

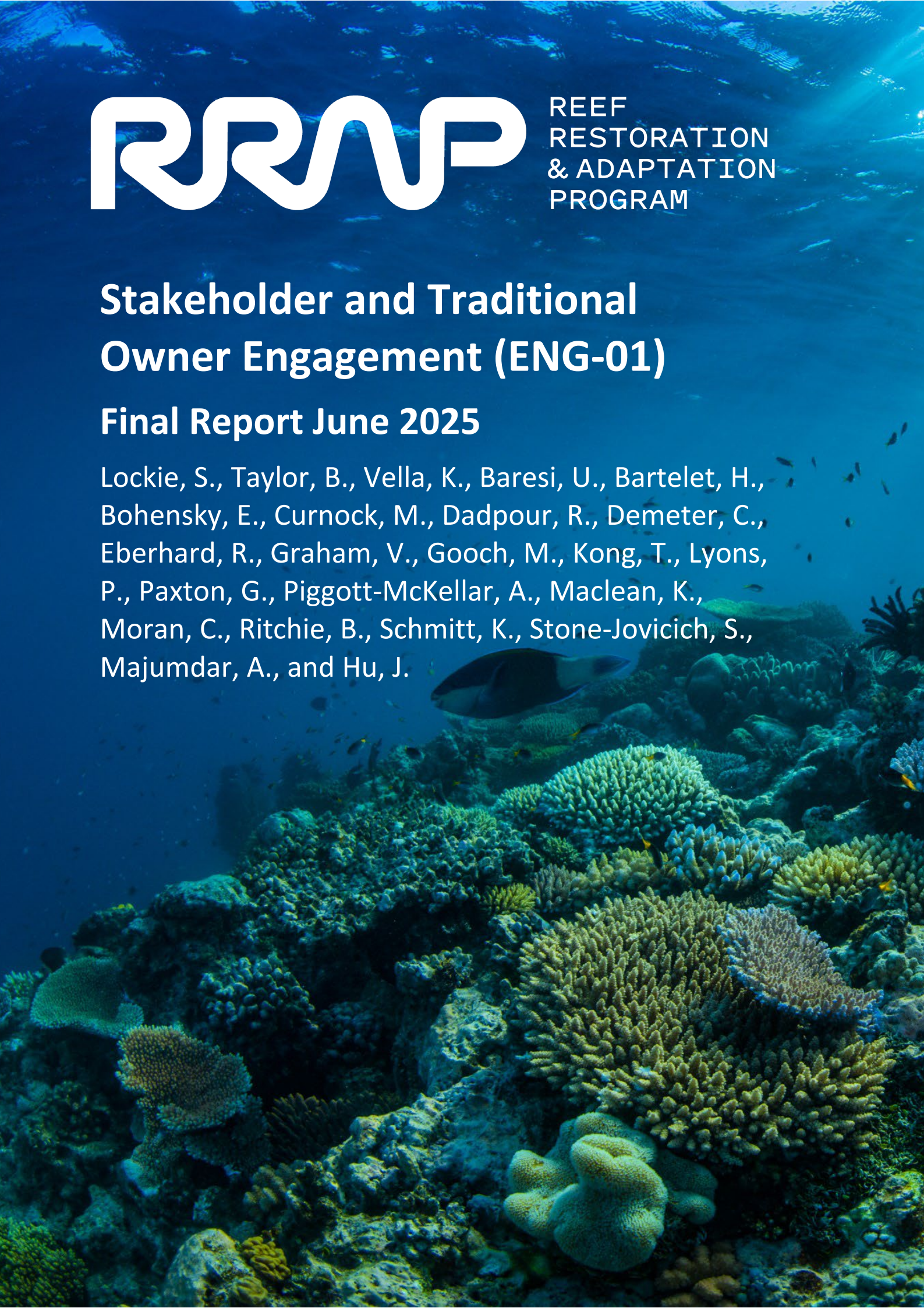


REEF  
RESTORATION  
& ADAPTATION  
PROGRAM

# Stakeholder and Traditional Owner Engagement (ENG-01)

**Final Report June 2025**

Lockie, S., Taylor, B., Vella, K., Baresi, U., Bartelet, H., Bohensky, E., Curnock, M., Dadpour, R., Demeter, C., Eberhard, R., Graham, V., Gooch, M., Kong, T., Lyons, P., Paxton, G., Piggott-McKellar, A., Maclean, K., Moran, C., Ritchie, B., Schmitt, K., Stone-Jovicich, S., Majumdar, A., and Hu, J.



