Marine and Coastal

National Environmental Science Program

FINAL REPORT

Project 3.7

Identifying and overcoming barriers to marine and coastal habitat restoration and nature-based solutions in Australia

Pathways to Aboriginal and Torres Strait Islander inclusion and co-design in restoration

March 2024

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Milestone number: 4

Research Plan number: RP2023

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Preferred citation

Saunders MI, Fischer M, Vozzo ML, Chewying K, Malcom F, Liddell B, Cooley R, Cassady J, Bugnot AB, Waltham N (2024) Identifying and overcoming barriers to marine and coastal habitat restoration and nature-based solutions in Australia – Pathways to Aboriginal and Torres Strait Islander inclusion and co-design in restoration. Report to the National Environmental Science Program. University of Tasmania.

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Acknowledgement

This work was undertaken for the Marine and Coastal Hub, a collaborative partnership supported through funding from the Australian Government's National Environmental Science Program (NESP).

NESP Marine and Coastal Hub partners

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Cover images: Coastal wetland at Mungalla Station, QLD. Megan Saunders

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Acknowledgement of Country

The Marine and Coastal Hub acknowledges Aboriginal and Torres Strait Islander peoples as the first peoples and Traditional Owners and custodians of the land and waterways on which we live and work. We honour and pay our respects to Elders past and present.

Aboriginal and Torres Strait Islander peoples represent some of the world's oldest living cultures. We celebrate and respect these continuing cultures and strive to empower Aboriginal and Torres Strait Islander peoples.

Positionality

Megan Saunders is a Senior Research Scientist at CSIRO Environment based in nipaluna (Hobart) lutriwetra (Tasmania). She has Irish and English ancestry and was born in Canada where she lived on the traditional lands of the Tsleil-Waututh Nation. Her research aims to underpin decision making for scaling up coastal and marine ecological restoration. As the lead author of the report the primary 'voice' of the writing is hers.

Mibu Fischer (she/her) is a multi-ethnic, saltwater Aboriginal woman from Noonucal, Ngugi and Goenpul clans from Quandamooka Country, with German, Scottish, Dutch, Brazilian, Chinese-Filipino and Pasifika ancestry. She grew up on Country (at Nandeebie) and currently lives on Country. She is a marine ecologist by training at CSIRO Environment in Meanjin (Brisbane, QLD) and is a PhD Candidate at University of Tasmania looking at how Indigenous Knowledges can equally be considered in climate knowledge systems.

Maria Vozzo is a Research Fellow at CSIRO Environment based in Meanjin. She is of Burmese (Myanmar) descent on her mother's side and Italian descent on her father's side. Maria grew up on the lands of the Tuscarora Nation and Lumbee people in North Carolina, USA. Her research is investigating different approaches to scaling up coastal and marine restoration, with a focus on understanding how positive cross-habitat interactions may enhance restoration outcomes.

Kyah Chewying is a PhD Fellowship student at CSIRO Environment based in Ngunnawal Country (Canberra- which means *'meeting place'*). She is a Walbunja woman from the Yuin nation, and her research is centred on utilising Traditional Knowledges to better understand marine ecosystem dynamics in southern New South Wales.

Bryce Liddell is a Bidjigal man from the La Perouse Aboriginal Community. He is a Gamay Ranger and an early career marine scientist. He has a key interest in using Traditional Ecological Knowledge alongside western scientific knowledge to restore habitats to create sustainable ecosystems for all of use to enjoy. He speaks on behalf of himself and the Gamay Rangers.

Robert Cooley is a Saltwater man from Coastal Sydney with a connection to Gamay through his mum, a proud Dharawal lady. His Father was a Yuin man from the NSW South Coast who arrived in La Perouse with family when he was a young child. Robert comes from a fishing family, with a long history of connection to the ocean. His Role with Gamay Rangers gives him the opportunity to put something back into the ocean which has sustained his community and family forever. He speaks on behalf of himself and the Gamay Rangers.

Jacob Cassady is a saltwater man with connection to Nywaigi sea Country around Ingham, Queensland from his grandfather, and a saltwater Manbarra man on his grandmother's side from Palm Island, Queensland). His role is the manager of Mungalla Station and he has been involved in wetland waterways restoration since the early 2000s. He is passionate about caring for Country as it is critical to culturally empowering young people though Connection to Country. In this report he speaks on behalf of himself; he is a senior Nywaigi man.

Ana Bugnot is a Research Scientist at CSIRO Environment based in Meanjin. She was born in the country of Querandi people (Buenos Aires, Argentina). She is of European descent, including Italian, French, Flemish and German. Her research focusses on identifying the ecological drivers of ecosystem function and services in marine coastal habitats, such as the maintenance of biodiversity, fisheries and nutrient cycling, and how they are affected by anthropogenic activities. The results of her research informs restoration and rehabilitation strategies in marine and coastal ecosystems.

Nathan Waltham is an Associate Professor at James Cook University Bebegu Yumba campus where he studies wetland ecology and restoration. He is based on lands of the Bindal and Wulgurukaba People in Townsville, Queensland.

Glossary

Term	Definition
Country	The term Country is often used by Aboriginal peoples when referring to their traditional territories and encompasses the sky, seas, waterways, lands and all within it. To describe Country is complex as it does not just refer to the environment or landscapes, it encompasses culture and spirituality including relationships to ancestors. Different groups use different terminology and depending on the context, the meaning of the term can change.
Indigenous Peoples	For the purposes of this research project, Indigenous Peoples refers to the many groups of Aboriginal and Torres Strait Islander Peoples who are connected to the original inhabitants of the country now known as Australia, before European settlement.
Indigenous-led	Projects, ideas, concepts, research or initiatives that are led by Indigenous Peoples, groups, communities or organisations. It is when the idea, funding, decision-making and methodology (amongst other things) are in the hands of Indigenous Peoples; this could include work that is applied through collaboration with non-Indigenous groups.
Co-design	A participatory approach to design, in which Indigenous Peoples are equal contributing collaborators in the decision-making and methodological process.
Participation	The action of an individual, group, organisation or community taking part in an activity in any capacity i.e., leading, contributing, or playing a role in the activity.
Ontology	Studied in philosophy and in simple terms refers to what is known or what is real.
Epistemology	A philosophical study that is concerned with the theory of knowledge and broadly looks at how we know what we know, and how we generate and validate that knowledge.
Western scientific	A system of knowledge based upon scientific methods, theories and processes, which are based in academia and are commonly generated by universities and research institutions. Scientific methods have been formed through modern history and are influenced by predominantly western societies and their systems and hierarchical structures.
Ecological Restoration	The process of assisting the recovery of an ecosystem that has been degraded, destroyed or damaged.
Nature-based solutions for coastal protection	The creation or restoration of coastal habitats for hazard risk reduction. Also referred to as living shorelines, natural and nature-based features, nature-based solutions, among others.

Executive summary

The present report aims to articulate a potential pathway to Indigenous inclusion, participation, partnership, collaboration, leadership, and co-design (hereafter referred to collectively as 'participation') of marine and coastal ecological restoration on sea Country in Australia.

Ecological restoration in marine and coastal ecosystems is becoming recognised as a key tool to reverse degradation and to achieve societal goals such as enhancing biodiversity and ecosystem services and mitigating and adapting to climate change. Ecological restoration is defined by the Society for Ecological Restoration as *the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed*. Ecological restoration in marine and coastal ecosystems (herein inclusive of saltmarshes, mangroves, seagrass, shellfish, seaweed and coral reefs) in Australia, as elsewhere, has typically been small scale and uncoordinated as a result of significant barriers which preclude adoption and implementation.

This report is the outcome of a one-year project and is one of three companion reports delivered to the National Environmental Science Program (NESP) Marine and Coastal Hub as an output from Project 3.7 *Identifying and overcoming barriers to marine and coastal habitat restoration and nature-based solutions in Australia*. The other two reports focus on legal and governance barriers to marine restoration (Bell-James et al., 2024), and barriers to adoption of Nature-based Solutions for coastal hazard protection to engineers (Morris et al., 2024), respectively. An overview of these three reports is also available (Waltham et al., 2024). This report builds off of earlier research in the NESP Marine and Coastal Hub - Project 1.6 *A Roadmap to landscape scale coastal and marine ecological restoration*, which articulates 'co-design is central' as the first guiding principle in the roadmap (Saunders et al., 2022).

There is a need to substantially scale up restoration activities and outcomes to achieve targets and societal goals. For example, the Kunming-Montreal Global Biodiversity Framework, Target 2 – *Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.* Stronger empowerment and partnerships with Indigenous groups is one mechanism that marine and coastal ecological restoration efforts can be achieved over large (regional-national) scales. In turn, participation in ecological restoration offers many socioeconomic benefits, such as livelihood opportunities, environmental education, and cultural benefits. However, there are a number of barriers which need to be overcome to achieve large scale marine and coastal restoration in partnership with Indigenous groups, which this report explores in detail.

There is some alignment between the principles adopted by restoration ecologists and practitioners and Indigenous peoples when it comes to the environment. Therefore, they/we

are potentially strong partners in achieving shared environmental goals. However, ecological restoration is embedded in western scientific worldviews, which differ substantially from Indigenous worldviews. **There is a need for guidance on how to bridge the gap between these two perspectives to develop successful collaborative efforts to achieve marine and coastal ecological restoration on Country**.

The Indigenous peoples of Australia have experienced connections to the island nations, coasts and oceans for over 60,000 years. These connections extend beyond the physical nourishment from the environment and include intangible values and ancestral connections to place, species, ecosystems and habitats. In Australia, and many other places globally, colonial processes have had, and continue to have, devastating impacts on Indigenous Peoples and their communities. One of the processes of colonisation is the disconnection from place, typically accomplished through the forced removal and dispossession of people from Country. The disruption of the relationship of caring by Indigenous people for the environment has resulted in landscape scale environmental degradation. This shift has resulted in drastic changes in resource use, management and value of the waterways, skies, seas and lands.

After centuries of colonial impacts, the *United Nations First International Decade of Indigenous Peoples* (1995-2004) was developed, and in 2007 the *UN Declaration on the Rights of Indigenous Peoples* (UNDRIP) was adopted. Australia became a signatory to UNDRIP in 2009, and has since committed to a number of targets through the *Closing the Gap* framework. Included in these targets is for Indigenous Peoples in Australia to maintain cultural, spiritual, economic and physical connections to Country (the environment). Due to environmental degradation over the past 235 years, many ecosystems, including those in coastal and marine environments, will benefit from ecological restoration as a component of caring for Country initiatives to allow environmental conditions to improve and for these connections to stand a chance well into the future.

In Australia, 50% of terrestrial lands have been formally recognised by the Commonwealth as having Indigenous rights and interests. The proportional rights over sea Country by Indigenous people may differ and are not currently well quantified, however, **successful collaboration with Indigenous peoples is likely to be essential to achieving national-scale marine and coastal restoration**. Ecological restoration provides ecological as well as social and economic benefits to the communities who are involved in it. Therefore, Indigenous participation in ecological restoration, whether Indigenous-led or co-designed, when done well, has the potential to help in the process of self-sovereignty and socioeconomic wellbeing of Indigenous communities – areas which are recognised as important elements of reconciliation.

This research is one of three components to NESP Marine and Coastal Project 3.7 *Identifying and overcoming barriers to marine and coastal habitat restoration and nature-based solutions in Australia*. It aims to address three research questions related to Indigenous participation (defined as ‘the action of taking part in something’ – in this report

used inclusively to encompass a range of roles spanning from playing a part in, co-design, or leadership of) in ecological restoration in Australia:

1. What are some of the barriers preventing participation?
2. What enables successful participation?
3. What steps can groups take to ensure more Indigenous participation in the future?

The research addresses these questions through two interviews with three Indigenous people from two different organisations who have successfully partnered with other organisations to conduct marine and coastal restoration of their Country. These individuals are members of the authorship team of this report. The information from the interviews was transcribed and then encoded using qualitative thematic data analysis. A more thorough exploration of each of the two interviews is available as separate documents. An important caveat is that the individuals interviewed spoke on behalf of themselves rather than on behalf of their organisations, and they/we represent only a few voices – therefore, this research should not be considered representative of all Indigenous groups or people in Australia.

For the present report, the information from the thematic analysis was workshopped by the researchers and synthesised into thematic elements of barriers, enablers, advice (to other Traditional Owners, to non-Indigenous practitioners and researchers, and to decision makers and funders), and outcomes. This information was supplemented using information from the literature and lived experience. The team then worked in collaboration with a graphic facilitator, also an author on the report, to produce visual pieces which are intended to be used as a conversation starter and to communicate the key themes (e.g. Figure 1). Key findings include:

There are **significant barriers** to Indigenous participation in marine and coastal ecological restoration in Australia:

1. Structural inequality
2. Insufficient funding
3. Jurisdictional complexity
4. Capacity and personnel

However, **common enablers** can improve opportunities for Indigenous participation and leadership in restoration:

1. Authentic relationships
2. Formal partnerships
3. Learning and education
4. Sustained funding

It is important to note that enabling conditions do not just arise – they are the outcome of tangible steps that people in different organisations can take.

People from **western scientific** backgrounds can:

1. Build cultural competence
2. Act with integrity and respect
3. Initiate and foster relationships
4. Be open to new ways of working
5. Aim for co-design not consultation

For **Indigenous groups** looking to conduct marine and coastal ecological restoration through partnering with other organisations and institutes:

1. Identify and learn about ecological challenges on Country
2. Develop shared community vision and priorities
3. Be curious and open to new ways of working
4. Identify and reach out to partners with shared values
5. Foster current and future capability

Decision makers and funders have an important role in deciding where to focus ecological restoration efforts. This is a complex subject which is influenced by several factors including the spatial scale of the program of investment and was not originally a main focus of the research. However, some suggestions include:

1. Set up an Indigenous advisory panel to help guide decision making
2. Lengthen timelines for submission of proposals and duration of funding
3. Increase the proportional amount of funding for maintenance, monitoring, and evaluation
4. Invest in co-designed and coordinated programs of restoration
5. Value equally different types of knowledge

Through addressing the above research questions this study produced a proposed pathway to help overcome barriers. It includes **steps** which can be taken by western scientific groups, Indigenous groups and decision makers and funders. These steps can lead towards achieving **enabling conditions** which support Indigenous participation in marine and coastal ecological restoration. This in turn can help to deliver **environmental, economic, and social outcomes**.

Following the pathway may result in benefits to Indigenous groups such as job opportunities and spiritual and cultural outcomes from caring for sea Country. Environmental benefits can include conducting successful ecological restoration over larger areas that would not otherwise not be feasible. Achieving marine and coastal ecological restoration over large scales may result in economic benefits from an expanded marine restoration economy which is ‘nature positive’ and supports ecosystem service delivery and climate change mitigation and adaptation. Decision makers and funders may also benefit from following the pathway, for instance, to achieve Closing the Gap targets which have been put forward to address UNDRIP. For Australia, we believe that partnering with Indigenous groups will be necessary to achieving Target 2 of the Convention on Biological Diversity to restore 30% of lands and waters by 2030. While there is no firm data to allow interpretation about whether we are on track to achieve this target, the available information suggest that a step change is needed to do so for coastal and marine ecosystems, and the following the recommendations provided herein offer a potential way forward.

