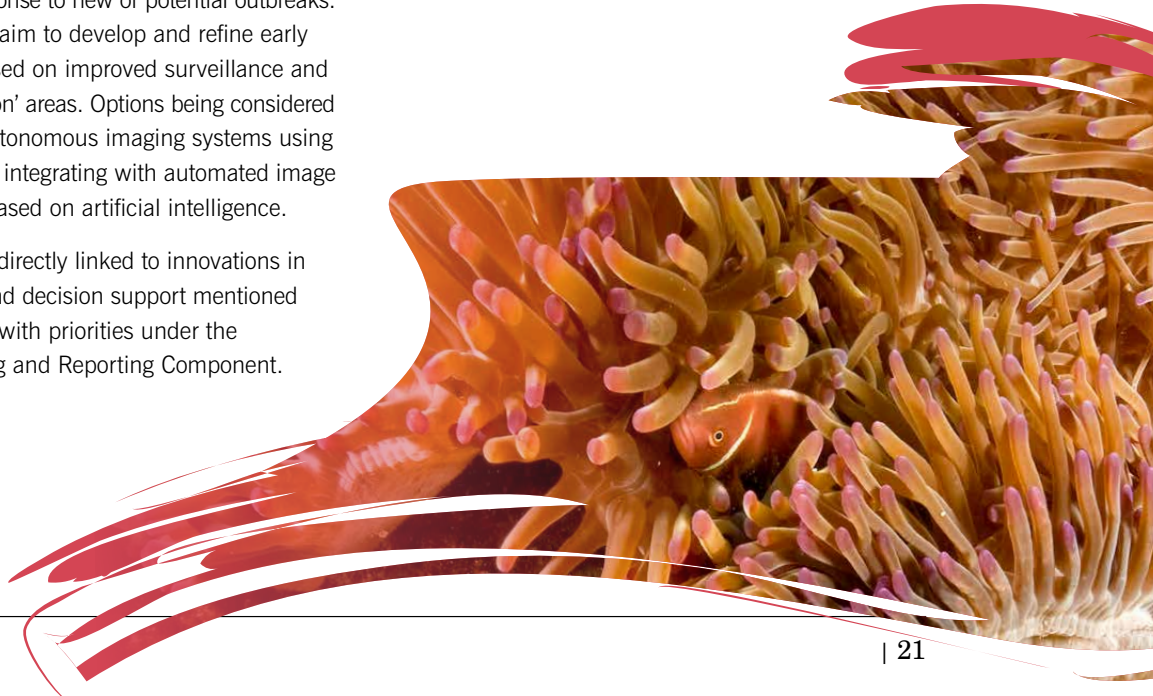
There is an urgent need to achieve better prevention, suppression and containment of COTS, especially at the early stages of the cycle where numbers could be kept below critical levels. That is why it is important to invest in the development and scaling up of methods that target real-time intelligence and help coordinate rapid response to new or potential outbreaks. The Partnership will aim to develop and refine early warning systems based on improved surveillance and monitoring in 'initiation' areas. Options being considered include deploying autonomous imaging systems using underwater vehicles, integrating with automated image analysis processes based on artificial intelligence.

These efforts will be directly linked to innovations in data management and decision support mentioned previously and align with priorities under the Integrated Monitoring and Reporting Component.

Explore alternative (non-manual) control methods to address COTS management at a broad scale in the future

Progressing the development of alternative control methods that would target COTS on a much larger scale is a priority if we are to give the Reef a fighting chance against future COTS outbreaks, when the cumulative impacts of climate change are expected to become more severe.

The use of biocontrol agents in the form of natural predators, pathogens and genetic technologies to decrease fertility are some of the concepts that have been discussed by the scientific community and Reef managers in the past. We are years away from having the scientific knowledge, social licence and regulatory environment to consider deploying such strategies. Yet this Investment Strategy recognises that these approaches cannot be dismissed and have to be explored further should they be needed to support the Great Barrier Reef under future conditions. This aligns with initiatives to be researched under the Reef Restoration and Adaptation Science Component.



Reef Restoration and Adaptation Science

Total investment: \$100 million

Purpose: Conduct and implement science activities to deliver and support reef restoration and adaptation for the Great Barrier Reef World Heritage Area.

What is the challenge?

Despite being one of the best-managed reef ecosystems in the world, the Great Barrier Reef is under extreme pressure and needs our help now. In 2016 and 2017 the combined impacts of two consecutive mass bleaching events and Tropical Cyclone Debbie resulted in a loss of an estimated 50% of the shallow water coral on the Reef⁶.

The frequency and severity of these events is predicted to increase. Even with strong action on climate change, water temperatures will continue to rise, and stay elevated, for decades to come. This means that in addition to a global commitment to greenhouse gas mitigation, and continued management of local pressures, we must also create a suite of innovative tools to support large-scale Reef restoration and adaptation.

- A combination of interventions will work best and getting the ‘mix’ right will be critical;
- In a rapidly changing climate, decision-support tools and models will play a critical role in informing what interventions should be applied where for maximum benefit to the Reef;
- Integration with other Reef management actions such as crown-of-thorns starfish control and water quality improvements is crucial;
- Effective engagement with Reef communities and industries, Traditional Owners and managers will be essential to build a social and regulatory licence for Reef restoration.

This will be a 10-year undertaking and represents the ecological equivalent of reaching the moon. The efforts funded under the Partnership will focus on research, development and piloting of interventions, establishing the foundation for large-scale implementation.

The feasibility study was solely focused on coral reefs which are under direct threat from increasing water temperatures. The Reef however, is an integrated system and efforts to restore it need to be undertaken in parallel with other programs that build the resilience of systems that contribute to the Reef’s resilience, such as mangroves, seagrasses, coastal wetlands and fish habitats.

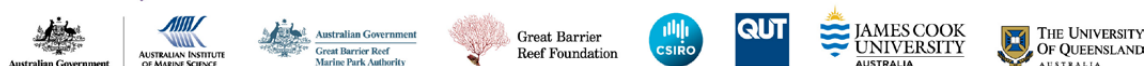
What can be done?

In 2018, the Australian Government funded a scientific consortium⁷ to assess the feasibility of large-scale interventions for restoration and adaptation of the Great Barrier Reef and to identify the research and development effort needed to make these interventions a reality. The consortium will deliver its findings in the first half of 2019 but preliminary results indicate that:

- Various intervention techniques are available but significant research and development is required to make these work at the right scale and price point;

⁶ Independent Expert Panel (2017). Advice on responding to mass coral bleaching of the Great Barrier Reef. Available online at: <https://www.environment.gov.au/system/files/pages/abff0d5e-b94d-4495-b79b-90dc52274f69/files/iep-advice-responding-mass-coral-bleaching-gbr.pdf>

⁷ Reef Restoration and Adaptation Program, a partnership:



“By being proactive, Australia has an opportunity to buy more time for the reef through resourcing its world leading scientists, engineers and innovators to develop new technologies and solutions enabling corals to cope, to adapt and evolve with increasing ocean temperatures.”

