Received: 3 August 2023 | Revised: 22 October 2023 | Accepted: 27 October 2023

DOI: 10.1111/csp2.13050

CONTRIBUTED PAPER

Conservation Science and Practice
A journal of the Society for Conservation Biology
Open Access

WILEY

The permitting process for marine and coastal restoration: A barrier to achieving global restoration targets?

Justine Bell-James[1] | **Rose Foster**[1,2] | **Nicole Shumway**[2]

[1]TC Beirne School of Law, The University of Queensland, Saint Lucia, Queensland, Australia

[2]Centre for Policy Futures, The University of Queensland, Saint Lucia, Queensland, Australia

Correspondence
Justine Bell-James, TC Beirne School of Law, W407 Forgan Smith Building, St Lucia, 4072, The University of Queensland, Saint Lucia, QLD, Australia.
Email: j.bell-james@law.uq.edu.au

Funding information
National Environmental Science Program, Grant/Award Number: Marine and Coastal Hub Project 3.7

Abstract

To meet global restoration targets, action is needed at a large scale, and at a high level of ambition. Coastal and marine restoration may be hindered by an array of factors, including governance: in particular, the cost and time associated with obtaining permits. We interviewed a small group of restoration practitioners in Australia to further explore this permitting issue. Our study revealed a deeper problem, with the legal permitting process driving outcomes. Some proponents are turning away from the sites with the highest restoration potential, and instead choosing sites based on the ease of obtaining permits. We also found that the permitting process is only one part of the problem, and progress is also being hampered by onerous post-approval conditions, including ongoing liability for restorative interventions. Finally, the permitting process stifles innovation and creativity as outcomes are locked-in at the permit stage. We conclude by highlighting the urgent need to reform legal permitting processes for restoration, as current practice may put the achievement of global restoration targets at risk. It is anticipated that these findings will be of interest to restoration practitioners navigating this space, as well as policymakers.

KEYWORDS

coastal, governance, law, marine, permits, policy, restoration

1 | INTRODUCTION

Healthy and well-functioning coastal and marine ecosystems are critical to humanity. These coastal landscapes are comprised of coastal wetlands and vegetation, oyster reefs, and seagrass, which together provide essential ecosystem services (Vozzo et al., 2023). More than three billion people across the globe rely on fish for nutrition, sustenance and livelihoods, with coastal ecosystems providing the essential nursery habitat for these fish (Vianna et al., 2020). These ecosystems play a key role in protecting coasts from wave energy (Mangi et al., 2011), stabilizing sediment (Valdez et al., 2020), sequestering carbon (Duarte et al., 2005; McLeod et al., 2011), improving water quality (Grabowski & Peterson, 2007), and providing habitat for migratory species (Barbier et al., 2011). Coastal ecosystems are also culturally significant to many societies and groups (Clarke et al., 2021; Friess et al., 2019).

The continued delivery of these ecosystem services is at risk, however, due to a legacy of loss and degradation (Evans et al., 2018; Friess et al., 2019; Li et al., 2018; Unsworth et al., 2019), giving rise to an urgent need for restoration (Lee et al., 2019; Waltham et al., 2020). The

demand for ambitious global restoration is reflected in the UN Decade on Ecosystem Restoration 2021–2030, which has the aim of preventing, halting and reversing the degradation of ecosystems worldwide (United Nations, 2019). The recent Convention on Biological Diversity's Kunming-Montreal Global Biodiversity Framework has set the bar even higher, with a target of "ensur[ing] that by 2030 at least 30 percent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity" (Convention on Biological Diversity, 2022).

Restoration in the coastal and marine space is no easy task, and is complicated by factors such as cost (Bayraktarov et al., 2016), and governance factors including land tenure (Bell-James, Fitzsimons, & Lovelock, 2023; Bell-James, Foster, & Lovelock, 2023), and legal permitting processes (Saunders et al., 2022; Shumway et al., 2021; Stewart-Sinclair et al., 2020). We use the term "permitting processes" in this context to refer to the need to seek regulatory permits and approvals from government agencies prior to undertaking restoration. While permitting processes have been identified as a hurdle to restoration progress in previous studies internationally, including in Australia (Bell-James, Fitzsimons, & Lovelock, 2023; Bell-James, Foster, & Lovelock, 2023; Saunders et al., 2022), the United States (Craton, 2022), South-East Asia (Razak et al., 2022), and Europe (Cortina-Segarra et al., 2021), none have clearly articulated specific permit challenges and their implications from a practitioner perspective.

Therefore, our aim was to interrogate this issue further to understand precisely why and how the legal permitting system is restricting restoration outcomes. Using Australia as a case study, we interviewed a small cohort of restoration practitioners to capture in granular detail their experiences with permitting processes, and what barriers to restoration exist within these processes. Given that permitting requirements are inherently jurisdiction-specific, the focus of our study is Australia. However, these problems are certainly not unique to Australia and many of the issues identified will likely be of international relevance.

We found that while the complexity, time and expense of permitting processes is problematic, this was merely the tip of the iceberg, and more pervasive issues were identified, including site selection and post-approval liability. Our study found that project sites are often being selected based on ease of permitting processes rather than on their biophysical restoration potential. In turn, restoration projects that could be critical for the conservation of species or ecosystems are being abandoned due to permitting frameworks. We also found that conditions imposed on projects post-approval will limit the ability of private sector proponents to continue undertaking restoration, with restoration practitioners being required to accept enduring liability (e.g., liability for the intervention in perpetuity), as well as onerous management responsibilities. If we are to scale up restoration to meet global restoration targets, law and policy reforms will be needed.

