R6: GOVERNANCE AND PROGRAM DELIVERY

A report provided to the Australian Government by the Reef Restoration and Adaptation Program

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1. PREAMBLE

The Great Barrier Reef

Visible from outer space, the Great Barrier Reef is the world's largest living structure and one of the seven natural wonders of the world, with more than 600 coral species and 1600 types of fish. The Reef is of deep cultural value and an important part of Australia's national identity. It underpins industries such as tourism and fishing, contributing more than $6B a year to the economy and supporting an estimated 64,000 jobs.

Why does the Reef need help?

Despite being one of the best-managed coral reef ecosystems in the world, there is broad scientific consensus that the long-term survival of the Great Barrier Reef is under threat from climate change. This includes increasing sea temperatures leading to coral bleaching, ocean acidification and increasingly frequent and severe weather events. In addition to strong global action to reduce carbon emissions and continued management of local pressures, bold action is needed. Important decisions need to be made about priorities and acceptable risk. Resulting actions must be understood and co-designed by Traditional Owners, Reef stakeholders and the broader community.

What is the Reef Restoration and Adaptation Program?

The Reef Restoration and Adaptation Program (RRAP) is a collaboration of Australia's leading experts who are aiming to create a suite of innovative and targeted measures to help preserve and restore the Great Barrier Reef. These interventions must have strong potential for positive impact, be socially and culturally acceptable, ecologically sound, and ethically and financially responsible. They would be implemented if, when and where it is decided action is needed – and only after rigorous assessment and testing.

RRAP is the largest, most comprehensive program of its type in the world; a collaboration of leading experts in reef ecology, water and land management, engineering, innovation and social sciences, drawing on the full breadth of Australian expertise and that from around the world. It aims to strike a balance between minimising risk and maximising opportunity to save Reef species and values.

RRAP is working with Traditional Owners and groups with a stake in the Reef – as well as the general public—to discuss why these actions are needed and to better understand how these groups see the risks and benefits of proposed interventions. This will help inform planning and prioritisation to ensure the proposed actions meet community expectations. Coral bleaching is a global issue. The resulting reef restoration technology could be shared for use in other coral reefs worldwide, helping to build Australia's international reputation for innovation.

The $6M RRAP Concept Feasibility Study identified and prioritised research and development to begin from 2019. The Australian Government allocated a further $100M for reef restoration and adaptation science as part of the $443.3M Reef Trust Partnership, through the Great Barrier Reef Foundation, announced in the 2018 Budget. This funding, over five years, will build on the work of the concept feasibility study. RRAP is being progressed by a partnership that includes the Australian Institute of Marine Science, CSIRO, Great Barrier Reef Foundation, James Cook University, The University of Queensland, Queensland University of Technology, the Great Barrier Reef Marine Park Authority as well as researchers and expert from other organisations.

2. EXECUTIVE SUMMARY

The objective of the Reef Restoration and Adaptation Program (RRAP) is:

> *To provide decision-makers with scientifically proven, ecologically effective, socially acceptable, technically feasible, and economically viable options for intervening at scale on the Great Barrier Reef, and other Australian reefs, to help them recover from, and adapt to, the effects of climate change.*

This objective can only be delivered through a program that:

- Is managed through a highly adaptive approach to prioritising technologies proposed for intervention.
- Delivers a research and development (R&D) program with an embedded design principle that technological interventions need to be suitable for implementation on the Reef at scale.
- Brings to bear diverse multidisciplinary science and skills – including social science and economics – to enable delivery of the objective and, for this purpose, maintains this intellectual base throughout the program.
- Collaboratively pools the intellectual capital of many organisations to create and maintain a 'hybrid vigour' that drives the program and engenders a fundamental sense of shared purpose and commitment.
- Allows for the necessary brave decisions in managing the risks inherent in deploying new intervention technologies (even at pilot-test scale) into the environment.
- Builds societal confidence in the utility of proposed interventions, through transparent, high-quality science and engineering.

The governance and requirements for effective program delivery were determined to be:

1. The RRAP R&D Program is executed by a consortium of partners, operating through an unincorporated joint venture.
2. This governance structure and culture with participant commitment to the objectives of the program would enable the consortium to deliver the R&D program, with the ability to marshal the right resources in a highly adaptive and prioritised manner, manage the technical risks and deliver real outcomes for the Reef under conditions of rapid change and uncertainty.
3. The proposed structure provides a joint venture board, supported by advisory committees including a Traditional Owner advisory committee and an international peer review panel to provide the board with a fully independent review of strategic decisions, plans, reports and outputs.
4. The board would oversight a dedicated program management team to be established to manage delivery of the R&D program.
5. The proposed structure is appropriate for the funding landscape, which would include a mixture of public and private sector and philanthropic funding. In the first instance, this will include the need for strong alignment with the requirements of the Reef Trust Partnership.

3. GOVERNANCE AND DELIVERY OF RRAP

3.1 Context

This report presents the recommended governance model for the RRAP R&D Program. The RRAP Concept Feasibility Study identified 43 intervention options to advance on a prioritised basis through research, development and regular review of feasibility and suitability for deployment. To achieve this, the governance model needs to enable an agile and highly-adaptive program of research, development and deployment to ensure decision-makers can manage the high level of risk, direct resources to the most prospective options and maximise the likelihood that viable options for at-scale intervention can be delivered. This framework was built on the broad experience of the consortium partners in managing and delivering complex R&D collaborations. This section describes the criteria for the governance arrangements. Section 3.2 outlines the proposed governance and delivery model.

3.1.1 Criteria for selection of governance framework

The purpose of the governance framework is to give the consortium the best chance of successfully delivering the highly adaptive and focused RRAP R&D Program. Elements of the governance framework required for this purpose are:

Partners working together for a single purpose

The consortium framework needs to:

- Be a decision-making forum – not simply a consultative or relationship-management body – with a governance structure that facilitates partners to effectively **collaborate** towards the single purpose and with urgency (see Section 3.1.2).
- Eenable explicit consideration and **planning for the implementation program** (engineering and deployment) that will follow, and in some cases overlap with, the R&D program.
- **Drive adaptive management in the program** as Reef conditions change. There is a strong possibility Reef conditions could change markedly in a short time through impacts such as future bleaching events which could require substantial changes in near-term action and objectives.
- Promote the drive towards the **highest quality product** (through, for example, bringing in external expertise as needed), including an independent **peer review** process, insulated from positioning around commercial interests and perceived competition for funding.
- Facilitate **integration** (rather than fragmentation) of consortium partners' efforts and enable deployment of **appropriate expertise.**
- Ensure rigorous **quality assurance** at every stage of the program and align the interests of consortium partners with delivery of the mission.

Inclusion of all required parties

- Involve and engage **consortium partners.**
- **Involve other partners** such as the Queensland and Australian Government departments either directly or in subsidiary levels. Incorporation of industry partners and other smaller-scale participants is also desirable.
- Be a structure that **works for all participating organisations**, including to permit new entrants to have a **voice in governance**, and therefore the ability to accept new participants as needed.
- Allow for the **involvement of funding organisations**, to the degree they wish and is appropriate.