Bill Ferris AC
Chair of Innovation and Science Australia

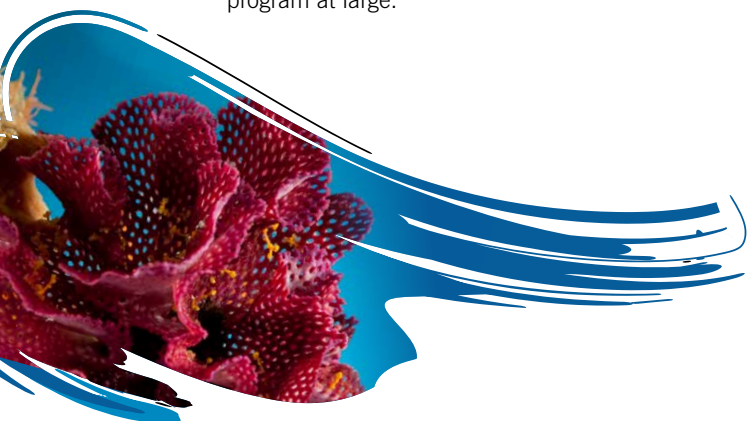
Investment Strategy Priorities

To make these game-changing interventions a reality requires a coordinated approach, bringing together ecologists, engineers, innovators, modellers and social scientists. Work will be delivered in close collaboration with management and regulatory agencies, Traditional Owners and the community to ensure impact and uptake. Flexible entry points for new partners and opportunities such as open funding calls, innovation challenges and prizes will ensure that new ideas and approaches can be harnessed from around the world.

The social licence to operate

Acquiring social acceptability for large-scale Reef restoration and adaptation interventions is key to the success of this program. Policy, regulation and on-ground action must be aligned and ensure that any risk of adverse impact is appropriately managed.

This requires active and early collaboration with Traditional Owners, stakeholders and the community in the pursuit of a common sense of purpose. It also requires a strong collaboration with regulatory agencies to progress implementation of field trials and community-based restoration efforts that serve to progress the program at large.



Research and development to boost new intervention methods

This ambitious initiative will require an order of magnitude increase in the research and development of new solutions that are safe, effective and long-lasting.

Research and development focus areas include:

- **Interventions aimed at shading and cooling reefs**
This demands a leap forward in our understanding of the Reef’s atmospheric and marine conditions, the interaction between heat and light in the coral bleaching process and solution-driven innovations to achieve economies of scale
- **Methods based on assisting the reproduction, settlement and survival of corals**
This requires us to think and operate at a whole new scale, both in the field and in bespoke aquaculture facilities
- **Strategies to make corals stronger and more thermally tolerant**
There has been significant progress in this field recent years. Building on this, significant acceleration is required to keep pace with the predicted impact of climate change.

The right science and models underpinning the right decisions

Decision-support models and systems need to be considerably strengthened to adequately guide investments in research and support the prioritisation, sequencing and design of interventions. Translating the findings of the research program into models and an advanced decision-making framework that supports management is the surest way to deliver the best possible outcomes for the Great Barrier Reef in a constantly evolving environment.

These systems will be designed to interface with the broader Reef 2050 Integrated Monitoring and Reporting Program to guide restoration activities in relation to other management actions. This area will directly benefit from cross Component interactions with the COTS Control, Water Quality and Integrated Monitoring and Reporting Components of the Partnership.

Making interventions a reality on the Great Barrier Reef

Restoration and adaptation interventions will only be successful if these can be implemented safely and at the appropriate scale on the Great Barrier Reef. The logistics of taking a concept from a research facility or pilot site to a full-scale roll-out is a huge technical challenge in itself. Time is of the essence and investigations into the logistics, practical application and public acceptability of interventions need to take place in parallel with research into the interventions themselves.

Engineering strategies which have been proven across a range of industries will be adapted to the Reef restoration and adaptation challenge. Scientific and corporate partnerships will be put in place to explore a wide variety of options and design solutions.

Strategies will be identified that not only meet technical objectives in a safe and sustainable fashion, but also provide significant social and economic co-benefits. It is anticipated that this program will generate Australian solutions that can be exported in the future and benefit other reefs globally that are under duress.

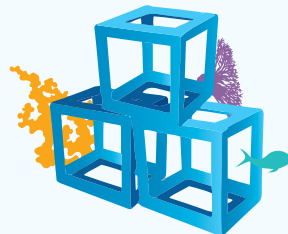
Local restoration activities will be supported through the development of tools to guide evidence-based approaches. The Program could also support small-scale pilot restoration projects where these are designed to contribute to the long-term goals of the program, for example by generating valuable scientific data or piloting new tools.

Interventions could include:

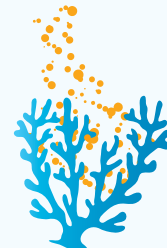
Shading and cooling reefs



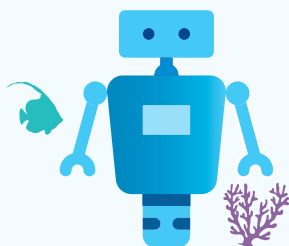
Creating artificial reef surfaces and structures



Reseeding reefs with coral larvae or corals cultured through aquaculture



Robotic outplanting of corals



Probiotics to reduce coral stress



Developing thermally tolerant corals through approaches such as selective breeding



Community Reef Protection

Total investment: \$10 million

Purpose: Improve the engagement of the broader community in the protection of the Great Barrier Reef World Heritage Area.

This element is in addition to the engagement with Traditional Owners, and integration with other Components of the Partnership. Traditional Owners are a core part of the Reef community, and we will respectfully acknowledge their rights and relationship with land and sea country through an independent co-design and co-delivery process as outlined from page 28.

What is the challenge?

The Great Barrier Reef and its future lives firmly in the hearts of all Australians, and more importantly, Australians have been rising to the challenge these past years as the Reef has been under more pressure than ever before. A rich network of people and organisations are already engaged in active Reef protection activities including Traditional Owners, community members, schools, local government, NGOs, businesses, the scientific community and conservation groups.

But amongst all these groups there is a feeling we could be working more collaboratively and strategically to meet the scale and urgency of action required. How can we connect and empower these actions, how can we share progress and the good news, and how can we ensure community protection becomes a cornerstone of future protection of our Reef?