## RRAP Stakeholder and Traditional Owner Engagement (ENG-01) Final Report June 2025

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*Cover Page: Coral Reef, Credit: Gary Cranitch, Queensland Museum*

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All information reflects project scope and outcomes as of May-June 2025. Subsequent updates, analyses, or scientific developments are not included. This report should be read alongside any associated and publicly available technical reports, datasets, and publications for full detail. This report does not provide scientific inferences, policy guidance or operational instructions beyond the project's defined scope and duration.

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# 1 Executive Summary

The aim of the RRAP Stakeholder and Traditional Owner Engagement Sub-program (ENG) was to deliver a best-practice engagement program that meets Program, community, Great Barrier Reef (GBR) Traditional Owners (TO) and stakeholders’ needs. Its objectives were to:

1. Understand public perceptions of reef restoration and adaptation, the distribution of risks and benefits arising from intervention research and development (R&D) and implementation, and opportunities to deliver community and stakeholder co-benefits.
2. Design and evaluate best-practice, place-based, engagement opportunities for GBR communities and the public.
3. Involve stakeholders, GBR Traditional Owners and communities in co-design, evaluation and adaptive management of the subprogram.

These were operationalised via three projects: (i) Social Licence and Impact Monitoring (ii) Best-practice engagement; and (iii) Adaptive governance and learning. As a critical cross-cutting RRAP Sub-program, Stakeholder and Traditional Owner Engagement (ENG) has worked closely with RRAP Program Management, intervention science, the RRAP Modelling and Decision Support (M&DS) and RRAP Translation to Deployment (T2D) Sub-programs, the RRAP Pilot Deployments Program (PDP), and the Indigenous Partnerships Team to inform planning and prioritisation. The figure below presents the ‘program logic’ of the RRAP Stakeholder and Traditional Owner Engagement Sub-program.

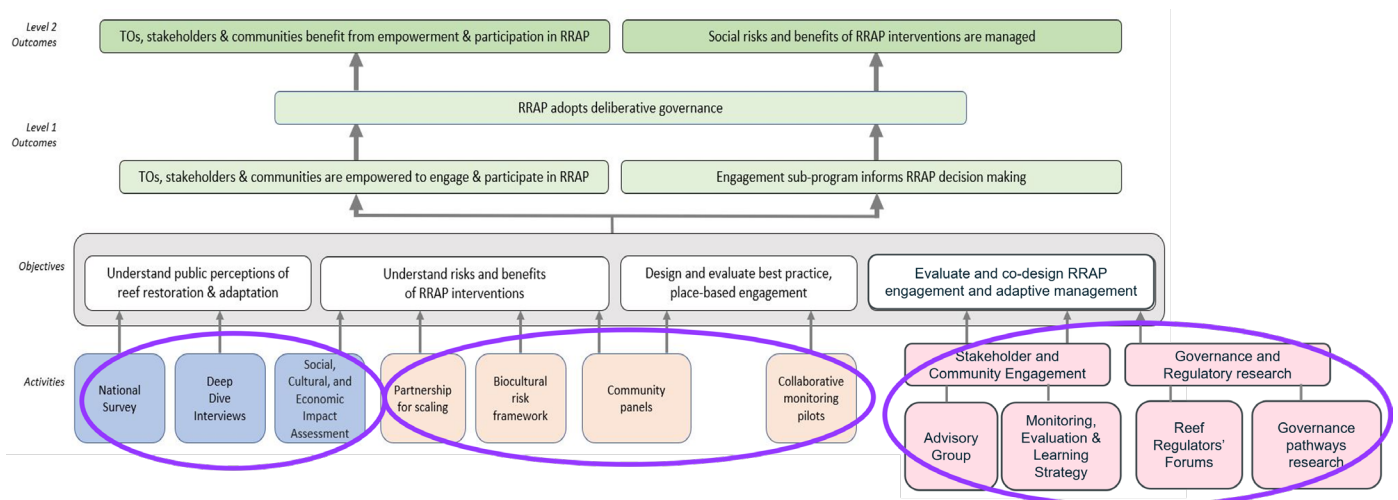


Figure 1: Program logic for the RRAP Stakeholder and Traditional Owner Engagement (ENG) Sub-program

The **Social Licence and Impact Monitoring Project** was inclusive of three major activities: (i) a biennial national survey designed to track broad public sentiment toward reef restoration and adaptation; (ii) a regional deep dive into GBR catchment Traditional Owner, community and stakeholder perceptions of reef restoration and adaptation priorities, opportunities and risks; and (iii) a social, cultural and economic impact assessment to estimate and, where possible, measure the spatial and social distribution of opportunities, risks and benefits associated with reef restoration and adaptation.