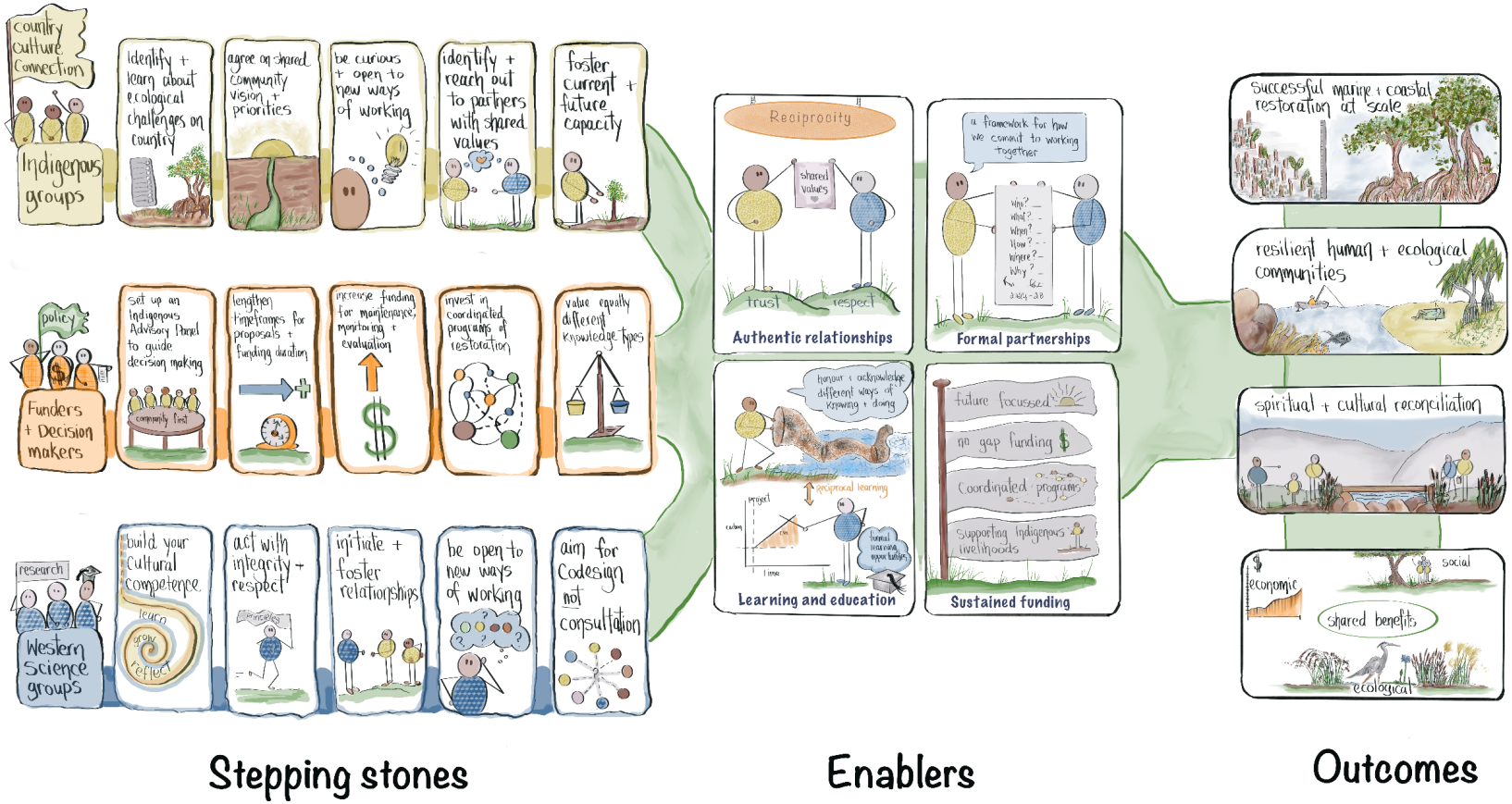

Figure 1 A proposed pathway to Indigenous participation in marine and coastal ecological restoration designed to overcome current barriers. For a more detailed view see the individual included in larger format throughout the document, and the whole image online: https://www.nespmarinecoastal.edu.au/imagery/a-proposed-pathway-to-indigenous-participation-in-marine-and-coastal-ecological-restoration-designed-to-overcome-current-barriers/ The pathway includes stepping stones (advice) which three distinct groups can take, and when followed, can lead to enabling conditions which support restoration on sea Country, ultimately leading to social, ecological, and economic outcomes. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team. The pathway was developed based on two interviews with three individuals as well as literature and expertise of the project team. Image: Fiona Malcolm, Purpose Partners.

1. Introduction

The planet is at a crisis point due to human impacts on natural ecosystems (Richardson et al., 2023). Ecological restoration, defined as the *process of assisting the recovery of an ecosystem that has been degraded*, *damaged, or destroyed* (McDonald et al., 2016), is called for by the Convention on Biological Diversity Kunming-Montreal Global Biodiversity Framework Target 2: *Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.* A number of other international initiatives such as the United Nations Framework Convention on Climate Change (UNFCCC), the Sustainable Development Goals, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), similarly call for ecological restoration. In Australia, the need to support ecological restoration is being addressed through emerging national initiatives such as the Nature Positive Plan and Australia's Strategy for Nature. Ecological restoration over large spatial extents is now widely considered to be required to keep the earth within the safe operating limits of the 'planetary boundaries,' as restoration can improve conditions related to factors such as climate change, biosphere integrity, and land-system change (Leclère et al., 2020). Identifying barriers to, and enablers of, ecological restoration is critical to achieving large scale restoration and unlocking the potential for the joint social and ecological benefits that ecological restoration can offer (Saunders et al., 2022).

This report is the outcome of a one-year research project and is one of three companion reports delivered to the National Environmental Science Program as deliverables to Project 3.7 *Identifying and overcoming barriers to marine and coastal habitat restoration and nature-based solutions in Australia*. The three reports focus on 1) legal and permitting barriers to marine restoration (Bell-James et al., 2024); 2) engineering barriers to Nature-based solutions for coastal hazard protection (Morris et al., 2024); and 3) how to overcome barriers to Indigenous participation in ecological restoration in Australia (the present report). Here we define participation as 'the action of taking part in something' and use this term inclusively to encompass a range of roles, spanning from playing a part in, co-design, or leadership of. Ecosystems within scope include saltmarsh, mangrove, seagrass, shellfish reefs, coral reefs and seaweed beds.

Indigenous peoples globally have practiced local land-sea management for millennia (Smith et al., 2023; Smith et al., 2019; Toniello et al., 2019). However, the destructive impacts of colonisation, capitalism and anthropogenic climate change are decimating the natural world, subsequently affecting the sociocultural world of Indigenous peoples, perpetuating the harm to Indigenous peoples' self-determination and agency by directly and indirectly inhibiting their ability to enact cultural management practices (Matthews et al., 2023). Awareness of these impacts is slowly increasing and Indigenous peoples today are re-asserting their rightful place in caring for Country and are leading and conducting ecological restoration of places holding deep and ancient connections (Goolmeer et al., 2022; Rist et al., 2019; Robin et al., 2022; Ross et al., 2009). Many Indigenous knowledge holders possess the wisdom unique to an area that carries forward through the intergenerational passing of eco-cultural knowledge (Goolmeer et al., 2022; Rist et al., 2019; Robin et al., 2022; Ross et al., 2009). In Australia, intergenerational sharing of knowledge has been highly successful in many regions and these positives outcomes for nature are evidenced by the success of

Land and Sea Ranger programs, where Indigenous rangers manage and care for Country (Barrett, 2022; Pew Charitable Trusts, 2019).

The United Nations Declaration on the rights of Indigenous Peoples (UNDRIP) - Article 31 – states that: *Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions.* The UNDRIP establishes in international law, unique Indigenous rights across various aspects of their cultural heritage and knowledge systems, many of which have direct relevance to the goals of ecological restoration. However, these inherent human rights for Indigenous peoples are not necessarily recognised by state and federal bodies. Approximately 50% of the world's lands are held by Indigenous Peoples and other local communities (Veit and Reytar, 2017). Indigenous peoples constitute around 5% of the global population, yet they protect approximately 80% of the earth's biodiversity (World Bank, 2003; World Bank, 2008; Trewin et al., 2021). It is hence clear that achieving high-level ecological targets will not likely be possible without participation, empowerment, and leadership of Indigenous peoples. This holds true in Australia, where according to Commonwealth Law 16% of lands are owned or controlled by Aboriginal and Torres Strait Islander people, with rights and interests of these groups formally recognised for over 50% of the landmass (National Indigenous Australia Agency, n.d.; Productivity Commission, n.d.; Goolmeer et al., 2022).

Scientists and practitioners of ecological restoration and Indigenous groups are thought to be potentially strong partners in the context of ecological restoration (Dickson-Hoyle et al., 2022). Concepts for both ecological restoration and Indigenous caring for Country (an Aboriginal concept and terminology coined in Australia) have similar environmental objectives and often overlapping social and cultural objectives. However, caring for Country is not synonymous with the western science terms of ecological restoration or even conservation. Indigenous Peoples did not need to be conservationists or think about restoring Country due to their inherent responsibilities to their environment. Indeed, the western scientific concept of 'nature' (e.g. a state in the absence of human impacts) is at odds with Indigenous worldviews which inherently encompass purposeful stewardship of the landscape (Grenz, 2020). In contrast, western science has introduced the terms conservation and ecological restoration, with reducing or reversing human impacts on nature a major goal of both activities. In sum, ecological restoration and caring for Country are based in different philosophies, the former centred in western science where humans are often seen as external to the ecosystem (Dickson-Hoyle et al., 2022; Parsons et al., 2021; Smith et al., 2023).

The concept of Country is complex, and not directly analogous to the concept of ecological restoration. In its simplest form, Country is the connection between Indigenous Peoples and all aspects of the environment (living and non-living). The different features, species and ecosystems represent connections to their ancestors and creation spirits, so the environment often engaged with through a spiritual and cultural belief system. Caring for Country is about centring that connection and ensuring that the relationship is reciprocal, which is why the term "Healthy Country, Healthy People" is so commonly quoted by Indigenous Peoples in Australia. Bird Rose (1996) captured the importance of Country as "People talk about Country as they would talk about a person: they speak to Country, sing to Country, visit Country, worry about Country, feel sorry for Country and long for

Country... Country knows, hears, smells, takes notice, takes care, is sorry or happy... Country is a living entity with a yesterday, today and tomorrow, with a consciousness, and a will toward life. It is home, peace and nourishment for the body, mind and spirit" (Bird Rose, 1996). So, whilst ecological restoration shares complementary aspects of caring for Country and can provide a pathway or tool for Indigenous Peoples to undertake their responsibilities to Country, it cannot be a substitute or alternative for the overall practice of caring for Country.

From a western structural and systemic perspective, ecological restoration offers an opportunity to progress towards positive outcomes for both environmental and socioeconomic challenges. Ecological restoration in marine and coastal ecosystems offers ecological, social and economic benefits (Saunders et al., 2020). Investment into ecological restoration offers a similar number of jobs per $ million spent compared to other land conservation initiatives, and is much higher than investment into sectors such as construction, oil or gas (Edwards et al., 2013). Therefore, participation in restoration can lead to valuable employment and livelihood opportunities for Indigenous communities. Furthermore, and equally importantly, ecological restoration can enhance spiritual and cultural connections to Country (Weir et al., 2011).

There are strong examples of ways that Indigenous worldviews and western scientific approaches are used together to successfully manage land-sea environments in the context of western management systems. "Two-eyed Seeing" (Etuaptmumk in Mi'kmaw), articulated by Elder Dr. Albert Marshall, embraces "learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of mainstream knowledges and knowing, and to use both these eyes together, for the benefit of all" (Bartlett et al., 2012). This concept has been applied to diverse social-ecological issues, such as fisheries (Reid et al., 2021), education for sustainable development (Zeyer et al., 2022), wildlife health (Kutz and Tomaselli, 2019), and scientific literacy (Cirkony et al., 2023). In western Canada, the concept of "walking on two legs" was introduced to guide restoration scientists and practitioners in advancing the interconnected practices of Indigenous-led restoration and reconciliation. This framework, originally articulated by Secwépemc Elder Ronald E. Ignace, seeks to "bring Indigenous knowledges into balance with western scientific knowledge in service of upholding an Indigenous stewardship ethic that is embedded in Indigenous ways of relating to land and embodies principles of respect, reciprocity, and responsibility" (Dickson-Hoyle et al., 2022). Similarly, in Australia, the concept of "walking together" describes research as a respectful reciprocal exchange between Indigenous peoples involving five steps (Talbot, 2017).

A wealth of research exists on engagement and co-leadership of Indigenous peoples in Australia (e.g. Woodward et al., 2020). For marine and coastal restoration in particular, advice for how to improve engagement of local Indigenous people in shellfish ecosystem restoration was an outcome of the NESP Biodiversity Hub (McLeod et al., 2018) and insights on Indigenous stakeholder engagement with respect to coral restoration on the Great Barrier Reef was an outcome of the Reef Restoration Adaptation Program (Taylor et al., 2019).

Our previous research in the National Environmental Science Program revealed that there is a strong disconnect between how western and Indigenous communities perceive engagement of Indigenous people in marine ecological restoration in Australia (Saunders et al., 2022). In a survey of ~100 decision makers, practitioners, and researchers of marine and coastal ecological restoration conducted in 2021, 80% stated that Indigenous people participated in the restoration project(s) (Saunders et al., 2022) including through paid employment, volunteering, co-design, consultation or participation through higher level committees, or collaboration on grant applications. However, a survey which targeted Traditional Owners revealed a different perspective. Respondents gave overall scores of around two out of eight when asked to score statements such as: "Traditional Owners (TO) are enabled", "TO engagement feels genuine", "TOs are listened to and valued", "TOs are valued", and "researchers and practitioners understand protocols" (Saunders et al., 2022). While the sample size of respondents of the latter survey was very small, the findings align with other research calling for greater inclusion of and genuine co-design with Indigenous peoples (e.g. Reyes-García et al., 2019) and from broader historical societal trends towards lack of inclusion of Aboriginal and Torres Strait Islanders, including in the marine sciences (Hedge et al., 2020).

The scientific literature from Australia does not report on many ecological restoration projects being undertaken in marine and coastal habitats with Traditional Owners, which raises questions about how to support these activities in the future. In a structured literature review, only 11 articles out of 470 passed through a screening process identifying Indigenous co-design of marine and coastal restoration in Australia (Saunders et al., 2022). As such, there are limited examples in the scientific literature of best practice collaboration or co-design with Aboriginal and/or Torres Strait Islander peoples and communities in the context of marine and coastal ecological restoration. That said, scientific publications in the field of ecological restoration represent a fraction of the activities that are occurring on ground, as the majority of actors in ecological restoration are not incentivised or resourced to publish. Furthermore, Indigenous Ranger groups in Australia are conducting ecological restoration on sea Country as well as a range of intersecting activities, such as management activities, habitat protection, and habitat mapping (e.g. Girringun Aboriginal Rangers, 2021). Lastly, there is a wealth of information on engagement and co-design with Indigenous groups in Australia which is not specific to marine and coastal restoration (e.g. Tropical Water Quality Hub, 2015; Woodward et al., 2020). Based on these findings and logic, two fundamental questions arise: 1) What are the pathways to participation of Aboriginal and Torres Strait Islander people in marine and coastal ecological restoration?; and 2) How do we bridge the current gap between Traditional Owners and the western scientific and practitioner community with the aim of scaling up effective marine and coastal restoration in Australia?

A pathway to Indigenous participation in coastal and marine ecological restoration designed to overcome current barriers and harness enablers is required. To develop concepts for such a pathway, we conducted in-depth interviews with three individuals from two Traditional Owner groups who have successfully conducted ecological restoration on sea Country in Australia. One individual spoke on behalf of himself but is a member of the Nywaigi Traditional Owners at Mungalla Station in Queensland Australia. Two individuals spoke on behalf of themselves and the Gamay Rangers in Gamay (Botany Bay), Sydney, New South Wales. In this report, we synthesise key findings from each

of two interviews supplemented with supporting information from our own experiences and from the broader literature. The findings cover common barriers and enablers of Indigenous participation in coastal and marine restoration, advice to other Indigenous groups seeking to conduct marine and coastal ecological restoration in partnership with western scientific groups, advice to western-based science groups seeking to collaborate and partner with Indigenous groups, and advice to decision makers and funders seeking to boost Indigenous participation in research and practice of restoration. Together, the advice constitutes 'steps' in a **pathway** which can lead to 'enabling conditions' which can support ecological restoration on Country; this in turn can lead to socioeconomic and ecological outcomes.

