



Climate change adaptation in coastal Australia: An audit of planning practice



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ABSTRACT

This study examines the state of local practice in planning for climate change adaptation in coastal Australia, in the context of rapidly evolving policy frameworks, using grounded theory to examine the process communities follow as they undertake adaptation planning. Australia's coastal cities and towns, with over 85 per cent of the nation's population, are at the frontline of physical risks associated with sea level rise and changed weather patterns; exacerbated by ongoing concentration of public and private assets in potentially vulnerable locations. This is particularly so for coastal councils beyond the major capital cities, where settlement patterns and lifestyle oriented economies based on tourism and leisure focus on the coastal strip, and local government resources are highly constrained. To assess progress in climate change adaptation planning, this study involved local government professionals, experts and elected officials through a survey and focus groups ($n = 49$) held between February and July 2011. The audit indicates some areas are well underway towards holistic adaptation strategies but, others have neither engaged, nor anticipate, adaptation planning activities; of the strategies that have commenced, few are yet completed; and, despite ongoing development pressure, few councils have yet changed their planning controls for climate risk. Of those areas that have commenced adaptation planning, most strategies and commitments will require additional resourcing and external expertise to implement; while others face community skepticism and "pushback" which may undermine future progress. The results reveal a ladder of adaptation action, whereby communities tend to have to accomplish early steps before they move on to more complex, expensive, or political policies. We connect this ladder to community perceptions of what is supported in state and national frameworks and legislation. Communities in the future may be able to use this ladder to suggest where to start their processes, and directions to undertake as they accomplish their first tasks.

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1. Introduction

There is widespread awareness and policy concern regarding the impacts of climate change in coastal Australia (Coasts and Climate Change Council, 2010; House of Representatives, 2009; Department of Climate Change, 2009). As well as the impacts of changed weather patterns, Australia's coastal areas face increased risks from physical exposure to sea level rise, erosion, and storm surge, with implications for coastal infrastructure, homes and biodiversity (Steffen et al., 2009; Department of Climate Change, 2009). Significant assets are already exposed: of the estimated 711,000 existing homes in coastal zones, up to 35 per cent are at risk of inundation within ninety years under a plausible sea level rise

scenario of 1.1 m (Department of Climate Change, 2009). Despite these risks, urban development pressures continue to focus on coastal areas surrounding the capital cities and in Australia's key lifestyle regions, in Victoria's South and Bass Coasts, South East and Far North Queensland, and South Western Australia, which experience some of the nation's fastest rates of growth. Driven by "amenity migration", whereby migration to regions rich in natural amenity is underpinned by lifestyle rather than employment factors (McIntyre, 2009), pressures in Australia's non metropolitan coastal areas are exacerbated by ongoing demand for second homes and tourism development to accommodate seasonal populations (Kelly and Hosking, 2008).

This article explores local responses to potential climate risks in the context of such demands. We identify the current state of local climate adaptation in these coastal areas, via an internet survey and focus groups with coastal policy makers, scientists, lawyers, local

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councilors, and planners. We use these results to develop theory regarding the paths that adaptation follows in peri- and non-metropolitan areas. The study was funded by the National Sea Change Taskforce (NSCT), a coalition of coastal councils in peri- and non metropolitan regions of Australia.

There is a growing body of international literature on climate change adaptation. Much of this work emphasises that adaptation considerations should be situated within an overarching sustainability paradigm (Swart and Raes, 2007; Davoudi et al., 2009), and addressed across the different sectors of government responsibility (from strategic spatial planning and development assessment, to emergency services, community health, coastal management and economic development) (Department of Climate Change and Energy Efficiency, 2010). Local government engagement is crucial. While national frameworks establish important mandates for action on climate change, the heterogeneous nature of climate risk means that national policy cannot simply be generalised for local implementation (Yoo et al., 2011). Adaptation needs to occur along a variety of scales (Adger et al., 2005). At the same time, the need for scientific information and funding means that national governments cannot devolve all responsibilities to the local level (Government Accountability Office (GAO) 2009; Measham et al., 2011; Juhola et al., 2012).

While locally devised adaptation responses are needed, to date local authorities have been more engaged in work to reduce greenhouse gas emissions than prepare for climate change impacts already underway (Wheeler, 2008), although this is beginning to shift (Tang et al., 2010). Reviews suggests that local authorities who have begun preparatory work are generally at the stage of assessing overall vulnerability to climate change, and developing strategies intended to build resilience, but that fully implemented strategies are rare (Berrang-Ford et al., 2011).