2 | METHODS

To better understand the legal and permitting issues that emerge in practice when implementing a restoration project, we interviewed a small cohort of restoration practitioners ($n = 8$), spanning a range of jurisdictions, project types, land tenures, and a variety of different entity types (e.g., NGOs, research institutions).

We used existing networks to generate a shortlist of possible organizations/interviewees, and contacted them by email to request an interview. Marine and coastal restoration in Australia is undertaken predominately by government agencies, natural resource management ("NRM") groups, environmental NGOs, and research institutions (Saunders et al., 2022). We chose to focus on restoration undertaken by NRM groups, NGOs and research organizations rather than government, as government agencies often have different permitting pathways (Shumway et al., 2021) which would make comparison difficult.

We contacted ten entities, and eight responded positively to our request. We acknowledge that this sample size may be perceived as relatively small, but coastal and marine restoration is in an early stage (Saunders et al., 2020) and undertaken by a small group of practitioners in Australia (Saunders et al., 2022). As we distilled very similar themes from all interviews this indicated that we had achieved "saturation" (i.e., patterns had emerged and no entirely novel insights were emerging) and we determined that further interviews were unnecessary (Newing, 2010).

Prior to interviews, we asked participants to choose one former/current project to be the focus of our interview. We also asked that they be prepared to discuss: the project type and location, what permits were applied for, what government agencies they worked with, timeframes, and any conditions imposed on their approval/s.

Interviews were held in person or on Microsoft teams in the first half of 2023 and were recorded and transcribed. The average interview length was approximately 60 minutes. We also received written data from some participants to supplement their interviews.

Given our objectives, we chose to use semistructured interviews (Hay, 2000). This type of interview is useful

TABLE 1 Summary of projects.

	Permits needed	Government agencies involved	Main issues experienced	Time frames and project status (as of early 2023)	Coded themes
Project One Reintroduction of tidal flow Mixed tenure (freehold/leasehold/Crown) Queensland	• Development approval (coastal works, wetland protection area) • Consent from the River Improvement Trust • A right to occupy and use • Acid sulfate soil management plan • Potential fisheries permits • Excavation permit if soil removal exceeded 100 m^3; • Landholder and traditional owner consent; • Permit related to gazetted road on site.	• Local government • Department of Environment and Science • Department of Resources • Department of Agriculture and Fisheries • River Improvement Trust • Private landholder • Traditional owners	• Conflicting advice regarding permits • Mix of tenures, difficulty working on leasehold and private land • Inability to get landholder permission as P1 would need to "sell" project benefits, and needed a financial services license to do this	• Commenced investigations in ~2018/2019 • Permitting applications commenced in 2020 • Has not progressed due to permitting/consent issues • Likely to be abandoned	1, 3, 4, 6
Project Two Shellfish reef restoration Crown land New South Wales	• Development approval (Part 4 or Part 5 depending on whether applicant is a public authority/working on behalf of a public authority, or other); • Development approval for land-based site to load barges with restoration material • Approval to use airport land	• Four local governments • Crown Lands • Transport for NSW • Department of Planning and Environment • Department of Primary Industries (Fisheries) • Local Land Services • Federal Airport Building Controller	• Involvement of multiple agencies, some areas where no agency had responsibility • Long time frames • Difficulty negotiating permits for off-site works (loading shellfish onto barges) • Requirement to accept liability in perpetuity for structures	• Permitting process commenced approximately 2 years ago • Some sites abandoned • Some still being assessed by government	1, 2, 3, 5, 6
Project Three Reintroduction of tidal flow Private land South Australia	• Development approval • Dredging license [but used a licensed operator so did not have to apply for a separate license] • Referral to Coast Protection Board • Proponent developed a vegetation management plan, acid sulfate soil management plan, construction environmental management plan, mosquito management plan, land management plan	• Local government • Department of Environment and Water • Landscapes Board • Clean Energy Regulator • Coast Protection Board	• Good experience reported • Complexity of working out the multiple permits required • Extra modeling required to meet carbon market requirements	• Fast permitting (several months) • Still working through management plans	1, 2

(Continues)

TABLE 1 (Continued)