Most Reef community members agree, pragmatically, that novel interventions are needed to address escalating threats to the health of coral reefs. However, they also believe in the importance both of collective action at the local and global levels to address societal causes of environmental change and of meaningful Traditional Owner and stakeholder involvement in the development and deployment of novel interventions.

Survey results show that Australian residents overwhelmingly believe that climate change is negatively affecting the health of the GBR and that more should be done to protect it – including through the upscaling of reef restoration and adaptation actions.

The strongest predictors of support for novel interventions include emotional responses, trust in science to deliver solutions, and the belief that environmental impacts can be identified and tested. The perceived feasibility and impact of interventions are shaped by their perceived safety and ethics. Together, these results suggest that maintaining and enhancing trust through transparent and inclusive approaches to intervention research and deployment are critical to social acceptance.

The social, cultural and economic impact assessment activity was modified to focus on methods development and thence assessment of social, cultural and economic risks associated with RRAP' Pilot Deployments Program (PDP). Interviews with Reef Traditional Owners, stakeholders, and members of the public identified six key risk domains – Indigenous Partnerships, Distributional Equity, Reef Outcomes, Community Engagement, Program Sustainability, and Unintended Consequences. Further, the most frequently mentioned adverse outcomes were potential failure to achieve desired ecological Reef Outcomes and to secure the ongoing funding for restoration and adaptation Program Sustainability.

The **Best-Practice Engagement Project** answered the question: *how do we productively and appropriately engage with local stakeholders and publics in both the emerging R&D program itself, and around its longer-term objectives and implications?* We sought to (i) improve the transparency and accountability of RRAP's implementation, (ii) encourage and facilitate two-way dialogue between researchers and publics, including joint learning and co-production of knowledge within the program, (iii) contribute to the participatory identification of risks and benefits, and (iv) explore community aspirations for future involvement and partnering opportunities. This work has drawn on several areas of applied social research that explore, theorise and evaluate the application of public participation mechanisms in environmental and natural resource management, including in ecological restoration, and to appraise risks associated with novel or contentious developments, science or technologies.

This component of the Sub-program included five major research activities:

1. Helping to scope, mobilise and support the development of a **regional multi-stakeholder platform** of local researchers, marine tourism operators, restoration practitioners and others – the Cairns-Port Douglas Reef Hub - that has operated successfully from 2019-2025 with over 50 active members.
2. The design and operation of two **regional community panels** that operated over several months in the Townsville and Cairns regions and engaged 30 community members and RRAP scientists in deliberation about the science and its implications, in particular cooling and shading and coral-based interventions.
3. The design and implementation of a **collaborative monitoring pilot** for assisted coral recovery devices in the Cairns Port Douglas region.
4. Stakeholder interviews and workshops to explore the potential of **cross-sectoral partnership opportunities** and collaborative sustainable business models to scale up restoration efforts.
5. Co-design and co-development of a **biocultural assessment framework** (and supporting guidance material) with and for 15 Reef Traditional Owner groups to assess risks and opportunities of proposed reef intervention science and pilot deployments.

The Best-Practice Engagement (BPE) project successfully piloted and evaluated novel engagement processes for large scale restoration R&D and deployment. High level insights and outcomes from this project include: (i) the provision of different avenues for participation was a fundamental condition for social acceptance and support among interest-based and regional stakeholders; (ii) providing opportunities for two-way dialogue

increased transparency, joint-learning and largely confirmed support for RRAPs ambition and research; (iii) forward demand for diverse and meaningful participation opportunities is high, and only partially met; (iv) recognising and building on the human capital that exists in the reef communities should form part of the translation and scaling strategies to maximise co-benefits and future industry development ambitions of the Program; (v) Traditional Owners are now equipped with culturally appropriate decision support tools to assess concerns with scaling of R&D in their sea Country and exploring opportunities for deployment partnerships.