What can be done?

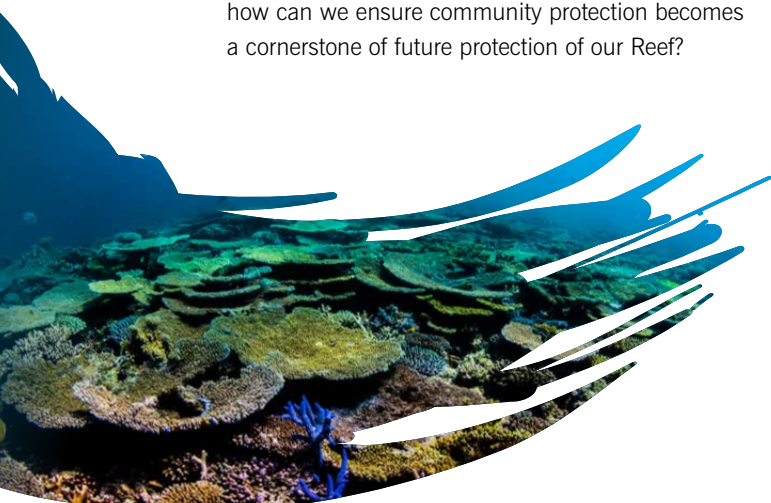
“Empowering people to be part of the solution” was identified as a critical component to building the resilience of the Reef and Reef-dependent communities in the Great Barrier Reef Blueprint for Resilience. The Reef 2050 Plan also aims to support an *“informed community that plays a role in protecting the Reef for the benefits a healthy Reef provides for current and future generations”* as a key outcome.

Both building local resilience and fostering support for climate action is critical to protect the Reef. Consistent with the Partnership, greater strategic coordination, innovation and collaboration across community Reef protection activities will help realise its objectives. Community project activities will support actions to identify, accelerate, scale and connect local stewardship to support the many values of the Reef.

On a broader scale there is a need to provide a meaningful way for everyday people, irrespective of where they live, to play their part in the future of the Reef. Recent research has shown the profound impact a visit to the Reef or making changes to everyday behaviour has on attitude and engagement in the issues facing the Reef⁸. The Partnership provides an opportunity to pilot some large nationwide calls to action and foster cohesive place-based approaches to catalyse a turning point in the general community's sentiment around the Reef from hopeless to hopeful.

“There is not one individual who cannot help to make a difference to the health of the environment.”

the late and great Ian Kiernan



8 GBRF Consumer Research 2018

Investment Strategy Priorities

The Community Reef Protection Component under the Partnership will facilitate inclusive approaches that strengthen individual and collective action contributing towards targets in the Reef 2050 Plan.

Work will be based around facilitating partnerships and funding streams to support enduring outcomes; delivering and communicating on-ground stewardship outcomes that inspire further action; sharing and spreading best-practice; and integrating community contributions into broader Reef science and management decision-making processes.

Our approach will celebrate existing community heroes and seek pathways for new audiences to play a role in Reef protection.

Recognising the critical role of community Reef protection, activities will be integrated into each Component in the portfolio.

Community Reef Protection investments under the Partnership are likely to include the following themes:

Strengthening and accelerating on-ground action

The task of saving the Reef can appear enormous, but the cumulative difference that comes from place-based or local involvement is real. Our focus will be on strengthening, scaling and accelerating community Reef protection actions. Acknowledging the extensive work already happening in this sector, activities will focus on implementation through existing organisations and networks, while seeking to foster unity and efficacy in approach. For example, the Great Barrier Reef Marine Park Authority already supports a network of Reef stewardship initiatives including Reef Guardians and Local Marine Advisory Committees that the Partnership could reinforce and complement.

Projects will support and enhance community capacity to deliver on-ground action that reduces Reef threats or increases Reef resilience. Activities will support best-practice citizen science and on-ground actions for other Partnership Components such as water quality, crown-of-thorns starfish control and local-scale restoration initiatives, as well as broader initiatives on reducing marine debris or protecting key species.

Where new solutions are required, the Partnership will seek opportunities for innovation to bolster Reef resilience and the co-benefits that communities gain from the Reef.

Through a collaborative and integrated approach, we seek to support and communicate the power of actions at individual and local levels contributing to a movement that aligns the actions of many – turbocharging the impact.

Connecting community with decision making

Individuals and community groups contributing to Reef protection have a strong desire for the outputs of their efforts – data, knowledge and actions – to be used to inform Reef management and decision making. This is often challenging as the entry points and pathways for connecting community-based information with larger government and science-based Reef protection programs can be unclear, or non-existent. To achieve the greatest outcomes, we need to foster both bottom-up and top-down approaches that focus and connect the many ways in which people do, and can, contribute to looking after the Reef.

The activities within this theme will aim to support innovation, integration and collaboration that enhances implementation pathways for local actions that contribute to Reef 2050 Plan and Reef Resilience Blueprint priorities. Programs will strengthen information exchange pathways that inform the delivery of local actions and report on their outcomes, and demonstrate the value and application of citizen science data and community contributions.

This could include strengthening monitoring and reporting on the scope and outcomes of community-led, place-based action or integrating community-based data to inform Reef management through existing programs such as regional report card partnerships.



Building understanding, unity and hope

Every Australian has a role to play in protection of the Reef, but for many they must first see and believe that their efforts can make a difference.

Activities in this theme will focus on enhancing understanding and appreciation of the challenges facing Reef health, but most critically, amplifying communication about the power of personal choices and community action in delivering collective impact at multiple scales.

This will require supporting efforts to build or strengthen: the evidence-base of case studies and stories that demonstrate the power of united action at many scales; platforms that are able to help people understand entry points to participation; tools that capture and aggregate individual outputs and provide positive feedback to drive future action; and validated metrics for measuring success.

Recognising that we can all contribute to efforts that build resilience, the Partnership will also look to engage those who don't have the opportunity to see the Reef regularly through education programs, digital technology, and storytelling channels.

We also seek to support a 'national day of action for the Reef' to shine the spotlight on the role of individual and community action in building Reef resilience, celebrating collaborations to protect the Reef and encouraging others to get involved.

Fostering enduring funding, next-generation participation and partnerships

Consistent with the broader Partnership, innovative funding streams and partnerships can both elevate the impact of community endeavours, and ensure they endure well beyond the next six years. To deliver sustainable programs, community organisations must also be sustainable. Building delivery capacity through inclusive development of programs, enhanced communication and evaluation of outcomes, and creating opportunities for sustainable local fundraising capability will be included.

