


**Please cite the Published Version**

Kamstra, Peter, Cook, Brian, Edensor, Tim , Kennedy, David and Kearnes, Matthew (2021) Relational risk and collective management: a pathway to transformational risk management. Risk Analysis: an international journal, 41 (10). pp. 1782-1794. ISSN 0272-4332

**DOI:** <https://doi.org/10.1111/risa.13691>

**Publisher:** Wiley

**Version:** Accepted Version

**Downloaded from:** <https://e-space.mmu.ac.uk/630089/>

**Usage rights:**  In Copyright

**Additional Information:** This is the peer reviewed version of the following article: Kamstra, P., Cook, B., Edensor, T., Kennedy, D. and Kearnes, M. (2021), Relational Risk and Collective Management: A Pathway to Transformational Risk Management. Risk Analysis, 41: 1782-1794., which has been published in final form at <https://doi.org/10.1111/risa.13691>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions. This article may not be enhanced, enriched or otherwise transformed into a derivative work, without express permission from Wiley or by statutory rights under applicable legislation. Copyright notices must not be removed, obscured or modified. The article must be linked to Wiley's version of record on Wiley Online Library and any embedding, framing or otherwise making available the article or pages thereof by third parties from platforms, services and websites other than Wiley Online Library must be prohibited.

**Enquiries:**

If you have questions about this document, contact [openresearch@mmu.ac.uk](mailto:openresearch@mmu.ac.uk). Please include the URL of the record in e-space. If you believe that your, or a third party's rights have been compromised through this document please see our Take Down policy (available from <https://www.mmu.ac.uk/library/using-the-library/policies-and-guidelines>)

# Relational risk and collective management: a pathway to transformational risk management

Peter Kamstra<sup>1\*</sup>, Brian Cook<sup>1</sup>, Tim Edensor<sup>2</sup> and David Kennedy<sup>1</sup>

<sup>1</sup> School of Geography, The University of Melbourne, Parkville, VIC 3010, Australia

<sup>2</sup> Manchester Metropolitan University, Manchester, M15 6BH, United Kingdom

\* Corresponding author [peter.kamstra@unimelb.edu.au](mailto:peter.kamstra@unimelb.edu.au)

## Abstract

Risk tends to be conceptualised at the individual scale, with global risk communication and governance efforts fixated on an individual's knowledge and behaviour. Yet, an individual's risk perceptions and risk-based practices are not isolated from others who co-occupy hazardous spaces. Individuals are undoubtedly influenced by those who surround them, but such human-human interactions tend to be excluded from empirical and field-based analyses, despite conceptual arguments that risk is a relational product of people in places over time. This study diverges from the prevailing analyses of risk as an individualised phenomenon, exploring the relational interactions and practices that influence risk while fishing from hazardous rocky coasts. The aim is to counter the near-universal tendency to individualise risk in empirical analyses by instead using a mixed-methodology that can quantify and enable consideration of relational processes. Guided by a relational conceptualisation, this research innovatively integrates participant observations, video footage, GPS tracking of movement, semi-structured interviews, and participant sketch-map interviews using a GIS (Geographic Information System). Empirically confirming the relational production of risk, we demonstrate that both rock fishing practice and many of the high-risk events that emerge while rock fishing is managed relationally. Compared to the tendency to individualise risk across countless risk management challenges, we demonstrate that relational responses to risk are more representative of how risk is experienced and acted upon, with implications for risk management in countless contexts.

## 1.0 Introduction

Any scrutiny of the practice of rock fishing from uneven, jagged, and slippery rocky coastal environments reveals that these recreational activities are replete with risk (Figure 1). In such environments, risk emerges via human-environment relations shaped by swell changes in direction, winds and wave heights, and the ways in which fishers' respond to these agencies. Despite - or perhaps because of - the dynamism

of these processes, these hazardous environments present a pleasurable location for fishing for over one million Australians (Ryan et al., 2018). Although not all are equally aware of how coastal conditions interconnect to produce risk, experienced rock fishers appear to be more acutely attuned to the emergence of site-specific hazards and to how these hazards influence human behaviours (Kamstra et al., 2018). In this study, we explore the relations amongst fishers via the practices they co-produce, presenting an innovative analysis of how hazardous events are managed. This is accomplished by integrating quantitative and qualitative data to critically substantiate how risk may be conceptualised as relational (Adams, 1995; Renn, 2017).



**Figure 1** - Fishers casting their lines off shore platforms in Maroubra, South East of Sydney, Australia.

Conceiving risk as relational departs from assuming that risk is an individual cognitive operation and emphasises the experiential realm of dwelling, skill and engagement (Ingold, 2000). Here, relational thinking interprets space and place as an outcome of (social) interactions, intimately connected with the social practices (Massey, 1985, 1999) that are performed. In the context of rock fishing, the interaction between a fishers' sensorial experience of wave energy as it washes over their feet, the practices they deploy when walking through spaces where waves overtop, and their perceptions of whether waves will impact on a fisher standing near them constitute contexts in which risk is relational. This understanding of spatiality allows for no separation between the individual and their environment and, especially in the given our focus here, with the other humans who co-occupy these spaces. Over time, fishers become attuned to the interrelated medley of changing conditions in which they choose to fish, developing a relational understanding or 'feeling' of risk in which their capacity to anticipate, respond and attend to potentially hazardous situations is heightened

(Dewsbury and Bissell, 2015) This skilful attunement is not merely the repetition of learned behaviours, but involves constant variation and improvisation in response to uncertain events, including an attunement to others' behaviours. We analyse this skilful attunement empirically by using a mixed methodology to explore the different ways that experiential-expert fishers anticipate, recognise, and interject when other, often inexperienced, fishers engage in potentially hazardous practices.