The **Adaptive Governance Project** explored ways to enable effective adaptation-related decisions and outcomes for the Reef, its stakeholders, and Traditional Owners. Towards these goals, we focused on the following three areas:

1. The establishment of a **reef-wide Stakeholder Advisory Group (Advisory Group)**, which was an external advisory body comprised of diverse members from across industry, GBR Traditional Owners and the broader Reef community. The Group advised the RRAP Stakeholder and Traditional Owner Engagement Subprogram on future strategic directions and identified potential risks, opportunities, and benefits of RRAP engagement activities from the perspective of GBR rightsholders and stakeholders. Between 2022-2025, we organised a total of nine Advisory Group meetings and two webinars. These activities produced recommendations for cohesive stakeholder communication across RRAP, a scholarly paper on diversity in deliberative processes, and an opinion piece on strategies for community-led intervention deployment. The Advisory Group's recommendations informed the RRAP Engagement Strategy. (2025).
2. The implementation of **evaluation frameworks to strengthen learning and adaptive management in RRAP decision-making and stakeholder engagement**: During the first phase of RRAP, our stakeholder and community engagement work also included the Monitoring, Evaluation and Learning Strategy research activity (MELS). MELS evaluated the overall functioning of the RRAP Stakeholder and Traditional Owner Engagement Sub-program including the efficacy and areas for improvement in our stakeholder and community engagement efforts. The outcome of the MELS project was a series of recommendations on best practices for engagement and governance within RRAP going forward. The MELS recommendations independently corroborated the Advisory Group's findings of the need for a consistent and cohesive RRAP Engagement Strategy and Communications Plan.
3. The continuation of **the Reef Regulators Forums and exploring the wider restoration policy system**: The responsibility for organising and running the bi-monthly Reef Regulators' Forum meetings was transferred to the Queensland University of Technology (QUT) from the University of Queensland (UQ) in 2024. These Forum meetings brought together agencies such as the Department of Climate Change, Energy, the Environment and Water; the Great Barrier Reef Marine Park Authority; Queensland Department of Environment, Tourism, Science and Innovation; and Queensland Department of Primary Industries, including Biosecurity Queensland. The meetings facilitated knowledge exchange both between RRAP and the agencies and the agencies themselves on reef-related policies, regulations, and adaptation activities -thereby strengthening partnerships for intervention deployment and decision-making in the GBR Marine Park. Additionally, as part of our governance work, we have completed a study and developed an options report on the effective pathways for reef restoration governance in the GBR. The report draws on insights from Traditional Owners, reef stakeholders, and case studies from the GBR and beyond to illustrate how strong governance structures can support reef adaptation and resilience. The report also identifies governance pathways with clear roles, responsibilities, decision-making, and delivery mechanisms, to guide future RRAP interventions and efforts to foster a healthy Reef.

## 2 Background and Justification for the Research

The social acceptability of proposed interventions to protect, repair and help the Reef adapt to climate change, will be a significant factor in determining the success or otherwise of programs such as RRAP. Relevant cases of large-scale ecological restoration in aquatic environments (e.g. Florida Everglades) show the risks of ignoring the entangled structure and network of interactions of and among government, scientists and the community (Borkhataria et al. 2017). Similarly, experiences of assisted forest migration/colonisation outline the struggles and community concerns raised by diverse views about economic and conservation goals (Sansilvestri et al. 2016). Although RRAP shares similarities with both these types of experiences, this initiative is unprecedented and unique for its scale of intervention, the variety of social actors directly involved, and the deployment of state-of-the-art technology. When all these factors co-exist in one context, implementing anticipatory measures raises community concerns around uncertainty, cost, and proposed intervention measures (Kates et al. 2012).

The term social licence is most often used to refer to the broad approval or acceptance that communities, the public, and other stakeholders afford to the development and management of natural resources (Parsons et al. 2014; Moffat et al. 2016). While the term has most recently been used to examine social acceptance of industrial activities that extract natural resources from the environment such as mining, forestry and fishing, it is increasingly being applied to the acceptability of conservation management activities (Kendal & Ford, 2017; Van Putten et al. 2018).