Today's youth will inherit both the challenges and beauty of the Reef legacy that we create. That is why we will empower our future decision makers through youth leadership initiatives. Doing this effectively will require new engagement pathways and programs that are tailored to the way that young people access information and connect with others. Through this approach we will inspire and encourage rising leaders to shape a better future for the Reef.



Traditional Owner Reef Protection

Total investment: \$42 million

Under the Indigenous⁹ and Community Reef Protection activities Component of the Partnership, there is \$12 million to improve the engagement of Traditional Owners in protecting the Great Barrier Reef World Heritage Area and support their stewardship of endeavours on the Great Barrier Reef over the activity period 1 July 2018 to 30 June 2024.

An additional \$30 million for Traditional Owner on-ground actions will come from the Water Quality, Crown-of-Thorns Starfish Control, Reef Restoration and Adaptation Science, and Integrated Monitoring and Reporting Components to undertake priority actions within each of these areas, making a total investment in Traditional Owner Reef protection activities of \$42 million, equalling 10% of the total Partnership funding.¹⁰

Purpose: The purpose of this Component is to improve the engagement of Traditional Owners in the protection of the Great Barrier Reef World Heritage Area.

What is the challenge?

There are at least 70 Traditional Owner groups with rich, ongoing connections, rights, interests and aspirations in sea country across the length of the Great Barrier Reef. Over half of the Reef catchment and 13.5% of the marine World Heritage Area is subject to formal Indigenous ownership, interest or co-management arrangements¹¹.

The Reef 2050 Plan acknowledges the significance of Traditional Owner rights, interests and capacity for management of Reef sea country with 27 significant Indigenous implementation actions. These actions are embedded throughout the Reef 2050 Plan, and collectively they represent an unprecedented opportunity to finally establish a central role for Traditional Owners of the Reef.

Traditional Owners are making a significant and meaningful contribution to Reef protection now, for example through the work of more than 200 Indigenous Rangers across the Reef catchment, but there is a huge opportunity and very strong desire to be doing much more. There has been a consistent call for genuine partnership in the overarching governance of the

Reef and far deeper ownership of, and participation in, its active day to day management through the co-design, co-delivery and co-management of Reef protection programs.

While the message is clear about what needs to be done, there are a number of gaps which have been consistently recognised as barriers to maximising success. In particular there is a need for:

- Longer term, coordinated and strategic program delivery which embraces and engages Traditional Owners as real partners in the long-term management of Reef land and sea country;
- Greater support for building capacity of local, regional and Reef-wide Indigenous land and sea management structures through improved planning processes, training, knowledge systems, leadership and innovation;
- Acknowledging, safeguarding and embracing Indigenous Knowledge in the management of the Reef; and
- Strengthening business capacity, partnership frameworks and sustainable financing.

⁹ For the purposes of this investment strategy Indigenous means Traditional Owner(s) who are defined as an Indigenous person:

(a) Who is recognised in the Indigenous community or by a relevant representative Aboriginal or Torres Strait Islander body:

(i) as having spiritual or cultural affiliations with a site or area in the Great Barrier Reef and its catchments; or
(ii) as holding native title in relation to that site or area; and

(b) Who is entitled to undertake activities under Aboriginal or Torres Strait Islander custom or tradition in that site or area.

¹⁰ Excludes Component 1 of the Grant Agreement.

¹¹ Traditional Owners and Governance of the Great Barrier Reef: A Discussion Starter. Available online at: <https://www.rrcc.org.au/wp-content/uploads/2018/09/Reef-2050-TO-and-Governance-of-the-GBR-Flyer-24-04-18.pdf>

What can be done?

The Reef benefits from a wide and passionate network of contributors. But no one else on the Reef has inherent rights; is the owner and expert on their heritage values; has an ongoing obligation to preserving heritage in accordance with their customs and beliefs; and has the rich Indigenous Knowledge systems acquired through time immemorial trial and error like the Traditional Owners.

We now have an opportunity through the Partnership to align Traditional Owner aspirations with bold investments and embed the best practice principles of Free, Prior and Informed Consent and Mutual Benefit in work derived from this Component.

Two pieces of work will help inform the next steps. A Traditional Owner Working Group has been established to help shape strategic Indigenous investment, policy and engagement settings (including annual work plans). The Working Group will enhance and complement rather than replace continuing on-ground engagement and consultation with Traditional Owners.

The Reef 2050 Traditional Owner Aspiration Project is also being coordinated via the Reef and Rainforest Centre. This is yielding a common set of priorities that can be aligned with objectives and principles of the Partnership.

Investment Strategy Priorities

Co-design, delivery and decision making will underpin investments made under the Traditional Owner Reef Protection Component of the Partnership. Traditional Owner activities and engagement are also recognised in all other Components – providing a seamless platform for engagement across all work undertaken via the Partnership.

It will also allow for a progression of measures to support existing initiatives and actions, ones to be implemented over the life of the Partnership and outcomes that can persist beyond the six-year window.

To maximise efficiency and avoid duplication, this program will be designed in close consultation with other major funders of Traditional Owner Reef protection activities including the Department of Prime Minister and Cabinet, Department of the Environment and Energy, the Queensland Government, and the Great Barrier Reef Marine Park Authority.

Investments under the Partnership will be based on the following themes:

Land and sea action and investment planning

Land and Sea Country planning provides a structured approach for groups to articulate and understand the values and aspirations of their land and sea country – including biodiversity, critical species, and Indigenous heritage. They also prescribe measures to sustainably protect and restore these values and aspirations in partnership with their stakeholders underpinned by an agreed investment framework.

The Partnership will support land and sea action and investment planning aligned to the Reef 2050 Plan and with a strong focus on business planning, economic empowerment and strategic partnerships to support more sustainable outcomes. Using a common framework – but ensuring they are tailored to each Traditional Owner group's unique circumstances and aspirations – these plans provide a Traditional Owner-led, more regional perspective of Traditional Owner Reef Protection activities to achieve greater impact.





Active Traditional Owner-led reef protection measures

Recognising the host of Traditional Owner Reef protection efforts underway already across all Components of the Partnership (Water Quality, Crown-of-Thorns Starfish Control, Integrated Monitoring and Reporting, and Reef Restoration and Adaptation Science) and the potential for these efforts to be much greater, a minimum of 10% of total Partnership investment will be allocated to boost Traditional Owner Reef protection activities across all five Components of the Partnership. This will be underpinned by a five-year strategic plan of action that will be co-designed with Traditional Owners. Investment will be directed towards activities that will deliver the greatest outcomes for the Reef, with shared benefit for Traditional Owners.