This research provides insights from the valuable lived experiences of three Traditional Owners working to restore Country. It provides a deeper insight into the challenges that exist for Traditional Owner groups across two states, working on several types of marine ecological restoration, and working in different ownership structures within existing colonial systems. The research represents the views of the authors of this research (which includes the three individuals interviewed), and therefore cannot be generalised to a wider sea Country Traditional Owner population. However, the results align with previous research outcomes (Saunders et al., 2022) and are intended to underpin a conversation moving forward.

2. Methods

2.1 Development of Traditional Owner Collaborations

To gain an understanding of the barriers and enablers for Indigenous-led restoration of sea Country, the project team reached out to contacts at fourteen Indigenous organisations that have engaged in marine and coastal ecological restoration in Australia. They were identified through our previous research (Saunders et al., 2022), through personal networks, networking at conferences and symposia, and through engagement with the NESP Marine and Coasts Hub knowledge brokers and Indigenous facilitators. Based on this list, we initiated contact with groups via email and phone. While many groups expressed interest in the project, some were at- or over-capacity, or were unable to participate due to organisational processes (Table 1). Of the fourteen groups, three individuals from two groups were interested and able to contribute their time to the project and proceed to formal interviews. They participated in the research project first as interviewees, and later through providing feedback on the report content. These individuals are co-authors on the report. In this capacity, one represents themselves rather than speaking on behalf of their organisation, and two represent themselves as well as their organisation.

Table 1 Communities (deidentified for privacy) who have conducted marine and coastal restoration on sea Country who were contacted to assess interest and availability for collaborating on the project.

Community Identifier	State	Yes/No	Notes

Community A	QLD	No	Busy with Native Title Determinations. Ongoing conversations and interested in keeping in touch.
Community B	QLD	No	Culturally unsafe for team member.
Community C	QLD	Yes	Collaborators and authors.
Community D	QLD	No	Didn't have the time.
Community E	WA	No	Didn't have the time.
Community F	QLD	No	No response.
Community G	QLD	Initial Yes, then no	Unable to find a time.
Community H	NSW	Yes	Collaborators and co-authors.
Community I	SA	No	Interested in hearing about the project and staying connected.
Community J	SA	No	Interested but the timing didn't work out.
Community K	QLD	Initial yes, then no	Unable to find a time.
Community L	NSW	Initial yes, then no	Organisational processes did not support the interview proceeding.
Community M	TAS		Ongoing discussions.
Community N	SA	No	Sorry business was in progress therefore unable to engage.

2.2 Ethics approval

The research was approved by the CSIRO Human Research Ethics committee (Approval number 204/22). A participant information sheet was provided to the interviewees prior to the interview, and interviewees were remunerated for the one-hour interview according to best-practice for Indigenous participation in research (Appendix A, B). Further compensation was available for collaborators' time to edit and review the published documents.

2.3 Interview design and implementation

A series of formal interview questions were designed by the research team (Appendix C Interview schedule). The interview included questions about the location and type(s) of habitat at the restored site; motivations for and cultural significance of restoration; any challenges that were faced and how they were overcome. We also asked for advice on what would make it easier for Indigenous leadership or participation in restoration in the future, advice to other Indigenous groups seeking to engage in restoration and advice to non-Indigenous/western science-based groups on what would make it easier for Indigenous leadership and participation in restoration (Appendix C – interview run sheet).

Two interviews were conducted in May and September 2023, respectively. At each interview, two members of the research team were present; during the interview one of the team members asked the same series of open-ended interview questions to the interviewee(s) (Appendix C Interview

schedule). An interview with Jacob Cassady, who is a Nywaigi man and the manager of Mungalla Station, near Ingham, Queensland, was held in May 2023 at Mungalla Station. An interview with Robert Cooley and Bryce Liddell, who are members of the Gamay Rangers, was held at La Perouse, Gamay (Botany Bay), New South Wales, in September 2023. Audio recordings of the interviews were made for transcription purposes. Audio recordings and transcriptions (see below) were stored on secure networks at CSIRO according to the CSIRO Human Ethics and Privacy processes. These interviews were a primary data source for developing Case Studies (see below) and the synthetic content of this report.

2.4 Interview transcription and thematic analysis

The interview recordings were transcribed and annotated using a thematic analysis approach, a method for analysing qualitative data, to identify key themes. The transcription and annotation process were conducted by the same two members of the research team to ensure consistency in the interpretation and messaging of the interviews. NVivo software was used for data management and coding. Interview content was coded according to five key themes: Barriers, Enablers, Advice, Benefits (of engaging in restoration), and Cultural. A coding framework was used to categorise and organise the interview transcripts to identify key patterns and themes. The framework helped organise the depth of information collected during the interviews and draw out commonalities and differences between the two case studies. The coding was done through an inductive approach and was refined as themes emerged; an example of a coded segment can be seen in the results in Table 2.

After the initial transcription and coding, the research team conducted group discussions, shared insights and perspectives, and further refined the themes. This iterative process allowed us to collaboratively assess emerging patterns and to ensure a higher understanding of the data. Through discussions amongst the project team, three themes were identified to become the primary focus of the project (Barriers, Enablers and Advice). Within these themes, sub-themes were identified and are explored further below.

2.5 Development of case studies

The insights from the interviews formed the basis for the development of two case studies. Case studies are here defined as “detailed description and assessment of a specific situation in the real world created for the purpose of deriving generalizations and other insights from it. A case study can be about an individual, a group of people, an organization, or an event, among other subjects” (Raikar, 2023). The case studies aimed to provide detailed understanding of how Traditional Owners were able to engage in sea Country restoration through real-life experiences and perspectives. For each of the two interviews a case study fact sheet was created which will be made publicly available. Throughout the analysis process the research team checked with the interviewees to validate the interpretations. The case studies derived from this research represent findings from an interview with one or two people and are not representative of the specific groups which the individual interviewees are members of, or of Indigenous people or groups more broadly.

2.6 Synthesis and Pathway development

While developing the two case studies, the research team identified commonalities, patterns, over-arching themes, and unique insights between the two interviews. Together with existing literature and results from previous projects, we were able to get a clearer understanding of some of the barriers and enablers of Traditional Owner participation and leadership in the restoration of sea Country in Australia. As themes emerged and were refined, we developed a narrative beyond the individual case studies – these findings form the basis of the present report.

Synthesis of the information from the interviews was conducted by the project team through a series of meetings and workshops. The project team commenced the synthesis process and then engaged with a graphic facilitator (also an author on the report) and used an iterative arts-based process to develop a visual representation of the findings. Workshop 1 was held in Hobart, Tasmania, with members of the research team (Saunders, Fischer, Vozzo, Chewying) In November 2023, and Workshop 2 was held in Brisbane, Queensland in Dec 2023 with members of the research team (Saunders, Fischer, Vozzo) and graphic facilitator (Malcolm).

The graphic facilitator and the research team worked together (co-production) to distil key findings related to barriers, enablers, advice, and outcomes, and then used an arts-based method to represent these findings visually. In this approach, information is summarised and presented visually with the aim of making findings more understandable and accessible to a wider audience (Martikainen, 2019). Outcomes of this process include images representing the key themes of the research: 1) barriers, 2) enablers, 3) advice, 4) outcomes, and 5) a pathway to Indigenous participation in coastal and marine restoration, which consists of steps (advice), enablers, and outcomes (e.g., Figure 1).

The content for barriers and enablers was generated through the thematic analysis, whereas key pieces of advice (steps) were identified and synthesised from three sources: the discussions with Traditional Owners, project team members' learning through this and other related projects, and the literature. The advice is aimed at three groups: Traditional Owners interested in restoring sea Country, western scientific groups looking to work with Indigenous communities on marine and coastal restoration, and decision makers and funders seeking to support Indigenous participation in marine and coastal restoration. The advice for decision makers and funders arose out of conversations from the project team while conducting the thematic analysis of interviews, rather than being a main focus of the interviews themselves. The advice that constitutes the stepping stones in the pathway is not comprehensive but is designed to be a starting point in a conversation.

Together, the steps form stepping stones on a pathway which lead to the generation of enabling conditions which support Indigenous restoration of sea Country. The themes of cultural and benefits ('outcomes') were not explored in detail in this research, as they were not the primary focus of the research questions, however, they are represented visually in the pathway as the end point.

2.7 Limitations

Our research has illustrated the depth of experiences of three Traditional Owners working on Country to restore marine and coastal habitats. Therefore, it is not representative of the individual's community or organisation overall, nor is it representative of Indigenous perspectives more broadly in Australia. Despite representing only a few voices, we believe that, in combination with outcomes from previous work (Saunders et al., 2022), the key themes are likely broadly representative. The findings can be refined in future to underpin research and actions which aim to empower and enable Traditional Owners to participate (broadly defined) in the restoration of sea Country.

3 Results

3.1 Thematic analysis reveals key trends in participant experiences in marine and coastal ecological restoration

Thematic analysis of the interviews was based on five key overarching themes: Barriers, Enablers, Advice, Benefits and Cultural, with three themes related to our research questions identified to become the focus of the project (Barriers, Enablers and Advice). Focussing on these themes, ten sub-themes emerged:

Barriers:

1. Capacity
2. Funding
3. Jurisdictions
4. Inequality

Enablers:

1. Relationships
2. Partnerships
3. Education
4. Funding

Advice:

1. To other traditional owners interested in conducting ecological restoration on sea Country
2. To western scientific groups interested in partnering with Traditional Owners

Each of these subthemes relates to specific coded content from the interviews – examples for barriers and enablers are shown in Table 2. Note, advice for decision makers and funders was not the core theme of the research questions or of the interviews to the Traditional Owners interviewed in this project, therefore it was not coded in the interview transcription. Instead the research team then used expert knowledge and literature to generate ideas for steps that decision makers and funders could take to boost Indigenous participation in restoration.

Table 2 Coding matrix used in NVivo software to analyse themes and sub-themes in interviews with three individuals from two Indigenous groups who have conducted ecological restoration on sea Country in Australia.

Case Study	Barriers				Enablers			
	Capacity	Funding	Jurisdictions	Inequality	Relationship	Partnership	Education	Funding
1	”… a lot of our people won't make the blocks or miss blocks because of sorry business…”	“But you understand that there’s processes and things take time and that. But you know? Funds are always a barrier.”	“…having people on the ground making sure we follow up with stuff and that, that’s probably a barrier.”	“…once we got [redacted] on board and [redacted] and different organisations, it kicked up a bit of momentum here and there and because of that we had no trouble getting grants.”	“100% relationship building, it’s critical.”	“…if I could just say that partnerships are critical.”	“…it's an opportunity for a lot of our mob to get involved to be real hands on and come out with a qualification…”	“…because of that we had no trouble getting grants; that enabled us to employ people and engage people and the more engaged people the more word gets out and the more people get involved.”
2	“…we get so many requests for assistance. So many it's almost overwhelming. …just giving up our time and trying to manage those … is a challenge sort of balancing and juggling all of those things.”	“…when we started, we were doing a lot of stuff without taking any payment just to get our name out there…But now… Without funds for a lot of that stuff, we can't do it.”	“…some of the licenses to do that and legalities around that, particularly this project where we’re removing and translocating…”	“…we didn’t have no input on where these locations were, even though we have documented history of our community accessing those [redacted] habitats and areas.”	“…they welcomed us up to the marine science centre in the boardroom, introduced themselves and all introductions were made.”	“A lot of that is partnering with scientific institutions …”	“…there it’s just learning a lot from each other and combining those two sorts of aspects of living experience; cultural knowledge and western science.”	“…small grant, that we’re involved with, so they value run off that.”

Overall, enablers were mentioned roughly twice as frequently as barriers. For barriers, 6-7% of content discussed *Funding* and *Jurisdictions,* respectively, and less than 7% of content covered *Capacity* and the influence of *Structural inequality*; in most instances structural inequality was implied rather than directly stated (Figure 2).

For enablers, the theme of *Partnerships* was consistently expressed as being a major factor in enabling groups to participate in sea Country restoration, with 37% of all content coverage referencing the importance or influence of partnerships (Figure 2). Twelve percent of all interview content discussed *Training and Education*, while 8% focused on *Relationships*, and 8% on *Funding* (Figure 2). Positive sentiments were frequently articulated by interviewees around partnerships and education. Interviewees also consistently showed an increase in enthusiasm and engagement in the interviews when discussing partnerships and education with the project team. This was inferred through increased length of and positive emotive responses to corresponding questions. While it was beyond the scope of the current research to identify the elements that construct successful partnerships, given the emphasis provided on this subject during the interviews we suspect it may be an important area of future research.

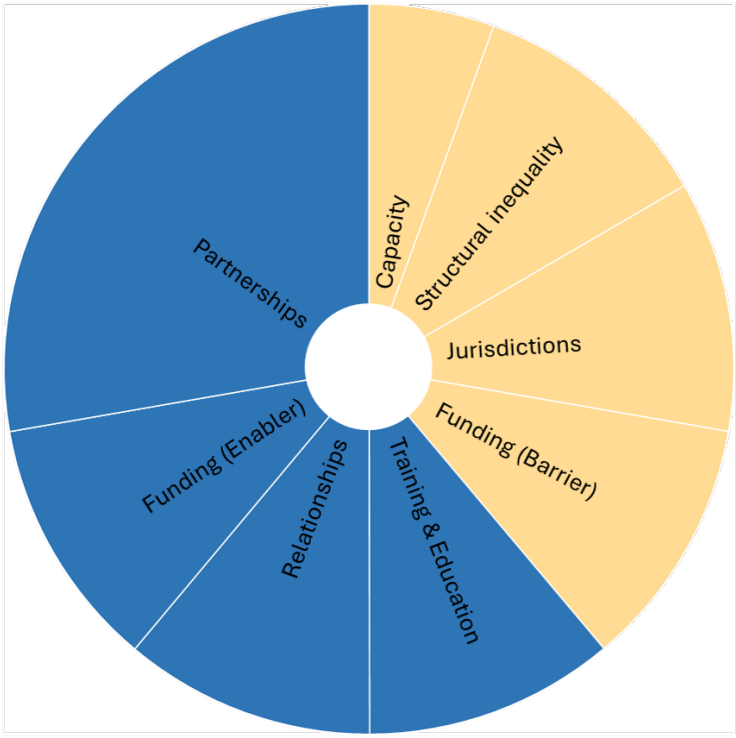

Figure 2 Eight sub-themes related to Barriers and Enablers of Indigenous participation in marine and coastal ecological restoration identified in interviews with two Indigenous groups who have conducted ecological restoration on sea Country in Australia. The results are based on thematic analysis as coded in NVivo software. The size of the pie wedges represents the proportion of items in two interviews coded to that theme, and the colours indicate barriers (yellow) and enablers (blue). Coded items are segments of the data which have been assigned to one of the eight themes in the coding process.

3.2 Key Theme – Barriers

3.2.1 Barrier 1 – Structural inequality

One of the four sub-themes within the overarching theme of *Barrier* that emerged from both case studies was related to the structural inequalities experienced by Indigenous groups (Figure 3). In both cases, the Indigenous organisations have persevered through systemic structures imposed since colonisation in 1788, including inequitable access to Traditional lands, seas, waterways, and skies. Structural inequality comes through laws, legislation and policy that restricts access to Country and inhibits decision-making power for Traditional Owners (Cronin, 2017). These systemic barriers, including racism, are often invisible as they are within the very structure of society, and occurs with no regard to individual attitudes (Elias et al., 2021).

As we navigated through both case studies, it became evident that structural inequality stood out as an underlying barrier to Traditional Owner involvement in restoration of Country. This theme, whilst arguably the hardest barrier to overcome, highlights the need for genuine and goal-oriented partnerships for Traditional Owners, to increase their self-determination over Country.