	Permits needed	Government agencies involved	Main issues experienced	Time frames and project status (as of early 2023)	Coded themes
Project Four In-stream fish habitat Crown land South Australia	• Development approval • Crown land development approval • Crown lease	• Local government • Crown Lands SA	• Need to undertake habitat mapping to find best location • Need to obtain Crown lease • Requirement to accept ongoing liability for maintenance	• Crown lease can take up to 9 months • Approved	1, 3, 4, 5, 6
Project Five Revegetation of river bank Mixed tenure (private/ Crown)	• NSW Marine Parks permit (in consultation with traditional owners • Fisheries permits to disturb marine vegetation	• Local government • NSW Department of Primary Industries • Traditional owners • Private landholders	• Negotiations with private landholders and traditional owner groups • Need to re-scale project to avoid some approval triggers as this would make timeframes too long	• 6 months for permits • Abandoned another site that would have taken 5–10 years for permits • Awaiting final landholder agreement	1, 3, 5, 6
Project Six Estuarine Restoration Private land Queensland	• Multiple development approvals; • Approvals to work in fish habitat areas; • Approvals to remove marine vegetation; • Lease over private land	• Local government • Department of Environment and Science • Department of Resources • Department of Agriculture and Fisheries • Private landholder • Traditional owners	• Involvement of multiple government agencies—led to 137 conditions imposed on project • Inability to be flexible once on-ground as this would require new/amended permits	• Permit process took several years • Approved, project underway	1, 2, 3, 4
Project Seven Seagrass Restoration Crown land Queensland	• Development approvals; • Approvals to work in fish habitat areas; • Approvals to remove marine vegetation; • Marine Parks permit; • Resource Allocation Authority	• Local government • Department of Resources • Department of Agriculture and Fisheries • Department of Environment and Science (QPWS) • Great Barrier Reef Marine Park Authority	• Large volume of permits and involvement of multiple agencies • Conflicting advice from government agencies	• Permitting process had been ongoing for 18 months • Awaiting final approvals	1, 2, 4
Project Eight Oyster reef restoration Crown land Western Australia	• Development approval • Approval to install objects in navigable waters • Fisheries permits	• Local government • Department of Biodiversity, Conservation and Attractions	• Lack of clarity around process • Requirement to accept liability in perpetuity for structures	• Undertook pilot project • Permitting process for pilot took approximately a year	1, 4, 5

TABLE 1 (Continued)

	Permits needed	Government agencies involved	Main issues experienced	Time frames and project status (as of early 2023)	Coded themes
	• Biosecurity and translocation approvals • Indigenous consultation • License to occupy Crown Lands	• Department of Planning, Lands and Heritage • Department of Transport • Department of Primary Industries and Regional Development	• Inability to secure permits in ecological window needed	• Had to abandon full-scale project due to permits after a year of negotiations and permit applications	

Note: Includes a list of permits needed, government agencies involved, the main issues experienced, the project status, and which theme was discussed by each participant.

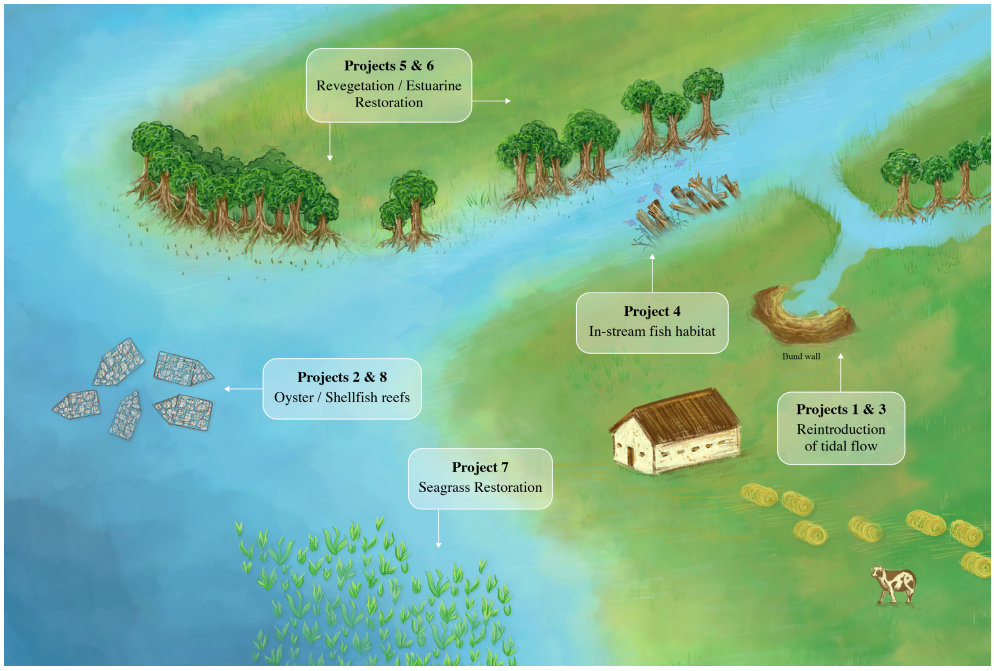

FIGURE 1 Summary of projects considered in this study.

for its flexibility and for allowing an in-depth analysis based on the experience of the participants (Young et al., 2018). This allowed us to follow the general interview guide above, but also provided the flexibility to clarify, ask follow-up questions and discuss some of the complex issues that emerged. Semistructured interviews are considered to be an appropriate method especially in studies considering the interaction of science and policy (Young et al., 2018).

Given the small number of participants, we were able to conduct a manual thematic analysis to identify the key themes referred to by participants. We used inductive analysis, with themes determined based on their emergence in the data (Walter, 2019). The transcripts were manually analyzed by two independent analysts, and then cross-referenced to distil common themes.

The study received ethical approval from the University of Queensland's BEL Low to Negligible Risk Subcommittee (approval number 2023/HE000168). We de-identified all data and assigned each informant a random participant number (e.g., participant one = P1), by which they will be referred to in this article. Note that a reference to a participant includes a reference to the organization that they work for.