From a governance perspective, an individual's risk perception cannot simply be translated into policy because an individual's disposition is difficult to generalise across larger populations. At the same time, an understanding of risk perceptions are critical for the development of public safety and governance (Adams, 1995, Jasanoff, 1998, Renn, 1998). Despite the difficulty of translating perception into policy, risk managers continue to make policy decisions based on how certain individuals understand risk and consequently, to date few methodologies have been developed to account for relational actions or responses (Dobbie and Brown, 2014). Our analysis suggests that relational practices offer new opportunities for co-productive governance. We contend that the historical neglect of relational responses contributes to the lack of success in implementing risk mitigation strategies, for the prevailing, individualised understandings cannot account for the relational practices that inform the collectively fashioned responses to risk. A focus on individual phenomena assumes that people experience risk in a vacuum, isolated from their past and their immersive, ongoing, shared experiences with others. This often manifests in reports that blame individuals and the monocausal attribution of 'operator error' within complex systems where accidents occur that are associated with aircraft or nuclear power (Birkland and Lawrence, 2009).

Furthermore, individualised conceptualisations of risk contribute to decision-making that reinforce the unchallenged centrality of rational actor theory (Clarke, 1999). In this way, both the 'problem' (such as risk events such as drownings) and the 'solution' (for instance, to alter fishers' individual behaviours) orient governance towards the individual, excluding and empirically ignoring the relational nature of risk (Adams, 1995). The tendency of risk managers to implement governance via information transfer and awareness raising strategies further frames risk as an individualised problem-solution, with behaviour conceived as a product of individual awareness, knowledge and experience. Like the preponderance of evidence in support of risk as an individualised phenomenon, the effectiveness of information transfer for individual behaviour change has long been unsupported empirically, even though it is endemic in risk research and practice (Kamstra et al., 2018a; Cook and Melo Zurita, 2019).

The introduction critically outlines the prevailing norms of risk research and management, and in the following section, a more detailed review of relational theory is presented. A discussion of the mixed-methodology we deploy and the cases upon which we draw follow. The findings are then presented, successively focusing on the relational practices of fishing, the relational attunement to risk, and a counter-factual exploration of relational risk when collectives break down. We conclude by asserting that relational risk is both conceptually and methodologically advantageous in comparison to conceptions that individualise risk, and opens up new possibilities for

risk management in a world beset with increasingly frequent and severe risk events and scenarios.

## **2.0 Re-conceptualising risk as relational**

Social scientists have argued that uncertainty and risk are perceived in terms of knowledge and practices formed from people's previous experiences and collective identities (Caplan, 2000; Stoffle and Arnold, 2003; Stoffle and Minnis, 2008). Situated risk(s) thus emerge in embedded social environments in which people's perceptions of risk vary, even though the same environmental phenomena is often being assessed (Boholm and Corvellec, 2011). The first step someone takes when crossing a busy street, for example, undoubtedly influences how, when and whether another individual observing or sensing their behaviour chooses to cross. Yet, empirical analyses of the influence that co-occupiers have on other decision-makers is somewhat rare.

At the institutional scale, Beck (1992) argues that this is a product of a new post-industrial modernity, which he terms the "Risk Society", in which risk is individualised. This epoch is characterised by the effects that 'risk' has had on industrial society, contributing to a growing scepticism about expert knowledge or technology's ability to govern risk in a 'rational' way. This scepticism influences citizens to experience the world as less stable and they thus become more aware that they must be equipped to manage risk on their own. Within this context, Beck (1994) argues that welfare states have shifted from policies that target collectives – classes, workplaces, and families – towards a focus on the individual. As contemporary policies continue to define risk in similar ways, decision-makers have turned their attention to the individual and individual behavioural change (Beck and Beck-Gernsheim, 2002).

Sociological critiques of notions of risk as individualised point to 'culture' – the organized, practice-based structures of context-specific collective knowledge and understanding – as that which shapes human-environmental systems (Ingold, 2000), rather than individuals. Culture, therefore, is a precondition for coordinated social practice and should be conceived in terms of relational thinking and the negotiation of dynamic human-human interactions. This involves a recognition of the ways in which practices are learned and defined, but also how people understand contingency and causality. This is pertinent in the case of rock fishing where the diversity of languages and cultural backgrounds amongst fishers make it difficult to communicate, reinforcing the need for fishers to become attuned to each other's movements and practices by watching, as much as to their environments. Similar to the development of an attunement to the emergent environmental hazards, understanding which actions – and by who – should be taken when another fisher is at risk is acquired through experience and participation in relational responses to risk. We contend that experience with how coordinated and distributed risk-based practices function once a high-risk situation emerges improve one's ability to anticipate when another fisher is at risk and how to respond. This knowledge – developed through experience and admission into fishing culture – provides more experienced fishers with the skilful ability to read and react to dangerous situations, if they so choose. We empirically explore the practice-based social environments that are negotiated in real-time by rock

fishers to further critique of the individualised framing of risk, offering instead examples of practice that are attuned to the dynamism of relational responses.

## 2.1 *Attending to relational risk(s)*

To explore how social cues or human-human interactions may affect practice, we draw on Ingold's (1993) concept of the 'taskscape'. The taskscape considers 'tasks' or everyday actions that are carried out by people as constitutive practices of dwelling and being part of the 'landscape', rather than being separate from it. Ingold (2000) contends that variable tasks are performed as a part of the landscape, either in sequence or in parallel, and often by people working together. In shared spatial contexts of action and activity – like rock fishing – the intentional and unintentional attunement to each other's movements is what Ingold argues may lie at the very foundation of 'sociality'. In this study, understanding social practice as embedded within the taskscape is used to elucidate the resonance of practice that stems from fishers' shared attentive engagements that affect risk.

Relational conceptions of risk are not new. For instance, Boholm and Corvellec (2011) establish a 'relational theory' in which people perceive an object as a risk. This understanding of risk, however, freezes risk in time, ignoring the ways that humans evolve and learn as they experience and consider socio-material risk environments and the risky objects in them; part of what Beck (1994) refers to as 'reflexive modernity'. Moreover, the interactions between a subject at risk and the object of risk neglects how social phenomena relate to one another, for instance, how cognition affects practice and how practices reinforce cognition. This means that there has been little exploration of how risks are relationally produced, nor how others might directly or indirectly influence whether something is perceived as a risk (Dobbie and Brown, 2014). When an individual fisher chooses to retreat from an incoming wave they perceive as hazardous, for example, they may trigger others to respond similarly. On the other hand, if that same fisher stands still, other fishers could remain still and be engulfed by an overtopping wave. These types of human-human interactions, all in the context of relational space, affect risk (Renn and Rohrman, 2000), yet little is known about how space-perception assemblages influence practice.

