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Advancing values-based approaches to climate change adaptation: A case study from Australia

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ABSTRACT

Coastal flooding affects physical and social place attachments. Values-based approaches to climate change adaptation examine how risks to place attachments are distributed within and among communities, with a view to informing equitable adaptation policies. In this nascent body of research, divergent theoretical frameworks and empirical approaches to measuring social values are evolving. While some studies explore the things people value about their everyday lives generally—the lived values approach, others locate specific social and cultural values in geographic space—the landscape values mapping approach. This study aims to compare the explanatory value of these two approaches for understanding the social risks of sea-level rise, and appraise whether either or both approaches are likely to meet local adaptation planning needs. It does this by examining the potential social impacts of sea-level rise in Kingston Beach, Australia, informed by a mail-out survey of the community. The lived values approach identified that the natural environment, scenery, relaxed lifestyle and safety are highly important to local residents, while the landscape values mapping approach revealed that Kingston Main Beach is the most highly valued of eight coastal landscape units. Incorporating the landscape values mapping into the lived values cluster analysis revealed that while Kingston Main Beach is highly important for its recreational value to some members of the community, for others manmade features such as community halls or sports ovals may be of higher importance because they facilitate social interactions. There is potential to further integrate these two approaches to better inform adaptation policy about how lived and landscape values are distributed among communities, where they are located in space and whether they change over time. A deeper understanding of such assigned values can lead to improved engagement with coastal residents to inform adaptation policy now and into the future.

1. Introduction

Planning for sea-level rise is well underway at local, regional and national scales worldwide, yet planning focuses on ameliorating the physical rather than social impacts of sea-level rise (Karlsson et al., 2015; O'Brien and Wolf, 2010). For example, government adaptation plans typically focus on the need to *protect* communities, *accommodate* sea-level rise, or *retreat* manmade infrastructure, and many local government adaptation policies in Australia require new developments be built above a specified future sea-level (e.g. McInnes et al., 2016). Beyond infrastructure, there is an emphasis on understanding and minimising impacts on the natural environment, such as ensuring that biodiversity and ecosystem resilience are maintained (Baker et al., 2012). A notable absence from many plans is consideration of how to reduce the impacts of sea-level rise and coastal flooding on non-material social values (Adger et al., 2009, 2013).

To address this gap, non-material 'values-based' approaches to climate adaptation have been developed to explore what people value most about their everyday lives, and how these social values are likely to be affected by environmental changes and the policies developed to respond to such changes (Persson et al., 2015). Values-based approaches seek to redress the emphasis of adaptation planning on

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physical impacts by putting the lifestyle and wellbeing attributes that matter most to communities at the centre of adaptation analyses (O'Brien and Wolf, 2010). While values-based approaches are receiving increased attention by scholars, it is unclear to what extent they are being adopted by decision-makers. The aim of this study is to further evaluate the potential utility of two values-based approaches for informing more socially-oriented adaptation policies.

Early values-based studies on climate adaptation involved qualitative research into the social and cultural values, or 'held' values (Brown, 1984), that determine 'how' people interpret and respond to environmental changes and adaptation policies (e.g. Kuruppu, 2009; Nielsen and Reenberg, 2010; Wolf et al., 2013). Kuruppu (2009) found that religion potentially impedes climate adaptation in Kiribati because it shapes the goals that individuals pursue. Nielsen and Reenberg (2010) identified that cultural values of the *Fulbe* ethnic group of Burkina Faso prevent them from embracing particular adaptation strategies. Wolf et al. (2013) showed how diverse values within two Canadian communities may act as barriers to adaptation. While such studies are useful for understanding constraints to climate adaptation, they offer few practical suggestions for how decision-makers can "address values explicitly" (: 560).

Graham et al. (2014) argues that values-based approaches to adaptation can explicitly address values by focusing on 'what' people value about their everyday lives, i.e. 'assigned' values (Brown, 1984). They proposed that values-based approaches should investigate the diversity of 'lived values'—"valuations that individuals make… about *what* is important in their lives and the places they live" (: 49, emphasis added)—that exist within communities and how these lived values are impacted by environmental change. This is consistent with Brown (1984), who argued that values assigned to objects—physical things, persons, emotions, and forms of physical activity—need to inform public resource allocation decisions. In collaboration with two local governments, they developed a quantitative method for measuring lived values and evaluating differences that exist within (Graham et al., 2014) and across (Barnett et al., 2014a) communities. This method was published in *A Guide for Local Government* (Barnett et al., 2014b) to facilitate uptake of the lived values approach by planners in Australia and internationally.