3 | RESULTS

Our interviews generated eight case studies (Table 1). These projects span across marine and coastal environments, and include in-stream fish habitat restoration, reintroduction of tidal flow, revegetation and estuarine

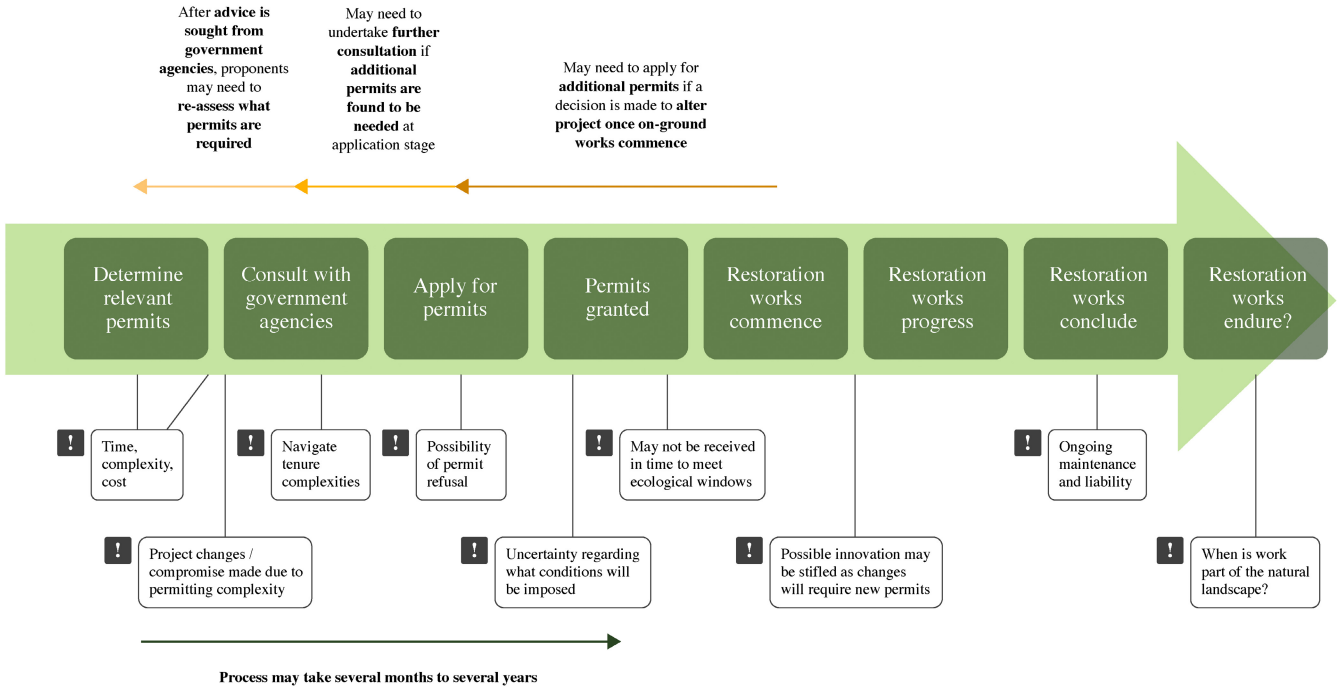

FIGURE 2 Timeline of the restoration permitting process and the major issues identified by interview participants.

restoration, seagrass restoration, and oyster/shellfish reef restoration (Figure 1).

Table 1 summarizes the results of the interviews, including the permits required and the government agencies involved. It also provides a high-level summary of some of the key issues faced by participants during the permitting process. More detailed interview summaries are available as Supporting Information.

Importantly, the key issues faced by participants revealed some common themes, spanning the breadth of the permitting process, from project conception all the way through to conclusion of works (Figure 2). The first theme identified was that the permitting process is complex, time-consuming, costly, and difficult to navigate—this point was raised by all study participants ($n = 8$). The second theme was the importance of governmental "will" and the disconnect between legislation, policy and implementation ($n = 4$). The third theme was that land tenure can be a barrier to restoration, but this barrier was not perceived uniformly ($n = 4$). The fourth theme identified was that the permitting process can stifle innovation, creativity, and large-scale restoration, and favored the status quo ($n = 5$). The fifth theme was that ongoing liability and maintenance responsibility was a significant challenge ($n = 4$). Finally, the sixth theme identified was that complex permitting systems can lead to compromise and suboptimal outcomes from a biophysical perspective ($n = 4$). Each of these themes and the context in which they were discussed are explored further below.

4 | DISCUSSION

4.1 | The permitting process is complex, time-consuming, costly, and difficult to navigate

Our interviews confirmed that the permitting process for restoration projects is not fit-for-purpose, consistent with earlier studies (Saunders et al., 2022; Shumway et al., 2021). The process was described by all participants as complex due to the number of permits required and government agencies involved, and the difficulty in determining what was required. As P2 noted, "it's completely broken and it's prohibitive," and P8 stated that "it is acting as a barrier to getting good work done in a climate where none of us can afford not to have good restoration work happening." The high costs of obtaining permits (including time/salary costs) was also emphasized by all participants, and reflects earlier studies in the coastal and marine space (Saunders et al., 2022) and the terrestrial context (Richardson & Davidson, 2021). Economic literature also emphasizes the importance of considering transaction costs in designing environmental policy (McCann, 2013), as complex policy with high transaction costs can create barriers that reduce or prevent conservation activities from occurring (Camacho & McLachlan, 2021; Shumway et al., 2021).