Program scope and funding

- Consider inter-relationships with other aspects of the overall Reef program, as set out in **Reef 2050 Plan**, and in other parts of the Reef Trust Partnership investment package.
- Align strongly with the Reef Trust Partnership but have the capacity to evolve beyond the **timing and scale** of the Reef Trust Partnership. Its longevity should exceed six years (the limit of the current Reef Trust Partnership funding) and requires the capacity to attract and incorporate more funding from different sources.
- **Minimise establishment and operational costs** of the R&D consortium; ensuring a lean, streamlined governance approach that is efficient with partner and funders' time and money.
- Raise and access **additional funding** over years for the R&D program.

Manage risks

- Account for the important issue of **risk** to consortium partners, Reef-dependent people and industries, and the Reef itself and those who manage it. A long-term R&D program which includes on-Reef intervention trials will be subject to many risks, including ethics, regulatory, physical damage to the Reef and appropriate compensation, community perception, reputational damage to research partners and regulators, and other more traditional loss and damage risks. There is also a significant risk of being overcautious and not delivering the required science and its products in time to make a difference.
- Be sensitive to the current and future perceptions of individuals and groups outside the consortium. This implies the ability for **clear and open external communication**, and transparency of effort and decision-making.
- Enable partner **conflicts of interest** to be **transparently managed**, for the good governance of both the individual organisations and the consortium.
- Set **program management/decision-making protocols** into the consortium governance structure including how conflicts between partners are to be resolved ensuring best-practice science and quality outcomes.
- Manage and **de-risk intellectual property** control including the issue of background intellectual property to align with the purpose of the mission.
- Effect **insurance or bonding solutions for risk coverage**, including exploring access to innovative insurance mechanisms through private or government sources.

3.1.2 Collaboration principles

Genuine collaboration will be fundamental to the ability of RRAP to deliver its ambitious goals. Working in new ways, and bridging traditional boundaries, is extremely challenging and often falls far short of the high expectations of those involved. Therefore, extending the criteria listed in 3.1.1, the RRAP governance system needs to be able to respond to key collaboration challenges through a shared set of collaboration principles, as outlined in Table 1.

Table 1: Five core principles for effective collaboration (modified from Partner Brokering Association).

Challenges	Principles	Benefits
1. Managing different cultures of partners	Embracing diversity	Unlocking more value
2. Power imbalances between partners	Equitable relationships	Greater mutual respect
3. Hidden agendas, perceived or real	Transparency and openness	Deeper trust between partners
4. Competition for resources and roles	Focusing on mutual benefits and achieving shared goals Ensuring all parties contribute to the intellectual pool of the program	Increased and secure partner commitment Breadth and hybrid vigour of intellectual pool maintained
5. Uncertainty and risk	Ability and willingness to take risks	Achieving breakthrough results

Central to genuine collaboration is agreement by all partners that RRAP is a mission-oriented venture, focused on the timely delivery of critical restoration and adaptation outcomes for the Reef. This implies a departure from traditional research modes and an embracing of an innovation- and research-based, structured engineering approach, predicated on teams comprising the best intellects. Contribution and recognition of ideas transcend individuals and institutions, accepting that not all ideas will proceed to fruition indeed, it is anticipated most ideas will not. Ultimate success is shared and recognised as an RRAP team outcome.

Progress of ideas from individual participants is only one element of their required contribution. A key additional requirement, and strength, is the pool of intellect that fashions and drives the program. This together with recognition that the mix of skills and resources required will change through the lifecycle of an intervention means the ability to attract additional partners during the progress of the program is a critical element in maintaining the hybrid vigour of the consortium. It is an important point of difference from many other collaborations that tend to be an assembly of individual, related projects delivered by fixed teams.

The design of the RRAP R&D Program governance structure needs to allow for the necessary brave decisions in managing the risks that inherently accompany deploying new intervention technologies (even at the pilot-test scale) into the environment. The Great Barrier Reef may increasingly require higher risk tolerance, and more expensive interventions, to keep pace with climate change and worsening impacts over the next decade a situation that can only be addressed by an agile, transparent and proactive governance.

Designing for risk-taking rather than just a stable collaboration requires a shift in perspective. Normally, collaborative R&D and deployment arrangements aim to exclude risk rather than design for handling it. For a challenging program such as this, handling risk must be a critical driver of program management. It is highly likely to be a differentiating factor for success.

Real success will require a fundamental sense of shared purpose and commitment from the consortium partners, not just in the structure of the organisation formed to execute the program, but beyond, into the executive teams of the partner organisations. Involvement in an inherently uncertain program such as RRAP requires consortium partners to recognise that aspects of their involvement will also be unpredictable. The partners must be fundamentally committed to tightly working together on the challenging assignment of finding ways to help the Great Barrier Reef (and via collaboration, the world's reefs) recover from, and adapt to, on-going climate change; to buy time for global emissions reduction efforts to start taking effect. The commitment of the senior leaders of consortium partner organisations (including their board members) will be vital to the overall effort, and to the reality that risks will be taken and not all of what is tried will be successful. End-use stakeholders and key funders must, in particular, be intimately engaged at all levels, from an early stage.

3.2 Recommended governance and delivery model

It is recommended the RRAP R&D Program be executed by a consortium of partners, operating through an unincorporated joint venture (see Appendix B). An unincorporated joint venture governance structure would allow the consortium to marshal the right resources to accomplish the mission; balancing the ability to take risks, and deliver real outcomes for the Reef, under conditions of rapid change and uncertainty. The unincorporated joint venture would be formed and conducted pursuant to a collaborative agreement between the consortium partners, which would include the purpose (Section 3.1.1) and the following delivery model. The proposed structure includes a board, supported by advisory committees including an international peer review panel, to provide a fully independent review of strategic decisions, plans, reports and outputs; as well as a Traditional Owner advisory sub-committee.

The board would oversight a steering committee and a program management team to be established to manage program delivery and who would work with the participating R&D parties. An executive director would be engaged, reporting to the board and leading the steering committee.

Figure 1 shows the proposed basic structure for the governance of the operational delivery of RRAP. Further details of the governance model are provided below. The proposed structure would allow the RRAP R&D Program to be fully integrated into the consultative and governance arrangements of the Reef 2050 Plan. Importantly, this model is appropriate for any funding landscape and mixture of public and private sector/philanthropic funding.