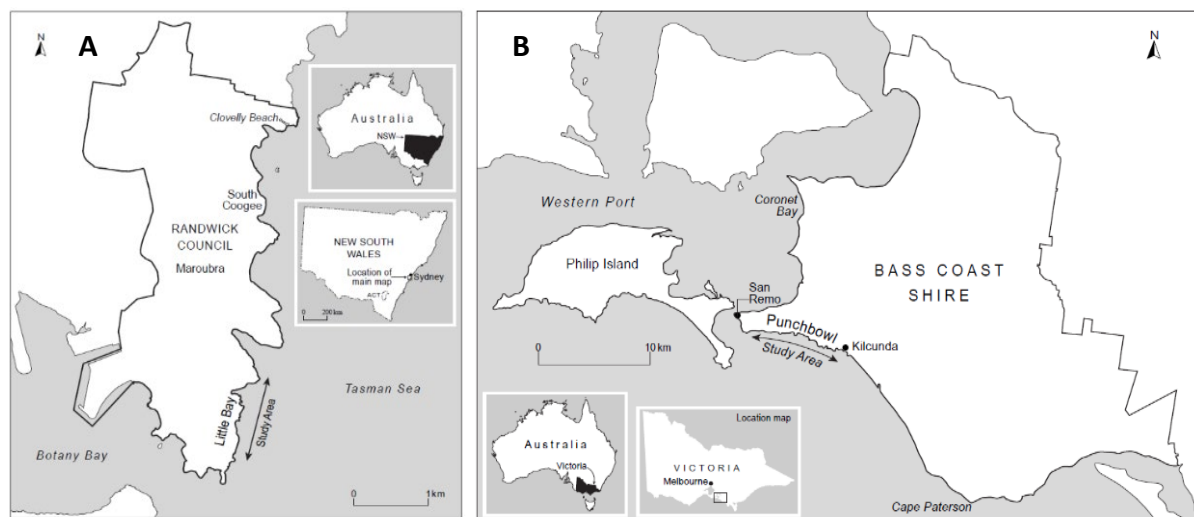
Recent studies that analyse risk as a relational phenomenon include collective responses to stressful situations (Wang et al., 2008), how individuals perceive the risk of crowds in confined spaces (Alkhadim et al., 2018), and how social cues influence an individual seeking protection (Lindell and Perry, 2012). Lindell and Perry argue that people who transmit information by preparing for evacuation can lead others to also take preparatory actions, but such examples have been difficult to analyse empirically. In the context of coastal risk, recent studies have begun to explore the relational practices that influence risk by analysing the characteristics of rescues performed by 'bystanders' who drown in the attempt (Brander et al., 2019, Franklin et al., 2019). Moreover, Attard et al. (2015) demonstrate the utility of relational risk prevention by exploring how surfers perform nearly the same number of rescues of swimmers on Australian beaches as enacted by Surf Life Saving Australia lifesavers (Attard et al., 2015), the national authority on coastal drowning prevention. These studies show a shift in thinking towards coastal risk as a relational phenomenon that



can be collectively managed, but supporting empirical analysis remains challenging and in order to develop a more substantive relational approach, this is essential. Accordingly, we contribute to this gap by adopting a mixed methods approach to the analysis of the social cues, perceptions and practices of fishers' collective practices in engaging with risk.

### 3.0 Methods

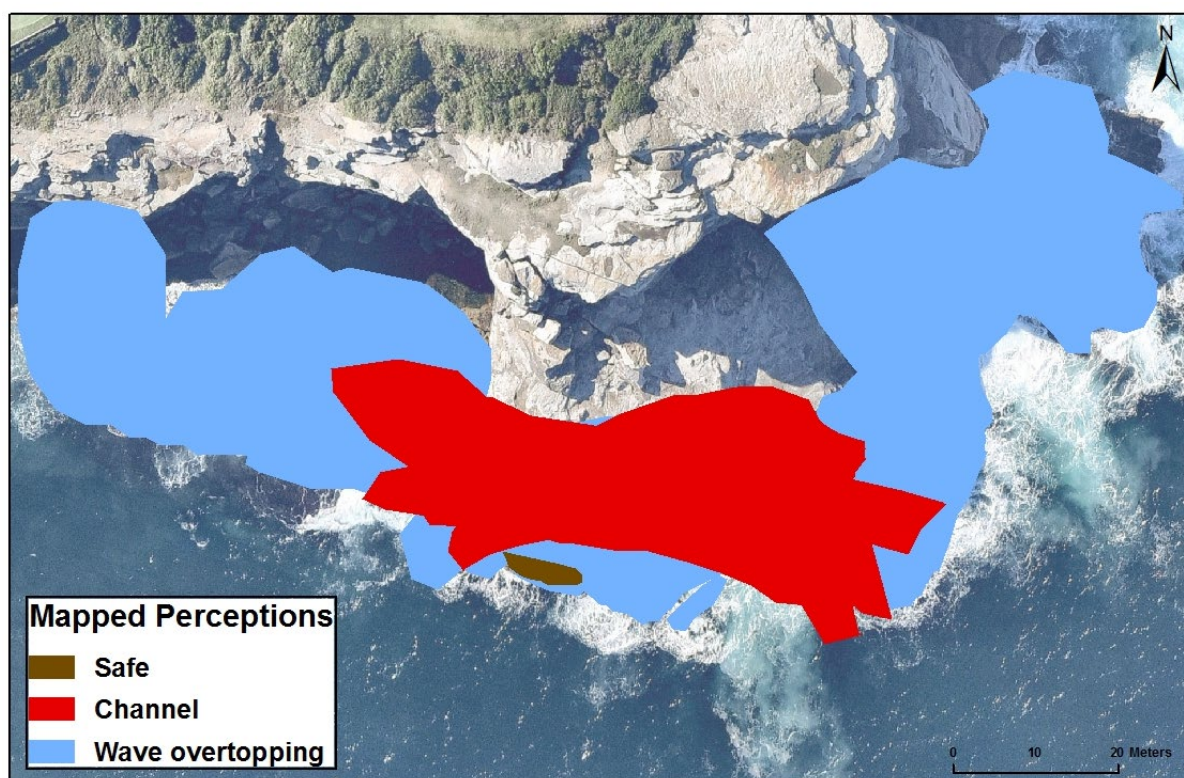
Data collection was undertaken at two rock fishing drowning blackspots, Little Bay, New South Wales (NSW) and San Remo, Victoria (Vic) (Figure 2). 'Drowning black spots' are locations that have had some of the highest number of rock fishing-related drownings in Australia (Ryan et al., 2018). In order to sample diverse respondents, data was collected from 52 rock fishers over 18 months (September 2016 – March 2018) whose fishing practice tends to coincide with seasonal changes in coastal conditions and associated fish species. Multiple drowning fatalities, with 104 reported deaths since 2004 in New South Wales, have encouraged councils to legislate the wearing of life jackets for all individuals engaged in rock fishing (Water Safety New South Wales, 2018). Additionally, Surf Life Saving Australia target (SLSA) targets 'occasional' (typically inexperienced) rock fishers as especially at-risk and in need of safety education (Ryan et al., 2018). In the context of these changing public safety education targets and legislation, analyses focused on individual rock fishers' approaches to risk is particularly important, yet to date there have been few studies that analyse the relational ways that fishers create or prevent risk, nor how their relational practices might be used to contribute to public safety.