Participants commented that the process is designed to limit harmful development rather than facilitate

restoration (P2, P4, P5, P6, P7), with P4 observing that "we're trying to do work that is positive for the environment, not a five-story development...but the permitting process is the same." For this reason, applications for environmental projects join the same queue as all types of development (e.g., residential) and are not given any priority for their purpose as public good projects. This increases the time it takes for an application to be assessed (P2). This aligns with international studies, where the low political priority given to restoration was identified as an extremely important barrier to restoration in a study investigating experts' perceptions in Europe (Cortina-Segarra et al., 2021).

The sheer number of agencies practitioners are required to consult adds to the amount of time it takes to seek permits: one participant's project involved interacting with four different local councils, as well as six separate state government agencies (P2). It also means that practitioners are sometimes required to strongly advocate for their projects, as they are not interacting with staff trained in restoration work (Fitzsimons et al., 2019). This in turn adds a further time burden (P4). It also means that staff are sometimes overly risk averse as they do not understand the purpose of the projects (P6, P8). The involvement of multiple agencies exacerbates this; for example, while an Environment Department may understand the project benefits, the need to engage other agencies (e.g., transport, infrastructure) can be a barrier to progress as restoration is not part of their mandate (P2, P8).

Crucially, our interviews revealed that the high costs and long timeframes are more than just an added project cost—they can prevent projects from occurring. This is particularly prevalent if the proponent is an NGO with limited resources (P4, P5), or with funding that is tied to delivery of a project within a specified timeline (P1, P2). In some cases, participants referred to the need to scale back their projects (P2) or potentially even explore handing funding back to granting agencies due to the inability to complete the project (P1). Other participants reflected on the fact that some projects generate significant community involvement and excitement, but that momentum is lost when permitting processes take a long time (P4). Another participant noted that ecological restoration is often only possible in very particular ecological windows: in their case, P8 noted that "we're completely at the behest of the natural reproductive cycles of blue mussels and when those mussels can be harvested from the lease." In that instance, not getting their permits in time would be—and ultimately was—fatal to the project. The mussels were not harvested in time and were predated by pink snapper.

Despite this complexity, it was acknowledged that some rigor is needed due to the potential implications of the projects. Rigorous permitting processes exist for a good reason, and care must be taken to ensure that projects are carefully assessed if there is a possibility for environmental harm (P5, P6). However, it is a difficult balance: while it may be desirable to reform permitting to make the process more navigable, this needs to be weighed against the need to maintain oversight of projects (P6).

It was also acknowledged and observed that, despite the lack of fitness-for-purpose, the permitting process can sometimes be successfully navigated (P1, P4, P5, P8), and the complexity of permitting itself may not be an insurmountable barrier to getting restoration done. Some participants reported good experiences with governments who understood the importance of their projects, which helped to streamline the approvals process (P3, P5). These participants noted that generally governments are quite facilitative where they can be, but the situation gets complex if there are multiple agencies and permits involved.

However, in other instances it cannot be navigated, and sometimes the permitting process does generate a "no" outcome. That may occur where there is no applicable permitting process for a project type, or where a project is proposed in an area where environmental protection is very high (e.g., a marine park) (P4). It was noted that this is ironic as these are sometimes the places in most dire need of ecological improvement, but the legislation is strictly set up to protect the status quo (P4).

A "no" response might also occur where the priorities of the government agency are not aligned with the priorities of the restoration practitioner. For example, P6 referred to a major metropolitan local government which is highly concerned with flood risk mitigation, and has published flood risk maps for local residents. P6 has sought to undertake revegetation projects in this jurisdiction, but planting vegetation within the waterway can change flood risk profile by increasing roughness, slowing water velocity, and spreading water out. While this is a positive outcome from an ecological perspective, it changes the flood risk profile of the region and increases risk for the local government.

There were mixed perspectives on using consultants to help navigate the process. Some parties thought it was very beneficial, as the consultants have detailed knowledge of the planning process and can ensure that all relevant permits are applied for (P1, P3). On the flipside, some participants thought consultants may overcomplicate the process as they do not understand the project as deeply as the participants do, which might lead to

recommendations to apply for additional permits that are not needed (P6).

4.2 | Governmental "will" and the disconnect between legislation, policy and implementation

There can be significant differences across jurisdictions in terms of how willing governments are to operationalize restoration projects. For example, NSW, Vic and SA have very similar legislative processes, but a proponent observed that permitting in one state can take more than six times as long, and governments are more conservative about liability and indemnities (P2). Several practitioners observed that their experience with the permitting process was facilitated where there is government recognition of the importance of restoration (P3), or where practitioners had a contact within government who could provide advice on the process, or internal advocacy for the project (P7).

There might also be a disconnect between the legislation as drafted, and how it is implemented in practice (P2, P6). For example, P6 noted that, despite legislation stating that a proponent can apply for a permit to work with acid sulfate soils, a local government had adopted an unwritten norm of refusing any works in acid sulfate soil areas. P2 also lamented the fact that the government agencies are imposing prohibitive conditions and indemnities on them as part of standardized contracts, despite this not being contemplated by the legislation.