For Aboriginal and Torres Strait Islander groups looking to lead restoration work on Country without a non-Indigenous partner, systemic barriers have played a part in limiting their ability to access resources for successful restoration activities. For example, Mungalla Station was unsuccessful in achieving funding to undertake restoration of their wetlands when applying for grants as the sole organisation. Similarly, the Gamay Rangers experienced restrictions of access to Country to collect seagrass due to legislation related to National Parks. Through partnership with a university they gained access to a permit to collect seagrass, but the permit process was difficult and lengthy. Indigenous groups have also been used by some to ‘tick-a-box' in funding applications which require Indigenous participation to move forward in the application process.

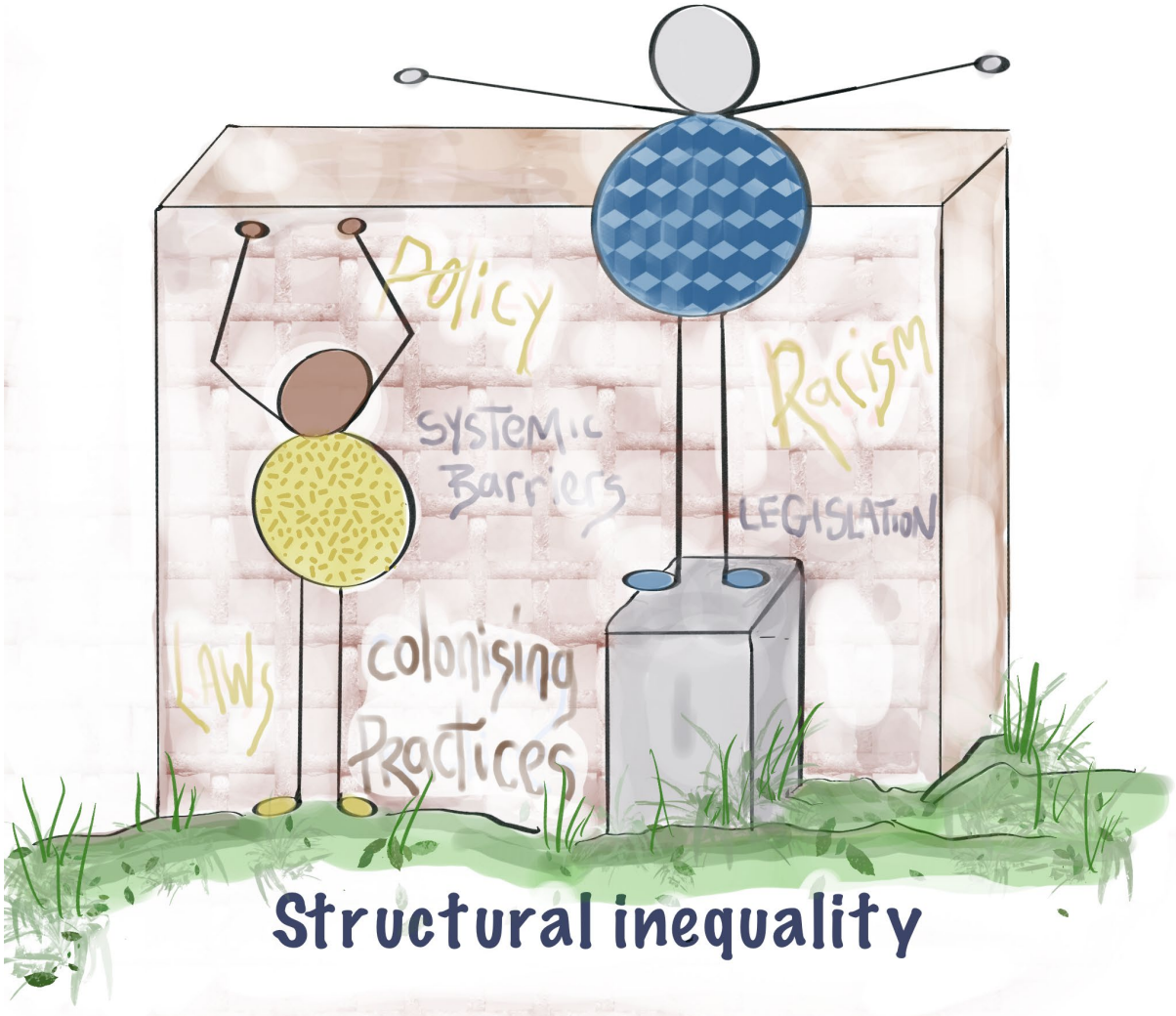

Figure 3 Structural inequality is a barrier to Indigenous participation in marine and coastal ecological restoration. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.2.2 Barrier 2 – Insufficient funding

The interviewees articulated how, as with many Indigenous-led initiatives, limited funding challenges their ability to engage and lead restoration activities on Country (Figure 4) (e.g. Hoffman et al., 2022). The quantity of funding available is a barrier, as is the presence of structures which are challenging for Traditional Owners to apply for funding. Indeed, funding to participate for both Indigenous and non-Indigenous practitioners in restoration is one of the top barriers to marine and coastal restoration in Australia (Saunders et al., 2022). When the Gamay Rangers first formed their ranger group they initially worked for free to increase their experience and confidence. However, they changed to a fee-for-service arrangement as the number of requests and enquiries they received became unsustainable in the context of their other commitments. The fee-for-service funds covered salaries to employ casual staff to backfill the rangers' day-to-day work. The Gamay Rangers are now seeking funding for a compound upgrade and a new vessel to support their increased work activities. Mungalla Station did not initially receive the funding they required to support the amount of work they needed to do, and they also did not initially receive funding grants from any applications they applied for on their own. They were eventually successful in gaining funding through a partnership with CSIRO and James Cook University. It was beyond the scope of this work to identify how grant application schemes could be modified to facilitate success of applications led by Indigenous groups, but this is an important area of further investigation.

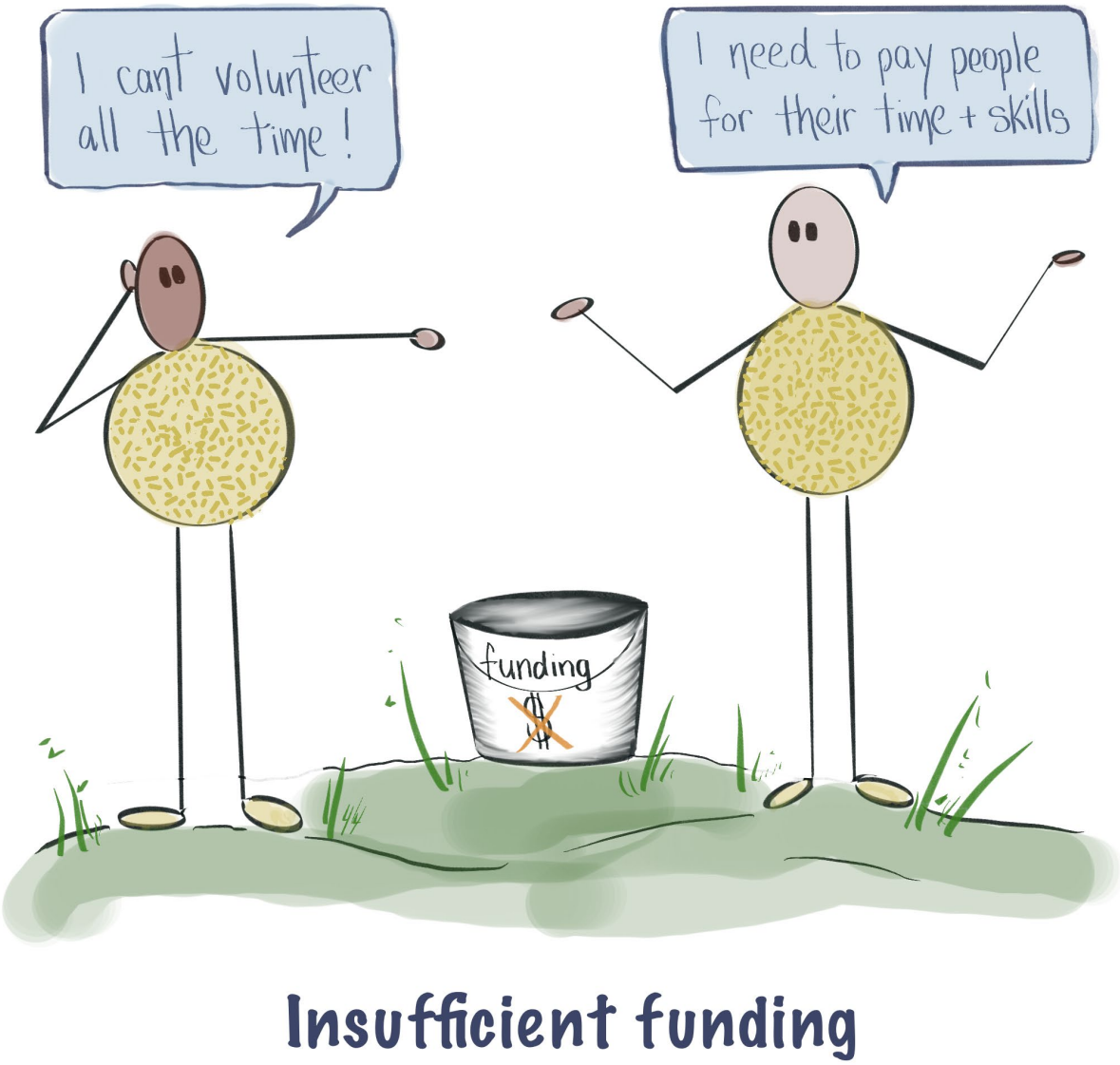

Figure 4 Insufficient funding for salaries and people's time is a is a barrier to Indigenous participation in marine and coastal ecological restoration. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.2.3 Barrier 3 – Jurisdictional complexities

Since colonisation**,** Aboriginal and Torres Strait Islander people and communities have had to fight for recognition of belonging to and managing their own traditional lands, waterways and skies (e.g. AIATSIS, 2020b; Hird et al., 2023). Legal rights were taken away via colonial laws and displacement, and Traditional Lores in many communities were not able to be practiced in relation to the environment. Further, decision-making about Country and the environment was rendered non-existent or, in some instances, reduced to consultation or approval through the colonial systems of management. Therefore, as discussed by the interviewees, while Traditional Owners of lands and seas are at times acknowledged, they often do not have true ownership (in a western context) and decision-making authority over this space, and this jurisdictional injustice inhibits their ability to conduct ecological restoration on sea Country (Figure 5).

The representatives of the Gamay Rangers explained that they did not have true decision-making authority over the intertidal and subtidal seascapes upon which they were conducting restoration. They articulated the complex planning, permitting and legislative processes they undertook to take action to care for Country. Alternatively, the Nywaigi people (Mungalla Station) received Native Title Determination over the Halifax Bay area of QLD in 2018. This Determination, in principle, returns decision-making authority with respect to Country to the Nywaigi people. A portion of this land has been purchased by the Indigenous Land Corporation, and now the Nywaigi people hold private ownership of over 880 ha of Country where Mungalla Station is located. This is a significant benefit in enabling decision-making powers over which activities and traditional practices are conducted within the bounds of the Nywaigi people's private land. The differences between the experiences of the Gamay Rangers and the Nywaygi likely related to a fundamental distinction among terrestrial and marine ecosystems, whereby it is possible to own landscapes, but seascapes are not subject to private tenure arrangements under the colonial Crown legal arrangements. The significance here is that private land tenure involves the right to exclude others from the area, which is more complex to grant in seascapes.

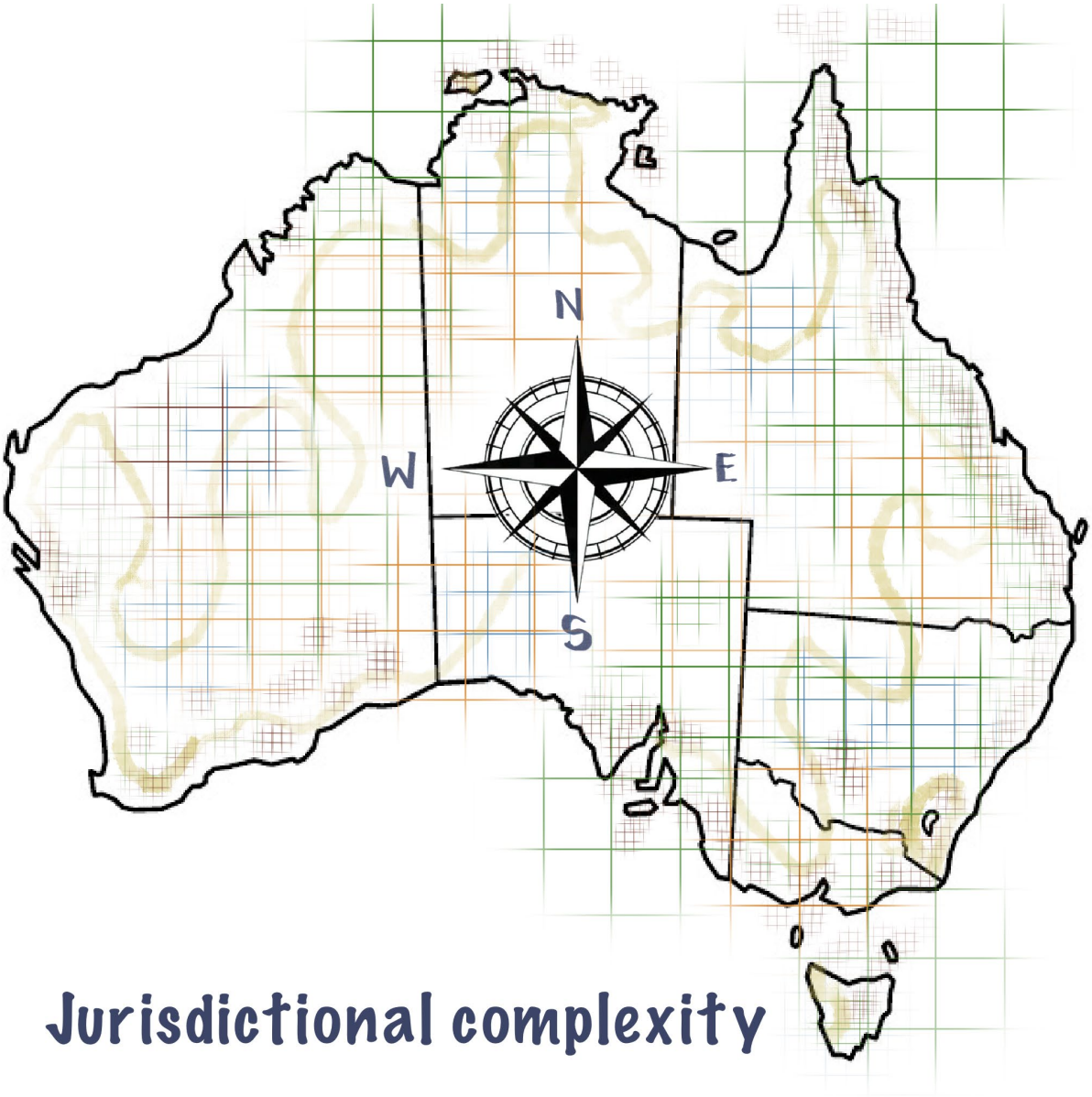

Figure 5 Jurisdictional complexity is a barrier to Indigenous groups restoring sea Country. The lines on the map are conceptual rather than representing particular jurisdictions and represent spatial variability in jurisdictions over lands and seas. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.2.4 Barrier 4 – Capacity and personnel

The interviewees revealed that there are issues with capacity for individual Indigenous organisations which limit their ability to restore sea Country (Figure 6). This is influenced by the other barriers, including structural inequality and insufficient funding. For many groups the requests to community members to participate in research, restoration or other related activities often exceeds the amount of funding they have available to employ permanent staff to cover all the opportunities that arise. Despite having opportunity to fund some casual work, this is not a valid funding model for many communities, especially for regional communities or remote restoration projects, where people are living off site and would need to travel to participate. An additional difficulty faced by Indigenous groups is known as 'engagement or consultation fatigue'. This comes from over engagement by different research groups, governments and industry who are seeking partnerships or relationships with these groups (Brunger and Wall, 2016). The increased interest placed on individual groups and their ability to keep up with the different requests adds to the existing barriers related to capacity.