It is well established that public attitudes can influence the level of support, opposition or even ambivalence towards technologies and environmental management decisions, and the importance of involving the public in environmental decision-making from an early stage is well recognised. This is not only to manage potential social conflict but because the complex and uncertain nature of environmental problems frequently demands transparent decision-making that embraces diverse knowledge and values (Colvin et al. 2015). In proposing a series of technical interventions for large scale reef restoration on the GBR, understanding public attitudes is not only a pathway for understanding the broad social acceptability of specific reef restoration interventions, it also unlocks a broader range of perspectives on the case for intervention, the suitability for existing engagement arrangements, and preferences for future engagement.

Just as important as the acceptability of interventions, is acceptability of risks associated with their deployment and the ways these risks are characterised and managed. Rather than attempting to reduce complexity and uncertainty, risk management that is inclusive of diverse disciplinary and social perspectives is considered most effective in managing risks associated with intervention in natural environments (National Research Council, 2010). In recent decades, inclusive risk management frameworks have evolved by including the range of potential impacts of technologies related to genetically modified organisms, hazardous facilities, and geoengineering (Klinke and Renn, 2002).

It is also well established that social license is not fixed in time but dependent on continuing processes of engagement. Engagement is a broad term that refers to a set of intentions and approaches that one group or entity uses to structure interaction with others about an issue or proposal that is potentially of mutual concern. It includes a broad suite of activities along a spectrum of participation that differ both in their objectives (outcomes sought from participation) and the degree of power-sharing. These can involve (based on the International Association for Public Participation (IAP2): keeping the public or stakeholders informed; consulting and seeking input on proposed actions; involving stakeholders in the decision-making process; collaborating on making the decisions and implementing actions; and, empowering the public or stakeholders to make the decision.

Each of these different strategies can be appropriate for different contexts, but it is essential to carefully match the chosen strategy to the needs, purpose and language of the Program – and to understand how these relate to community or stakeholder expectations about both the goals and process of participation.

Increasingly the principles of responsible research and innovation are also creating an impetus globally for greater levels of public participation in technology research, development and assessment. These include the role of participation in grappling with questions such as:

- How will the risks and benefits of acting/not acting be distributed?
- Who is taking part?
- Who is in control and taking responsibility?
- Why are we doing this, and what are the alternatives? (Stilgoe et al. 2013).

There are many ways in which social diversity can be understood but, for the purposes of this subprogram, research and engagement activities were designed to reflect a threefold typology of:

- *Livelihood stakeholders* – includes reef-dependent and reef-associated industries, stakeholders, and communities in the GBR and catchment (cf. Australian Government and Queensland Government, 2018; and Queensland Government and Australian Government, 2018).
- *Citizens and civil society* – includes broader public and other interests in the GBR such as individuals or groups based inside or outside of the GBR catchment.
- *Institutional stakeholders* – includes local, regional, state, national, and international governing bodies or organisations with responsibilities and interests in the GBR. These could be based inside or outside the GBR.

Many members of the Reef community belong to more than one of these categories – of note being Reef Traditional Owners whose rights and interests are inclusive of, but transcend, the livelihood, civil and institutional domains. Indigenous people have been linked with the GBR since time immemorial (Australian Government and Queensland Government, 2018) and they are active custodians of their land and sea Country (e.g. Nursey-Bray and Rist, 2009; Maclean et al. 2013).

Cultural heritage is an ongoing focus for the management of Indigenous interests on the GBR. Traditional Owner engagement must recognise that Indigenous custodianship is based on the physical, social and spiritual interdependency of ‘people’, ‘Country’ and ‘Culture’ (Peterson and Langton, 1983; Thomson, 1972). Indigenous people need to interact with Country in order to care for it (e.g. Zurba and Berkes, 2014) and this ‘interaction’ can encompass everyday practices such as hunting and fishing (Smith 1989), ‘caring for Country’ management activities (including co-research activities) (Zurba et al. 2019), and the leadership of and involvement in governance processes for local and regional decision-making (Maclean and The Bana Yarralji Bubu Inc, 2015).

The GBR is a complex social and ecological system, not only due to its large size but also its diverse, multidimensional, interdependent and sometimes conflicting social, cultural, political, economic and environmental values, structures and processes (Lyons et al. 2019; Sie et al. 2022). The layered environmental and socio-political systems within the GBR mean that it is a space fraught with uncertainties.

Within this complex and often variable context, reef adaptation and resilience interventions are a relatively new management focus in the GBR (McLeod et al. 2022). Programs such as the Reef Restoration and Adaptation Program (RRAP) (RRAP, n.d.) and the Crown-of-thorns starfish Control Program (Coupland and Hewitt, 2020) that focus on building reef adaptive capacity have only gained traction since 2016, as mass bleaching events, climate change impacts and Crown-of-thorns starfish (COTS) outbreaks have intensified.