4.3 | Land tenure can be a barrier to restoration, but this barrier is not perceived uniformly

Land tenure, ownership and use has been recognized as a barrier to marine and coastal restoration (Bell-James, Fitzsimons, & Lovelock, 2023; Bell-James, Foster, & Lovelock, 2023). In Australia, land may be held in private ownership, in "Crown" ownership (i.e., government owned), or in leasehold, which is a type of tenure unique to Australia where a lessee leases land directly from the government for a long period of time (often 20+ years) and for a particular purpose (often grazing or agriculture) (see Edgeworth, 2017). Overlaid across these tenures is native title, which grants Indigenous peoples rights over their traditionally owned lands (Strelein, 2005). Marine and coastal ecosystems often span across several of these tenures, and conducting restoration on each raises particular challenges (Bell-James, Fitzsimons, & Lovelock, 2023; Bell-James, Foster, & Lovelock, 2023). This has also been identified as a challenge in "scaling up" restoration, because as the size of a restorative initiative increases, so too does the potential for it to cross multiple tenures and jurisdictions (Richardson, 2016).

Some of our participants identified land tenure as a complicating factor in obtaining permits for their restoration projects. P1 suggested that restoration on private land can be challenging, due to the need to hold a Financial Services License to encourage a landholder to participate for the purpose of obtaining carbon credits (or another type of financial product). Landholders might also have a mortgage or insurance over their property which does not permit this type of land use (P1) This difficulty was overcome by another participant by obtaining a lease over part of the private land (P6), which gives the leaseholder an interest in the land and therefore more flexibility to do the work. Restoration on private land can also be complicated by factors such as the death of a landholder (P2), or the concerns of a landholder regarding their ability to sell their property in the future with the potential burden of a restoration project on site (P5).

In contrast, other proponents have found public land challenging to work on due to the risk averse nature of government, and the reluctance to have structures or works on their land (P2, P4). Leasehold land can also be extremely difficult to work on, as the restoration project purpose may be inconsistent with the lease purpose (P1).

While our participants did not experience tenure difficulties in a uniform way, their experience is certainly consistent with the literature that indicates that land tenure, ownership and use generally can be an influencing factor in the uptake of a restoration project (Bell-James, Fitzsimons, & Lovelock, 2023; Bell-James, Foster, & Lovelock, 2023).

4.4 | The permitting process can stifle innovation, creativity, and large-scale restoration, and favors the status quo

The need to engage with the permitting process, and associated cost and inconvenience, can stifle innovation and positive, large-scale outcomes for the environment. This is of significant concern, as to meet global restoration committments a high level of ambition and acceleration of outcomes is needed (Gann et al., 2019; Lovelock et al., 2022; Waltham et al., 2020).

The current permitting process requires restoration practitioners to effectively lock in an approach to restoration at the permit stage, and any changes to this approach would require an application for a variation or even a new permit. This is problematic as it is well-recognized that restoration can lead to unexpected results, and practitioners must be prepared to adapt their approach (Gann et al., 2019). This was reiterated by our

participants: P6 noted that sometimes it is difficult to predict the best way to do a restoration project until you are on the ground. P1 also noted that it is hard to interpret maps and data until you get on site due to hydrological changes that have occurred.

P6 articulated the problem by noting that once you start a project, you might find an alternative way to carry out the work that is less impactful on the natural environment. However, pursuing this alternative would require them to re-apply for permits and engage with the process from the beginning again. This would in turn cause significant project delays. This lack of flexibility therefore leads proponents to continue with the more impactful option as the alternative is not feasible.

P1 and P7 also reflected on the fact that many permits are trigger-based—that is, a proponent only needs to apply for a permit if a particular threshold is crossed (e.g., more than x tonnes of soil is disturbed). This may also influence outcomes and discourage restoration practitioners from "scaling up" restoration (P8), as the permitting process becomes more onerous and complex once these thresholds are reached.

The complex permitting process can also favor the status quo (McLeod, Boström-Einarsson, et al., 2018; Telesetsky, 2017), despite the environmental benefits of innovation. P4 reflected on the "locked-in" nature of many protected areas like marine parks. One participant mentioned an instance where a landholder had a concrete seawall on their property, and it was in need of upgrade. If they chose to rebuild it with concrete, they could easily obtain permits as this activity is classified as maintenance of an existing structure. However, replacing it with a nature-based solution would require a multitude of permits and the process would take at least 12 months longer (P6). Similar experiences have been observed in Europe, where governments often favor conventional interventions which offer the security of decades of proven experience, which in turn stifles innovation (Sánchez-Arcilla et al., 2022).

4.5 | Ongoing liability and maintenance responsibility is a significant challenge

Ongoing liability and maintenance responsibilities pose a critical risk to the future of marine and coastal restoration. One participant observed a growing trend for governments to impose liability for restorative interventions onto restoration practitioners (P2), which is a compounding problem as it becomes cumulative. An organization, particularly one that operates on a not-for-profit basis, has limited resources and may only have capacity to pursue a handful of projects per year. However, as liability and maintenance responsibilities are imposed through multiple permit conditions, after several years the NGO may carry responsibility for dozens of projects (P2, P4). As described by P2, "the trouble is, if you do this, let's play this game forward. We've now got 200 reefs around the country that we own and we have risk on in perpetuity. At some point, you're going to win the lottery and something bad's going to happen."