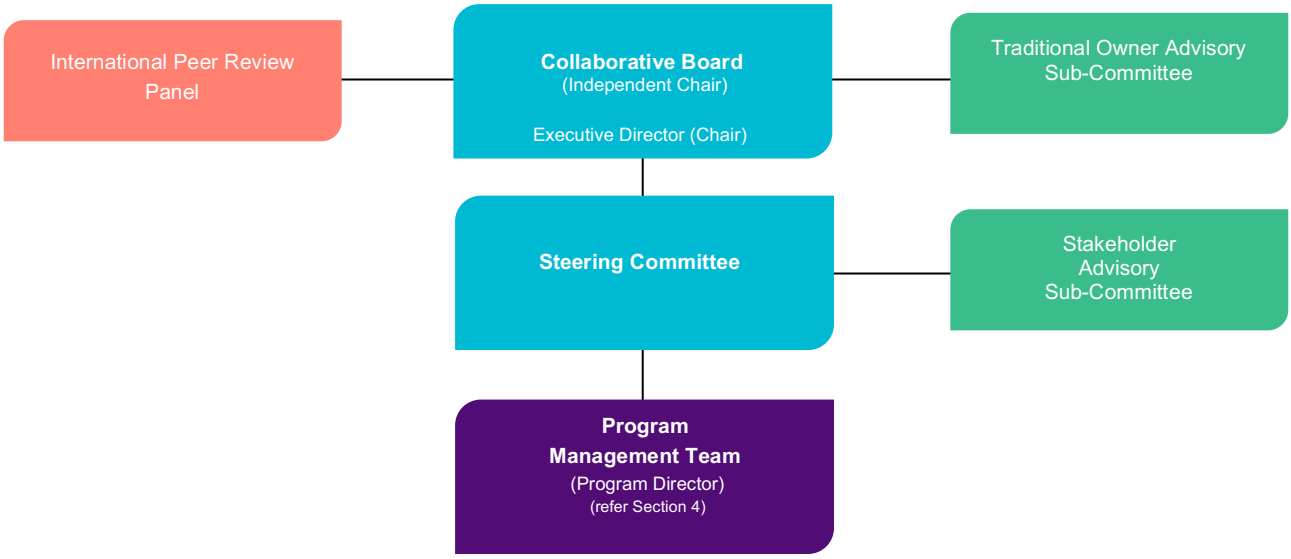

Figure 1: Proposed governance and operational structure for RRAP.

3.2.1 Unincorporated joint venture board

The independently-chaired collaborative board would be the ultimate decision-making body for the RRAP R&D Program, noting that for activities funded via the Reef Trust Partnership, the Great Barrier Reef Foundation Board makes decisions about the appropriation of these funds, but will do so informed by the advice of the collaborative board. Wherever possible, this will be facilitated through the Great Barrier Reef Foundation member on the collaborative board.

In addition to ensuring focused program delivery from a scientific and engineering perspective, the collaborative board would manage issues including the societal mandate for the program, the maintenance and growth of the consortium and changing stakeholder expectations, and the resourcing required for scale-up of interventions. Given the nature of the risks that need managing at the board level, the collaborative board chair must be primarily selected for leadership skills and chairing experience, rather than for specific scientific domain knowledge. The chair should have prior experience with collaborative ventures, be a consensus-builder and have a good understanding of the business of the respective partner organisations. Those not specifically involved in the Reef, or reef-related issues, would be preferred, to reinforce the notion of independence.

The collaborative board would comprise an independent chair, senior executives from the six consortium partner organisations, at least two independents (selected on a skills basis), a Traditional Owner representative and observers from the Department of Industry Innovation and Science and the Department of Environment and Energy. The Australian Institute of Marine Science (AIMS) and the Great Barrier Reef Foundation would be permanent members of the collaborative board. Because of the Great Barrier Reef Marine Park Authority's regulatory obligations under the *Great Barrier Reef Marine Park Act*, its representative would have a position of a non-voting advisor on the board.

The collaborative board would:

- Set overall strategy and direction for the unincorporated joint venture to deliver RRAP, consistent with the collaboration agreement.
- Manage overall risk (while balancing the imperative for the program to take risks and understand the time-critical nature of the mission).
- Ensure compliance with the requirements of the founding organisations to deliver R&D outcomes for the Reef.
- Maintain dialogue and alignment with key stakeholder groups, in part through the advice provided by the stakeholder and Traditional Owner sub-committees.
- Represent RRAP in high-level dealings with government, industry and internationally.
- Support efforts to secure additional funding for the venture on an on-going basis.
- Seek and take advice from the international peer review panel, as deemed appropriate by the board.
- Approve the research plan and major expenditures recommended by the steering committee and executive director.
- Ensure consortium partners maintain collective focus on the mission and work together for the good of the Reef.
- Approve and establish the other aspects of the governance and program management framework.
- Manage any disputes arising from the steering committee or otherwise.
- Provide strategic oversight to balance the needs of funders, key stakeholders and research providers.
- Foster strategic external engagement.
- Approve communication and engagement strategies.
- Make recommendations to the parties as to whether a formal transition to an alternate governance model for the collaboration (for example an incorporated joint venture) would be appropriate and make recommendations to the parties as to whether an incorporated entity should be formed for deploying new intervention technologies developed in RRAP into the environment at implementation scale.

3.2.2 International peer review panel

The collaborative board would ensure all aspects of the R&D program including plans, results, deliverables and key strategic decisions were scrutinised and peer-reviewed by a panel of independent international scientific experts at an appropriate level of detail. The panel would consist of a core of four to five paid members, chosen exclusively from international ranks. Their advice would be received at the board level and referred to the steering committee for consideration. Given the program's Great Barrier Reef focus, the relatively limited pool of key senior specialists within Australia and the involvement in the venture of a large number of the key Australian institutions with capacity in reef-related science and engineering, this approach will help limit conflict and heighten credibility. The panel would be able to call upon other experts, as required, to ensure the highest level of peer review.

3.2.3 Traditional Owner advisory sub-committee

The collaborative board would be directly advised by a Traditional Owner advisory sub-committee, composed of representatives from communities along the length of the Great Barrier Reef. The importance placed on this reflects the unique role Traditional Owners would play in developing feasible and socially acceptable Reef intervention strategies.

3.2.4 Steering committee

The steering committee, led by the program executive director, would be the senior technical decision-making body for the unincorporated joint venture, responsible for executing the strategic direction set by the board and charting the critical pathway for accomplishing the mission.

The steering committee would be responsible for overall program formulation, recommending the research plan and major expenditures to the collaborative board, prioritising the intervention options being actively pursued, ensuring an adaptive approach is applied through appropriate use of stage gates/critical decision points, allocating resources among consortium partner organisations and managing the on-going working relationship between the R&D partners. If required, it could form sub-structures and/or engage independent specialists to provide technical advice.

The steering committee would consist of key personnel from consortium partner organisations and associate organisations involved in program delivery. It would receive advice and plans from the program management team and manage trade-offs and conflicts between different options of technical approaches, and different levels of impact, to prioritise resources to the portfolio of approaches.

The executive director role would be vital to the success of the program as an interface between the collaborative board, the partners and the governance and program delivery structures. Reporting to the chair and collaborative board, the executive director would lead this complex R&D consortium and provide strategic oversight of the program in accordance with the RRAP guiding principles. The executive director would work closely with the managing entity and other partners to develop and implement the R&D program.