Due to their relative recency within the suite of management actions, there are many uncertainties around the applicability of GBR's existing policies, regulations and planning frameworks related to reef resilience-building activities. The best governance methods and frameworks for reef adaptation efforts are also relatively unknown.

Political, social, technical, and technological dimensions of RRAP point toward the importance of:

- i) identifying social contextual factors likely to affect the acceptability of large-scale restoration and scientific or engineering programs and tailoring engagement programs around contextual concerns.
- ii) employing collaborative governance, learning-based approaches and integrated decision-making approaches to act in complex social-ecological contexts specifically large-scale ecological restoration and engineering programs and new science and technology.
- iii) using governance models to holistically frame the agenda for community, stakeholder and public involvement in highly uncertain, complex and risky decision-making contexts, and
- iv) creating opportunities for action through engagement, skilled facilitation, and deliberative decision making.

### 3 Research Objectives and Key Findings

A current list of project outputs are listed on the [RRAP website](http://gbrrestoration.org): gbrrestoration.org. Key research objectives and findings are detailed below.

Table 1: Key findings of the Project aligned to the overarching and specific research questions for each sub-project.

Objective	Key Findings and/or Outcomes
<b>1.1 Social Licence and Monitoring (SLM) Sub-project</b>	
1.1 (a) Monitor public and stakeholder perceptions of and sentiment toward reef restoration and adaptation research and development (R&D) over time.	<ul style="list-style-type: none"> <li>• The vast majority of Australian residents believe climate change is negatively affecting the health of the GBR and express strong support for measures both to reduce threats like climate change and to upscale reef restoration and adaptation actions.</li> <li>• Consistent predictors of support for research and deployment include emotional responses to intervention possibilities and trust in science to deliver solutions.</li> <li>• Belief that environmental impacts can be identified and tested is a critical predictor of support for deployment.</li> <li>• The perceived ethics and safety of intervention's enhance their perceived feasibility and impact.</li> <li>• Reef community members position interventions relative to narratives both of inevitable loss and alternative possibilities, on the one hand, and between collective action to address climate change, globally and locally, and pragmatic scientific interventions, on the other.</li> <li>• Reef tourism visitors who observe coral restoration devices in situ report no reduction in their appreciation of those visitation sites or the beauty of the reef, and report less concern about the use of those devices.</li> </ul>
1.1 (b) Understand the distribution of opportunities, risks and benefits arising from intervention research and implementation.	<ul style="list-style-type: none"> <li>• Development of a conceptual framework for understanding social risk in relation to threats to individuals and communities, threats to First Peoples, threats to businesses or project implementation, possibilities for amplified social vulnerability, and risk perceptions. This is now informing the PDP social and cultural risk assessment process.</li> <li>• Deep Dive interviews identify six key risk domains of concern to Reef Traditional Owners, stakeholders, and members of the public – Indigenous Partnerships, Distributional Equity, Reef Outcomes, Community Engagement, Program Sustainability, and Unintended Consequences.</li> </ul>