This is the case for the Gamay Rangers who are stretched to respond to all the enquiries of all the groups (industry, academia, government, etc) working in Gamay (Botany Bay), NSW and beyond. In addition to handling numerous enquiries, they also do not currently have available funding to employ a larger number of rangers fulltime and instead have several casual staff they call on when needed. The casual staff also assist with regular Gamay Ranger duties when the other rangers have been placed on external projects or tasks. Their current compound/base does not allow for further expansion of staff or capacity. They would like to expand their work in caring for Country in more of their cultural area, but experience constraints on funding for assets and staff.

'But now it's at the point where we're getting so many requests and enquiries, if we're doing it without payment- because we use those sorts of funds to bring casuals in to fill the spots that we have got to do when we leave. Without funds for a lot of that stuff, we can't do it just because we don't have time to... I think a bigger base would help as well...'
Bryce Liddell, Dharawal Traditional Owner

The Nywaigi People at Mungalla also face a similar issue around a lack of funding to meet current needs that is made more complicated by the remote location of the station, with community members needing to move hours away for livelihood (e.g. school, other jobs) opportunities. For members to participate in training and knowledge sharing of caring for Country, these community members need to take time away from their lives and travel to Mungalla Station to be upskilled to undertake the work.

'I think there will come a time when lots of our mob really want to come and get involved. They're aware of the success that we had but still a lot of people aren't involved who want to be involved because they just don't have the capacity because they're not here. They live in Cairns or MacKay or wherever, you know?'
Jacob Cassady, Nywaigi Traditional Owner

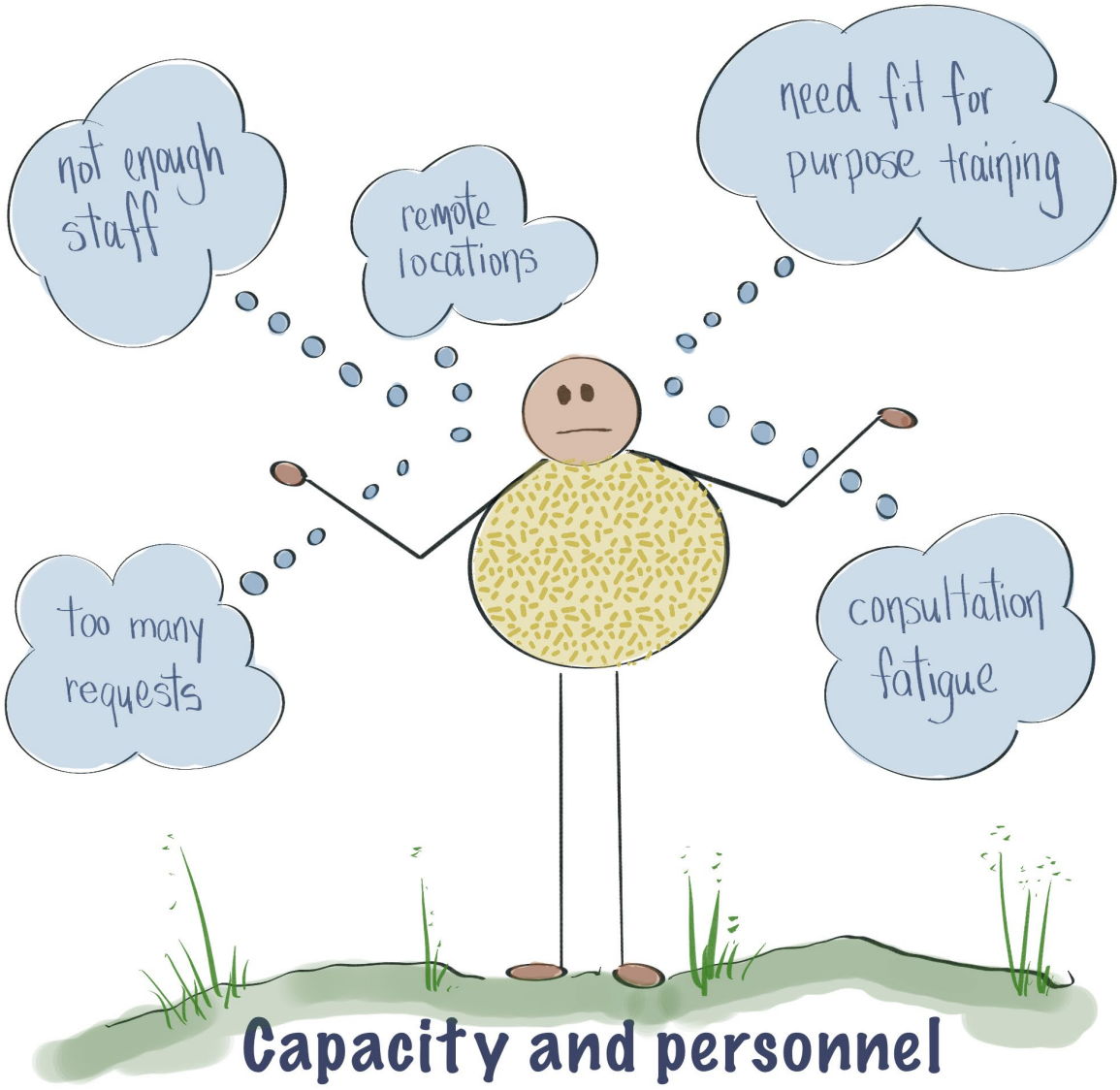

Figure 6 Limiting factors affecting capacity and personnel of Indigenous groups from conducting ecological restoration in sea Country. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.3 Key Theme - Enablers

3.3.1 Enabler 1 – Authentic relationships

The interviewees described various processes for the development of mutually respectful authentic relationships (Figure 7) with external agencies which enabled them to conduct ecological restoration on Country. Some of these relationships progressed to formal partnerships, and some did not. Early recognition of the funding constraints placed on both potential external partner organisations and Mungalla Station led to an identified need to find sustained funding for both organisations during the relationship building phase. For the Gamay Rangers, authentic and genuine discussions allowed the team to understand the research and restoration aims of external organisations.

'Overall the experience has been really good, and with the researchers we work with we understand what they're doing and they understand our point of view and we understand good consultations lead to good working relationships and it all starts with chats'
Robert Cooley, Dharawal Traditional Owner

Developing mutually respectful, authentic relationships between Indigenous groups and non-Indigenous western scientific groups is an enabler of successful Indigenous involvement in marine and coastal ecological restoration (Figure 7). An authentic relationship begins 'when we reveal our true self to another person. That means being genuine and vulnerable in our communication and interactions. Moreover, we are congruent—in other words, what we feel inside is consistent with how we act and what we say to others' (Newport Institute, 2022). Authentic relationships underpin trust, which is needed to support strong foundations for ongoing partnerships. Steps that can support authentic relationships in professional contexts include starting with the right intent, asking questions which build positive energy, being mindful of potentially false preconceptions, listening with full attention, and being willing to be vulnerable (Inam, 2018).

During this stage, Indigenous and western scientific groups can confirm that they have similar values, and with time, build the trust that the partnership will deliver mutual benefits. Developing a mutual understanding about goals and objectives, needs (e.g. funding for capacity, personnel, or training), and requirements (e.g. types of engagement or outputs) of each organisation is necessary before moving into the next phase of planning and implementing restoration.

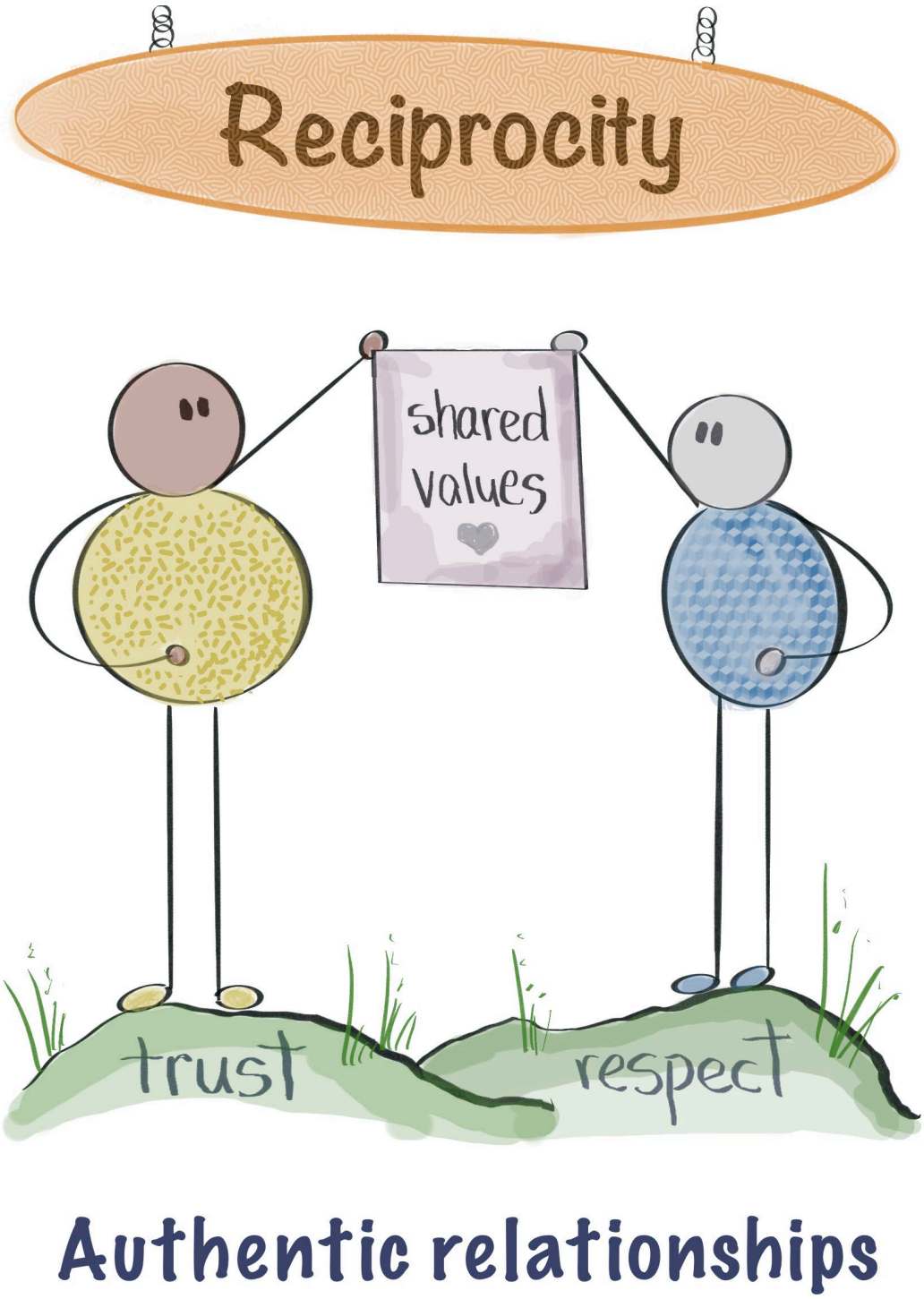

Figure 7 Authentic relationships are one of the enablers of successful marine ecological restoration on sea Country by Indigenous groups in Australia. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.3.2 Enabler 2 – Formal partnerships

In both interviews, the interviewees stated that formalising relationships (Enabler 1) into partnerships was beneficial (Figure 8) as it paved the path for two-way learning and agreement upon goals and objectives or all parties. For example, in a previous research and restoration project conducted at Mungalla Station, a formal Memorandum of Understanding (MOU) between Mungalla Station, James Cook University (JCU), and CSIRO was signed. Within six weeks of signing two-way learning (between the Indigenous group and western-science based groups JCU and CSIRO) via site visits and meetings began. Similarly, the Gamay Rangers were open-minded to the opportunities that partnering with a university could offer, such as shared learning and training. Whilst the partnerships among the Gamay Rangers and local university groups are relatively young, the group have started to see opportunities to expand, including sharing of resources (i.e., boats, science facilities and personnel) and input into research planning and questions.

Partnerships can work in many ways. Indigenous ranger programs often have the means to do field work and monitoring in restoration. The Gamay Rangers have skilled personnel who accomplish field work activities in partnership with the University of New South Wales. Partnerships can be formalised through a partnership agreement, MOU, contracts, or funding agreements to share resources. Formalised agreements also enable groups to agree upon goals and objectives for the partnership and restoration activities. Formal partnerships have been identified as key to supporting the resourcing for Indigenous-led conservation and management actions in other countries as well [e.g. fire management in Canada, (Hoffman et al., 2022)]. All good partnerships should include agreements in line with Indigenous Cultural and Intellectual Property (ICIP) and Indigenous Data Sovereignty, and governance documents such as the *Our Knowledge Our Ways Guidelines* (Woodward et al., 2020) which provide examples of best practice for developing partnerships.

In the present case studies Indigenous participation or leadership in restoration occurred where there were relationships with other non-Indigenous groups. That does not mean that is the only way Indigenous involvement or leadership in restoration can or should occur. However, ecological restoration is a complex process involving many types of experience and capacity, and globally, marine and coastal restoration projects involving multiple partnerships are one of the common factors among highly successful projects (Saunders et al., 2020).

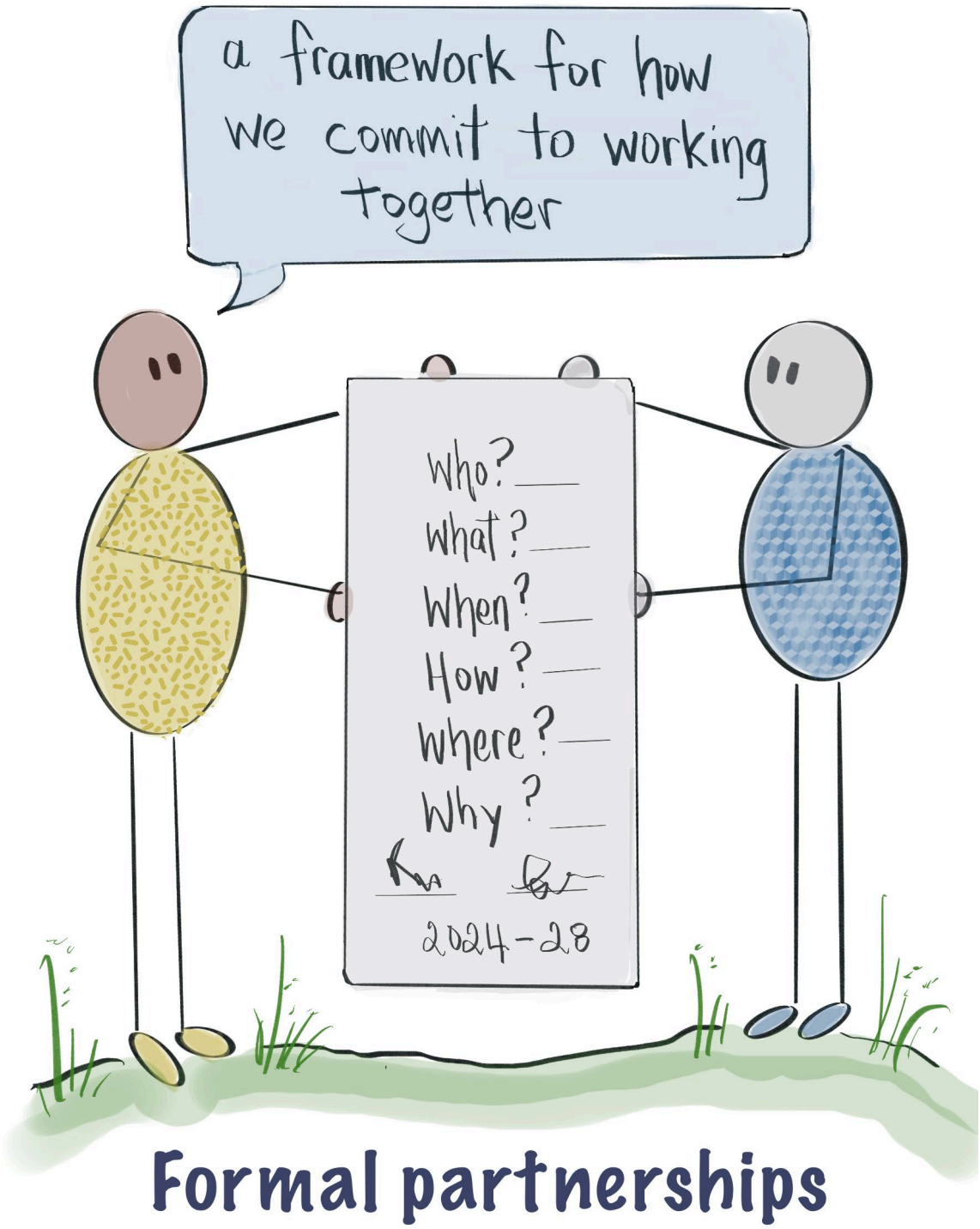

Figure 8 Formal partnerships are the second enabler of successful marine ecological restoration on sea Country by Indigenous groups in Australia. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.3.3 Enabler 3 – Learning & education

Learning and education about methods for caring for Country and coastal marine ecology can help to ensure long-term care and success of a restored site (Figure 9). For instance, training programs which aim to develop capacity and expertise in monitoring and management of stressors or threats can allow for proactive management of a restoration site by those living and working there. Providing the proper training and knowledge of how to care for Country can help build connections to Country and aid in long-term ecological success of a restored site (Hoffman et al., 2022). Education opportunities that help diversify the skills and knowledge of project partners can help create new opportunities in the future. Importantly, formal education opportunities that are tailored to the unique circumstances of communities will have the best chance of success.