P8 also discussed the issue of liability at length, and noted that it was unclear precisely what risk the government agencies were concerned about: "they don't really know what they're worried about. And so the fall-back there is just the biggest cover-all that they could possibly go for." Through conversations with the relevant agencies, navigational risk emerged as a clear issue. To address this, P8 undertook to install a navigational marker to warn boaters of the risk. However, the desire to impose liability on P8 remained. P8 described this as "circular logic" as the entire purpose of the permit system is to assess risk and ensure that a project is done safely. Ultimately P8 successfully negotiated a shorter liability clause as once the reefs are installed, they become property of the State, and therefore P8 no longer have control over them—an essential component of legal liability.

Long-term obligations are also a barrier to getting private landholders involved in restoration as there may be reluctance to take on long-term obligations—for example, a landholder may be concerned about their future ability to comply with maintenance obligations as they age or experience ill health. It may also be seen as something that may affect future land value if they need to sell their property (P5).

There is also a theoretical but highly relevant question of when a restorative intervention becomes sufficiently "natural" or part of the landscape such that maintenance should no longer be required—and in fact, removal would trigger the need for permits (P2, P4). For example, P4 noted that:

> There were 200 snags per kilometre removed from the Murray bank when they first brought in paddle steamers. Really, fundamentally what we're doing is putting that structure back in the river... So you try and try and make this piece of natural habitat that reforms back into the landscape and puts something back that was once there. Yet it's treated almost like a commercial man-made physical structure.

Similarly P2 remarked:

> Now what we're building is not a building. We're not putting in a jetty. We're not

> putting anything in a public space where we expect there to be harm. We are restoring an environmental ecosystem that once was very common in the location and there are still portions of the Bay that have this natural feature in them. So we're creating a feature that already existed...Yet, they still are requiring us to indemnify them where this is a natural feature on the landscape.

Ultimately, this current approach of treating some restorative interventions as artificial structures—and therefore imposing management obligations and liability—runs counter to restoration's aims of returning the environment to a natural state or improving habitat (Gann et al., 2019). Finding an appropriate balance to the risk concerns of government and the ability of practitioners to bear risk is a crucial issue to address going forward.

4.6 | The complex permitting system can lead to compromise and suboptimal outcomes from a biophysical perspective

In their "International principles and standards for the practice of ecological restoration," Gann et al. (2019) reflected on the distinction between "full" and "partial" recovery of an ecosystem. Full recovery is a state whereby the key ecosystem attributes have been restored, whereas partial recovery is a scenario whereby lower levels of recovery are intended or occur, due to constraints such as resources. Our interviews reflected a trend towards partial recovery of ecosystems, with permitting being a major barrier to full recovery.

Choosing the "ideal" restoration site often involves compromise and there is a disconnect between the best site from a biophysical perspective and what is feasible from a governance perspective (P5). Participants noted that, when choosing where to invest in restoration, they will consider factors such as: how facilitative a particular jurisdiction is of restoration, how complex a permitting process is for a particular type of project, and how easy it is to work on a particular type of tenure (P1, P2, P5). An organization may have various options and sites available for restoration, but choose one because it has an easier permitting process (P5). Unfortunately, the sites with the easiest permitting processes are not necessarily those with the highest potential for ecological gains. For example, from a biophysical perspective, a restoration practitioner may wish to choose a site that already has some native vegetation to help with revegetation and to provide for ecological connectivity. But if there is intact native vegetation on site this may trigger the need for additional permits, which makes the project costlier and perhaps a much longer process as well (P5). In contrast, a heavily degraded site with no extant vegetation may have an easier permitting process as no vegetation will be disturbed during the restoration—but the ecological benefits are lower.

It may also prompt a proponent to choose a site based on a tenure type or in a jurisdiction that they think will involve a more straightforward process. For example, one proponent noted that in the future they would avoid land that had partial Crown ownership and instead focus solely on private land (P1). Other proponents have indicated that they will only work in jurisdictions where a government is willing to accept liability for the restored site (P2).

In another case, a proponent wanted to undertake oyster reef restoration in a Marine Park and were unable to obtain permission from the permitting authority. Ultimately the relevant Port Authority granted them permission to use part of their lease in the Marine Park, but it was not the most appropriate site from a biophysical perspective due to the shipping in the area (P4). P4 further noted that some of the most environmentally valuable areas are wrapped in such a high level of protection that doing any work in them—including beneficial environmental work—is not possible.

This finding is consistent with other studies which have demonstrated that compromise due to governance factors (e.g., land tenure) can lead to suboptimal biophysical outcomes (Lovelock & Brown, 2019). These issues are problematic because to meet ambitious restoration targets, there is a clear need to choose the best sites from a biophysical perspective, and aim for the highest level of restoration (or full recovery) (Gann et al., 2019). Our interviews revealed that the choice of project sites is being heavily influenced by the need to compromise on a multitude of governance barriers. This is a key issue that must be considered in light of current global targets for large-scale restoration.

4.7 | Possible solutions

Overall, our interviews revealed that government will and a supportive and enabling attitude from regulators seems to be the most crucial factor for success. While all jurisdictions considered require proponents to work through a plethora of relevant legislation and permits—that is, there is no jurisdiction that had a highly facilitative process on paper—an enabling environment can allow a participant to work through this process in a more streamlined fashion.