The executive director would ensure alignment between consortium partners and funders, and with Traditional Owners and key stakeholders. The role would have direct line management of the program director, be employed by the managing entity and have responsibility to maintain strong productive relationships internally (board, steering committee, program management team and consortium partner representatives) and externally (government representatives, funders, Reef 2050 and international committees, strategic collaborators and partners).

A comprehensive international search for a candidate who could bring the required skills and culture is recommended. Key skills have been assessed as collaborative, non-partisan, strong communicator, inclusive, technically conversant but not an expert, influencing, displaying strong emotional intelligence and balance between strategic and operational.

3.2.5 Stakeholder sub-committee

The stakeholder sub-committee would advise the steering committee on stakeholder-related issues affecting the implementation of the R&D program and assist the committee in executing the program strategy. The stakeholder committee would include representatives of groups with an intimate connection to the Reef and a stake in its future health. Rather than creating a new body, one option would be to invite an existing reef advisory body (such as the Reef Advisory Committee) to act as the venture's stakeholder committee. The Reef Advisory Committee exemplifies the broad mix of stakeholders, including government, industry and non-government organisations needed to fulfil this role. The executive director should have the mandate and freedom to select a pre-existing stakeholder group or convene a bespoke sub-committee.

3.2.6 Management team

The program management team, led by the program director, would be responsible for the day-to-day management and delivery of the R&D effort. The program director would report directly to the steering committee and support the executive director in fulfilling their responsibilities and reporting to the collaborative board.

While the executive director, working with the steering committee, would be ultimately responsible for the overarching program budget, milestones, risk management and key strategies, the program director would be responsible for all day-to-day development and operational program management activities, including development of R&D program recommendations, budget management, scheduling, program delivery oversight, program integration and sequencing, quality control, planning and execution of on-reef pilot trials, use of decision-making protocol to sequence and plan R&D activities, and coordination of all day-to-day activities of the R&D effort. A detailed discussion of the proposed structure is outlined in Section 4: Program management.

3.2.7 Science and engineering conference

A key asset of RRAP is the broad community of experts available and willing to provide knowledge and input into the program. It is expected that as part of the collaboration, the steering committee and program management team will be cognisant of this asset and as they determine appropriate call informally on this community of experts for advice. Maintaining the involvement of a broad community of researchers and experts will be an important activity, in terms of knowledge base and hybrid vigour of the program, but also to grow and maintain recognition of, and support for, RRAP in the scientific community (as well as the broader stakeholder community) through engagement and communications activities.

3.2.8 Risk management structures

The program's ability to rigorously test critical issues and decisions will be key to program risk management. The broad encompassing governance structure is designed to facilitate diverse perspectives in decision-making supported by a program risk management framework. In instances of particularly challenging decision-making, specialist methodologies such as 'red team vs blue team' assessments would be deployed. Developed

by the US military, the concept involves establishing expert teams who challenge each other to test how robust a plan or proposition is. One team defends and another attacks the proposition in a simulated exercise. The RRAP R&D Program would deploy a 'red vs blue' approach as required through its governance structure (at the collaborative board, steering committee and project levels), forming multi-institutional red and blue teams to test critical issues and decisions, and develop risk management and mitigation strategies.

4. PROGRAM MANAGEMENT

4.1 Context

RRAP is designed to deliver interventions available for use and accordingly has a development and deployment focus, with research and other innovation processes embedded as required. During the concept feasibility study, an extensive R&D planning and design process was undertaken to determine the specific approach required to test and develop each intervention, the associated R&D requirements and to identify an efficient and effective program delivery structure. More than 150 scientists and engineers worked in multi-institutional collaborative teams, each leveraging their global peer networks.

An outline of the recommended R&D program is provided in **R4: Research and Development Program**. The recommended program management approach and structure, outlined below, was designed to deliver this program and would report to the steering committee.

4.2 R&D program flexibility

In designing the R&D program, as outlined in **R4: Research and Development Program**, specific emphasis was given to the need for a highly-adaptive approach.

The R&D program structure was designed such that the areas with the highest anticipated flexibility requirements were positioned inside (rather than across) sub-programs. This enables much of the required flexibility to be managed 'in-team' rather than via contractual methods. For example, intervention delivery methods are an area in which high levels of change are anticipated and where the program needs the flexibility to seamlessly combine ideas into new delivery methods, halt R&D on unproductive methods and focus on more prospective methods, bring in new ideas or respond to the changing state of the Reef and overarching intervention priorities. By clustering interventions with similar delivery methods into common R&D sub-programs and teams, this flexibility can be more readily achieved.

4.2.1 R&D team establishment

The R&D design process confirmed the benefits of using multi-institutional and cross-functional teams. The overheads in engagement and reaching consensus are offset by the benefits of more rapid R&D outcomes delivery. For these reasons, each R&D sub-program would be progressed by multi-institutional and cross-functional teams.

Based on the extensive work already completed, initial R&D program establishment cannot be a call for 'ideas' or 'research proposals', but rather the identification and establishment of

teams to commence delivery of the R&D program. Further detailed design (and, where beneficial, peer review) would be required prior to commencement and this would be led by these teams. Supporting this core approach, mechanisms such as open calls for research grants, or innovation challenges, could be used to address specific areas of need and facilitate new ideas being incorporated into the program.

Establishing R&D teams for each element of the program would occur while the proposed governance arrangements were established in particular, the steering committee would be convened in an informal, interim role while the unincorporated joint venture agreement and arrangements were formally established. The process of establishing the R&D teams would be guided by the steering committee and would need to be fully aligned with any funding mechanism requirements, including the Reef Trust Partnership. The following factors would also need to be considered:

- Identification of the skills required to deliver the program elements, which would include recognition of the input and intellectual property already provided by organisations, scientists and engineers involved in the R&D design activities.
- Expertise and leadership in the specific areas.
- Existing organisational R&D programs and capability that could be leveraged.
- Existing and required multi-institutional collaboration needed for each area of the R&D program.
- Ability to comply with the unincorporated joint venture contractual arrangements, including compliance with contracts providing funding from governmental sources and, where applicable, other funding sources, and compliance with government procurement requirements, including for work requiring sub-contractors.
- Extent of organisational involvement in the unincorporated joint venture.
- Fair consideration for all parties during the design process.

4.3 Management structure

Successful delivery of the RRAP R&D Program would require a dedicated program management team, underpinned by the required program management and administrative systems.

The proposed structure covers four core areas:

- Project management
- Technical leadership
- Systems engineering
- Commercial transfer.

4.3.1 Project management

A team, under the oversight of the program director, would be established to lead and manage this large, complex, interlinked R&D program. The specific nature and design of the program would place additional emphasis on several areas:

- **Contracting** funding and delivering the R&D program would involve many parties (more than 20 just on the R&D delivery side) with an associated high contracting and financial management workload.
- **Project scheduling** the applied and cross-cutting nature of the program places emphasis on project scheduling across program areas, to ensure all aspects are converging on targeted milestones and stage gates.
- **Health, safety and fieldwork logistics** the R&D program would require extensive collaborative on-reef activities, creating an increased need (and value) to optimise field programs and minimise the number of trips/vessels required, efficiently contract charter vessels and establish and manage a common field safety system.
- **Communications, stakeholder engagement and reporting** the large number of stakeholders within and outside the program places a major emphasis on effective communications and reporting.