'I'd have a rolling course because a lot of our people won't make the blocks or miss blocks because of sorry business or whatever reasons- cultural reasons or whatever. So just having the capacity for people to come when other blocks are on- you know? So, it gives them the best opportunity to complete it.'
Jacob Cassady, Nywaigi Traditional Owner

At Mungalla Station, the Nywaigi People had not been on Country for many decades prior to re-acquiring their land in 1999. Mr Cassady described how many younger people had to learn about caring for Country once funding to be on Country became available.

'CSIRO got funding to hold a workshop and people got to come and camp and we had elders involved and it was out on Country and groups were broken up- elders and young people together. And we had big butchers' paper and went out on country and people got to learn about the issues [redacted for privacy] *…. They got to plant a tree and the sense of community in that was terrific.'*
Jacob Cassady, Nywaigi Traditional Owner

Additionally, training on Country was important for subsequent decision making around adaptive management to new stressors, such as invasive species, droughts and floods. The Gamay Rangers are focussed on generating diverse education opportunities for those who wish to learn more. For example, their partners at a local university set up an ecology 'crash course' for the group who were interested in learning more about western scientific perspectives of the marine habitats. This skill set will hopefully open more avenues for leadership and participation in ecological research and restoration in Gamay.

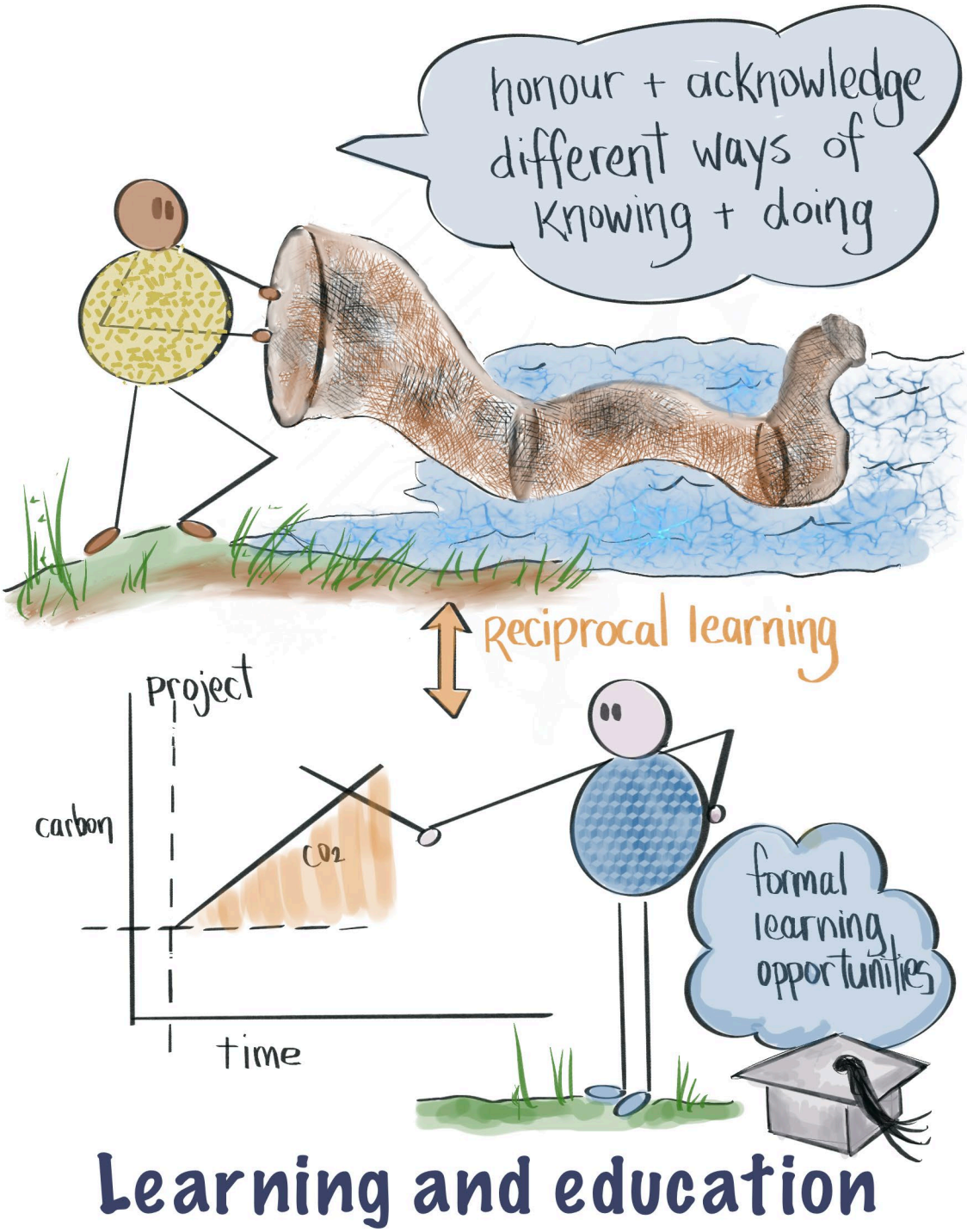

Figure 9 Opportunities for learning and education is the third enabler of successful marine ecological restoration on sea Country by Indigenous groups in Australia. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.3.4 Enabler 4 – Sustained funding

The interviewees stated that continuous funding that will support jobs on Country are needed to sustain livelihoods, connections to Country, and successful restoration (Figure 10) (Hill et al., 2013). Funding is crucial to keeping people, especially young people, connected to Country through employment opportunities. Sustained funding is important for the success of restoration projects – for instance, for the management, maintenance, or adaptive management of restored sites. Sustained funding with long timelines allows for better partnership building as there is confidence that the team will be around for a substantial amount of time.

At Mungalla Station, the need for sustained funding that supports full time jobs is crucial, and this also intersects with how training programs to support training for restoration ecology are developed and provided. The site is located approximately 90 minutes (by car) from the nearest large city, which makes part-time or casual employment difficult if people need to live closer to cities for other work and school. Full-time jobs allow people working on Country to have more security in determining where they need to live for work and school commitments.

'I expected other people to volunteer but you can't.... Because people got to eat, people got to work, and people got to you know? They got bosses to answer to- they got all their things. It's about having respect for everybody you know. And yeah, I think that's important.'
Jacob Cassady, Nywaigi Traditional Owner

Figure 10 Sustained funding is the fourth enabler of successful marine ecological restoration on sea Country by Indigenous groups in Australia. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

3.4 Key Theme - Advice

Key pieces of advice were identified and synthesised from the interviews with the Traditional Owners. The advice in the interviews was aimed at both Traditional Owners interested in restoring their Country, and western scientific groups looking to work with Indigenous communities. The research team then used expert knowledge and literature to generate ideas for steps that decision makers and funders could take to boost Indigenous participation in restoration, as advice for decision makers and funders was not the core theme of the research questions or of the interviews to the Traditional Owners interviewed in this project. Nevertheless, this is important and further research is required to identify most effective ways to design restoration funding programs and processes that are effective for Traditional Owners. The advice for each group is not intended to be comprehensive nor is it a definitive list but is rather a starting point for conversation. Together, the advice section forms stepping stones on a pathway which supports enabling conditions for Indigenous restoration of sea Country (see Figure 1).

The key themes around advice emerging throughout the discussions were empowerment of communities, mutual respect being a foundation to partnerships, and learning together: of each other's goals and priorities. Learning from previous partnerships and engagement enables groups and Traditional Owners to ensure strategies that account for and mitigate potential barriers, and be better prepared to deal with them, and ultimately, achieving positive outcomes for both groups and creating healthy Country for current and future generations. Note that this advice was developed from our interviewees who have conducted restoration activities in partnership with non-Indigenous organisations; Indigenous peoples are not homogenous and the advice or experiences are expected to be different among and even within groups.

3.4.1 Advice 1 - Steps for western scientific groups looking to engage and partner with Traditional Owners

Here we outline steps for western scientists to consider before they embark on engagement with Traditional Owner groups with respect to research or practice of marine and coastal ecological restoration (Figure 11). These suggestions are based off the interviews, as well as the research team's personal experiences. Importantly, there are many theoretical frameworks and methodologies developed to guide Indigenous engagement practices for researchers (e.g. Tropical Water Quality Hub, 2015; Smith, 1999; Woodward et al., 2020) and we refer the reader to these sources for more in-depth information. The AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research is considered best practice regarding research with First Nations people (AIATSIS, 2020a).

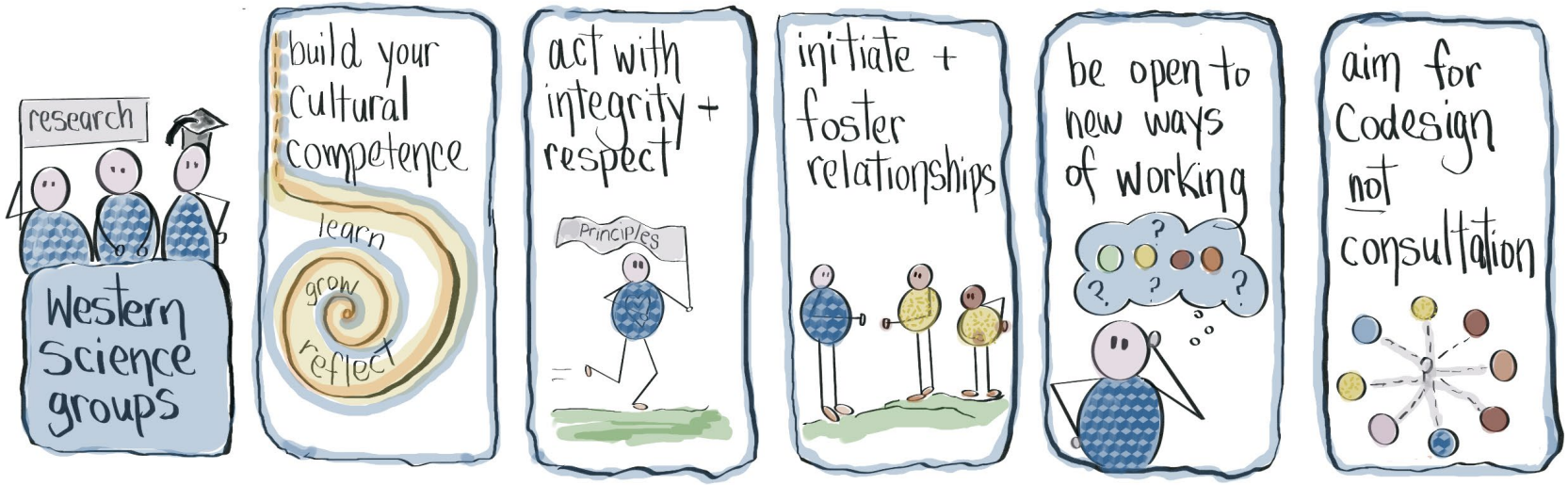

Figure 11 Steps for western scientific groups interested in engaging and partnering with Traditional Owners on marine ecological restoration. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

Build your cultural competence

For many people with western scientific backgrounds it can be daunting to start engaging with Indigenous groups. You might not know where to start, or are worried about making mistakes, or feel uncomfortable about the truth of the injustices of the past. Before you start any engagement - do some homework – e.g., build your cultural competence. This involves developing knowledge and appreciation of Indigenous histories, cultures, and contemporary social dynamics; learning whose Country you are living or working on; recognising that Indigenous communities are diverse; and valuing the knowledges of Indigenous peoples and communities (Hunt, 2013). Accepting that you might feel uncomfortable is an important part of the processes (Hird et al., 2023). When starting any new skill or activity it is important to accept that learning will take time. If you are not sure where to start, start small – as small steps lead to bigger ones.

There are many resources available to build cultural competence. Look at guidelines for Indigenous engagement, such as AIATSIS Cultural Awareness Core Program. Your own organisation might have its own guidelines as well**.** For instance, CSIRO requires all staff to complete an Introduction to Aboriginal and Torres Strait Island Cultural Awareness training, and has a program called "Our Knowledge, Our Way" that is designed to empower Indigenous groups to lead their own management and care of Country.

You can also research information about local groups to ensure you know who to contact and how. For example, reach out to local Land Councils or representative bodies who may know more about the current priorities of a community so that you understand those prior to initiating contact. Importantly, you should not expect Traditional Owner groups to take time to teach you about cultural competence for free. Take care not to swamp Indigenous groups with requests; to mitigate this, identify whether your institution has a team that can facilitate engagement (i.e., knowledge brokers or Indigenous liaison officers).

It is important to recognise that cultural competence is place-specific, and that different groups have experienced different impacts and content with different issues. For example, Gamay is at the meeting place of two cultures, with Sydney at the core of colonialism, and therefore, have faced different issues to more rural areas. One interesting and fun way to gain more place-based cultural competence is to pay for cultural immersion or experiences. For example, the Gujaga Foundation offer cultural experiences in the Sydney area.

Act with Integrity and Respect

A key theme that underpins any type of engagement, relationship building or collaboration is that of acting with integrity and respect (AIATSIS, 2020b; Hunt, 2013). Engagement that is tokenistic or done as a 'box-ticking' exercise is not likely to be met with enthusiasm, will lead to mistrust, and is unlikely to lead to productive outcomes. Acting with integrity and respect helps to ensure that when you make mistakes you can learn from them and still move forward.

Initiate and foster relationships

Initiating relationships and fostering partnerships with integrity can signify your respect for Indigenous groups. The interviewees in this project reported that having western scientific groups reach out to their team(s) for engagement demonstrated a sign of respect when done appropriately.

'Most of the time communities will find that a mark of respect if you reach out and make the first move, I think it's important, particularly if you plan to do work in those areas... reach out to them, do a bit of groundwork who the community are and I'm sure there's information out there in the land councils of what's important to them.'
Robert Cooley, Dharawal Traditional Owner

Engagement and relationship building that is done with integrity requires time. Taking small steps, listening with patience and acting with care should underpin any interaction of an organisation or individual, but especially when seeking to partner with Traditional Owner groups. Relationships should be fostered as early as possible, given that active Indigenous participation at early stages of problem formulation, implementation and evaluation is a cornerstone of Indigenous engagement in research (Hunt, 2013).

