



How close to the coast? Incorporating coastal expertise into decision-making on residential development in Australia



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ABSTRACT

The most recent assessment of the *Intergovernmental Panel on Climate Change* confirms the importance of adaptation strategies such as ‘retreat, accommodate or protect’ but emphasizes the significance of institutional and governance structures in decision-making. Even without the threat of climate change there is a legacy of vulnerable coastal development in many parts of the world where there has been a lack of understanding of coastal processes. Coastal vulnerability and adaptation strategies are well covered in the literature but the extent to which coastal experts are used to advise on development in vulnerable coastal areas has to date received scant attention.

Expert coastal advice is essential to reduce vulnerability of coastal residential development to both existing coastal erosion and flooding and in particular to the threat of increased vulnerability associated with future climate change. This paper uses the Australian system of coastal management, where responsibilities rest mostly with state governments, to discuss the nature of coastal experts and the types of advice they provide. We focus specifically on the relevant legislation, statutory coastal authorities, coastal strategies, coastal planning and decision-making, where there are clear pathways for incorporating expert coastal advice. Only four states have dedicated coastal legislation and each state has its own planning legislation, which is linked to one or more pieces of legislation covering coastal development. Two case studies are used from different states to illustrate how these mechanisms for incorporating expert advice operate in practice. Our analysis includes both anecdotal case studies plus a more detailed quantitative analysis from one state using a decade of records to illustrate temporal patterns in the use of expert advice.

The paper concludes that Australia has a variable use of adopting coastal expert advice into the coastal residential development approval process because each state has different stages where the advice is incorporated into its planning system. These variations can be represented along a continuum of specificity for expert advice provided. It appears that none of the states provides a fail-safe mechanism to prevent residential development being built too close to the coast as shown by case studies described. In one state there is a statutory requirement for referral to an expert coastal body but a proportion of the advice is ignored. Most state jurisdictions are now attempting to mainstream expert advice into planning legislation, policies and guidelines so that best practice principles are adopted early in the development approval process in order to avoid building too close to the coast.

1. Introduction

As development pressure on global coastal environments continues to increase there is an international imperative for adaptation strategies to be used in areas of vulnerable coastal development. The most recent assessment of the *Intergovernmental Panel on Climate Change* (IPCC, 2014) confirms the importance of adaptation strategies such as ‘retreat, accommodate or protect’ but also emphasizes the significance of institutional and governance structures in decision-making, particularly

for planned coastal retreat (Wong et al., 2014). Even without the threat of climate change there is a legacy of vulnerable coastal development in many parts of the world where there has been a lack of understanding of coastal processes.

Existing patterns of coastal erosion or the potential for increased erosion linked to climate change can identify vulnerable coasts but are not necessarily the most important risk factor for coastal development. In fact, some authors downplay the relative importance of climate change as the major risk to property suggesting that increased

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accumulation of wealth in already vulnerable areas is more important in terms of future economic disaster and damage (Bartel and Neumayer, 2012). There are also scenarios where the increased risk exposure caused by coastal population growth can exceed the contribution to risk from projected sea-level rise (Department of Climate Change and Energy Efficiency [DCCEE] 2011). These issues present a challenge for planning authorities given the premium value of coastal land and the need for expert assessment of existing and future coastal risks. A comprehensive approach requires both strategic planning and cumulative impact assessment for future coastal development.

In most cases coastal development decisions are made by state or local government authorities, based on planning guidelines, which incorporate coastal expert advice. State governments use either ‘in-house’ or external independent expert coastal advice. Development in the coastal zone rarely relies on advice of coastal experts (defined below) alone unless delegation is given to a body of experts within a specific jurisdiction such as a statutory coastal board. Coastal experts can be drawn from a range of backgrounds such as coastal engineers, coastal geomorphologists or coastal and marine biologists and ecologists.

Coastal vulnerability related to climate change and coast protection and adaptation strategies are well covered in the literature for regions such as the United States (Burkett and Davidson, 2012) and Australia (Department of Climate Change [DCC] 2009, DCCEE, 2011). At a global scale these have been extensively reviewed, specifically for coastal impacts, adaptation and vulnerability, in the scientific assessments of the IPCC (Nicholls et al., 2007; Wong et al., 2014). However, the extent to which coastal experts are consulted in planning decisions to avoid or reduce future development in vulnerable coastal areas has to date received scant attention. This paper seeks to address this gap in the literature.