This team would also be expected to provide support, as required, to the executive director for strategic activities related to the areas described above.

4.3.2 Technical leadership

Each of the R&D sub-program areas outlined in **R4: Research and Development Program** would have a nominated leader. Additionally, each of the cross-cutting sub-programs would have a small leadership team comprising a member from each intervention R&D sub-program. These leaders would be expected to come from several different partner organisations.

To support these teams, and ensure integrated planning across the teams, a small R&D coordination team would be established within the program management team.

4.3.3 Systems engineering

A key facet of the R&D program would be to develop and progressively refine engineering concept designs for each intervention. These would focus the R&D activities and other innovation processes to progressively develop and test all aspects required for an operational intervention. The designs would also be central to planning for future deployment and the integration of production and deployment infrastructure between interventions (critical if costs are to be managed). To facilitate these processes, a small specialist team was incorporated into the structure.

4.3.4 Commercial transfer

The R&D program needs to maintain a continual focus on how the interventions would ultimately be implemented. Aspects such as deployment business models, methods of commercial transfer to prospective industry providers and community engagement all impact on the specific outputs required from the R&D program. Capability to participate in planning future implementation and providing guidance in the R&D program was factored into the program management structure.

4.3.5 Program management and administration systems

The RRAP R&D Program will require formal program and project management systems to ensure quick and efficient delivery. For example, the program incorporates an extensive and integrated research aquarium and field-testing program. Integrating the management of field testing sites, permits and research infrastructure will require cross-program scheduling. Modern program management systems that manage cross-program dependencies will provide a more efficient outcome. It is proposed that the program be operated using an integrated program management and administration system. Partners would be provided remote access as required.

4.3.6 Management structure outline

An outline of an indicative management structure is provided in Figure 2.

The reporting lines of these functions to the executive director and program director will be determined once the functions provided by the managing entity and employment arrangements for the key roles are finalised.

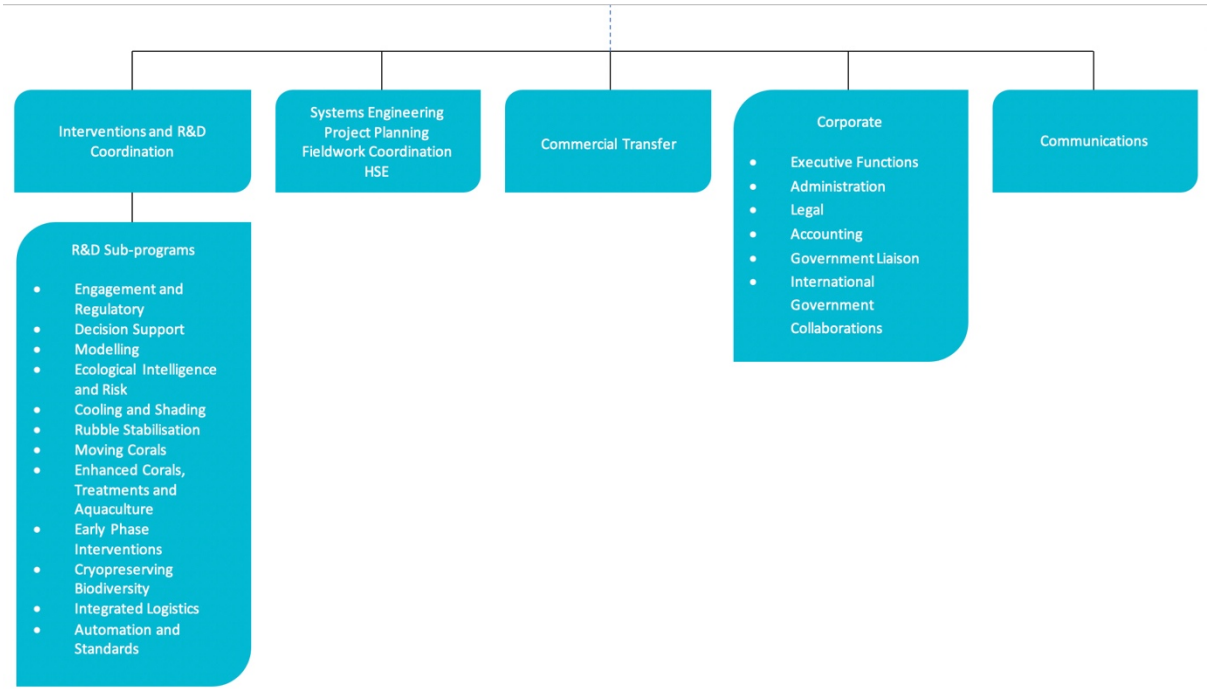

Figure 2: Proposed program management structure.

The R&D sub-program team will operate as a virtual team, with the leaders of each program area expected to come from multiple partner organisations.

5. MANAGING ENTITY

One or more organisations will be required to host the operational aspects of delivering the envisaged RRAP research program, program management and administration functions. These functions could be outsourced or split among consortium partners; however, a single host entity would be more efficient. This is the selected model. The RRAP parties intend to appoint a managing entity for this purpose.

As detailed in Section 4, the R&D program requires a high degree of integrated planning and operational management, best provided by specialist project and program management systems. Linking these to project development, reporting and invoicing systems provides further efficiency gains.

It is proposed that AIMS undertake the role of managing entity for the unincorporated joint venture partnership and that this appointment and scope of responsibilities be included in the collaborative agreement. At the time of preparation of this document, AIMS has indicated an intention to take up this role. The program management and administrative functions would be hosted at the AIMS Townsville site. Systems would be established to provide consortium partners with remote access to program management tools.

For collaborating partners providing funding (initially, the Great Barrier Reef Foundation Reef Trust Partnership) to meet their governance requirements, arrangements would be established such that funders were signatories to all project contracts they were funding and then integrated into milestone tracking and payment processes.

6. PARTNERSHIP ROLES

All RRAP consortium partners will have key roles in the program. The partners have come together in the context that they have interests, roles and responsibilities in relation to the Great Barrier Reef that include activities that are broader than the focus of RRAP. The consortium partners are expected to bring their best skills and capability to the conduct of the RRAP program, subject to any contractual or legal obligations to other parties.