Be open to new ways of working

To successfully engage with Indigenous groups in an authentic, respectful way requires being open to new ways of working. Plan to pay people for their time, skills and experience. Engaging in the activity means that they are not working on other paid employment. Proper remuneration and sustained funding that provides jobs and supports livelihoods are key to enabling Indigenous participation in projects (Hunt, 2013). Ultimately, Indigenous leadership in ecological restoration projects will allow for true ownership of the project that arises from strong connections to Country.

Respect and accept longer timelines. Time and timing are important components of respectful partnerships. Western scientific groups need to understand that Indigenous groups will have different protocols or ways of working, including consulting with community and prioritising community needs (Nursey-Bray et al., 2009), which may align differently to funding cycles and project milestones. These protocols go beyond politeness or rules, they are deeply engrained in cultural practices and reflect the very essence of many Indigenous cultures (Whyte et al., 2016). Therefore, having patience for different ways of working and building flexibility into project timelines, for communities to engage if or when they are able, is key.

Understand that Indigenous communities are not homogenous. Different people in each group will have different views and perspectives, which may lead to complex dynamics in the community. It is important to allow community groups the space and time to resolve these issues (Kassam, 2008; Walter, 2008).

Aim for co-design, not consultation

Valuing multiple ways of knowing is a cornerstone of all successful Indigenous partnerships with western scientific organisations (Bartlett et al., 2012; Dickson-Hoyle et al., 2022; Hird et al., 2023). Truly listening to communities' priorities and interests instead of assuming they are the same as your organisation's will allow for honest co-design.

'I use the analogy of having a walk, don't lead me. I don't want to be led. Don't follow me, I don't want to be followed. The problem's here, walk beside me.'
Jacob Cassady, Nywaigi Traditional Owner

Knowledge sharing and open communication should be sustained throughout any project to ensure that all parties can make decisions together. There is a wealth of information on co-design available to which we refer the reader for further information. Importantly, communities may decline to be involved in a particular project; respect this decision. The longevity of a project will be heavily dependent upon whether it aligns with the community's vision for their Country.

'It's got to be led by Indigenous people. It's got to be their vision, their dreaming, their projects – how can you help us get this done?'
Jacob Cassady, Nywaigi Traditional Owner

3.4.2 Advice 2 - Steps for Traditional Owners looking to increase participation in marine and coastal restoration

Much of the literature regarding engagement and partnership in marine and coastal restoration is targeted towards researchers who are interested in engaging with Traditional Owners. As such, there is limited literature which represents knowledge sharing from Traditional Owners towards other Indigenous groups interested in forming partnerships to conduct marine and coastal restoration on sea Country. Communities looking to conduct ecological restoration on Country may lack the necessary means to do so without engaging or forming partnerships with outside organisations (Jackson, M et al., 2019). Additionally, the varying levels of legal ownership over Country, the history of different communities, the location, accessibility, language barriers and various other factors may be preventing communities from being able to form partnerships (Buergelt, P et al., 2017, Carter, J 2010). Enabling a pathway of knowledge sharing is integral to long-term restoration, as Indigenous-led restoration has previously been shown to increase the speed of restoration, improve biodiversity, and sustain long term commitment to projects (Figure 12) (Grenz and Armstrong, 2023).

The benefits to Indigenous communities managing their own Country are well documented, including improved health and wellbeing outcomes, cultural connection, bolstering the community's local economy, enabling self-empowerment, and most obvious – improving the health of the environment (AIATSIS, 2020b; Fatima et al., 2022). Many of these benefits have been identified and discussed through the interviews with Traditional Owners who are engaged in partnerships to restore their own Country in the two case studies of this report. This section of the report aims to highlight the key pieces of advice shared by the Traditional Owners in these case studies for other Traditional Owners seeking to restore Country.

Figure 12 Steps for Traditional Owners looking to engage in marine ecological restoration on sea Country. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

Identify and learn about ecological challenges on Country

Robert Cooley from the Gamay Rangers discussed the importance of learning about the issues that Country faces. In Gamay (Botany Bay) losses of seagrasses had occurred over many years which then affected the abundance of culturally significant fisheries species. Through these observations the Gamay Rangers recognised that partnerships with local scientific organisations with western scientific expertise in marine ecology could be useful to the ranger group in identifying causes of seagrass decline and potential restoration solutions to restore culturally significant species.

'Also expanding our partnerships which have gone to other areas like Sydney SeaLife and SIMS [Sydney Institute of Marine Science] *which run that project, again opening our eyes up to different partners who do different things, but all are in that marine space. Now we've expanded even further...'*
Robert Cooley, Dharawal Traditional Owner

Agree on shared community vision and priorities

Considering the experiences held by the Traditional Owners within their own Country, offering advice to other Traditional Owners interested in pursuing restoration is beneficial to the future of healthy Country. Nywaigi Traditional Owner, Jacob Cassady of Mungalla Station, offered advice to other Traditional Owners centred around the integral importance of self-empowerment: knowing your vision and what you want for your own community and Country.

'Having a strategy and having a vision – having your own vision of Country.'
Jacob Cassady, Nywaigi Traditional Owner

Be curious and open to new ways of working

A further key piece of advice provided through the interviews was for Indigenous communities looking to engage with restoration practices is to have a curious and open attitude. Learning from other knowledge systems will benefit all parties looking to engage in new partnerships. This openness will start the process of relationship building and form the foundation of a partnership that is centred on trust.

'It's the relationships, right?'
Bryce Liddell, Dharawal Traditional Owner

'100% relationship building, it's critical.'
Jacob Cassady, Nywaigi Traditional Owner

Identify and reach out to partners with shared values

Gamay Ranger, Robert Cooley, discussed the importance of reaching out to other groups who work within the space, such as local universities. Learning about their processes and working with them turned out to be a positive step towards restoring Country, and the same may be true for other Traditional Owners and organisations. Importantly, seek to understand the limitations your potential

partners may face. For instance, they may also have shortages of capability or funding, or limitations on strategic direction.

'Reach out to anyone you know, any contacts you know that have been working in those areas and find out a little bit more about the work they're doing and find ways to actively participate in the work they're doing.'
Robert Cooley, Dharawal Traditional Owner

Foster current and future capability

Identifying what capabilities are needed within your own community (training, skills, incentives, funding, transport) to achieve the communities' restoration goals is integral to accomplishing restoration now and in the future. Planning for succession enables the future Indigenous leaders of the community to learn and grow in areas which foster self-empowerment and future employment opportunities. Ensuring that any plans and strategies to restore Country will be sustainable and long-term was also identified as a key piece of advice for other Traditional Owners. Achieving long-term momentum was enabled through having more than one individual driving the restoration and sharing the drive for restoration with the younger generation. Empowering young people to want to restore their own Country and having them continually involved with local projects was heavily discussed and highlighted the need for youth involvement to move towards overcoming the current challenges and barriers faced by the current leaders within the community.

'We want to have a better platform for our kids, not facing the same problems that we have today... involvement of young people and succession building.'
Jacob Cassady, Nywaigi Traditional Owner

3.4.3 Advice 3 - Steps for Decision Makers and Funders

Decision makers and funders have an important role in increasing the feasibility of ecological restoration on sea Country for Indigenous groups. In-depth analysis of the steps that this group can take will depend on the spatial scale of the jurisdiction and objectives of the program and is beyond the scope of the present work, as it was not addressed explicitly in the interviews. However, here we offer some suggestions of advice (stepping stones in the pathway) based off the literature and the authors' experience (Figure 13).

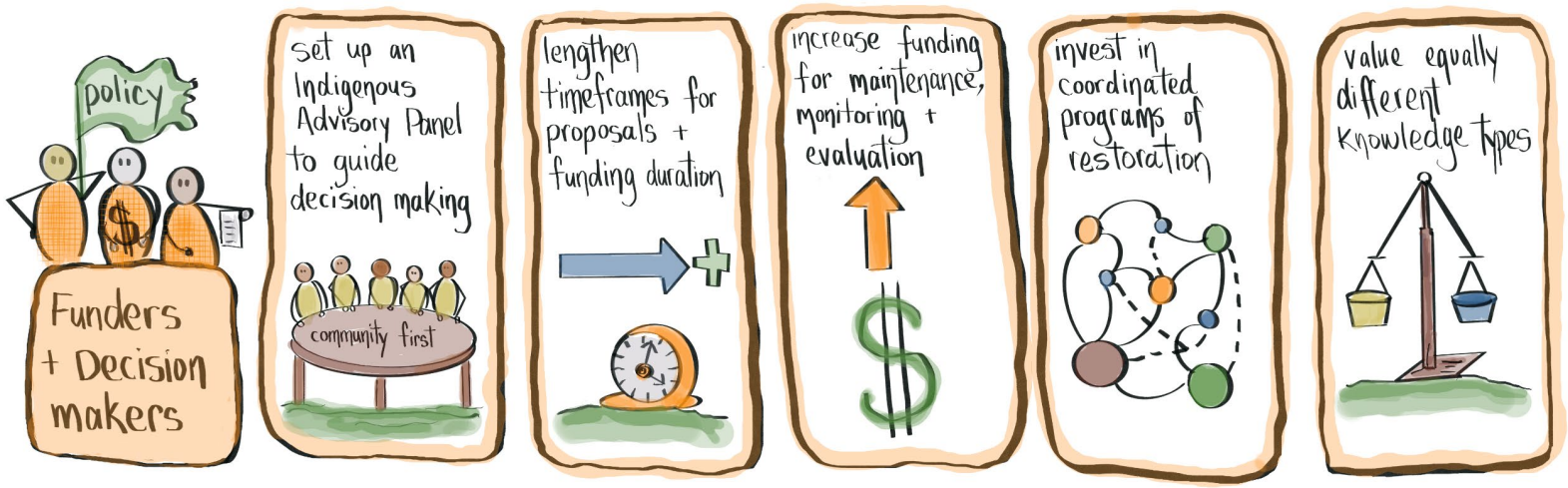

Figure 13 Steps for decision makers and funders to support Indigenous restoration on sea Country. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

Set up an Indigenous advisory panel to help guide decision making for ecological restoration

Having an Indigenous advisory panel linked to funding will help to keep Indigenous priorities at the forefront. In particular, this should be linked to coordinated programs of investment into restoration and include one or more key contact people who can help connect researchers and practitioners to relevant Indigenous groups. We advocate for this, in particular, for large programs of coordinated investment (Saunders et al., 2022). Coordinated programs of investment can adopt portfolio approaches, whereby some, but not necessarily all, projects have strong Indigenous participation. Our experience is that many Indigenous groups are currently very stretched with many requests and insufficient resources; therefore, programs which insist that *all* projects have Indigenous involvement may have perverse outcomes if not managed appropriately around the barriers and enablers. For instance, 'box-ticking' to get Indigenous participation, instead of the genuine engagement and partnerships as articulated previously. The exact structure and location of advisory panel(s) will depend on the spatial scale and jurisdiction of the program. As we scale up ecological restoration, then an advisory panel(s) that sits at the state or national level would be advisable.

Lengthen the timelines for both submission of proposals and the duration of funding

Short funding timelines preclude meaningful involvement of Indigenous people in many instances. It takes time to foster relationships. Indigenous ways of working operate differently to western ways of working and may involve long periods of consultation with community. In the western scientific context, funding proposals may take long periods for assessment and decisions but then require a quick start and short delivery times. In western science, once funding outcomes have been announced it is generally expected that the restoration or research activities will start very soon after. However, final funding outcomes may also require consultation with communities and therefore, should allow some flexibility for proper engagement. Seed funding to support relationship building could help in this regard. Additionally, the human research ethics approval procedures which are required when working with Indigenous partners and participants are often lengthy processes which take time. Working with Indigenous groups necessitates Free Prior Informed Consent (FPIC) which, rightfully, takes time. In Australia there are expectations to contribute to the implementation of UNDRIP through the Closing the Gap targets; developing funding programs which enable Traditional Owners to access funding acts as a step in this regard. This point refers to the Roadmap to Restoration (Saunders et al., 2022) (developed through NESP Marine and Coastal Project 1.6) Principle 3 *No Gap Funding,* to allow the duration of funding to account for delays.

Increase the proportional amount of funding for maintenance, monitoring and evaluation

Indigenous groups are, in many places, uniquely positioned to conduct ongoing monitoring, maintenance and evaluation of restoration activities due to their strong place-based ties to Country and alignment of required expertise and personnel with ranger programs. Monitoring is essential to the success of restoration projects (Saunders et al., 2020) and as such, recognised as Principle 6 in the Roadmap to Restoration *Robust monitoring, maintenance, and evaluation* (Saunders et al., 2022). However, funding is usually insufficient to fund robust monitoring and evaluation requirement

(Saunders et al., 2022). Increasing the proportional amount of funding allocated to monitoring and investing it into Land and Sea Ranger programs will enhance ecological outcomes, provide jobs and livelihoods for Indigenous communities.

Invest in coordinated programs of restoration

Coordinated programs of restoration will help to mitigate issues around funding and timelines, as well as other issues preventing Indigenous communities from participating in restoration. Coordination is required for restoration programs more broadly, as identified in Roadmap to Restoration Principle 6 *Restoration is coordinated and at scale* (Saunders et al., 2022). In the context of Indigenous participation, coordinated programs will have specific people responsible for engaging with Indigenous groups; this helps to foster strong relationships, develop partnerships, avoid 'box-ticking' approaches, and reduce contact fatigue.

Value equally different types of knowledge

Western scientific ontologies are entrenched in colonial histories and typically hold western science as more 'true' than Indigenous knowledge. Moving forward there is a need to not just incorporate, but to recognise and add to the value of Indigenous worldviews (Grenz, 2020; Hird et al., 2023; Maclean and Cullen, 2009). Building cultural competence in the teams that are making decisions about restoration actions and funding is a step towards this end point. The UNDRIP General Assembly recognises *that respect for Indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment.*

4 The value proposition for following the pathway to Indigenous participation in marine and coastal restoration

Following the stepping stones (Figure 11, Figure 12, Figure 13) to overcome barriers (Figure 3, Figure 4, Figure 5, Figure 6), creating the enabling conditions (Figure 7, Figure 8, Figure 9, Figure 10) for successful Indigenous participation in restoration on sea Country will allow us to walk a pathway to shared ecological and societal outcomes (Figure 14, Figure 1).

For Indigenous communities, ecological restoration activities offer potential economic opportunities including: jobs in the restoration industry; the potential for enhanced tourism values; and the potential for payments for ecosystem services (PES) schemes, such as Blue Carbon or Biodiversity credits in the emerging Nature Repair Market. PES have been used elsewhere internationally to support local community infrastructure, such as funding for hospitals and schools (Saunders et al., 2020). With the ability for Indigenous communities to manage the environment and be able to be part of the economy, ecological restoration opportunities address some disadvantages and provides avenues for self-determination and sovereignty over Country and self.

A very clear outcome of the restoration projects conducted by the Nywaigi and Gamay Rangers was spiritual and cultural benefits. Jacob Cassady, a Nywaigi Traditional Owner at Mungalla station,

identified the strong feeling of Connection to Country that conducting wetland restoration brought to his community.

'You get a better understanding of country. Connection- we have that. That's our blood, country.'
Jacob Cassady, Nywaigi Traditional Owner

Expanding a marine ecological restoration economy with Indigenous communities offers potential to contribute towards several "Closing the Gap" targets, for instance, "Students reach their full potential through further education pathways," "Strong economic participation and development of people and their communities," and "People maintain a distinctive cultural, spiritual, physical and economic relationship with their land and waters" (Australian Government, N.D.).