**Figure 2** - Study sites were in either in Little Bay south-east of Sydney (A) on the south coast and in Punchbowl (B) south-east of Melbourne on the Bass Strait.

Analytically, we draw on a mixed methods and qualitative GIS-based analysis of the relational way(s) in which risk is perceived, experienced and responded to in coastal space (Kamstra et al., 2019). This approach extends consideration of how visual analyses can expand critical geographical inquiry (Schuurman and Pratt, 2002, Sheppard, 2001) by developing methods for the creative exploration of socio-spatial structures (O'Sullivan et al., 2018). Five methods were used to collect data: First, participant observations were collected on-site. Second, low-resolution video footage

recorded pertinent events that were revisited during data analysis. Third, quantitative movement data was collected from rock fishers willing to wear a hand-held GPS (Global Positioning System) to map their spatial and temporal movement patterns. Fourth, mapping-interviews were conducted with participants who sketched features onto paper to represent their activities on the coast, the areas they perceive to be hazardous, and where risk had been experienced both first-hand or indirectly - witnessed or learned about through discussion with other fishers. Sketched features were then digitized via the spatial software ArcGIS to demonstrate fishers' mapped perceptions of space that was perceived as being 'safer', at risk of 'overtopping waves', or as a hazardous fast flowing 'channel' (Figure 3). Sixth, semi-structured interviews were conducted with fishers who had witnessed fatalities to understand the 'specific' ways these had occurred.



**Figure 3** - Mapped perceptions of safe space (brown) as well as where fishers anticipate the risk of overtopping waves (blue) and a fast-flowing channel (red) at Little Bay, NSW.

Noteworthy 'events', including instances of hazardous environmental conditions, the retrieval of fish, and any other pertinent shifts in practice were recorded, all serving as units of this analysis. Each event has a researcher-defined temporal scale for ease of empirical analysis. For example, how a group of rock fishers respond to a snagged fishing line begins when it is recognised by more than one fisher and concludes when fishers resume their previous fishing practices. These 'events' involving more than one fisher were captured by linking GPS tracking and sketch-maps with video footage to demonstrate how fishers relationally respond to risk (see section 4). These events are subsequently contextualised with interview quotes, observations and the processes through which the first-named author 'became' a rock fisher. This involved learning from experiential-experts about how to prepare a rod for targeting different fish



species, landing a fish and helping others retrieve fish. This first-hand experience generated a connection with participants that encouraged them to relate their stories, and solicited an understanding of risk that is somewhat attuned to the ways in which experienced rock fishers' practices and skills develop. The experience of becoming a rock fisher is thus not merely a theoretical tool but a methodological tool that allowed for fuller comprehension of relational practices and risks. This means that the analysis is empathetically attuned, at least partially, to the embodied intricacies that fishers describe in their accounts of risk.

## 4.0 Experiencing risk as relational

### 4.1 *Relational fishing practices*

Fishers' risk perceptions are not solely established through their individual experiences and responses to non-human coastal environmental processes perceived as hazardous. They are developed through human-human interactions within a fishing culture of experiential-experts as well as with fishers who are less familiar with the rhythms and risks of fishing. When checking conditions before fishing, for example, online message boards, texts, and phone calls are made across a multi-cultural online network, providing ample opportunity for more experienced fishers to voice their expert perceptions of risk on a particular day. This helps to mitigate the potentially high-risk behaviours of those who are unsure of when and where to fish:

We tend to message about who is going out today, where they are going, what the conditions are like and what's biting. There are probably four different groups including Pacific Islanders, Indonesians, Koreans, and some Māori guys, all these guys and my mates usually chat about where to go (2018).

Once on the platform, fishers often greet each other with a summary of the conditions and what fish are biting, helping fishers who have just arrived become more attuned to the fishing environment of the day, all before stepping on to the seaward edge to cast. This collective behaviour, which in many cases requires fishers to sit and wait for tides to change, an temporal aspect of fishing 'culture' allows the dissemination of advice and know-how, including knowledge-sharing about where to target casting, discussion about the most desirable fishing techniques or tackle to use, and the introduction of fishers, both experienced and inexperienced, to spaces that are particularly hazardous. This practice is especially evident when fishers arrive at the platform but is also maintained through constant social exchanges while casting. Some describe the act of rock fishing as an important place for recreation while for others, rock fishing is a place for healing and mateship. The connection between fishers from different cultural backgrounds that rarely interact outside of these coastal encounters is described by Rob, a fisher at Little Bay with over fifteen years of experience:

On the edge of this platform, one day you can be a fisherman or a friend or a therapist or a safety advisor, and sometimes you can be all at once [laughs]. This place is an escape for a lot of us and while

we are here for hours, it's great to have a chat about fishing but other things as well (2018).