Objective		Key Findings and/or Outcomes
		<ul style="list-style-type: none"> <li>The most frequently mentioned adverse outcomes were potential failure to achieve desired ecological outcomes and to secure ongoing funding for restoration and adaptation research and implementation.</li> </ul>
1.1 (c)	Identify opportunities to incorporate community rights, interests and capabilities in R&D activities, deployment plans and decision-making processes.	<ul style="list-style-type: none"> <li>The most frequently mentioned positive outcome of intervention, by Deep Dive interview participants, was the engagement of community members in restoration and adaptation efforts, leading to increased public support for meaningful action on climate change.</li> <li>The primary route for incorporation of community rights, interests and capabilities with the SLM Sub-project is currently the PDP Risk assessment process.</li> <li>Additional routes to identify and incorporate community rights, interests and capabilities are outlined below in relation to BPE and Adaptive Governance and Learning (AGL) Sub-projects.</li> </ul>
<b>1.2 Best-Practice Engagement Sub-project</b>		
1.2 (a)	Design, pilot and evaluate best-practice, place-based and other engagement opportunities for GBR communities and the public.	<ul style="list-style-type: none"> <li>Described further below (1.2b-1.2d) the team designed, operated and evaluated two regional community panels; co-designed and piloted a collaborative monitoring process for coral settlement devices with local stakeholders; supported the scoping, design and mobilisation of the Cairns Port Douglas Reef Hub; co-designed and produced a Traditional Owner owned biocultural assessment framework; and scoped the development of collaborative business models to support future deployment.</li> <li>Providing different avenues for engagement has yielded significant benefits for the Program by creating visible, practical and in some cases enduring spaces for participation. This has proved to be a fundamental condition influencing social acceptance and support among place-based stakeholders in regions and their networks. There is considerable opportunity for RRAP (with other partners and managers) to contribute to building and strengthening a constituency for scalable coral restoration and adaptation if these conditions can be supported.</li> </ul>
1.2 (b)	Inform and consult on program progress, decision-making and partnering opportunities;	<ul style="list-style-type: none"> <li>The Biocultural Framework (and associated guidelines) have been co-designed and developed as an Indigenous-owned decision support tool (including recognising Indigenous Cultural and Intellectual Property (ICIP) of the Framework itself) that adopts a strengths-based approach to assessing opportunities for Traditional Owner groups to partner in R&amp;D, pilot deployment and future industry development.</li> </ul>

Objective		Key Findings and/or Outcomes
		<ul style="list-style-type: none"> <li>Local stakeholders and community members identified several near- and longer-term future roles they might play in R&amp;D and deployment. Importantly these were not restricted to on-water activities (and the procurement thereof) but include educational, creative, capacity-building, information-sharing or other potential roles in future restoration value chains or business models.</li> <li>Using methods developed by the team, regional stakeholders were engaged in the process of assessing the suitability of reefs in the Cairns region for pilot deployment. This method has been incorporated into broader site selection and prioritisation workflows for the PDP and is repeatable over time as part of future annual planning and deployment cycles.</li> </ul>
1.2 (c)	Improve the observability of field testing and laboratory trials for interventions; and	<ul style="list-style-type: none"> <li>Reef visitors' observation of coral settlement devices at reef tourism sites had no significant effect on (a) their overall Reef trip satisfaction, (b) their perceptions of the Reef's visual aesthetic beauty, or (c) their level of concern about the future health of the Reef.</li> <li>Concerns about the use of coral settlement devices were generally low overall but were significantly lower among Reef visitors who observed them in situ at reef site(s).</li> <li>Reef tourism operators and demonstration sites, like those utilised in the Moore Reef Collaborative Monitoring Pilot (CMP), provide a valuable communication and engagement pathway that can enhance stakeholder and public understanding and acceptance of RRAP restoration initiatives.</li> <li>Improved engagement and trust between RRAP scientists, CMP local partners and Traditional Owners of Moore Reef, with improved understanding of potential pathways, motivations and capabilities that can be leveraged in future collaborative initiatives.</li> <li>New skills and capabilities developed among CMP partners from training and monitoring activities, that are being applied in other non-RRAP restoration projects.</li> <li>There is some unmet demand amongst local and regional restoration practitioners to have better, and more timely access to, the scientific results emerging from RRAP field studies and pilot deployments regarding the efficacy of different intervention technologies.</li> </ul>

Objective		Key Findings and/or Outcomes
1.2 (d)	Provide opportunities for public (citizen) deliberation on intervention risks, benefits and scenarios.	<ul style="list-style-type: none"> <li>Two Community Panels on reef interventions were established and operated in the Cairns and Townsville regions over a two-year period. Facilitated deliberation between panel members and RRAP intervention scientists was found to enhance trust, awareness, and understanding in both groups of scientific intent and risks.</li> <li>Fostering deliberation of this kind was found to create greater consensus on risks and their management; and activated panel members to engage others in their own communities and networks on these issues. It was found to strengthen support for RRAP's mission.</li> </ul>
<b>1.3 Adaptive Governance and Learning Sub-project</b>		
1.3 (a)	Stakeholders, GBR Traditional Owners and communities are involved in the co-design of the RRAP Stakeholder and Traditional Owner Engagement Sub-program.	<ul style="list-style-type: none"> <li>Eight key recommendations for RRAP engagement with GBR communities and stakeholders.</li> <li>Established the case and informed the development of a cohesive RRAP Engagement Strategy. Also informed the RRAP Communications Framework (2021).</li> <li></li> </ul>
1.3 (b)	Evaluation frameworks support learning and adaptive management of the RRAP R&D and the RRAP Stakeholder and Traditional Owner Engagement Sub-program and knowledge is integrated into RRAP planning and decision-making.	<ul style="list-style-type: none"> <li>Developed recommendations on best practices for engagement and governance within RRAP going forward.</li> <li>Independently corroborated the need for a cohesive RRAP Engagement Strategy and Communications Framework.</li> </ul>
1.3 (c)	Stakeholder and GBR Traditional Owner engagement activities undertaken through the Sub-program are coordinated with activities across RRAP and with the Reef Trust Partnership (RTP) in a synergistic way.	<ul style="list-style-type: none"> <li>Identified potential governance pathways -clarifying roles, responsibilities, decision-making processes, and delivery mechanisms to help guide future RRAP interventions and support a healthier Reef.</li> <li>Conducted five Regulators' Forum meetings since this responsibility has been transferred to QUT from UQ.</li> </ul>