For the broader society in Australia, enhancing the ability of Indigenous groups to conduct restoration on sea Country will provide benefits. Enhancing the ability of Indigenous groups to conduct ecological restoration will ultimately increase our capacity as a nation to restore and protect the valuable marine estate. Australia's marine environment contributes billions of dollars per year to the economy (Bennett et al., 2015; Economics, 2017), yet is faced with ongoing and increasingly severe threats from human activities (Babcock et al., 2019). We will need to have an 'all hands-on deck' approach to mitigate and repair the damage to marine and coastal ecosystems, which in turn will deliver ecosystem services, enhance biodiversity, and support climate change mitigation and adaptation.

Figure 14 Potential outcomes of Indigenous restoration on sea Country. The graphic is intended to be a conversation starter and was created using an arts-based method by a graphic facilitator in partnership with the research team with the aims of synthesizing and visualizing complex information. Image: Fiona Malcolm, Purpose Partners.

Recommendations

Effective marine and coastal restoration projects typically need to include strong partnerships and multiple perspectives to achieve landscape scale ecological restoration. Without commitment and positive action by non-Indigenous restoration researchers and practitioners, systemic barriers to participation in marine and coastal restoration will continue to impact Indigenous Peoples, communities, and the environment. Below are some key actions that can be taken to achieve this:

1. **Take concrete actions to achieve the steps in the *Proposed Pathways to Indigenous Participation in Marine and Coastal Ecological Restoration:***

    - Create spaces for transdisciplinary collaboration by creating opportunities for groups or individuals to participate, contribute, lead and have their voices heard.
    - Verify project staff have completed cultural competency training i.e., AIATSIS *Core Cultural Learning* or place-based cultural courses.
    - Implement appropriate project timeframes that fits with Indigenous engagement processes.
    - Support Indigenous-led projects by providing expertise, offering guidance, mentorship, resources, connections to networks and encouragement.

2. **Invest in programs to boost reciprocal knowledge sharing:**

    - Fund and support research that unpacks past, present and future restoration funding sources to understand limitations to Indigenous group not partnered with a university, research organisation or non-government organisation (NGO).
    - Allocate funding within project budgets to support Indigenous collaborators and leaders to participate in the research and practice systems beyond on ground restoration activities (i.e., conferences, courses).
    - When planning conferences and symposia create opportunities to include Indigenous presenters in the program.

3. **Ensure that Indigenous values are embedded in restoration schemes (i.e., Reef Trust and Nature Repair Market):**

    - Use theoretical frameworks or methodologies that enable Indigenous values, perspectives and voices to be embedded i.e., *7 Pearls of Wisdom* (McLeod et al., 2018).
    - Establish culturally safe working teams which value and respect alternate worldviews to enable Indigenous values to be included from the outset.
    - Engage an Indigenous advisory committee for large programs and projects.

4. **Engage in research designed to support effective partnerships:**

- Screen research partners, funders and collaborators to ensure they are equipped to work effectively in transdisciplinary teams i.e., they have completed cultural competency courses; they have relevant experience and flexibility and willingness to adapt to different ways of working.
- Develop transparent communication strategies between partners to build on trust and respect through all stages of the research project.
- Enable multiple worldviews and perspectives to fit into project design, implementation and reporting stages including consideration of translation of research outcomes into other languages.

5 Conclusion

Despite several barriers that inhibit Traditional Owners to participate in restoration activities of sea Country, there are integral pathway elements that have emerged that are fundamental to enabling communities to progress their aspirations. Whilst there are numerous differences among Traditional Owner groups and their respective ownership over Country, there are choices that non-Indigenous practitioners and researchers can take to ensure cultural integrity around restoration and empower Indigenous-led efforts to heal Country. Identifying the advantages of different actors coming together in the restoration space and building partnerships that are goal-oriented, can actively change the success rate of co-led restoration projects of marine and coastal habitats in Australia.

We acknowledge that there are existing challenges that are systemic and are much harder to overcome, however, there are opportunities for empowerment that will lessen the impacts of structural barriers for Traditional Owners. Funding is a considerable limitation for all actors in restoration (and on-going maintenance of Country) and acknowledging that both western science and Indigenous groups need to be funded to participate is a starting point for developing proposals together. Engagement/consultation fatigue has had a considerable impact on the delivery of this project, with many Traditional Owners inundated and overwhelmed with interest from many directions.

Focussing on two-way knowledge sharing and co-design methods to move towards the successful repair of Country is greatly improved with the long-term inclusion of Traditional Owners of Country, who are invested in the success of seeing Country thrive. By educating practitioners and researchers into the available guidelines, principles and protocols for engaging and working with Indigenous Peoples, we expect to see genuine and culturally sensitive collaborations and partnerships in the future. At the centre of all of this are the actions and commitments towards successful restoration of marine and coastal habitats at scale, which are a pathway for Indigenous peoples to Care for Country.

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Appendix A Participant Information sheet and consent form

Participant Information Sheet & Consent Form

Project Title: Identifying and overcoming barriers to coastal and marine habitat restoration and Nature Based Solutions (sub-program Indigenous Barriers)

Researchers: Dr Nathan Waltham, Dr Megan Saunders, Dr Rebecca Morris and project team

Organisations: CSIRO, JCU, Uni of Melb

What is the project about?

This project builds on a previous NESP Marine and Coastal Project (1.6) to gain a deeper understanding of the barriers to marine and coastal restoration across Australia. This sub-program within the project is looking to develop case studies around the barriers Indigenous communities face when wanting to engage in restoration projects on Sea Country.

Who is involved in the project?

This project is being conducted by Dr Megan Saunders and Mibu Fischer who work for CSIRO as part of a larger project led by Drs Nathan Waltham (JCU), Rebecca Morris (Uni Melb) and Megan Saunders, funded by the National Environment Science Program Marine and Coastal (MAC) Hub.

Why have I been invited to participate?

You have been invited to participate because of your expertise and knowledge in marine/coastal restoration practices as a Traditional Owner. We understand there are many barriers to restoration in marine and coastal habitats for numerous communities and we would like to understand the barriers you have faced or the processes you have taken to work around them to achieve restoration in your Sea Country. Developing an in-depth case study of your processes with us will enable you to share that experience with other Traditional Owner groups and contribute to their capacity to start restoration in their Sea Country. Identifying barriers to restoration that are directly impacting you will feed into the wider project looking at how we can overcome current barriers to restoration and support the up-scaling of marine and coastal restoration projects in Australia. Desired outcomes of the project include the identification of pathways towards Indigenous participation in restoration, development of fit-for purse policy and legislation necessary to allow large scale restoration, and collaboration with the Engineering sector to facilitate implementation of Nature-based Solutions to coastal protection in coastal and marine ecosystems.

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What are the potential risks?

The potential risks in participating could be inconveniences in engaging with the researchers initially and choosing not to participate in the project. Or discomfort in the initial stages of an interview. There is also a potential risk of distress to a participant in talking about barriers to working on Country. All these risks are considered low, seldom and minor risks for this research project. If participants experience any distress, they will be provided with contacts for mental health services such as 13YARN (13 92 76).

How will my data be stored?

During the project, your data will be securely stored as per CSIRO's Recordkeeping Procedure including on password-protected computers.

Culturally restricted information

This project is focusing on the barriers to marine and coastal restoration led by Traditional Owners, it is not anticipated that we will be asking about culturally restricted information. However, if that information is collected all information will be subject to Indigenous Cultural and Intellectual Property Principles as well as Privacy Principles.

Will I be compensated for my time?

Yes, you will be compensated for your time participating in this research. Please see the compensation information sheet provided to you by the research team for more information.

How will my privacy be protected?

Your personal information is protected by the *Privacy Act 1988* (Cth) (Privacy Act). CSIRO will handle your information in accordance with this Act and the National Health & Medical Research Council (NH&MRC) National Statement on Ethical Conduct in Human Research (2007, updated 2018), or as otherwise required by law.

Your personal information, including your email address, name, and bank information for payment, is being collected for the purposes of conducting the Identifying and overcoming barriers to coastal and marine habitat restoration and Nature Based Solutions (sub-program Indigenous Barriers) project, and related scientific research.

With your consent, CSIRO may also collect your sensitive information, such as your image, for the purposes outlined above, including media promotion of the project.

CSIRO may disclose your personal information to third parties including transcription services *and by virtue of your participation, other participants in the focus group/interview/symposium, etc* for the purposes outlined above.

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You can pull out at any time and it will not change your relationship with the researchers or anyone else. You will need to advise the researchers of your wishes 31st October 2023.

What will researchers do and when?

The research team will contact you to organise a suitable time to conduct an in-depth interview with your and/or your team to understand the barriers you faced in your restoration practices. The interview will be recorded via WebEx if the interview takes place online, or via an audio recorder or phone recording if the interview occurs in person for notetaking and communications purposes. After the interview is conducted the researchers will develop a case study draft of your experience and will share that draft with you for input. The researchers will also determine at this stage how you would like to be named as an author or contributor of the case study or if there is an alternate appropriate citation i.e., the name of the corporation/organisation you represent.

The research is expected to occur around May – August 2023 at various locations nationally. It will require the following time commitments from you:

- 60-min initial interview with researchers
- Time to edit the case study with researchers
- Any additional short follow-up interviews to assist with the completion of the case study
- Assist researchers in mapping pathways for restoration projects

Your time participating in this project will be renumerated. The research team will advise you of the CSIRO procedure, available in the supplied compensation information sheet.

What will happen to my information?

Your information will be used to create a case study specific to your work on marine/coastal restoration projects in Sea Country. The case study may feature in reports, scientific articles, data repositories (e-Atlas, Australian Ocean Data Network), educational material (including newsletters, and social media posts), and future projects that are linked.

Any information that is obtained in connection with this research will remain confidential unless otherwise permitted by you, or as required by law. The procedures for ensuring the confidentiality of your information during collection and later publication of results will be in accordance with CSIRO Privacy Policy.

You/your community/organisation will retain Intellectual Property from your interview recordings and will be offered authorship on the case study relating to your contributions to the research.

The researchers will provide you with a copy of the final case study, report, journal articles and any subsequent outputs produced using your information.

Your personal details including your [insert information that will be included e.g. name and organisation name] will only be published with your explicit consent.

For further information on how CSIRO handles your personal information and our access, correction and complaints process please read our privacy policy available on our website or by contacting us at privacy@csiro.au.

For information about how our transcription services generally handle personal information, please refer to their general privacy policies available at:

We have not selected a transcription service as yet.

Contact

If you have any questions about this project or would like more information about our research, please contact:
Dr Megan Saunders
megan.saunders@csiro.au
+61 7 3214 2228

Complaints

If you have any questions concerning your participation in the study, I know that I can complain to:

- Dr Megan Saunders using the above information
- The Executive Manager of Social Responsibility and Ethics at CSIRO on +61 7 3833 5693 or by email at csshrec@csiro.au

Ethics Committee Clearance

This study has been approved by CSIRO's Social Science Human Research Ethics Committee (approval number **204/22**) in accordance with the National Statement on Ethical Conduct in Human Research 2007 (Updated 2018).

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Appendix B Informed consent form

Informed Consent Form

Dear Participant,

Please review the information below and sign if you agree to participate in this research project.

Project Title: Identifying and overcoming barriers to coastal and marine habitat restoration and Nature Based Solutions (sub-program Indigenous Barriers)

Researchers: Dr Nathan Waltham, Dr Megan Saunders, Dr Rebecca Morris, Mibu Fischer

Organisations: CSIRO, JCU, Uni of Melb

Ethics Approval: 204/22 through CSIRO Human Research Ethics Committee

Funder: National Environmental Science Program 2.0, Marine and Coastal Hub

I _____ acknowledge the following:

	Yes	No
I have read the **participant information sheet** and understand what this project is about	☐	☐
I have agreed to participate in the above project **conducted by CSIRO**	☐	☐
I understand my participation in the project is **voluntary**	☐	☐
I grant permission for my contribution to be included in **project outputs**	☐	☐
I understand that my participation in the research project involves **in-depth interviews to develop a case study**	☐	☐
I understand that I can negotiate my participation and am **free to withdraw** at any time without being compelled to stay up.	☐	☐
I understand that I may also ask for all or part of the information I provide to be removed from the study **up until the publication/distribution of final outputs** without penalty or explanation.	☐	☐
I understand **what will happen** to me during this research project as explained to me.	☐	☐
I agree that the researcher can **interview me and contact me** for the research.	☐	☐

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I understand that as part of the project I am being **recorded audibly and visually** for note-taking purposes.	☐	☐
I agree to my image and voice being taken and for the research project **to use my image and voice** in communications about the project.	☐	☐
I have been provided with information about the project and had any questions regarding my participation and **associated risks and benefits** answered to my satisfaction.	☐	☐
I understand and agree to the **collection, use and disclosure** of my personal information (e.g., name), including sensitive information (e.g., identifying the name of their Traditional Owner group), in the ways described in the Participant Information Sheet	☐	☐
I understand that the **information I provide** for this research project will be used for the **following purposes**: • Reports, scientific papers and conference presentations • Future projects related to this one • Future project proposals related to coastal and marine landscape-scale restoration and Nature-based Solutions • Case Study highlighting the work I/we are doing on Country • Educational materials	☐	☐
I understand that my information will be treated **confidentially**, and I will not be identified in any written publications resulting from the study unless I give my consent. Information provided by me will be **stored securely** by CSIRO.	☐	☐
I have been provided with the **contact details** of the researcher and understand that I can contact them at any point during the study. I have also been provided with the contact details of an independent ethics officer at CSIRO should I wish to raise any concerns or complaints about the conduct of the research.	☐	☐
I understand the **compensation details** that are attached to participating in the project.	☐	☐
I understand how **copyright** will work in relation to the information I share as part of this research project.		

Name: Signature

Date:

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Appendix C Interview schedule

Interview Schedule for NESP Project 3.7

Community Name – Research Interview for NESP Project 3.7		
Participant name		
Interviewer		
Date & Location (of interview)		
Country/Location (of restoration work)		
Has the participant read and understood the Participant Information Sheet, Participant Consent Form, Media Release Form and Remuneration details?		
Has the participant signed the above forms?		
Before you commence the interview ensure the participants are comfortable (e.g., they aren't too hot or cold, the chair is comfortable, the sun is not in their eyes), they have water to sip on, and they have signed the consent forms. **Explain that you will recording the interview using audio (preferred) and potentially followig up with a video for communications purposes**		
Main Questions	**Follow on questions/prompts**	**Extra information about what the question relates to (anticipating questions about the question)**
Have you done a coastal and/or marine restoration project?		
A What type of restoration has (*insert community name*) been involved in?	What habitats? What techniques were used?	
A What is the name and location of the project?		

A What was your involvement in the restoration project?	Was this a partnership? Did you sign a formal agreement? What control did you have over the restoration details (e.g., methods, locations)	
A How did *(insert community name)* involvement in marine and coastal restoration come about?		
A What was the motivation of *(insert community name)* in participating or leading the restoration work on Country?		
A What challenges and/or barriers did you experience?	What did you do to overcome these challenges if you were able to?	
A What did you do to overcome these challenges if you were able to?		
A How has this project contributed to connecting with country?		
A What was the legal or permitting pathway (if you undertook that) to the restoration project?		
A What agreements or formal partnerships were developed with non-Indigenous groups when working on restoration?		
A What were the specific benefits of doing the restoration project?		Benefits could be to the Indigenous community, wider community, individuals, environment culture and economy

A How do you think that Indigenous involvement in restoration benefits the outcomes of the project?		
B What would make it easier for you and other Traditional Owners to participate, co-design or lead restoration in Sea Country moving forward?		Could be realistic, could also be pie-in-the-sky type solutions.
B What would you like other Traditional Owners to know if they are thinking about embarking on the restoration of Sea Country?		
B What would you like non-Indigenous groups to know about engaging with *(insert community name)* on Sea Country restoration?		
Close of the interview by thanking them for their time and turn off audio or video equipment.		
Participant has received VISA gift card ($100.00 - for one hour) for participating in the initial interview process (please get them to sign and date that they have collected)		

Marine and Coastal

National Environmental Science Program

CONTACT

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https://research.csiro.au/marine-restoration-nbs/

This project is supported with funding from the Australian Government under the National Environmental Science Program.