Some participants argued that acknowledging the experience of practitioners could streamline the process:

one participant noted that their organization had a long history of undertaking successful science-based restoration, but there is no pathway to be recognized as a "trusted" organization to deliver work (P4). P6 also noted that exemptions for trusted organizations could be useful, but there is also potential for corruption—there is no easy answer. The Society for Ecological Restoration has called for professional certification of restoration practitioners (Nelson et al., 2017), and having a register of "approved providers" of restoration projects could be a viable mechanism to expedite approvals (Shumway et al., 2021).

Our participants also suggested that developing dedicated approvals processes for restoration—separate to the approvals process for other developments—could facilitate better outcomes. This would also reduce transaction costs (McCann, 2013). This may include declarations of approved practices that can be done in approved places (P4), or a subset of approvals for environmental projects (P1, P6, P7). As P6 noted, we need to "separat[e] ourselves from housing development. Very, very different intents." P7 reiterated this point, noting that they are "restoring a resource that was lost, not due to development...there was a loss through a sequence of weather and climate events." This reflects previous calls for self-assessable restoration codes, which could work in conjunction with a register of approved providers—essentially, organizations that are accredited can automatically undertake low-risk projects, provided that they comply with any stated requirements (Shumway et al., 2021). Projects with a higher level of risk may require a commensurate level of assessment, but should be assessed according to the project's status as an environmental good project—not a harmful development (P2). There are examples from the United States where restoration projects are excluded from development assessment requirements, which streamlines the process significantly (Telesetsky, 2017).

Coordination is also needed given the multiple agencies involved in this field (see Sánchez-Arcilla et al., 2022). One participant suggested that this could take the form of a state-level coordination mechanism whereby a proponent submits a single application, it is dealt with quickly and in a streamlined manner, and they are then provided with a single set of conditions (P6). Another suggested that having one agency that acts as "lead" and coordinates all other agencies could assist greatly. There is international experience that can be drawn on to inform a coordination mechanism (Killebrew & Khalil, 2018; Telesetsky, 2017). Another suggested solution was pre-approval of projects before a proponent engages with the process, as a pre-approval will give them confidence to persist with a long and complex process (P6).

Exploring opportunities for working with First Nations peoples can maximize beneficial outcomes, and support a global push towards indigenous-led restoration (Dickson-Hoyle et al., 2022). In Australia, traditional owners are key managers of Sea Country and should be actively and meaningfully engaged in restoration projects from an early stage (McLeod, Schmider, et al., 2018). In our interviews it was observed that if there is active native title in an area, this gives traditional owner groups a stronger say in what can happen in that area (P5). This may give rise to win/win situations whereby a permitting process can be streamlined, and opportunities can be generated for indigenous-led restoration of ecosystems (P4).

Even where the permitting scheme can be successfully navigated, the issue of ongoing liability may remain a significant barrier to future investment in restoration works (P2, P4, P8). P8 postulated that this tendency to devolve responsibility comes from a place of "fear of the unknown and opting for the conservative option." To that end, P8 called for more "collective conversations" across all levels of government, to increase the understanding and appreciation of the need for restoration.

Finally, and fundamentally, additional government funding for restoration is needed (Saunders et al., 2022). To meet global restoration goals, high levels of funding are required (Waltham et al., 2020). In the Australian context, the Federal government has committed to "nature positive" outcomes (Australian Government Department of Climate Change Energy the Environment and Water, 2022), a goal which will be difficult to achieve in the absence of significant and sustained financial support. A large amount of restoration is done by NGOs and under-resourced community groups, and they cannot achieve the scale and connectivity needed to achieve global and national restoration goals, particularly when governance factors are driving choice of restoration sites, in turn leading to suboptimal outcomes.

5 | CONCLUSION

The next 7 years are critical to achieving ambitious global restoration targets, and require significant uptake of restoration projects across large scales. While previous studies have found that legal permitting processes for restoration are a complex, expensive and time-consuming hurdle for restoration practitioners (Saunders et al., 2022; Shumway et al., 2021), our study demonstrates that these hurdles can be insurmountable. Factors such as the growing trend of imposing onerous liability and management obligations on landholders and practitioners can stifle progress. The complexity of permitting processes is also leading to the choice of restoration sites based on

ease of navigating permitting requirements, which may not translate into the best outcomes from an ecological or biophysical perspective. To meet global restoration targets, resolution of governance issues including permitting must be an urgent priority of governments.

ACKNOWLEDGMENTS

The authors thank the National Environmental Science Program ("NESP") for financial support, and thank all interviewees for their generous contributions to this work. Any errors are the author's own. Open access publishing facilitated by The University of Queensland, as part of the Wiley - The University of Queensland agreement via the Council of Australian University Librarians.

DATA AVAILABILITY STATEMENT

The interviews were conducted under the condition of confidentiality, and the participants have been deidentified in the manuscript. The raw interview data is not publicly available as it may identify the participants.

ETHICS STATEMENT

This study received ethics approval from the University of Queensland's Faculty of Business, Economics and Law Low to Negligible Risk Committee (Approval 2023/HE000168).

ORCID

Justine Bell-James https://orcid.org/0000-0001-7189-1259

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Bell-James, J., Foster, R., & Shumway, N. (2023). The permitting process for marine and coastal restoration: A barrier to achieving global restoration targets? *Conservation Science and Practice*, *5*(12), e13050. https://doi.org/10.1111/csp2.13050