This approach will:

- Enable existing on-ground Reef protection activities being undertaken by Traditional Owners to be strengthened, scaled and accelerated;
- Facilitate creation of new partnerships to support enduring outcomes;
- Contribute to economic development objectives aligned to the Reef 2050 Plan, recognising these are as core as culture and can best illustrate the concept of mutual benefit; and
- Maximise the outcomes and co-benefits for the Reef.

Indigenous innovation, leadership and collaboration

The Partnership will support forums, research, case studies and collaboration initiatives that showcase best practice approaches for:

- Traditional Owner engagement including developing and sustaining genuine partnerships;
- Applying Indigenous Knowledge to the protection and management of the Reef;
- Respecting, recognising and promoting the rich ongoing cultures of Reef Aboriginal and Torres Strait Islander peoples; and
- Empowering Traditional Owners to actively protect land and sea country.

For instance, across the Great Barrier Reef and around Australia and the world Indigenous peoples are involved in natural and cultural protection activities. This represents a huge opportunity to grow capacity through learning from one another, to transfer new ideas and approaches, and to avoid the mistakes of others.

The Partnership would support peer to peer learning that aims to increase the impact of Reef protection activities in the Reef catchments. Activities could include:

- Supporting knowledge exchange events such as forums, e.g. a Saltwater youth or women's forum
- Identifying lessons learnt from other best practice indigenous co-management models from Australia and globally and implementing these learnings in a Reef context.

Sustainable funding options

One of the greatest challenges is the lack of sustained funding, with the majority of Traditional Owner Reef protections activities reliant on short term grant funding. This is a major impediment to growing a strong and skilled work force and prevents momentum from being maintained. It also restricts Traditional Owners' long held aspirations for an independent Reef wide voice to support and advocate for best practice approaches to Indigenous engagement, investment, policy and Reef protection measures.

The Partnership will explore new delivery models and sustainable funding opportunities including the potential for a Traditional Owner Reef protection fund. It will be informed in its design by the successful funding approaches of The Aboriginal Carbon Fund and Indigenous Business Australia. This will support and strengthen the role of Traditional Owners in Reef governance, foster new and sustainable partnerships and promote enduring Reef protection outcomes.

Integrated Monitoring and Reporting

Total investment: \$40 million

Purpose: Support the implementation of the Reef 2050 Integrated Monitoring and Reporting Program (RIMREP), improve health monitoring and reporting of the Great Barrier Reef World Heritage Area to ensure that monitoring and reporting to UNESCO is scientifically robust and investment outcomes are measurable.¹²

What is the challenge?

The Great Barrier Reef is vast, stretching more than 2300km along the Queensland Coast and spanning 348,000m². Commonly described as the size of Italy or 70 million football fields, the scale of the task of understanding, diagnosing and treating this system is an awesome undertaking in itself.

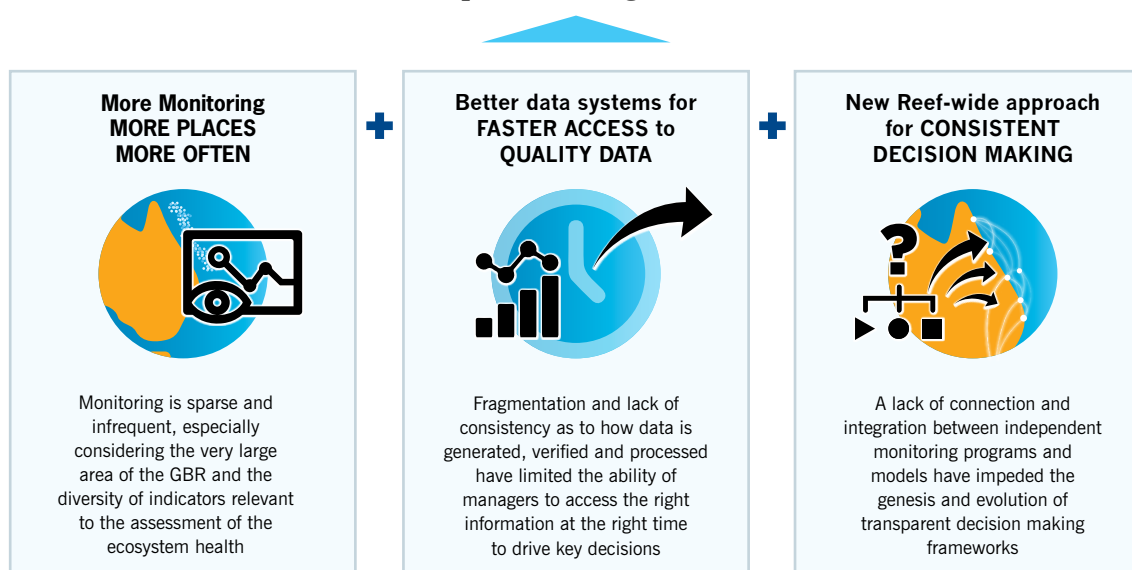
Significant effort is already directed towards Reef monitoring: over 100 distinct monitoring programs focusing on the marine environment and countless more in the adjoining catchments, each collecting data through various means and enabled by a multitude of funding sources. Quite simply how can we monitor smarter, reducing the inefficiencies and fragmentation and boosting the reach, quality and timeliness of the data needed? To treat each problem facing our Reef and to track our progress we must improve our monitoring.

What can be done?

Initial steps to transform monitoring and reporting programs began in 2014, when the Australian Government launched the Reef 2050 Integrated Monitoring and Reporting Program (RIMREP). It includes a stocktake of existing programs and identification of monitoring needs, with recommendations for an operational integrated monitoring and reporting system due in June 2019.

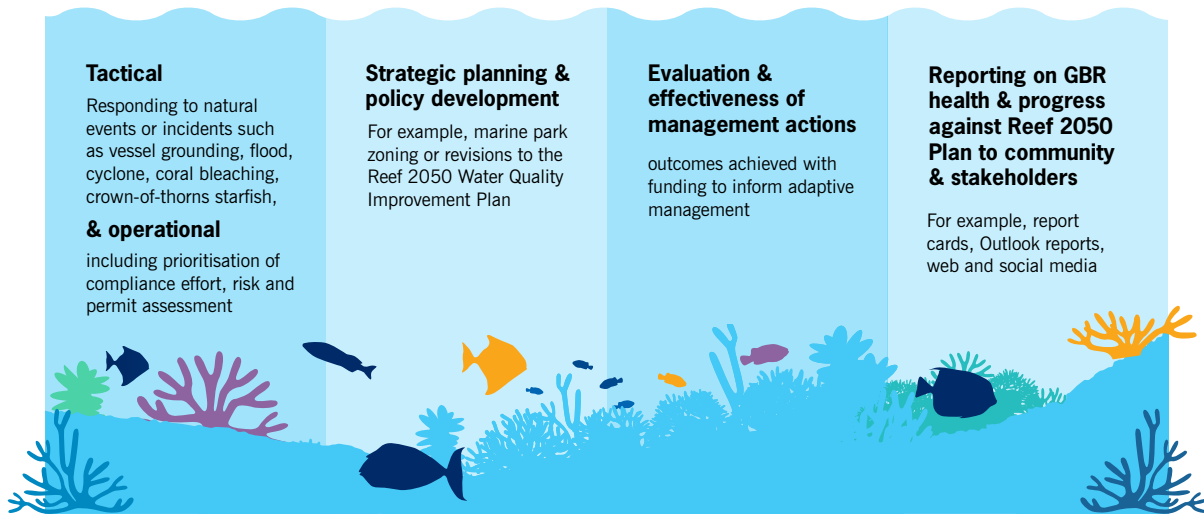
RIMREP represents a sound and centralised foundation to build from, but the Reef will still demand a step change in the depth, breadth, rigour, coordination and availability of data that managers depend on in making decisions to benefit the Reef.