Three RRAP partners have specific obligations in relation to their corporate functions that lead to specific requirements being met under their entry into the collaboration agreement and under the RRAP collaborative and governance arrangements:

Great Barrier Reef Marine Park Authority

The Great Barrier Reef Marine Park Authority was established under the *Great Barrier Reef Marine Park Act 1975* and under the Act is the Authority as the manager of the Great Barrier Reef Marine Park. The main object of the *Great Barrier Reef Marine Park Act 1975* is to provide for the long-term protection and conservation of the environment, biodiversity and heritage values of the Great Barrier Reef Region. The Great Barrier Reef Marine Park Authority is responsible for protecting and managing the environment, biodiversity and heritage values of the Great Barrier Reef Region. Other objects of the Great Barrier Reef Marine Park Authority are to allow for sustainable use, encourage engagement in protection and management by Traditional Owners and stakeholders, and assist in meeting Australia's international responsibilities in relation to the Great Barrier Reef's World Heritage listing. The

Authority reports to the Australian Government's Minister for the Environment. The Authority is a key stakeholder in the new interventions being developed under the program. In parallel, it will be regulating the Reef testing activities of the R&D program. To discharge its regulator obligations, the Great Barrier Reef Marine Park Authority will have observer status only within the RRAP program governance.

Great Barrier Reef Foundation

As the initial principal investor, the Great Barrier Reef Foundation has specific obligations relating to governance, third-party fundraising and integration across the broader Reef Trust Partnership portfolio that must be discharged for Reef Trust Partnership funds to be invested in the program. These will be met through permanent board and steering committee positions, veto rights in regard to Reef Trust Partnership funding, being a signatory to all contracts with Reef Trust Partnership funding, directly paying all invoices relating to Reef Trust Partnership funding and leading strategic communications.

AIMS

AIMS was established under the *Australian Institute of Marine Science Act 1972* to carry out R&D in relation to marine science and marine technology and the application of these, and to encourage and facilitate the application and use of the results of R&D of that kind. To assist in fulfilling this function under its legislation, under the collaboration agreement terms AIMS will have the permanent right to appoint a board member to the collaborative board. As outlined above, the collaborative agreement will also provide for AIMS to be the managing entity for the RRAP collaboration.

7. COMMERCIAL TRANSFER AND INTELLECTUAL PROPERTY

7.1 General principles in relation to intellectual property

The intellectual property arrangements for RRAP will be included in the unincorporated joint venture contractual agreement and tiered down through subsidiary contracts for the program. Intellectual property arrangements are often cited as a challenging area during the establishment of collaborations; however, it is not expected to be a significant risk factor in this case because these arrangements are quite standard in nature. Intellectual property arrangements must ensure that on-reef implementation of intervention options arising from RRAP are not limited.

The following provides guidance as to the intended purpose of these arrangements. The requirements concerning the use of intellectual property for delivery of RRAP, and thereafter for intervention on the Great Barrier Reef and other Australian reefs, will be included in the agreements. Generally, the assumed 'base case' model for interventions arising from RRAP is that these would be sourced via a government tender process and likely delivered through commercial providers (although we can't exclude other options being explored). The

contracts would cover background intellectual property, new knowledge developed through the conduct of RRAP and the intellectual property of third parties sought to enable delivery of RRAP.

The overall requirement is that the intellectual property rights needed for the scientifically proven options identified in RRAP are available for use on the Great Barrier Reef (independent of whether that intervention is by a government agency or under a commercial arrangement). To achieve this broad objective, some requirements may need to be stated at the level of guiding principles, to enable the exact circumstances of key intellectual property (for example, critical intellectual property from third parties) to be customised. It can be predicted that RRAP and reef interventions will include options for which there will be specific requirements in terms of third-party rights.

In addition to consideration of these use rights, the intellectual property arrangements for the RRAP collaboration will include disclosure and approval arrangements for the publication of scientific and engineering knowledge in the scientific literature and use of the intellectual property for government purposes, registration of intellectual property (for example, patent applications), licensing arrangements and moral rights.

7.2 Preferred intellectual property arrangements

The need for commensurate management of intellectual property underpins the long-term role of facilitating the transfer of intervention and deployment technology. While recognising that investments in the program will include specific conditions relating to intellectual property management, including arrangements as defined in the Reef Trust Partnership Grant Agreement, below are recommended intellectual property management principles and aspirations for the program:

- RRAP intellectual property would be publicly available for the purposes of reef restoration and adaptation a requirement for public funding investment.
- Rights to background intellectual property would be sought for the purpose of reef restoration and adaptation.
- Clauses in relation to rights to the use of RRAP intellectual property for applications that did not overlap with reef restoration would be included in the agreement, with the intention that inventing institutions will be encouraged to attract additional resources, including from industry, to further develop those technologies.
- Standard arrangements for approvals of publication of scientific outcomes in the scientific literature (subject to coordination arrangements regarding RRAP communication).

The issue of how RRAP intellectual property can be made available for international use in reef restoration and adaptation will also need further consideration during the development of the agreements.

8. CONCLUSIONS AND RECOMMENDATIONS

1. The proposed collaborative agreement (unincorporated joint venture) governance structure provides the RRAP R&D Program with the ability to marshal the right resources to accomplish the mission; balancing the ability to take risks and deliver real outcomes for the Reef under conditions of rapid change and uncertainty.
2. The proposed structure allows the RRAP R&D Program to be fully integrated within the consultative and governance arrangements of the Reef 2050 Plan.
3. The proposed structure allows for a collaborative board, which includes the research parties, as well as key representation of major funders, and also incorporates an independent chair and at least two independent members.
4. An international peer review panel provides the board with a fully independent review of strategic decisions, plans, reports and outputs.
5. The proposed unincorporated joint venture structure accommodates the ability to move into an incorporated joint venture, if future conditions warrant.
6. It is recommended that the RRAP R&D Program be executed by the consortium, operating as an unincorporated joint venture. The consortium was responsible for successfully delivering the concept feasibility study, uniquely bringing together leading institutions, companies and individuals from across Australia and the world.
7. It is recommended that a dedicated steering committee and program management team be established to manage the delivery of the R&D program.

APPENDIX A – RRAP DOCUMENT MAP

APPENDIX B – FOUNDATIONS FOR CHOSEN MODEL: OPTIONS CONSIDERED AND FINDINGS

From concept feasibility to research and development

Background

The agreement for the $443.3M Reef Trust Partnership between the Australian Government and the Great Barrier Reef Foundation sets out the relationship between the $6M Australian Government-funded RRAP Concept Feasibility Study and further investment in reef restoration and adaptation science. This relationship was further clarified in the Reef Trust Partnership's overarching investment strategy in January 2019.

The results of the RRAP Concept Feasibility Study will inform and guide investment of the $100M allocated for reef restoration and adaptation science. The concept feasibility study was, since inception, required to develop a proposed governance framework and recommendations that would allow the RRAP research consortium to deliver the recommended RRAP R&D Program.