The act of casting in these environments may appear individual but it is relational, for fishers who co-occupy space move and work together, necessarily attuning themselves to each other's movements and casting practices. Experienced fishers, for example, will join a casting rhythm – where no one fisher casts at the same time – to avoid crossing lines but also to relationally attract fish (Figure 4). This behaviour is described by Gord (2018):

The odds of landing your bait right beside a fish are small, but if we are all casting out there in a similar place and a fish chases our line towards the rocks it helps increase our chances of hooking up. That's what we want to do, draw the fish to the rock so the next cast might land beside the fish and you get a bite (2018).

By targeting their casts in a similar space off the platform edge, fishers work together – some knowingly, others not – to attract fish towards the platform, improving the chances of a catch for all.



**Figure 4** - Fishers south-east of Sydney casting from the same space in rhythm to draw fish towards the platform.

A common mistake made by behavioural psychologists and sociologists of practice is to assert that social practices can be disentangled from changing social environments, with the goal of identifying elements for the purposes of modelling an individual's social

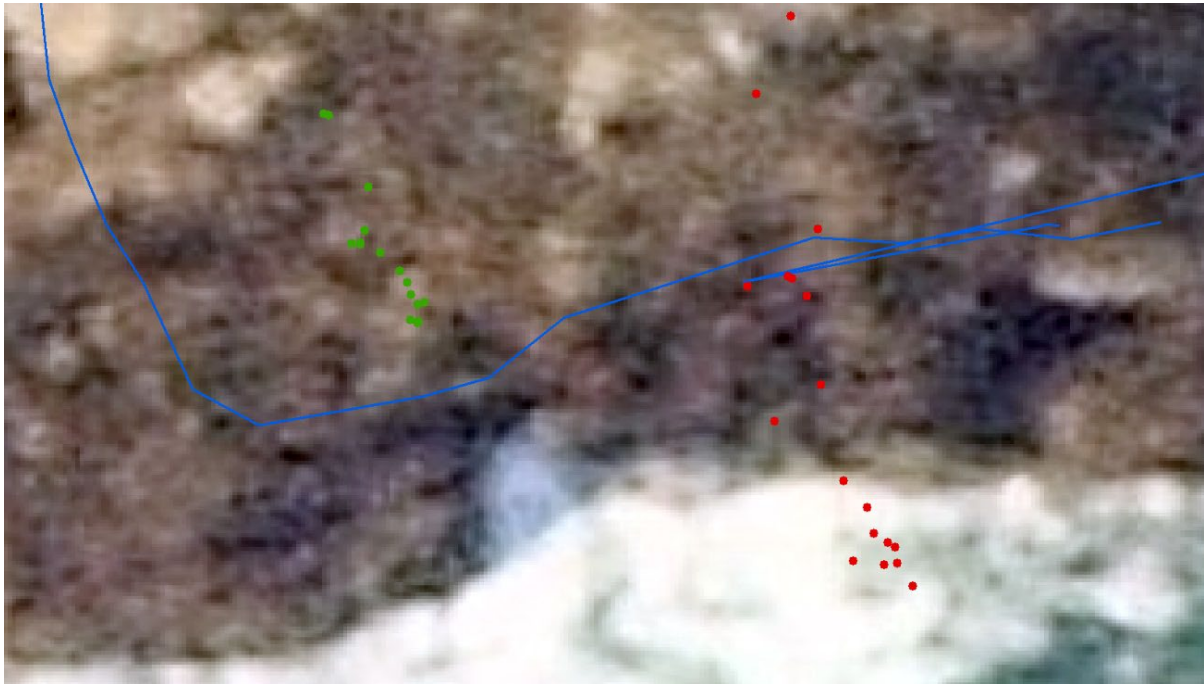
practices. Shove et al's (2012) dynamics of social practice theory, for example, proposes that individuals are 'carriers' of social practices that are composed of various stable and unstable elements. Problematically, this assumes that social practices remain the same and are simply reiterated, 'carried' by individuals to other risk-based contexts irrespective of changing social and environmental settings. Yet separating social practices from changing social environments overlooks the affective, embodied, communicative, sensuous and relational social interactions that influence perceptions, behaviours and practices. In this context, the struggle to safely and successfully land a fish, for example, is an affective, adrenalin-filled experience that is driven by an individual's fight with an unknown fish species, but it is equally influenced by the collective encouragement – or hindrance – of other fishers through their willingness and skilful ability to assist, circumstances which vary across sites of fishing.

The social practice of landing fish lies within the experiential realms of dwelling, feeling and sensing, and in the intentional and unintentional relations between fishers, even if other fishers choose not to assist. Although the practice of landing a fish is 'carried' within an individual fishers' embodied experiences of previously catching fish, we diverge from assuming that social practices are carried by individuals and instead, argue that social practices – especially in the context of risk – are inextricably linked with the situated, affective and relational interactions that are distributed between different fishers moving through space. By observing, listening and occasionally touching, fishers constantly attend to each other's presence, at every moment adjusting their movements in response to this continual monitoring (Ingold, 1993). The above examples of casting rhythms and attempting to land a fish signify the embedded practice-based social contexts and shared fishing culture that appears to transcend race and age, at least momentarily, providing initial evidence of relational risk.