### Adjustments to key research objectives

Table 2: Variation in the Project over time.

Initial Research Question	Explain when, how and why the research question changed
No adjustments to report	

## 4 Future Research Recommendations

Going forward, we recommend building on the RRAP Stakeholder and Traditional Owner Engagement Sub-program's earlier work by way of the following strategies:

**Social Licence and Monitoring.** Quantitative and qualitative monitoring of public and stakeholder perceptions of Reef intervention technologies, finance mechanisms and governance arrangements. This activity should identify and monitor social license risks to RRAP R&D and implementation. In doing so, it will support understanding of the Reef as a socio-ecological system essential to human wellbeing and provide essential data to decision support, risk assessment, technology development, and community and stakeholder participation activities.

**Social, Economic and Cultural Risk.** Monitor and verify social, cultural and economic impacts (positive and negative) including risks to Outstanding Universal Value (OUV). The aim will be to identify and assess social, economic and cultural risks associated with intervention research. This is essential to intervention risk assessment, and to ensuring claims to provide social and economic benefits to Reef Traditional Owners, communities and stakeholders are credible.

**Participatory Mapping.** Participatory mapping of biocultural knowledge and values and identification of Traditional Owner research priorities. This will aim to: (1) identify and map knowledge and priorities Reef Traditional Owners consent to share with RRAP for research and operational priority setting; (2) identify opportunities to facilitate Traditional Owner research and knowledge exchange; and (3) support Traditional Owner aspirations for self-determination and management of the Reef as a biocultural system.

**First Nations Science.** Dedicated Aboriginal and Torres Strait Islander research fellow, research scholarship and student cadetship program. This will leverage RRAP investment in research positions, the significant enrolment of Aboriginal and Torres Strait Islander students at partner institutions, and interest in research higher degrees among Traditional Owners collaborating with RRAP to create meaningful research career pathways. It is designed to offer maximum flexibility to match eligible candidates with topics of interest.

**Stakeholder participation in site selection and annual review.** Further developing, trialling and embedding processes to include stakeholder values, knowledge and priorities into annual reef selection process for field trials and PDP in regions to enhance decisions, planning, action and review.

**Co-benefits from implementation.** Design and implement a co-benefit monitoring framework for RRAP, PDP and post 2030. Develop and apply measurable indicators of different types of co-benefits (e.g. stewardship, employment, capacity etc.) that are realised from program implementation by diverse participants and stakeholders. It will directly assist the construction of an evidence-base that can guide adaptive management of the program and the development of impact narratives.

**Regional and reef wide scenarios.** Builds on the existing counterfactual and logistical modelling of the program to develop evidence-based scenarios of the future probable socio-economic outcomes of the program (including deployment) to anticipate future stewardship, workforce, livelihood, capability and related outcomes. These scenarios will in turn inform research and management priorities to optimise future benefits and anticipate challenges.

**Implementing the Engagement Strategy** to support RRAP and PDP Projects. The Engagement Strategy Implementation must be supported by a robust Monitoring and Evaluation Strategy process that enables an evaluation of the efficacy and areas for improvement within RRAP's engagement with GBR communities and stakeholders.

**Governance research** to support GBR regulators and managers to adopt and apply good governance frameworks and practices.

**Regulators' Forums** are maintained to enable information sharing, relationship building, and collaborations between GBR regulatory bodies, RRAP and reef adaption interventions in general.

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