Of the cluster of studies examining local climate change adaptation in the United Kingdom (Few et al., 2007) and the United States (Preston et al., 2011; Mozumder et al., 2011), information, resource constraints, and political will have been the main impediments to local action. In Australia, a benchmark study found varying levels of adaptation planning activity across government and the private sector, with differences linked to levels of climate change awareness and understanding; access to external advice or funding support; and the extent to which the organisation undertakes long term strategic planning (Gardner et al., 2010). However, Measham et al. (2011) caution against over-simplicity in understanding municipal action – or inaction – in relation to climate change adaptation. They point to the range of complex, competing responsibilities facing local government – from facilitating development opportunities through to the provision of infrastructure and services, alongside political pressures, which might interrupt the transmission of climate change concern to local action through planning and risk management frameworks (Measham et al., 2011).

As the literature has progressed, a general perspective on the process of adaptation has emerged. Moser and Ekstrom (2010) suggest that adaptation occurs in these phases: Understanding the problem (detect the problem, gather and use information, re/define problem); planning phase (develop options, assess options); managing stage (implement options, monitor outcomes and environment, evaluate effectiveness of option). See also (Arnell and Delaney, 2006; Moser and Ekstrom, 2010; National Research Council, 2010). The literature to understand barriers at each of these stages has been developing (see. e.g. Moser and Ekstrom, 2010), but, as reported by (Eisenack and Stecker, 2012), there are very few papers that explicitly deal with adaptation actions and assessments of actual actions undertaken. As a national inventory of actual actions, this paper makes a substantial contribution

towards understanding what communities are actually doing, rather than just their planning processes.

This article is structured in four sections. Firstly, we outline the study context, design and methods. We then discuss key results for individual questions, focussing particularly on recognition of key climate change adaptation issues affecting local government areas in non metropolitan coastal Australia; adaptation planning initiatives already underway; estimated costs associated with climate change; and views regarding state and local planning frameworks. In section three we compare results across the individual questions, using pattern-matching and grounded theory to explore the reasons connecting the findings (Yin, 2009), and develop our theory of an adaptation ladder. Finally, we analyse the implications of these findings as a basis for establishing the state of practice in planning for climate change in coastal Australia, the factors influencing this practice, needs for future research, and the potential reasons explaining differential engagement at the local level.

2. Climate change adaptation in non metropolitan coastal Australia: study context and methodological approach

Australia has a three tiered Federal system of governance. At the national level, the Commonwealth government has limited environmental responsibilities, although it has played a policy development role and yields influence through its numerous funding programs, available to State and local governments, as well as for community groups. Increasingly, the Commonwealth is adopting a strategic role in planning and development matters regarded to be of 'national environmental significance', meaning that major developments in coastal areas often require Commonwealth as well as state and local assessment and approval (Gurran, 2011). As defined under legislation, matters of national environmental significance include Commonwealth listed threatened species and communities, migratory species, Ramsar wetlands, world and national heritage, the Great Barrier Reef Marine Park, and nuclear actions. However, most responsibility, including responsibility for the land–sea interface of the coastal zone, is devolved to the six states and two territories. Local governments, comprised of elected representative 'councilors' and an 'arm's length' professional bureaucracy, have day to day responsibility for the provision of utilities, basic services, as well as local land use planning and development assessment (within a legislative and policy framework dictated by the states and territories). Local government roles include responsibility for managing the beach foreshores and tidal lands along with their other planning and development roles (Norman, 2009). Responsibility for coastal planning and management is a significant undertaking in Australia, where coastal areas absorb 85 per cent of the nation's population, which is mostly concentrated in and around six primate State capitals (Gurran et al., 2006). About twenty per cent of Australians live in coastal areas surrounding and beyond these centres, and this population has been growing since the 1980s (Gurran et al., 2006, 2011).

2.1. Growing national policy concern

Concern for the impacts of coastal urbanisation has been a recurrent theme in Australian environmental policy since the early 1980s (House of Representatives, 2009), but has assumed new resonance as awareness of potential climate change impacts grows (Norman, 2010). In 2008, a Commonwealth parliamentary inquiry into climate change impacts in coastal Australia catalysed policy action (House of Representatives, 2009). Subsequently, a significant research effort to assess potential climate change impacts to coastal environments, settlements and infrastructure, known as the *First Pass National Assessment on Climate Change and Coasts* (Department

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