#### 4.2 *Relational attunement to risk*

In remaining attuned to each other's casting rhythms, the sight of another fishers' line being 'snagged' stimulates a relational response to a potential risk by fishers. Such a situation can quickly become hazardous, especially if the fisher holding the snagged rod attempts to release the hook by themselves. This is because snagged lines typically occur near the seaward edge of the platform where fishers are vulnerable to slipping and falling into the turbulent sea (Ryan et al., 2018), where they can be battered against sharp rocks and drown. Event 1 shows how this potential risk is mitigated by one fisher helping another by grabbing a gaff hook, used to snare large fish and bring them ashore, walking beyond an area that was mapped as the 'safe' edge of the platform during sketch-map interviews (see blue line in Event 1) and disappearing from view to retrieve the seaweed-snagged line. While this coordinated practice unfolds, the snagged fishers' (holding the rod) critical attention is fixed on incoming waves, surveying the ocean surface for hazardous waves that would endanger the distracted fisher who is helping to unsnag the line. Kevin, a fisher with over twenty years of experience emphasises the preventable nature of drowning incidents related to snagged lines, more generally showing why a relational understanding of risk carries important implications for management:

This is how I reckon many people get into trouble. They get a two-dollar line snagged on the reef or stuck in some seaweed and walk down to the edge rather than just giving up on a two-dollar lure.



**Event 1** – The green GPS points represent the movement of the fisher whose rod is snagged while the red GPS points show the other fisher walking towards the seaward edge of the platform – in space where waves do overtop as captured in this aerial photo – past the blue line that was mapped as the boundary between safety-risky by experiential-experts.

Once individual lines have been cast, fishers are attuned to the feeling of their own rod while simultaneously being attuned to the lines of others so that when the unmistakable sound of another fishers' line 'hooks up', collective attention is captured. Typically, fishers without a hooked fish respond by reeling in their lines to give the hooked fisher more space, as well as making themselves available to help retrieve the fish if needed (see Event 2). This process is described as a 'fish-on' and produces multiple relations that influence fishers' movements, regardless of their familiarity with each other, because of the shared desire to see a fish safely and successfully caught.



**Event 2** - Experienced fisherman wearing red (with fifteen years of experience) watching a less experienced fisher wearing a black life vest (with less than one year of experience) reeling in what is perceived to be a large fish. Then, one minute later, standing behind the less experienced fisher, holding their lifejacket to prevent them from falling into the sea. Importantly this relational response emerges as the inexperienced fisher steps over the mapped safe area (brown) into the blue space, which was mapped as a space where hazardous waves frequently overtop.

Throughout the early stage of reeling in the fish, Event 2 shows the experienced fisher pointing to different areas, instructing the inexperienced fisher to move to specific parts of the platform, all with little verbal communication because the two do not share a common language. Importantly, as soon as the hooked fisher moves from the space mapped by rock fishers as 'safe' to a lower part of the platform that is closer to the seaward edge and mapped as 'hazardous' (because it is prone to wave overtopping), the experienced fisher's behaviour decisively turns to perform risk management on behalf of the collective. In taking responsibility for assisting the inexperienced fisher throughout this potentially hazardous event, he is subsequently accompanied by a third fisher, wearing white, who takes on the task of watching for potentially hazardous waves offshore.

This relational social action provides empirical evidence of the relational ways in which experienced fishers distribute risk mitigation practices. Although the experienced fisher wearing red was born in China, speaks little English and had likely never met the younger Italian fisher, he was attuned to the potential risk that the fisher was



undertaking by moving from the slightly higher and 'safe' edge to the lower, more hazardous space prone to overtopping waves. Nevertheless, he put himself at risk to help the other fisher land his catch. Event 2 also shows that once the fishers re-emerged from the lower part of the platform, the experienced fisher holds the fish in one hand, running in front of the other, encouraging the potentially distracted inexperienced fisher to move quickly through the hazardous channel (mapped red space) to an area protected from overtopping waves before he admires his highly-prized catch. Even after he had moved away from the hazardous seaward edge, the experienced fisher continues to encourage the inexperienced fisher to exit the space mapped by rock fishers as hazardous because of the potential danger posed by the existence of a channel. This reveals the inclusion of anticipatory practices in relational risk prevention beyond those that directly prevent fishers from falling into the sea.

This event demonstrates how risk is produced and experienced relationally, with some focusing their attention on the fish while others remain attuned to the sea conditions. The experienced fisher who retrieves the large fish from the lower parts of the platform in Event 2 reduces the likelihood of the line snapping while also minimising interference with the inexperienced fishers' pleasure in reeling in the fish for himself. These examples – mapped and tracked empirically – epitomise the communal qualities of rock fishing culture and reveal in real-time the distributed and relational interconnections and embedded practices that prevent risk.

What is especially important about this example is that these individuals are not friends outside of this high-risk space, and these actions are too improvisational and emergent for them to be planned (Cook and Melo Zurita, 2016). This suggests that the ways that rock fishers relationally produce, perceive and respond to hazardous events are often forged between fishers who are unfamiliar with one another. Bourdieu (1977, 1984) emphasises the importance of exploring social worlds and the interconnections between agents who seek to affect their environments in shared, often habitual ways. In this instance, an experienced fisher shows such interconnections by assuming a responsible role within relational risk-mitigating practices.

Lastly, in Event 3, the ever-present risk of overtopping waves is shown to be recognised by an experienced fisher but not by inexperienced fishers, emphasising their differentiated skills and modes of attunement to conditions. In this case, the experienced fisher seeks to protect his own bag from being washed off the platform. Social cues taken by the inexperienced fishers (one of which is the first-named author of this paper) from the experiential-expert shows how non-linguistic communication affect behaviour, without verbal or direct instruction. This video shows the experienced fisher moving, calmly assessing the angle and energy of the incoming wave, subtly positioning his body between at the position where he perceives the wave will overtop and the other fishers. Fascinatingly, this event was a reaction to the sole wave that overtopped the platform over a seven-hour fishing session. Yet the 'experiential-expert' attuned to risk was able to anticipate this wave before it reached the platform, reacted to it and whether intentionally or not, prevented the two inexperienced fishers from a hazardous situation. Had the experienced fisher not been present and moved in this particular way, or had refrained from non-verbally advising others about where they should stand, a more hazardous situation would have been likely to have

emerged. This timely reaction to risk, which cued risk-minimising action by the inexperienced fishers, demonstrates the capacity of collectives to recognise and mitigate relational risk – consciously and/or subconsciously. Furthermore, along with the other two events explored in this section, this incident lends empirical support to our contentions about the different ways that risk is perceived and acted upon relationally by those who co-occupy space and who share a ‘fishing culture’.