Adaptive management



¹²The monitoring and evaluation activities associated with assessing the effectiveness of individual Reef Trust Partnership projects will be funded through the relevant Component budget, not the Integrated Monitoring and Reporting Budget.

How Reef data is used



Investment Strategy Priorities

Investments under this Component of the Partnership will help underpin the ultimate goal of adaptive management of the Reef. They will produce significant momentum to introduce innovation in monitoring, new systems with long-term benefits and support critical needs identified through RIMREP.

The results will also serve as an overarching piece of architecture that can accommodate the requirements for better monitoring and reporting in each of the individual Components of the Partnership. As a matter of principle, the Partnership will endeavour to make data and models available to the broader Reef community.

Investments under the Partnership will be based on the following themes:

Supporting critical monitoring activities identified via RIMREP

A prerequisite to transformational investments is ensuring the foundations are sound, which means adequate baseline monitoring is in place. There are Reef-wide observation and modelling programs that need to be maintained or expanded to be able to assess total ecosystem health, support management and report against the Reef 2050 Plan.

While the Partnership is not meant to be the sole investor in monitoring activities on the Reef, it is

reasonable to expect that a significant portion of this Partnership Component funding will be directed to meeting essential whole-of-Reef monitoring needs. The Partnership will base its investment decisions on the recommendations from RIMREP and in accordance with the Grant Agreement. Funding the ongoing operationalisation of eReefs (Paddock to Reef Marine Modelling Program) in conjunction with existing commitments from the Australian and Queensland governments will form part of this activity.

Catalysing technological innovation

Transformative technologies that can routinely monitor large areas of the Reef need to become business-as-usual as they offer the promise of timely, cost-effective and meaningful information to guide adaptive management.

Priority areas include:

- habitat mapping and coral cover and composition surveys that would benefit from an increase in data collection and analysis throughput,
- new detection platforms such as unmanned aerial or underwater vehicles, cost-effective sensor networks or improved machine-learning for automated data or image analysis, and
- creating a dedicated technology transformation fund to be seeded with \$5 million and grown via the co-financing strategy outlined under the Partnership.

A Reef-wide decision-making and forecasting platform

The Reef needs a consistent and transparent approach to decision making based on data that is current and accurate and on models that enable forecasting and scenario planning. Much better value can and should be extracted from existing observations and model data. In particular, these could be used more systematically to drive management actions, inform policy decisions and assist with prioritisation of investments.

Currently there is a significant time lag between the acquisition of data and its availability to inform management or policy decisions. In a rapidly changing climate with a predicted increase in frequency and intensity of high impact events (including bleaching, cyclones and floods), adaptive management will only be achieved if monitoring and modelling data can be more readily and more consistently used to inform decisions.

Our strategic objective is not to develop a whole-encompassing integrated model for decision making, as 'one size fits all' approaches have historically failed to meet expectations. Instead it is to support the development and implementation of a flexible decision-making environment that recognises the value of diversity in monitoring and model data, consolidates existing systems and streamlines the flow of information.

The Partnership will engage through RIMREP with the broad Reef community to identify key hurdles and step changes and transformations required to achieve the ultimate objective of an adaptive system. Realising the full value and co-benefits of integrating observation and modelling will require the strategy to address the entire value chain from monitoring data to modelling, decision making, evaluation and reporting. Significant progress has been achieved by RIMREP which the Partnership will look to build on, focusing on reducing the time between monitoring data collection and impact.

Understanding the value of community stewardship and disclosure of high-value information

The community wants to partner more in the goal of protecting and restoring the Reef and people are hungry for timely information about the outcomes of their efforts and the general health of the Reef.

Communication about the trajectory of the Reef needs to step into the 21st century. Materially improving the quality, timeliness and accessibility of monitoring data will foster a greater sense of connection to the Reef, empowering all citizens to be on the journey and to be storytellers about its road to recovery. The potential value of such transformational initiatives is demonstrated, for example through the eReefs or Eye on the Reef projects. RIMREP offers the perfect platform to extend this to a much broader audience and a much wider representation of the Reef.

In conjunction with other Components of the Partnership, we will endeavour to identify new opportunities in citizen science, communication and engagement in monitoring of the Reef, that provide the greatest benefits.

Supporting partnerships and building a community of practice

The projects enabled under this Component will be delivered using a consortium approach which will bring together leading research organisations, industry expertise, Reef management agencies and monitoring infrastructure networks and partners such as the Integrated Marine Observing System and the Global Ocean Observing System. This partnership approach is crucial for accessing relevant and diverse expertise, integrating with existing monitoring programs, ensuring sustainable and enduring outcomes including ongoing housing of data and maintenance of infrastructure, and accessing new perspectives and ideas.



Where to from here?

The Investment Strategy is a significant milestone in the Partnership. It lays out the Partnership intent and approach, and describes the priority areas for investment within each of the Components. It is an important first step, but there is much more to be done.

Developing annual work plans

Over the next six months efforts will focus on developing detailed annual work plans in readiness for full implementation of the Partnership's activities from 1 July 2019. This will involve extensive consultation, engagement and planning with key groups and individuals, including other funders, to ensure that projects proposed complement rather than duplicate existing efforts.

Implementing best practice governance

As indicated in the Partnership Governance Plan which details the governance arrangements at the Partnership level, Component level governance arrangements must be thoughtfully designed to be both effective and efficient, and wherever possible build upon or leverage existing arrangements. They must be consistent with the Partnership's principles of accountability and transparency, address the challenging issues of conflict of interest, and be underpinned by robust decision making frameworks for prioritising investment consistent with the Reef 2050 Plan.