The proposed governance structure and supporting processes discussed herein recognise, and are based on, the following considerations:

1. The mission of the RRAP R&D Program is to advance our knowledge of the processes and systems of reef restoration and adaptation expediently, to the point where practical, affordable and effective at-scale interventions can take place. The R&D program would be strongly outcomes-driven; committed to delivering safe solutions to help the Reef adapt and recover.
2. The minimum recommended funding for the first five years of the R&D program calls for the $100M Reef Trust Partnership investment to be supplemented by additional funding that—at this time—is planned, but not secured. This comprises at least $100M raised by the Great Barrier Reef Foundation from industry and philanthropists and $100M of in-kind contributions from the research consortium itself.
3. The current RRAP consortium includes some of the leading researchers and practitioners in reef science in Australia and is supplemented by many other organisations and individuals from around the world. As such, the consortium is uniquely positioned to deliver the R&D needed to move to practical, economical, at-scale reef restoration and adaptation in the shortest possible time.
4. The RRAP R&D Program consortium would operate within the overall context of the Reef 2050 Plan, contributing directly to actions and objectives of the plan and adhering to the broader governance and consultative processes of the plan and the Reef Trust Partnership.

This document was prepared by the members of the RRAP executive committee, comprising senior representatives of each of the main consortium partners.

Purpose

The purpose of this part of the RRAP Concept Feasibility Study was to determine the optimal governance structure and underlying management systems and arrangements for the R&D program of the reef restoration and adaptation science component of the Reef Trust Partnership and beyond. The governance framework criteria were developed by the RRAP executive committee at a workshop on 4 September 2018 and refined over subsequent months.

Process

The proposed RRAP R&D Program governance structure and supporting processes, presented below, were developed through a deliberative process by the RRAP Executive Committee and included members of the original RRAP Senior Official Committee of Government. Several face-to-face and video conference meetings were held from September 2018 to February 2019.

The process involved the following steps:

1. Key criteria for a successful R&D partnership identified.
2. Key attributes for governance identified.
3. Risk assessment for R&D program implementation.
4. Active models of the alternative governance models identified and evaluated.
5. Consultation with key stakeholders outside the consortium, including relevant government departments and the Reef 2050 Plan Independent Expert Panel.
6. Preliminary consideration by each consortium partner organisation of its legal position and preferences on the various models.
7. Ranking and scoring the governance model options against the agreed selection criteria.
8. Decision on the most appropriate governance structure for the consortium, with a consideration of changes that might be required over time.
9. Development of a more detailed model of the preferred structure, including operational details, decision-making processes, peer review systems, finance and risk management.
10. Completion of this draft report with input from all partners and externally reviewed.

A detailed comparison of the governance structure options assessed is provided in the sections below.

Subsequent to the 2019 federal election, further workshops with key stakeholders were held and a working group formed to review the proposed governance structure. This process confirmed the core structure and made several refinements to ensure the Great Barrier Reef Foundation could appropriately discharge its Reef Trust Partnership obligations.

Governance framework model options

Overview

The RRAP executive committee members were canvassed to provide governance options for consideration. In each case, committee members consulted within their own organisations, in terms of available models and their relative advantages and disadvantages and suitability for the task of governing future RRAP R&D. An initial list of options was

developed by the RRAP executive committee at a workshop on 4 September 2018 and refined over subsequent months.

The initial governance model types considered were:

1. Current RRAP consortium agreement.
2. Unincorporated joint venture.
3. Incorporated joint venture.
4. Organisations act independently (open market).
5. Hybrid.
6. Partnership limited by guarantee.

Each of these models is discussed below.

Current RRAP consortium agreement

The RRAP Concept Feasibility Study was executed as an appropriation funding addition from the Australian Government to AIMS. The expectation was that AIMS would form a consortium to undertake the study.

AIMS, working with six core consortium partners, developed and executed a collaboration agreement. Under this agreement, each partner was contracted in nominated areas for specific levels of effort, without each of the organisations individually being responsible for any specific component of delivery. Each component of the program was established as a multi-institutional collaboration, relying on the organisations working together and sharing responsibility to deliver. This created a high level of goodwill and collaboration among the partners. We intend to maintain and extend this coherent approach.

A traditional (scope, deliverables, cost) approach was used to engage sub-contractors from outside the core collaboration parties.

A technical steering committee, reporting to the RRAP program director, was responsible for day-to-day supervision of work. The steering committee made recommendations to the executive committee on matters of high-level governance and to approve expenditure and strategic direction of research. In addition, at the start of the program (until January 2019), a government senior officials committee provided oversight and was briefed by the executive committee on progress. The original intent was that the senior officials committee would help guide the consortium's approach to government for the R&D funding. Once the Reef Trust Partnership funding was established, this approach to government was no longer required. It was agreed that selected members of the key departments represented on the now-defunct senior officials committee (the Department of Industry Innovation and Science and the Department of Environment and Energy) would join the RRAP executive committee.

Unincorporated joint venture

Unincorporated joint ventures are widespread in the R&D community and in a wide variety of commercial and business situations. An unincorporated joint venture is a formal agreement to collaborate that does not require the creation of a new formal legal entity, but rather relies on a centre agent, agreed to by all parties, to take on the required formal legal duties on behalf of the joint venture, including contracting, account and cash management, insurance

coverage and key facilities provision. The parties to the unincorporated joint venture continue to have responsibility for their own activities and contributions to the joint venture, including delivering to the joint effort as agreed.

Key attributes of unincorporated joint ventures are:

1. Provides for a high degree of buy-in from consortium partner organisations.
2. Engenders a high degree of collaboration and integration.
3. Flexible, easy to integrate new consortium partners, and allow exit of others, with minimal cost and administration.
4. Parties are not jointly and severally liable for activities of other parties.
5. Simple to establish, inexpensive to set up and run and widely used in R&D.
6. Not required to file tax returns and other documents associated with formal incorporation.
7. Primary liabilities for breach of contract fall with the centre agent.
8. Adopts existing systems and processes used by the centre agent, reducing set-up. costs, on-going administrative and project management overheads, and reducing operational complexity.
9. Can accept charitable, tax-deductible funds through a centre agent that has deductible gift recipient status.
10. As an unincorporated joint venture, is not a separate legal structure. Such a joint venture does not itself require formal compliance with the *Public Governance, Performance and Accountability Act* or *Corporations Act*, but can adopt equally stringent governance and reporting requirements, if needed and desired. (However, the Australian Government research agencies such as CSIRO and AIMS involved in the joint venture would need to comply with the *Public Governance, Performance and Accountability Act* for all activities they conduct including any centre agent role).
11. Background intellectual property of the consortium partners can be protected. Foreground intellectual property from the collaboration could be handled by agreement of the parties.

Incorporated joint venture

Incorporated joint ventures are also widely used in the R&D community. Many Cooperative Research Centres (CRCs) adopted an incorporated structure (following encouragement to do so in the mid-'90s) and are the most common example and are widely used in Australia. Under this type of structure, a new legal entity is formed, with each participating organisation becoming a founding shareholder. Incorporated joint ventures are governed under the *Corporation Act* and subject to the same governance and reporting requirements as any other registered Australian corporation. A board of directors is formed, holding the same legal responsibilities as any other corporate board. The board hires a CEO, responsible for the operations of the incorporated joint venture. Consortium partner organisations have an arm's length relationship with the new venture and engage with it as a separate entity.