**Event 3** - Waves overtop, and inexperienced fishers' behaviour is cued by how and when the more experienced fishers moves in response to the wave that he anticipates as hazardous (corresponding author is Blue checked shirt).

#### 4.3 What happens when the collective culture breaks down?

Understanding and emphasising examples of the relational ways in which fishers manage risk also has value in understanding the problems that occur when such relational responses to risk break down. The value of belonging to the rock fishing culture became apparent after a rock fisher entered the water at the field site in NSW on December 31<sup>st</sup>, 2017 and later died in hospital. Interviews conducted two weeks after this incident demonstrate that none of the participating fishers or members of their associated networks went fishing on this day or knew this man. The victim is thought to have been fishing during hazardous conditions and because he was not connected to the ‘locals’ or known by them, he was assumed to be unfamiliar with local risks, which might well have been mitigated if he had been part of the local fishing culture.

Other socio-cultural examples of relational risk management breaking down are when fishers with experience attempt to transfer their knowledge to others but are unable to because they lack a common language or because other fishers respond negatively to advice that is proffered. Once a fisher is treated dismissively, many noted, they were less willing to share their experiential-expertise, leading to frustration as described by Greg (2018):

Look, I went up to the guy to tell him 'mate, you're standing in the stupidest spot' and he started shaking his head, motioning with their arms for me to leave him alone and it pissed me off because I was only trying to help him and he treated me like shit. So I said fine, get into trouble, it's not my issue

The important influence that experience has on movement through hazardous space and the communication of this knowledge to less experienced fishers was demonstrated by Tom, an inexperienced fisher who describes that the only reason he was able to map hazardous space was because he had been taught by another, more experienced fisher:

Well the only reason I know about this channel or where waves come over is because some of the older guys told me when I came down here. I still don't know the area that well but the one thing I remember was the guys telling me that on certain days, waves wash over here [where a channel was mapped] and if you stand here you can be swept in (2018).

In addition to standing in hazardous space, failing to accord with shared fishing etiquette can also limit the willingness of experienced fishers to prevent risk. The leaving of rubbish on platforms was described by Steve as a key factor in shaping why he feels less compelled, as an experiential-expert, to help some inexperienced fishers during high-risk events:

The rubbish and lack of respect for the sea [that] people have pushes them out of the community and makes me not want to help them. It is so easy to bring a bag and throw all your rubbish in there. They just do not have any respect, so I could not care less about helping them (2018).

These breakdowns provide counter-factual examples of the ways that relational risk is managed, offering risk managers possible pathways to improve public safety by encouraging fishers to become more active members of fishing 'culture'. Lacking awareness or acceptance into a rock fishing culture limits the capacity of inexperienced fishers to engage with online networks and the experiential-experts in customarily accepted ways. This removes their opportunities to learn about risk through experience with experts and absorb the subsequent relational risk prevention practices that are produced. Identifying and documenting how these relational processes unfold provides evidence that risk is often, if not always, relationally produced, perceived and responded to, despite risk managers overwhelming tendencies to individualise risk.

## 5.0 Conclusion

In this study, we have provided examples of high-risk situations, including occasions with snagged lines, fish-ons and wave overtopping, to demonstrate the various ways that rock fishers experience and manage risk relationally. Our findings suggest that coastal risk management might consider the collective practices that deal with risk to be integral to their fundamental goals. Accordingly, we contend that they could productively work with existing rock fishing practices including online fishing networks and accepted fishing etiquette via risk messaging to strengthen the relational risk prevention and practices associated with rock fishing culture.

In most situations where multiple people are rock fishing, relational risk management is the most immediate materialisation of risk prevention, and this aligns with existing safety messages that encourage fishers to 'never fish alone' (BOM, 2018). This shows that risk managers can currently incorporate particular relational processes into governance, but the effectiveness of their approaches are impeded by the mobilisation of abstract expert expectations and presumptions that do not accord with expert fishing practices. A collective fishing etiquette, for example, has the immediate and site-specific benefits of crossing boundaries of language and experience that overcome potential restrictions on fishers' ability to cooperate when risks inevitably emerge. Crucially, we argue that approaches that seriously take account of these kinds of relational responses to risk are more likely to succeed than those that prioritise the individual and that remain dominant in coastal risk management and global governance (Beck and Beck-Gernsheim, 2002). Here, we have emphasised that 'culture' or collective forms of context-specific knowledge and practice shapes human-environmental systems (Ingold, 2000), not individual perspectives. In a context in which communities struggle to integrate different cultures and underfunded risk managers fail to influence individual behaviours, understanding risk as relational and inextricably linked with human-human interactions may provide more cost-effective in nurturing pre-existing risk management in which a shared culture and trust are established.

This study reveals the embeddedness of relational practices that can lead inexperienced fishers to collaborate with more experienced fishers. Experiential-experts often consider rock fishing culture as a communal praxis that functions as a resource for navigating risk and training newcomers. This culture is passed from one fisher to the next, over years of relationally experiencing the reward of landing big fish and negotiating hazardous situations together. Yet in risk governance, there is little accounting for how relational understandings and responses to risk are produced. Our analysis of relational practices can serve to validate and enhance the salience of conceptualisations of relational risk (Adams, 1995, Adger et al., 2009, Renn, 2017), which, to date, has escaped substantive empirical confirmation. Our example of the collaborative, relational practices of managing risk deployed by rock fishers could inform further research into many other risky settings that would further challenge contemporary individualised risk governance.

Examples of relational risk management breaking down also provide counter-factual evidence that reveal how in many cases, the risk of drowning is increased when the

relational agency of others to prevent risk is removed or rendered ineffective. We suggest that decisions-makers could benefit from improving the willingness of experiential experts to relationally respond to risk, in addition to reducing the financial burden on emergency services who must quickly respond to the effects of risk-laden situations after they have emerged. The fishers we feature in this paper exhibit a relational understanding of risk that has emerged from a habitual relational response as part of their sophisticated, well practised fishing experiences. The challenge this poses for managers lies in their moving beyond conceptualisations of risk and strategies of risk management that are founded on individualistic rather than collective, cultural assumptions.