First the paper examines the concept of coastal experts in the context of coastal development and how such expertise is incorporated in early planning stages prior to approvals being given for any future development. The paper focuses on residential development, which has been identified as a major priority in Australian coastal vulnerability assessments (DCC, 2009; DCCEE, 2011), however, the planning and approval processes for residential coastal development vary considerably between the different state and territory governments. Documentation from selected coastal jurisdictions is used to examine what procedures or guidelines exist to incorporate coastal expert advice into decision-making for residential development. The paper does not attempt to present a review of Australian coastal management as this has been covered elsewhere (Harvey, 2016; Harvey and Caton, 2010). Nor does this paper attempt to provide detailed geomorphic/engineering quantitative analyses since no two sites around the 36,735 km Australian coast have the same the same hydrodynamic or sedimentary environment, however, a recent national coastal sediment compartment framework (Thom et al., 2018) provides a first step in forecasting future erosion/accretion trends. In this paper we focus specifically on the relevant legislation, statutory coastal authorities, coastal strategies, coastal planning and decision-making, where there are clear pathways for incorporating expert coastal advice.

Following the above analysis, we investigate how these mechanisms for incorporating expert advice operate in practice by using selected case studies to illustrate the effectiveness of such advice. Our case studies include examples from two different states. Our analysis includes both anecdotal case studies plus a more detailed quantitative analysis from one state using a decade of records to illustrate temporal patterns in the use of expert advice.

Our analysis reveals that the extent to which coastal expert advice is incorporated in coastal development approvals varies around Australia. Existing approaches range from specific government appointed expert ‘coastal councils’ or ‘coastal boards’ which have authority to make decisions; to expert boards which provide advice but their advice is not always taken; through to jurisdictions which have no requirement to obtain expert advice for any coastal development. We argue that

decision-makers need to take more note of coastal expert advice. There has also been an increased use of the court system for coastal development in Australia (Bell, 2014). Legal challenges over existing and proposed coastal development take an adversarial approach, which often requires coastal experts on both sides.

2. Who are the coastal ‘experts’?

There are many examples of experts at different scales of coastal processes who are used to address issues of coastal erosion and longer-term strategic coastal management issues. At the global scale there are international scientific bodies such as *Land-Ocean Interaction in the Coastal Zone – LOICZ* (Syvitski et al., 2005) or intergovernmental bodies such as the *Intergovernmental Panel on Climate Change – IPCC* (Wong et al., 2014) which attempt to provide expert scientific advice and adaptation options on issues such as coastal vulnerability linked to accelerated sea-level rise associated with climate change.

At a national level, expert advice usually comes from government-funded institutions such as the *US Army Coastal Corps of Engineers* in the United States of America (Houston, 1988) or internationally recognized coastal expert organisations such as the *Delft University of Technology* in The Netherlands (<https://www.tudelft.nl/en/>), which is partially government funded. Expert advice can be included at different stages of decision-making for residential coastal development. At the longer time frame and large geographic scale there is often input from coastal experts into the preparation of:

- national coastal vulnerability assessment and coastal grant/funding programs;
- strategic and regional planning;
- coastal legislation, policies, regulations, guidelines; and
- local government planning and coastal plans

These types of coastal management instruments tend to be general in nature, although some may contain detailed objectives and principles for coastal development in certain areas. For more specific residential development on a particular section of coast coastal experts may be invoked to provide advice:

- major coastal developments such as marinas or canal estates which include significant residential components; and
- minor residential coastal subdivisions or individual residences

In Australia, the national government has little involvement in coastal management since this is the responsibility of the eight state and territory governments under the Australian constitution. At a national level, coastal engineers through Engineers Australia (EA) have contributed to a better understanding of the interaction of coastal processes and built structures, particularly in relation to climate change (EA, 2012a, 2012b, 2013). Australian coastal geomorphologists have also provided expert advice, which according to Thom (2008) has had an impact across seven different areas:

1. vulnerability assessment
2. environmental impact statements
3. coastal management practices
4. coastal planning
5. coastal policy, legislation and regulation
6. decisions of courts
7. communication

A good example of Thom's first area of influence is the *National Vulnerability Assessment* which was produced by the former Australian Department of Climate Change (DCC, 2009). This document drew heavily on expert advice from coastal geomorphologists and coastal engineers and was significant in raising awareness of the need to

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