Key attributes of incorporated joint ventures:

1. The CRC model is well established and understood by researchers and industry.
2. Individuals are recruited to run the company who are not tied to the partner organisations.
3. Ease of attracting additional consortium partners and new funding.

4. Relative difficulty in attracting co-investment funding from consortium partner organisations.
5. Simple model for universities to engage with
6. Adherence to the *Corporation Act* provides respected governance structure and protocols, rigour and discipline around conforming to associated reporting and transparency requirements.
7. High degree of transparency.
8. High legal protection for consortium partners.
9. An independent board of Directors act in the best interests of the company.
10. Representative board members (members associated with consortium partner organisations) can be exposed to conflict of interest.
11. Adherence to formal Australian Securities and Investment Commission reporting requirements and the associated financial discipline that results.
12. Relatively expensive to set up and run, compared with other options.
13. Needs to apply for charitable status in its own right.
14. Background intellectual property of consortium partner or contributing organisations can be protected.
15. Publicly funded research agencies such as CSIRO and AIMS are formally instructed to "only form new incorporated entities if absolutely necessary".
16. Under the requirements of the *Public Governance, Performance and Accountability Act*, the Great Barrier Reef Marine Park Authority is unlikely to be able to participate formally in a separate incorporated body.

Organisations act independently (open market)

Under this model, each organisation interested in undertaking reef restoration and adaptation science under the Reef Trust Partnership acts independently. Each organisation would decide independently which parts of the research it would undertake and on what terms, and would be solely responsible for executing those projects, alone or in collaborations as they see fit, through individual subcontract arrangements. Some degree of overall coordination of the effort could be provided by a non-binding coordination committee, on a voluntary basis.

Essentially, this model is an open market for research services, with all parties competing for available funds and projects. The burden for interconnecting, coordinating and relating various research projects into a cohesive whole falls primarily on the Reef Trust Partnership and its governing bodies.

Hybrid

As with many CRCs, the effort begins as an unincorporated joint venture and moves to an incorporated joint venture structure. The shift occurs when deemed necessary or when certain pre-set criteria (e.g. size of effort, risk thresholds exceeded, research complexity, milestone completion) are met. In this case, for instance, an unincorporated joint venture could migrate to an incorporated joint venture when the pilot-scale field trials begin.

Partnership limited by guarantee

A specific legal construct, useful when developing commercial intellectual property and products destined specifically for commercial markets.

Evaluation of options

Method

To select the most appropriate overarching governance model for the RRAP R&D Program, the executive committee undertook the following:

1. **Individual entity legal assessment** – each consortium partner undertook an internal legal assessment of each governance model, evaluating their ability to effectively participate within each possible structure.
2. **Preliminary screening** – the executive committee undertook a qualitative screening of the models, drawing on the memberships' combined experience with research collaborations in different applications. This resulted in a short-list of options.
3. **Detailed analysis of short-listed options and option selection** – The short-listed options were assessed against the criteria outlined in Section 3.1.1. The merits and weaknesses were compared in a series of formal discussions and a preferred model was selected.

Preliminary screening

As a result of the preliminary screening, three of the six options were eliminated from further consideration:

1. **Organisations act independently**. The results of the RRAP Concept Feasibility Study clearly show that success in the R&D program (and the subsequent, planned deployment program) will be predicated on all program elements working in an integrated way. Much of the required work would be foundational, setting the basis for success for packages of interventions. Most of the interventions recommended for future R&D would, in many ways, be complementary and would be deployed in an interlocking, mutually reinforcing way, to achieve cost-effective, exponential benefits and maximise success. As such, a high level of coordination and collaboration among all parts of the R&D program would be essential. It is very likely an 'organisations acting independently' model would result in research organisations competing against one another in a counter-productive, wasteful and duplicative way. For success, the R&D program would require Australia's (and the world's) best and brightest working together towards a common, integrated purpose. This is unlikely to be achieved under this model. REJECTED
2. **Partnership limited by guarantee**. The committee concluded this model did not offer any additional advantages for the R&D program over incorporated or unincorporated joint ventures. REJECTED.
3. **Current RRAP Concept Feasibility Study governance model**. While the current model has worked remarkably well, and for the most part instilled a strong sense of common purpose and collegiality among team members, it is not entirely suitable for delivering a program of the proposed scale and complexity. However, it was decided that many of its fundamental workings should be retained in the final governance structure,

for example organisationally agnostic allocation of resources; participative, open and transparent governance at the executive level and inclusive of a broad suite of core and additional members with the range of required expertise and skills. These positive elements would need to be enshrined in a formal structure and complemented with additional mechanisms such as international peer review and broader stakeholder participation. ELEMENTS RETAINED.

Detailed comparison

The remaining three options were assessed in more detail, as follows:

1. **Incorporated joint venture**. Consortium university partners favoured this option, particularly the incorporated CRC model. As previously outlined, the CRC model is well understood and enjoys benefits such as enforced rigour from the *Corporations Act* and legal protection for founding organisations. While recognising these advantages, the publicly funded research associations (CSIRO and AIMS) were less comfortable with this model. This was because the creation of subsidiary research vehicles was not their primary way of doing business, but more particularly, establishing an arm's length, transactional nature of the relationship between the new incorporated joint venture and the publicly funded research associations would lower the level of engagement and direct commitment. Under the requirements of the *Public Governance, Performance and Accountability Act*, the Great Barrier Reef Marine Park Authority would be unlikely to be able to participate formally in a separate incorporated body. The Great Barrier Reef Foundation, a necessary key partner, would also have problems justifying formal shareholding in an entity in which it would also hold a contractual engagement as a main funder.
2. **Unincorporated joint venture**. Overall, an unincorporated joint venture was assessed as a suitable option for the R&D program. While university consortium partners favoured an incorporated joint venture, all indicated an unincorporated joint venture was feasible, if properly constructed. The Great Barrier Reef Foundation indicated it could participate in an unincorporated joint venture without significant hindrance and had done so previously. Given its regulatory obligations under the *Great Barrier Reef Marine Park Act*, the Great Barrier Reef Marine Park Authority would be unlikely to sign up as a full consortium partner in an unincorporated joint venture, but could play an associate, advisor, or similar, role. The publicly funded research organisations considered the model's flexibility and the required strong level of ongoing engagement as key advantages, along with lower costs for establishment and operation.
3. **Hybrid model**. All participants felt that the hybrid option consisting of starting the R&D program with an unincorporated joint venture structure and retaining the option to transition to an incorporated joint venture if and when conditions required would be extremely valuable for all parties, and for the long-term success of the R&D and eventual implementation programs. The benefits of both models would be available to the consortium partners and the program.

Reef Restoration and Adaptation Program

GBRrestoration.org

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Reef Restoration and Adaptation Program, a partnership:

Australian Government | Australian Institute of Marine Science | Australian Government Great Barrier Reef Marine Park Authority | Great Barrier Reef Foundation | CSIRO | QUT | James Cook University Australia | The University Of Queensland Australia