## References

- ADAMS, J. 1995. *Risk*, London, Routledge.
- ADGER, W. N., DESSAI, S., GOULDEN, M., HULME, M., LORENZONI, I., NELSON, D. R., NAESS, L. O., WOLF, J. & WREFORD, A. 2009. Are there social limits to adaptation to climate change? *Climatic Change*, 93, 335-354.
- ALKHADIM, M., GIDADO, K. & PAINTING, N. 2018. Perceived crowd safety in large space buildings: the confirmatory factor analysis of perceived risk variables. *Journal of Engineering, Project, and Production Management*, 8, 22-39.
- ATTARD, A., BRANDER, R. & SHAW, W. 2015. Rescues conducted by surfers on Australian beaches. *Accident Analysis & Prevention*, 82, 70-78.
- BECK, U. 1992. *Risk society: towards a new modernity*, London, Sage Publications.
- BECK, U. 1994. The reinvention of politics: towards a theory of reflexive modernisation. *Reflexive modernisation*, 56-110.
- BECK, U. & BECK-GERNSHEIM, E. 2002. Individualisation. London: Sage.
- BIRKLAND, T. A. & LAWRENCE, R. G. 2009. Media framing and policy change after Columbine. *American Behavioral Scientist*, 52, 1405-1425.
- BOHOLM, Å. & CORVELLEC, H. 2011. A relational theory of risk. *Journal of risk research*, 14, 175-190.
- BOM 2018. Check the weather before you go rock fishing. Bureau of Meteorology.
- BRANDER, R. W., WARTON, N., FRANKLIN, R. C., SHAW, W. S., RIJKSEN, E. J. & DAW, S. 2019. Characteristics of aquatic rescues undertaken by bystanders in Australia. *PloS one*, 14, e0212349.
- CAPLAN, P. 2000. *Risk revisited*, Pluto Press.
- CLARKE, L. 1999. *Mission improbable: Using fantasy documents to tame disaster*, University of Chicago Press.
- COOK, B. & MELO ZURITA, M. D. L. 2019. Fulfilling the promise of participation by not resuscitating the deficit model *Global environmental change*.
- DEWSBURY, J. D. & BISSELL, D. 2015. Habit geographies: the perilous zones in the life of the individual. Sage Publications.
- DOBBIE, M. F. & BROWN, R. R. 2014. A framework for understanding risk perception, explored from the perspective of the water practitioner. *Risk analysis*, 34, 294-308.
- FRANKLIN, R. C., PEDEN, A. E., BRANDER, R. W. & LEGGAT, P. A. 2019. Who rescues who? Understanding aquatic rescues in Australia using coronial data and a survey. *Australian and New Zealand journal of public health*.
- HUMBERSTONE, L. 2011. *The connectives*, MIT Press.
- INGOLD, T. 1993. The temporality of the landscape. *World Archaeology*, 25, 152-174.



- INGOLD, T. 2000. *The perception of the environment: essays on livelihood, dwelling and skill*, Psychology Press.
- JASANOFF, S. 1998. The political science of risk perception. *Reliability Engineering & System Safety*, 59, 91-99.
- KAMSTRA, P., COOK, B., EDENSOR, T. & KENNEDY, D. M. 2018b. Re-casting experience and risk along rocky coasts: A relational analysis using qualitative GIS. *The Geographical Journal*, 185, 111-124.
- KAMSTRA, P., COOK, B., KENNEDY, M. D. & BRENNAN-HORLEY, C. 2019. Qualitative GIS to relate perceptions with behaviors among fishers on risky, rocky coasts. *The Professional Geographer*, 71, 491-506.
- LINDELL, M. K. & PERRY, R. W. 2012. The protective action decision model: theoretical modifications and additional evidence. *Risk Analysis: An International Journal*, 32, 616-632.
- MASSEY, D. 1985. New directions in space. *Social relations and spatial structures*. Springer.
- MASSEY, D. 1999. Space-time, 'science' and the relationship between physical geography and human geography. *Transactions of the Institute of British Geographers*, 24, 261-276.
- O'SULLIVAN, D., BERGMANN, L. & THATCHER, J. E. 2018. Spatiality, maps, and mathematics in critical human geography: Toward a repetition with difference. *The Professional Geographer*, 70, 129-139.
- RENN, O. 1998. The role of risk perception for risk management. *Reliability Engineering & System Safety*, 59, 49-62.
- RENN, O. 2017. *Risk governance: coping with uncertainty in a complex world*, Routledge.
- RENN, O. & ROHRMANN, B. 2000. *Cross-cultural risk perception: a survey of empirical studies*, Springer Science & Business Media.
- RYAN, A., RIJKSEN, E., STONE, K. & DAW, S. 2018. Coastal Safety Brief: Rock Fishing. *Surf Life Saving Australia*.
- SCHUURMAN, N. & PRATT, G. 2002. Care of the subject: Feminism and critiques of GIS. *Gender, Place and Culture: a Journal of Feminist Geography*, 9, 291-299.
- SHEPPARD, E. 2001. Quantitative geography: representations, practices, and possibilities. *Environment and Planning D: Society and space*, 19, 535-554.
- SHOVE, E., PANTZAR, M. & WATSON, M. 2012. *The dynamics of social practice: Everyday life and how it changes*, Sage.
- STOFFLE, R. & MINNIS, J. 2008. Resilience at risk: Epistemological and social construction barriers to risk communication. *Journal of Risk Research*, 11, 55-68.
- STOFFLE, R. W. & ARNOLD, R. 2003. Confronting the angry rock: American Indians' situated risks from radioactivity. *ethnos*, 68, 230-248.
- WANG, P., LUH, P. B., CHANG, S.-C. & SUN, J. Modeling and optimization of crowd guidance for building emergency evacuation. *Automation Science and Engineering*, 2008. CASE 2008. IEEE International Conference on, 2008. IEEE, 328-334.
- WATER SAFETY NEW SOUTH WALES. 2018. *Lifejacket Law* [Online]. <https://www.watersafety.nsw.gov.au/Pages/rock-fishing/lifejacket-law.aspx>: Water Safety NSW. [Accessed].