Measuring performance

To assess the performance of the Partnership a robust methodology for credibly demonstrating the contribution of the Partnership to the Reef 2050 Plan, and to the expected outcomes specified in the Grant Agreement is required. The first step in this process is the development of a monitoring and evaluation (M&E) framework which was completed and published in late 2018. The final M&E Plan which will define performance expectations for the Partnership as a whole and for each component will be finalised in March.

Expected outcomes of the Partnership:

- a. **Improved management** of the Great Barrier Reef World Heritage Area and relevant activities in the adjacent catchments
- b. **Protection of attributes** that contribute to the outstanding universal value of the Great Barrier Reef World Heritage Area, including species, habitats and Indigenous values
- c. **Management of key threats** to the Great Barrier Reef World Heritage Area, including poor water quality and crown-of-thorns starfish outbreaks

Delivering on-ground projects

As outlined in the 2018/19 Activity Gantt Chart, up to \$25M of Partnership funds has been allocated to early investment projects that will commence in the first half of 2019. The majority of this funding will support Water Quality projects that seek to build on existing programs with proven beneficial water quality outcomes, address clearly articulated needs within Reef catchments, and lay the foundations for the longer term Reef Trust Partnership Investment Strategy. A second suite of early investments will support citizen science and community-based Reef protection activities, with projects expected to commence in early 2019.

Working together

The challenges facing the Reef are great and cannot be solved by any one group or any one single solution. Fortunately, the Reef space is a busy one – with many highly committed organisations and groups tackling these challenges and achieving great outcomes. The Reef Trust Partnership provides an unprecedented opportunity for supporting partnerships, collaborations and collective action, at a scale never previously possible.

This collective approach will underpin the Partnership's success and ensure that meaningful and high impact outcomes for the Great Barrier Reef are achieved.

Appendix 1: Alignment of Reef Trust Partnership Activity Components with the revised Reef 2050 Plan (July 2018)

The Grant Agreement between the Reef Trust and the GBRF outlines relevant actions, targets, objectives and outcomes for each activity component based on the 2015 version of the Reef 2050 Plan.

The following table outlines the updated Reef 2050 Plan actions for each of the activity components following the Plan's mid-term review. This review focused on consolidating and updating actions to respond to climate change and cumulative pressures on the Reef. New actions (designated by 'MTR' – mid-term review) complement existing efforts and include trialling new approaches and technologies.

With the exception of the water quality theme, the mid-term review did not alter the vision, outcomes, objectives or targets of the 2015 Plan. Targets for the water quality theme were updated to align with the Reef 2050 Water Quality Improvement Plan 2017-2022.

Once detailed project plans are developed for Components of the Partnership, these plans will be mapped against Reef 2050 Plan actions, targets, objectives and outcomes as part of the monitoring and evaluation planning process required at the individual project level.

Table A1: Water Quality Activities

Reef 2050 Plan Action (A)	Reef 2050 Plan Targets (T)	Reef 2050 Plan Objective (O)	Reef 2050 Plan Outcome
MTR* WQA1: Implement the Reef 2050 Water Quality Improvement Plan 2017-2022	MTR WQT1: By 2025: <ul style="list-style-type: none"> • 60% reduction in anthropogenic end-of-catchment dissolved inorganic nitrogen loads • 25% reduction in anthropogenic end-of-catchment fine sediment loads • 20% reduction in anthropogenic end-of-catchment particulate nutrient loads • pesticide target—to protect at least 99% of aquatic species at the end-of-catchments [from Reef 2050 WQIP based on comparison to a 2013 baseline]	WQO1: Over successive decades the quality of water entering the Reef from broadscale land use has no detrimental impact on the health and resilience of the Great Barrier Reef.	WQ: Good water quality sustains the Outstanding Universal Value, builds resilience, improves ecosystem health and benefits communities.

* MTR refers to Mid-Term Review, WQ refers to the Reef 2050 Plan Water Quality theme

Table A2: Crown-of-Thorns Starfish Control Activities

Reef 2050 Plan Action (A)	Reef 2050 Plan Targets (T)	Reef 2050 Plan Objective (O)	Reef 2050 Plan Outcome
MTR* EHA2: Implement an integrated crown-of-thorns starfish management framework within the marine parks to guide and coordinate efforts by all partners to reduce coral predation and maximise live coral cover on identified reefs.	EHT5: Condition and resilience indicators for coral reefs, seagrass meadows, islands, estuaries, shoals and inter-reefal habitats are on a trajectory towards at least good condition at local, regional and Reef-wide scales.	EHO3: Trends in the condition of key ecosystems including coral reefs, seagrass meadows, estuaries, islands, shoals and inter-reefal areas are improved over each successive decade.	EH: The status and ecological functions of ecosystems with the Great Barrier Reef World Heritage Area are in at least good condition with a stable to improving trend.

*MTR refers to Mid-Term Review, EH refers to the Reef 2050 Plan Ecosystem Health theme

Table A3: Reef Restoration and Adaptation Science Activities

Reef 2050 Plan Action (A)	Reef 2050 Plan Target (T)	Reef 2050 Plan Objective (O)	Reef 2050 Plan Outcome
<p>MTR* EHA3: Investigate, deliver and support active localised restoration activities, as identified in the Reef Blueprint.</p> <p>MTR EHA11: Develop technologies to facilitate recovery of degraded reefs and to build increased resilience under forward climate scenarios including assessing the feasibility of increasing the thermal tolerance of Great Barrier Reef corals.</p> <p>MTR EHA4: Determine the best measures to reduce impacts, improve resilience and implement a coral reef resilience network as identified in the Reef Blueprint.</p> <p>MTR EAH16: Undertake further research to gain a deeper understanding of climate change trajectories for the Reef and communities that depend on it.</p>	<p>EHT5: Condition and resilience indicators for coral reefs, seagrass meadows, islands, estuaries, shoals and inter-reefal habitats are on a trajectory towards at least good condition at local, regional and Reef-wide scales.</p> <p>BT2: Trends in the availability and condition of habitat for species of conservation concern are improving at Reef-wide and regionally relevant scales.</p>	<p>EHO2: The Great Barrier Reef World Heritage Area retains its integrity and systems functions by maintaining and restoring the connectivity, resilience and condition of marine and coastal ecosystems.</p> <p>EHO3: Trends in the condition of key ecosystems including coral reefs, seagrass meadows, estuaries, islands, shoals and inter-reefal areas are improved over each successive decade.</p> <p>BO5: Reef habitats and ecosystems are managed to sustain healthy and diverse populations of indicator species across their natural range.</p>	<p>EH: The status and ecological functions of ecosystems with the Great Barrier Reef World Heritage Area are in at least good condition with a stable to improving trend.</p> <p>B: The Reef maintains its diversity of species and ecological habitats in at least a good condition with a stable to improving trend.</p>