There have been two applications of the lived values approach in Australia that focus on the impacts of sea-level rise and distributional effects of adaptation planning within communities (Graham et al., 2014; Kreller, 2016). These studies concluded that the lived values approach is useful in shifting the focus of adaptation towards non-material values and enables policies to be tailored to meet the needs of diverse segments of the population. Although the values elicited through the lived values approach can direct policy-makers towards the general impacts from sea-level rise and groups of people at risk, there is scope to provide further definition on what individual's value about the coastal landscape and natural environment.

A third values-based approach to climate adaptation focuses on the social and cultural landscape values that people assign to particular physical places, i.e. the 'where'. The landscape values mapping approach[1] was originally developed to associate assigned social values with landscapes and include local or marginalised populations in natural resource planning and decision processes. For example, in NSW, Australia the method has been used to include indigenous attachments to landscape in the management of National Parks (Brown, 2008).

More recently, Novaczek et al. (2011) sought to adapt the landscape values mapping approach to a climate adaptation context. They explicitly sought to evaluate whether landscape values mapping can be used as a decision-support tool for climate adaptation, working closely with a provincial Canadian government department to create maps of the study area and adapted the typology of values (following Brown, 2004) to be more specific to coastal environments and activities. They concluded that landscape values mapping was a useful tool for enabling coastal communities to explore and recognise their assigned values and raise awareness of the non-material losses that are likely to occur in a changing climate. They also argued that the approach is useful for policy-makers because it is affordable, inclusive and collaborative and enables decisions to be made that take into account diverse values and priorities. There is considerable scope for this approach to be applied elsewhere, yet we know of no applications of this approach to sea-level rise adaptation in Australia nor how it may compare with the lived values approach.

This paper evaluates the usefulness of the lived values and landscape values mapping approaches for identifying the preferences attached to diverse assigned values relevant to climate adaptation planning. A case study in the coastal suburb of Kingston Beach in Tasmania, Australia, is used to elucidate the lived and landscape values that exist within the community and to understand risks from sea-level rise. Section 2 introduces the case study, the methodology is outlined in Section 3 and results presented in Section 4. The discussion in Section 5 compares the utility of both approaches for measuring and comparing assigned values and outlines more broadly how policy-makers can utilise both methods in coastal adaptation planning. Conclusions are drawn in Section 6.

2. Case study site: Kingston Beach

The suburb of Kingston Beach is located in southern Tasmania, Australia and is 13 km from Hobart, Tasmania's capital city (Fig. 1). It has approximately 2000 residents with one-quarter of the 965 dwellings situated less than 3 m above mean sea-level. The local municipality, Kingborough Council, has undertaken traditional coastal risk assessments to inform its adaptation planning (e.g. Climate Planning, 2016), however to date little work has been undertaken to understand the social values at risk.

The case study site is a useful location to examine values-based impact assessments as the suburb is predominantly residential, with iconic landscapes (e.g. beaches) and low-lying infrastructure. The study area is faced with a unique flood risk that could threaten social values because of the interaction between Browns River (Photo C, Fig. 1) and the Derwent Estuary (Photo F, Fig. 1). Historically, there have been riverine floods from Browns River that have caused damage to adjacent houses and infrastructure (Climate Planning, 2016). Anecdotal evidence suggests that storms throughout the mid 1900′s caused waves from the Derwent Estuary to break over Kingston Main Beach onto the esplanade, dragging boats from their moorings and destroying jetty infrastructure (: 65).

A modest sea-level rise in the order of 0.5 m by the end of the century (McInnes et al., 2016) has the potential to change and/or inundate parts of Kingston Main Beach (Photo E, Fig. 1), including Tyndall Beach, which is reserved for dog exercise and referred to as the 'dog beach' (Photo D, Fig. 1). Both beaches have little ability to recede landward with sea-level rise; Kingston Main Beach is backed by an aging concrete sea wall (: 66) and the dog beach is backed by rising hard bedrock (Sharples and Donaldson, 2014). Sea-level rise would have other consequences to natural landscapes in the area, potentially raising the local groundwater table, which could impact flora and fauna in the saltmarsh (Photo B, Fig. 1), saline grassland (Photo A, Fig. 1) and bordering forest (Knight, 2016). Additionally, sea-level rise could lead to increased flooding impacts from Browns River, in particular through a combined storm tide and riverine flooding event, damaging physical infrastructure. A modelled 1 in 100-year coincident flood event with 1 m of sea-level rise was estimated to expose $217 million of assets

[1] There are a range of terms used in the literature to describe the process of mapping social and cultural values. These include 'participatory mapping' (Plieninger et al., 2013), 'mapping social values' (Tyrväinen et al., 2007) and 'landscape values methodology' (Raymond and Brown, 2011). Here we use the term landscape values mapping (Brown, 2006) to encapsulate these overlapping methods and indicate that we are interested in the values assigned to landscape features.