*MTR refers to Mid-Term Review, EH refers to the Reef 2050 Plan Ecosystem Health theme, B refers to the Reef 2050 Biodiversity theme

Table A4: Indigenous and Community Reef Protection Activities

Reef 2050 Plan Action (A)	Reef 2050 Plan Target (T)	Reef 2050 Plan Objective (O)	Reef 2050 Plan Outcome
<p>EHA2: Incorporate and prioritise Traditional Owners’ planning into existing future ecosystem policy and programs.</p> <p>EHA3: Support Traditional Owner stewardship activities that contribute to Reef health and resilience, including removing and, where possible, identifying the sources of marine debris.</p> <p>EHA4: Develop further agreements with Traditional Owners addressing management of ecosystems within their traditional estates.</p> <p>BA3: Improve Traditional Owner engagement to strengthen participation in decision making at all levels relating to the conservation and cultural use of biodiversity.</p> <p>HA1: Build capacity for the involvement of Traditional Owners and community members in cooperative management, planning and impact assessment.</p> <p>CBA2: Work with Traditional Owners to identify world’s best practice in agreement making, strategic planning, and management and implementation of Indigenous programs in relation to Great Barrier Reef sea country estate.</p>	<p>EHT2: The number of agreements with Traditional Owners addressing management of ecosystems within their traditional estates is increased.</p> <p>HT3: Partnerships between Traditional Owners and all stakeholders are increased to ensure key Reef heritage values are identified, documented, and monitored.</p> <p>CBT3: Community participation in stewardship actions to improve Reef health and resilience continues to grow.</p> <p>EBT2: The number of employment opportunities for Traditional Owners in sea country management and Reef-based industries is increased.</p>	<p>EH01: The knowledge, innovations and practices of Traditional Owners relevant for conservation and cultural use of biocultural diversity are preserved and maintained.</p> <p>BO1: Traditional Owners are engaged and participate in and manage the conservation and ecologically sustainable use of cultural keystone species and biocultural resources.</p> <p>HO2: Indigenous and non-Indigenous heritage including natural, aesthetic, historic, scientific, and social values are identified, conserved and managed in partnership with the community.</p> <p>CB03: Community benefits provided by the Reef, including its superlative natural beauty and the sense of place, are maintained for current and future generations.</p> <p>CBO4: Local, regional and Reef-wide community benefits are understood and the community is actively engaged in managing Reef activities.</p> <p>EBO4: Reef-dependent industries are productive and profitable based on a healthy Reef and are ecologically sustainable.</p>	<p>CB: An informed community that plays a role in protecting the Reef for the benefits a healthy Reef provides for current and future generations.</p>

Table A4: Indigenous and Community Reef Protection Activities (continued)

Reef 2050 Plan Action (A)	Reef 2050 Plan Target (T)	Reef 2050 Plan Objective (O)	Reef 2050 Plan Outcome
<p>MTR* CBA1: Strengthen community efforts to address climate change impacts on the Reef by:</p> <ul style="list-style-type: none"> • communicating the implications of climate change on the Reef and the outcomes required to secure its future • empowering partners to be part of actions to build Reef resilience. <p>GA11: Improve Traditional Owner participation in governance arrangements for protection and management of the Reef.</p> <p>GA12: Prioritise and develop specific implementation plans and reporting protocols addressing the Plan’s targets and actions in consultation with the community.</p>		<p>GO3: Strong partnerships with Traditional Owners, industry, researchers and the community support protection.</p>	

*MTR refers to Mid-Term Review, EH refers to Ecosystem Health, B refers to Biodiversity, H refers to Heritage, WQ refers to Water Quality, CB refers to Community Benefits, EB refers to Economic Benefits and G refers to Governance themes in the Reef 2050 Plan



Table A5: Integrated Monitoring and Reporting Activities

Reef 2050 Plan Action (A)	Reef 2050 Plan Targets (T)	Reef 2050 Plan Objective (O)	Reef 2050 Plan Outcome
<p>MTR* GA4: Develop and implement a Reef Integrated Monitoring and Reporting Program that:</p> <ul style="list-style-type: none"> • facilitates adaptive management for the Reef that is effective, efficient and evolving • enables timely and suitable responses by Reef managers and partners to emerging issues and risks • enables the evaluation of whether the Reef 2050 Plan is on track to meet its outcomes, objectives and targets. 	<p>GT5: A comprehensive Integrated Monitoring and Reporting Program is established and operational and the reporting informs review and updating of this Plan.</p> <p>GT4: Investment in actions is prioritised using evidence-based risk assessment to maximise benefits for Reef health and resilience.</p> <p>GT3: Actions under this Plan are prioritised and tailored to reflect local or regional differences in threats to the values of the Reef.</p> <p><i>Note: No change to governance targets.</i></p> <p>EHT1: Traditional Owners have developed Indigenous Ecological Knowledge Management Systems for collecting, handling and sharing culturally information and its integration in decision making.</p> <p>HT2: Indigenous and non-Indigenous heritage values are identified, documented and protected in decision-making and planning processes.</p> <p>CBT2: Community benefit values have been identified and are considered in decision making.</p>	<p>GO4: An adaptive management approach underpins implementation of this Plan and results in improved governance arrangements and processes.</p>	<p>G: The Outstanding Universal Value of the Reef is maintained and enhanced each successive decade through effective governance arrangements and coordinated management activities.</p>

*MTR refers to Mid-Term Review, EH refers to Ecosystem Health, H refers to Heritage, WQ refers to Water Quality, CB refers to Community Benefits, EB refers to Economic Benefits and G refers to Governance themes in the Reef 2050 Plan

Appendix 2: Guiding Principles

The Investment Strategy incorporates and is guided by Partnership guiding principles as set out in the Grant Agreement, Reef Trust investment principles, and Reef 2050 Plan investment principles and priorities. In addition to these principles the Reef 2050 Plan Independent Expert Panel recommended a set of principles, all of them consistent and/or complementary with those specified in the Grant Agreement, that should underpin the Partnership.

GBRF has mapped and grouped all of these into a single set of overarching principles for the Partnership:

- Strategic and targeted
- Measurable outcomes
- Integration delivering multiple benefits
- Additionality and complementarity
- Cost effectiveness
- Collaboration, partnerships and co-investment
- Evidence-based and scientifically robust
- Transparency and accountability
- Solution-driven innovation
- Future-focus, dynamic and adaptive



Reef Trust Partnership Investment Strategy



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